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NEW YORK
BOTANICAL GARDEN

Florida
State

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PROCEEDINGS
OF THE
FOURTEENTH ANNUAL MEETING

Florida State Horticultural Society

HELD AT
ST. AUGUSTINE, FLA., MAY 21, 22 and 23, 1901.

Compiled by the Secretary.

PUBLISHED BY THE SOCIETY.

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FLORIDA STATE HORTICULTURAL SOCIETY.

OFFICERS-ELECT FOR 1901.

PRESIDENT:

George L. Taber, Glen St. Mary.

VICE-PRESIDENTS:

Dr. George Kerr, Pierson; G. W. Wilson, Jacksonville;
W. A. Cooper, Orlando.

SECRETARY:

S. Powers, Jacksonville.

TREASURER:

W. S. Hart, Hawks Park.

EXECUTIVE COMMITTEE:

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

President, Secretary and Treasurer, ex-officio.

STANDING COMMITTEES.

Citrus Fruits—F. D. Waite, Palmetto; H. L. DeForest, Sanford; John J. Beers, Emporia.

Diseases and Insects of Citrus—W. S. Hart, Hawks Park; Geo. W. Adams, Thonotosassa; J. C. Carter, Dade City.

Peaches, Plums and Pears—W. B. Healy, Jaffery; R. W. Storrs, De-Funiak Springs; Walter Cooper, Sorrento.

Grapes, Figs and Kaki—C. A. Bacon, Ormond; A. B. Harrington, Winter Haven; A. G. Goodbody, Bradfordville.

Pineapples—E. F. Sperry, Orlando; F. W. Lyman, Georgiana; A. D. Alderman, Bartow.

Tropical Fruits Other than Pineapples—E. N. Reasoner, Oneco; A. A. Boggs, Cocoanut Grove; Dr. E. E. Pratt, Limona.

Ornamentals—Mrs. E. S. Hubbard, Federal Point; Mrs. F. W. Inman, Winter Haven; Mrs. Mary A. Bigelow, Tarpon Springs.

Damage from Cold and Best Methods of Prevention—Geo. R. Fairbanks, Fernandina; C. C. Shooter, Earleton; T. P. Drake, Yalahala.

Fertilizers and Irrigation—C. T. McCarty, Ankona; W. E. Parmenter, Jr., Orange Park; Cyrus Jones, Bowling Green.

Nut Culture—Prof. H. Harold Hume, Lake City; D. L. Pierson, Monticello; H. Fleming, Kissimmee.

Transportation—J. E. Ingraham, St. Augustine; W. L. Glessner, Macon, Ga.; M. E. Gillett, Tampa.

Strawberries and Miscellaneous Fruits Other than Tropical—C. M. Griffing, Jacksonville; H. S. Graves, Gainesville; W. H. Jones, Orange Bend.

Entomology—Prof. H. A. Gossard, Lake City; L. Montgomery, M. D., Micanopy; W. J. Ellsworth, Jessamine.

Vegetables—Prof. H. E. Stockbridge, Lake City; S. H. Gaitskill, McIntosh; M. F. Robinson, Sanford.

Marketing and Good Roads—G. P. Healy, Jaffery; Gardner S. Hardee, Rockledge; A. J. Pettigrew, Manatee.

Forestry—Geo. W. Wilson, Jacksonville; Chas. H. Baker, Grasmere; Prof. O. P. Steves, St. Augustine.

New Fruits—Rev. Lyman Phelps, Sanford; E. S. Hubbard, Federal Point; W. E. Baker, Melrose.

SPECIAL COMMITTEES.

To Confer with Board of Trustees of State Agricultural College—S. H. Gaitskill, McIntosh; E. O. Painter, Jacksonville; Benj. N. Bradt, Huntington.

Delegates to American Pomological Society Meeting—G. L. Taber, Glen St. Mary; Rev. Lyman Phelps, Sanford; C. T. McCarty, Ankona; Mrs. Florence P. Haden, Cocoanut Grove; E. S. Hubbard, Federal Point; E. O. Painter, Jacksonville; Dr. Geo. Kerr, Pierson; W. S. Hart, Hawks Park.

LIST OF MEMBERS.

HONORARY.

Berckmans, P. J., Augusta, Ga.

Redmond, D., St. Nicholas.

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Alderman, A. D. Bartow.

Allen, Wm., 90 White St., New York City.

Andrews, Clement W., John Crerar Library, Chicago, Ill.

Armstrong, L. H., St. Nicholas.

Francisco, Beltran, Monterey, N. L., Mexico.

Chidester, D. D., 2321 Madison Square, Philadelphia, Pa.

Conner, W. E., 532 Madison Ave., New York City.

Cunliff, L. H., Garden City, N. Y.

Ellsworth, W. J., Jessamine.

Francis, Jr., Chas., Interlachen.

Frink, Aubrey, Glen St. Mary.

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Haden, Capt. Jno. J., Cocoanut Grove.

Haden, Mrs. Florence P., Cocoanut Grove.

Haldeman, W. N., Naples.

Harris, E. K., East Palatka.

Hart, W. S., Hawks Park.

Hastings, H. G., Atlanta, Ga.

Harvey, S. S., Havana, Cuba.

Healy, G. P., Jaffery.

Hentz, W. B., D. D. S., City Point.

Hempel, H. A., Gotha.

Herf. B. von, 93-99 Nassau St., New York City.

Hopper, Isaac A., Orlando.

Kerr, Dr. Geo., Pierson.

Leonard, Geo. W., Hastings.

Lewis, Dr. Fred D., 188 Franklin St., Buffalo, N. Y.

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Merritt, Dr. Jos. C., Orlando.

Milligan, John W., Apopka.

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Painter, Mrs. E. O., Jacksonville.

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Stuart, Leon N., Montemorelos, N. L., Mexico.

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Woodroffe, Alfred, Auckland, New Zealand.

Worcester, C. H., Pomona.

Wyeth, J. H., Winter Park.

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- Dorr, Wm. L., Federal Point.
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- Griffing, W. D., Jacksonville.
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- Hardee, M. C., Eden.
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- Jones, W. H., Orange Bend.
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Parks, W. Gordon, Stuart.
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Perry D. W., Pomona.
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Phillips, Mrs. J. H., Melbourne.
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Sartorius, Mrs. L. A., Seminole.
Sartorius, L. G., Seminole.
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Schneider, Mrs. C. F., Ocala.
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Shooter, H., Earleton.
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Sjostrom, L. H. O., Hallendale.
Smeltz, Henry A., Tarpon Springs.
Sneden, Mrs. W. C., Waveland.
Sorensen, John, Jensen.
Sperry, E. F., Orlando.
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Stevens, Mrs. H. B., Stetson.
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Storrs, R. W., DeFuniak Springs.
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Straub, W. L., St. Petersburg.
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Suttie, D. A., Belfast, Ireland, Albert
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Sulzner, Chris., Miami.
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Tatem, Miss Muriel, Stetson.
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Thomas, Robert, St. Petersburg.
Tilden, W. L., Oakland.
Tischler, P., Jacksonville.
Townley, John, Miami.
Townley, J. L., Miami.
Trowbridge, S., Green Cove Springs.
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N. Y.
Waite, F. D., (2) Palmetto.
Wakelin Amos, Bullitt Building, Phila-
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Wakelin, Guilford M.
Warner, S. C., New York Mills, N. Y.
Weeks, Geo. M., Glen St. Mary.
Weihman, Chas., St. Petersburg.
Weidman, Jacob, Pittsburg, Pa., 319
Lexington Ave.
Williams, J. C., St. Petersburg.
Westphal, A. M., Island Grove.
White, C. G., Hastings.
White, J. M., Orange City.
White, Kirk M., Crescent City.
White, Miss L. M., Hastings.
Whitman, Albert M., West Palm Beach.
Whitten, Wm. M., South Bend, Ind.
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Whittle, J. C., Seminole.
Williams, H. E., Miami.
Wilson, Geo. W., Jacksonville.
Witherington, H. H., Apopka.
Wolf, C. F., Jensen.
Wood, Geo. H. Tangerine.
Wood, E. R., Miami.
Wood, N. G., Miami.
Woods, Mrs. M. L., Bowling Green.
Woods, Dr. S. R., Bowling Green.
Worcester, Mrs. C. H., Pomona.
Wyckoff, John S., Citra.
Wylie, J. H., Interlachen.

PROCEEDINGS
OF THE
FOURTEENTH ANNUAL MEETING
OF THE

Florida State Horticultural Society.

The fourteenth annual meeting of the Florida State Horticultural Society was held at St. Augustine upon the invitation of the council of that city. The Society convened in the armory at the city building on Tuesday, May 21, 1901, at 8:00 p. m., in accordance with the published program, and adjourned sine die on the following Thursday at 10:00

p. m. About 140 members were present, and it was the generally expressed feeling that the interest of the meeting itself had never been surpassed, while the hearty, thoughtful hospitality of the people of St. Augustine rendered it also perhaps the most enjoyable in our history.

Minutes.

FIRST DAY.

OPENING SESSION.

Tuesday, 8:00 p. m.

1. Call to order by President Taber.
2. Prayer by Rev. L. S. Rader, pastor of Grace M. E. Church.

3. Address of welcome by Mayor E. E. Boyce, of St. Augustine. (See page 17.)

4. Response on behalf of the Society by Mr. C. T. McCarty. (See page 17.)

5. President's annual address. (See page 18.)

6. Mr. J. E. Ingraham announced that the ladies would give the Society a reception at Fort Marion, to which all the members were cordially invited.

7. Paper on Celery Culture, by Frederic H. Rand, of Sanford, read by the Secretary, in the absence of Mr. Rand. (See page 25.)

SECOND DAY.

MORNING SESSION.

Wednesday, 9:00 a. m.

8. Report of Standing Committee on Citrus Fruits, by Chairman E. S. Hubbard. (See page 28.)

9. Report by B. M. Hampton, also of the Committee. (See page 31.)

10. Discussion of the above. (See page 33.)

11. A box of very fine pomelos was presented to the Society by Potter Brothers, of "Devil's Den Orange Grove," Cocoanut Grove, Dade county. Grown on rocky pine land.

12. Report of Standing Committee on Diseases and Insects of Citrus Fruits, by Prof. H. A. Gossard, was not presented, but a discussion took place on the subject. (See page 37.)

13. Statement as to local program of entertainment.

14. President Taber stated that he had authentic information from Washington that a new and ample appropriation had been made by the Department of Agriculture, to resume the study of citrus fruits in Florida, interrupted some years ago.

15. Motion made by Rev. Lyman Phelps that, in recognition of the many courtesies received by this Society from

Jacksonville, a collection be taken up in relief of the sufferers. Adopted.

16. Paper on Lettuce Culture Under Cover, by W. H. Draeger, read by the Secretary. (See page 43.)

17. Discussion of the same. (See page 46.)

AFTERNOON SESSION.

Wednesday, 2:00 p. m.

18. Letter read from W. A. Taylor, Secretary of the American Pomological Society, extending a cordial invitation to the members of this Society to attend their meeting in Buffalo, September 12 and 13.

19. President Taber read a letter from Prof. H. J. Webber, expressing his appreciation of the Society's work, and regretting his inability to attend or send in a contribution.

20. The President appointed as a Committee on Final Resolutions, E. O. Painter, G. W. Adams and E. V. Blackman.

21. Rev. Lyman Phelps, E. S. Hubbard and S. H. Gaitskill were appointed a committee to consider certain parts of the President's Message.

22. Letter read from Mr. J. E. Ingraham, placing at the disposal of the Society a large number of free tickets to South Beach, given by courtesy of the St. Augustine & South Beach Railway.

23. Standing Committee on Pineapples made no report; in lieu of it a general discussion took place. (See page 47.)

24. Standing Committee on Damage from Cold made no report. An interesting discussion arose, participated in by several members. (See page 52.)

25. Mr. J. E. Ingraham, voicing the

unstinted hospitality of St. Augustine, asked if there was any other way whatever in which the people could serve the Society.

26. It was announced that the veteran members, D. Redmond and C. A. Bacon, were ill and could not attend the meeting. A vote of condolence was passed, and E. O. Painter was appointed to convey it to Dr. Redmond and E. W. Amsden to do the same in the case of C. A. Bacon.

27. Report of Standing Committee on Pears, Peaches and Plums reported through the chairman, J. P. Mace, his paper being read by the Secretary. Also the paper sent in by C. C. Shooter. (See page 60.)

28. Discussion on Peach Culture. (See page 62.)

29. Paper read by Prof. H. Harold Hume on Fungous Diseases of Citrus and Other Fruits, with samples of the diseases. (See page 64.)

30. Discussion of above. (See page 70.)

EVENING SESSION.

Wednesday, 7:00 p. m.

31. Standing Committee on Ornamentals presented a report through the chairman, Rev. Lyman Phelps. Also a paper by Mrs. Florence P. Haden, of the committee. (See page 73.)

32. Discussion of above. (See page 75.)

33. E. S. Hubbard called attention to the magnificent palms with which the ladies had embellished the hall.

34. Paper, Civilization Increases Bird Life, by S. Powers. (See page 76.)

35. Discussion. (See page 78.)

36. Standing Committee on Nut Culture made no report. A general discus-

sion on Pecan Culture ensued, led by Professor Hume. (See page 78.)

37. Report of Standing Committee on Grapes, Figs and Kaki, reported through the chairman, H. von Luttichau. Also a paper by W. D. Griffing, of the committee. Both on Grape Culture. (See page 82.)

38. Discussion of the subject. (See page 84.)

THIRD DAY.

MORNING SESSION.

Thursday, 9:00 a. m.

39. Tickets for South Beach excursion handed in by Mr. Ingraham.

40. Committee on New Fruits appointed: Rev. Lyman Phelps, E. S. Hubbard, W. E. Baker.

41. Delegates to attend the meeting of the American Pomological Society in Buffalo appointed: Rev. Lyman Phelps, C. T. McCarty, Mrs. F. P. Haden, E. O. Painter. A motion was made by W. S. Hart, and the Secretary put it before the house, that President Taber be the chairman of these delegates, with authority to fill all vacancies in Buffalo.

AFTERNOON SESSION.

Wednesday, 2:00 p. m.

42. The Nominating Committee presented their report, recommending that the entire present board of officers be re-elected; which was accordingly done by one motion.

43. Speeches by the newly-elect. (See page 86.)

44. For the next place of meeting all the speeches were made in favor of Tampa. (See page 86.)

45. Tampa was unanimously chosen as the next meeting place.
46. Secretary's report read. (See page 89.)
47. Treasurer's report read. (See page 90.)
48. Executive Committee's report presented. (See page 90.)
49. President Taber made a statement as to the terms and conditions under which the reduced transportation rate was obtained this year. The Jacksonville fire compelled the officers to change the meeting-place to St. Augustine on short notice, and this caused a little confusion.
50. C. W. Butler stated that the rate of one cent a mile had already been promised for next year for the Tampa meeting.
51. Treasurer W. S. Hart stated that he had received the sum of \$42.25 from the members for the Jacksonville fire sufferers.
52. Paper on Grafting and Budding, by W. S. Hart. (See page 91.)
53. Discussion of the same. (See page 97.)
54. Resolution presented in favor of protection of forests.

AFTERNOON SESSION.

Thursday, 2:00 p. m.

55. Report of Standing Committee on Entomology was presented by the chairman, Prof. H. A. Gossard, with illustrations of fumigating tents. (See page 100.)
56. Discussion of above. (See page 105.)
57. Committee on Forestry reported through Major G. R. Fairbanks. (See page 107.)

58. Discussion of above. (See page 109.)
59. Standing Committee on Fertilizers made no report.
60. Prof. H. E. Stockbridge made some remarks on the bogus character of "Canada hardwood ashes." (See page 110.)
61. Major Fairbanks had previously offered a resolution appealing to the Legislature to protect Florida forests. This was now amended to include protection against the turpentine men, and adopted.
62. Paper on Fertilizers sent in by E. D. Putney, but too late to be read.
63. No report from the Committee on Transportation.

EVENING SESSION.

- Thursday, 7:00 p. m.
64. Motion made and carried that this session wind up the business.
65. C. T. McCarty offered a resolution requesting the Legislature to make an appropriation of \$2,500 for the State Fair. Adopted.
66. Report of Standing Committee on Vegetables was presented by Rev. E. V. Blackman, in an individual paper on Tomato Culture. (See page 118.)
67. C. G. White also read an individual report, a paper on Potato Culture. (See page 121.)
68. Discussion on above papers.
69. S. Powers read a paper on Dwarf Orange Culture. (See page 126.)
70. Discussion of same.
71. Committee on Strawberries and Miscellaneous Fruits made no report.
72. Committee on Marketing and

Good Roads called. The Secretary said he had a rather lengthy paper on Good Roads from C. H. Baker, of the committee. On motion, it was ordered to be published in the annual report, time being limited. (See page 132.)

73. Library Committee called. Secretary S. Powers read a report.

74. Committee on Co-operation with Trustees of State Agricultural College

called. S. H. Gaitskill stated that the committee had nothing to report.

75. Mr. Phelps moved that this committee be continued another year. Carried. Members are: S. H. Gaitskill, E. O. Painter, Benj. N. Bradt.

76. Committee on Final Resolutions reported. (See page 139.)

77. Resolutions adopted.

78. Adjourned sine die.

MEMBERS PRESENT.

The following members registered at the Secretary's desk; there may have been others who did not enroll their names:

W. S. Hart.
Cyrus W. Butler.
James Henry.
J. E. Strauss.
W. H. Cresson.
Walter Cliff.
W. I. Metcalf.
J. H. Phillips.
Mrs. J. H. Phillips.
W. E. Embry.
Benj. N. Bradt.
Mrs. Benj. N. Bradt.
Lyman Phelps.
Mary L. Phelps.
C. H. Racey.
L. G. Sartorius.
Mrs. L. G. Sartorius.
H. G. Sartorius.
J. C. Whittle.
Mrs. J. C. Whittle.
B. F. Chilton.
Jno. J. Beers.
B. S. Potter.
E. F. Sperry.

R. A. Arnold.
H. P. Chenowith.
Henry Benedict.
A. B. Prevatt.
M. E. Gillett.
Prof. H. E. Stockbridge.
Prof. H. A. Gossard.
J. A. Crosby.
S. R. Woods, M. D.
Mrs. S. R. Woods.
J. M. McClung.
L. Cameron.
John Sorensen.
W. H. Mann.
Miss M. E. Bentley.
Wm. L. Dorr.
Mrs. Wm. L. Dorr.
Miss L. M. White.
Muriel Tatem.
Dr. Edward E. Conant.
C. G. White.
H. H. Witherington.
J. B. Steinmetz.
E. P. Porcher.

Mrs. E. P. Porcher.
G. S. Hardee.
J. C. Carter.
Mrs. J. C. Carter.
Mrs. G. W. Dayton.
W. G. Parks.
E. O. Painter.
E. S. Hubbard.
Mrs. E. S. Hubbard.
Miss Mary Van Wyck.
C. T. McCarty.
Mrs. C. T. McCarty.
R. W. Storrs.
C. M. Griffing.
W. D. Griffing.
Geo. I. Russell.
Mabel M. Russell.
T. P. Drake.
Oliver P. Steves.
H. Meislahn.
H. Price Williams.
Mrs. Price Williams.
John J. Haden.
Mrs. Florence T. Haden.
B. F. Hatler.
A. W. Chisholm.
C. F. Barber.
W. E. Parmenter, Jr.
H. Harold Hume.
Mrs. H. Harold Hume.
Aubrey Frink.
Cyrus Jones.
V. Schmelz.
E. V. Blackman.
George Kerr.
Mrs. Carrie Lincoln Kerr.
Miss M. E. Mead.
Jno. S. Wyckoff.
J. M. Hawks.
H. C. Bieley.
Joseph Bumby.
W. A. Cooper.
W. H. Jones.
Walter Cooper.
W. B. Campbell.
S. B. Mann.
Dr E. E. Pratt.
D. N. Hine.
D. W. Perry.
M. E. Ames.
J. P. Felt.
Chas. F. Schneider.
Mrs. Chas. F. Schneider.
W. J. Lewis.
H. H. Harvey.
Geo. W. Adams.
A. B. Harrington.
Mrs. A. B. Harrington.
W. L. Glessner.
F. C. Loehr.
J. H. Wyeth.
W. E. Baker.
J. H. Wylie.
E. N. Reasoner.
Wm. Edwards.
F. D. Waite.
A. D. Alderman.
J. S. Chapman.
J. T. Richards.
L. B. Knox.
D. D. Powell.
Mr. H. B. Stevens.
Mrs H. B. Stevens.
G. L. Taber.
Mrs. G. L. Taber.
T. H. Johnson.
Mrs. T. H. Johnson.
F. C. Cochrane.
W. J. Ellsworth.
Geo. E. Graham.
D. L. Pierson.
S. H. Gaitskill.
Mrs. S. H. Gaitskill.
B. H. Alden.
Stephen Powers.
F. W. Inman.

OPENING ADDRESS.

The address of welcome by Mayor E. E. Boyce, of St. Augustine, was a characteristic bit of sturdy and independent American officialism, voicing the kindly and sincere hospitality which intelligent American communities entertain toward the tillers of the soil. The welcome of St. Augustine was aptly typified by the enormous palm boughs with which the hall had been ornamented, spreading far out overhead like the arches of a cathedral—decorous, stately, free from all the evanescent effects of perishable flowers—an old-time courtly hospitality well befitting the Ancient City. Mayor Boyce said, among other things:

"To this old city, with all its historic associations we welcome you most cor-

dially. We extend to you the warmest hospitalities of our homes and our hearthstones. We trust that while you are here you will feel that the perfect freedom of the city is open to you, and, as the representative of the people of St. Augustine, I extend to you, Mr. President, and to you, gentlemen of the Horticultural Society, the freedom and the hospitality of St. Augustine, trusting that you will avail yourselves of one and enjoy the other, that in years to come, when you look back to the first meeting of the twentieth century, you will pronounce it the most pleasurable and profitable in the annals of the State Horticultural Society of Florida."

THE SOCIETY'S RESPONSE.

On behalf of the Society, Mr. C. T. McCarty, with only a few minutes' preparation, speaking in place of another, rose to a fine touch of eloquence. He said in part:

"It occurs to me that he must be dull indeed who, with the history of three and a half centuries surrounding him, were not able to rise to such an occasion as this. And what is represented by these three and a half centuries? Havoc and war have disappeared, and nature has

reached the zenith of power and grandeur.

"The United States of America, of which we are justly proud, has risen from a small settlement on the remote peninsula of Florida to one of the leading nations on earth. Ladies and gentlemen of St. Augustine, we feel that you are indeed fortunate in your homes, in your surroundings, having about you the place where the first city in America found its permanent home.

I feel it on behalf of the Society my duty as well as my pleasure to say that we are keenly alive to the beauties that surround you; and in passing, I cannot fail to say a word for our stricken sister city, now in ashes. Among the great disastrous fires that have visited many, we have been the unfortunate sufferer from one in our own State. Few can realize it. Many years ago I saw the ruins of the city of Chicago, one of the

greatest calamities in the history of the world. We to-day mourn the loss of the city which is perhaps second only in magnitude to that proportionately. We assure the people of Jacksonville that they have our deepest sympathy. We have eaten salt and broken bread with them; we have enjoyed most keenly on many occasions their hospitality. We expect to enjoy ourselves equally keenly in the city of St. Augustine."

President's Annual Address.

GEORGE L. TABER.

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

On a fateful Friday a little less than three weeks ago the wires carried throughout the length and breadth of the land the dire news that the city of Jacksonville was in flames. The next day some of us drove for hours over fallen wires, cluttering brick and other unburnable debris, through smoking ruins of what had been the fairest residence and most prosperous business portions of the Gate City to Florida.

The time for our Horticultural Society meeting had been set for May 21 to 24. Hotel accommodations had been arranged; transportation had been secured. We were to convene at the beautiful Board of Trade rooms in Jacksonville. But now with her largest hotels vanished into thin air, her Board of Trade building, opera house and other convention places but unsightly piles of

brick and mortar, what should we do; what ought we to do?

A hasty conference of some of our officers and members resulted in the decision that the meeting should still be held in Jacksonville, provided it could be accomplished in a way that would prove beneficial to Jacksonville but not otherwise. In times past we had been welcomed there as guests. We had partaken of the bread and salt of a city noted throughout the country for its generous hospitality. Fortune had been kind to some of us during the past year, and perhaps some of us, viewing the ruin wrought, would feel minded to contribute toward the necessities of those with whom fortune had dealt less kindly; we would at least leave in the city some of the dollars that trade and hotel bills imply, and we would reciprocate, so far as in us lay, the kind expressions of encouragement, of hope and of

cheer that Jacksonville had extended to us during the dark days of our own adversity.

RECUPERATIVE POWERS UNDERRATED.

Acting upon this decision, Secretary Powers sent out his first circular announcing that, notwithstanding the fire, the meeting would still be held in Jacksonville. A few days later, however, a second canvass of the situation, in which your President consulted with Vice-President George W. Wilson and Secretary Powers, of the Society, and the prominent railroad, city and Board of Trade officials of Jacksonville, resulted in a reversal of our first decision. It became plain that we had underrated Jacksonville's wonderful recuperative powers. Her burnt-out population, instead of leaving the city in swarms, remained to rebuild the fallen city and recoup their fallen fortunes. The city needed every available room for officing and housing her own inhabitants. The kindest service we could render Jacksonville was to look for other quarters. We accepted St. Augustine's kind invitation, Secretary Powers sent out notices to that effect, and we are here.

The thanks of the Society are due the railroads, which, with courtesy and promptness, made available for St. Augustine the reduced rates that had been granted for Jacksonville. Our thanks are also due the Board of Trade of Jacksonville and its large-hearted, whole-souled president, Capt. C. E. Garner, the worthy president of the Relief Association, who, when your President told him that we had decided to go to St. Augustine, said, "Brother Taber, please say to your Society and to the good people

of St. Augustine that in addition to the losses Jacksonville has sustained by fire, she feels the loss of the Horticultural Society meeting."

In addition to St. Augustine's invitation, we received one from the city of Orlando and one from the city of Tampa. On behalf of the Society, thanks were conveyed to the mayors of both of these cities together with the information that, under the circumstances, we thought better to come here.

Your President wishes to extend his personal thanks to the Executive Committee for empowering him with their prerogative and indorsing, in advance, his decision as to place of meeting, when red tape would have seriously impeded the prompt action that the exigencies of the case demanded.

SOCIETY A SUFFERER.

The fire which was so disastrous to Jacksonville was far-reaching in its effects, and our Society is one of the sufferers—to comparatively small extent, it is true, yet the loss is one we deplore. All records of the Society and all annual reports on hand for the past years were destroyed. This makes it impossible to supply life members from now on with reports published prior to the fire. I am happy to say, however, that the library, of which the Library Committee's report will show we have a nucleus, was not burned. In this connection I wish, without discrimination against other contributors, to call special attention to the generosity of Mrs. Frances E. Manville, of Orange City, who, in remembrance of her husband, our former Secretary, A. H. Manville, kindly donated the complete collection of horticultural books which

he possessed at the time of his death.

While each and every one of us must deplore the calamity that made necessary a change in our meeting place, yet it seems to me peculiarly fitting that the Florida State Horticultural Society, which, more than any other, represents the peaceful, substantial progress of our State, should hold a convention in this historic town, the oldest, not only in Florida, but in the United States. It was here that, more than three and one-third centuries ago, Menendez's expedition of conquest and control first found anchorage. It was from this port the Don sallied forth to give battle to the Frenchman; it was near this town the massacre of the French occurred that, in turn, brought forth from France the expedition that wrought terrible retribution on the Spaniard. In those days Florida was primeval. The most valued art was the art of war. Fighting, for occupation or defense, was for many years the most important business of the inhabitants of this city and of this State. It had to be. Those were days when, if ever, might made right. But now see how changed! No need now for sentries to pace the ramparts of yonder ancient fort and signal whether the fleet sailing up the bay is bringing relief to a beleaguered people, or flying colors that mean fight or be destroyed. No need now for moat or drawbridge. No need now for the portcullis at old Fort Marion to be kept in working order; the one at the Ponce de Leon has replaced it—and it is raised to all without fear of an enemy. St. Augustine has no enemies, but hosts of friends, and among them all none more friendly than the horticulturist. It is in the practice of our art that the grounds surrounding her palatial

buildings have been embellished, and without this art her magnificent architecture would lose half its significance.

THE SCOPE OF WORK.

And now, ladies and gentlemen, let us consider for a few moments the scope of work that lies before us at this meeting. Our Society has to deal with the horticulture of the second largest State east of the Mississippi river, embracing, roughly speaking, fifty-nine thousand square miles. From Fernandina to the Perdido we cover six degrees of longitude, and from St. Mary's river to Cape Sable about the same number of degrees of latitude. Figures, however, whether representing distances or areas, carry much more weight when reinforced by comparisons:

Let us suppose that aerial navigation—which the present century will undoubtedly see perfected—is already in successful operation. With one of these space-annihilating machines, let us start from the northwestern extremity of the State of Florida and make a flying trip in a straight line to the southeastern extremity of our mainland. An examination of the meter will show that we have logged off five hundred and fifty miles. Now, returning to our initial point of Northwestern Florida, let us take a trip of equal distance in a northeasterly direction. This will take us across a large portion of the State of Alabama, the whole of the States of Georgia and South Carolina, and land us in the middle of the State of North Carolina, or, with our course a little more to the northward, take us clear over the northern line of North Carolina into Virginia; or, trending still more to the northward,

land us in West Virginia, after having covered portions of the States of Alabama, Georgia, North Carolina, Tennessee and Virginia. Pursuing a still more northerly direction, we can land in Northern Kentucky, almost up to Cincinnati, O. Flying north and northwest, we can land one-third of the way up the States of Indiana or Illinois, or the center of the State of Missouri; or, with just a few extra revolutions of our propeller, can land in Southeastern Kansas. In an almost westerly direction, we would land near Austin, the capital of Texas, or, trending a little more to the southwest, almost reach Corpus Christi. Directly south or directly east we would not care to fly, or at least to light when our five hundred and fifty miles were completed. In the one direction we would land in deep water well down the Gulf of Mexico, with nothing more tangible to grasp at than the Tropic of Cancer, and in the other direction we would disappear from sight in the Atlantic, two hundred miles east of Fernandina.

VAST DISTANCES.

Now, while some of us might find this flying to be a pleasant sensation, others of us might not, and as none of us are yet used to it, and our airship might not accommodate us all, let us take a map of the United States and a pair of compasses, and drawing a circle with the northwestern point of Florida for its center and our southeastern mainland on its periphery, attain the same results. This circle will not only corroborate the distances named, but also show us that there are fifteen States and one Territory—one-third of all the States and Terri-

tories in this country prior to the Spanish war—that are, either in whole or in part, nearer to the State of Florida than the two extremities of our State are to each other. (As a matter of fact, there is one other State that comes within the distance, but not within the circle; this is Ohio, the southern extremity of which is nearer to Fernandina than our northwestern extremity is to our southeastern.)

Now, if these figures and comparisons applied to a State situated farther north, surrounded on all sides by other States, the situation, while still admitting of plenty of work on our part, would be vastly simplified. In that case we would be one of a cluster of States having, horticulturally speaking, much in common. We could consult horticultural papers and horticultural reports of States adjoining us on the east or west or south, and obtain valuable information from our neighbors working under similar conditions of soil and climate. But when we consider that the only two States with which we come in contact are those that constitute our northern boundary, and that, leaving these, our State immediately trends southward into salt water and warmer latitudes, our unique position and comparative isolation among the sisterhood of States becomes doubly apparent; we realize more fully how much we are thrown upon our own horticultural resources. I am happy to say that these resources have never yet failed us—and are not likely to.

Returning again to our map and surveying the territory over which our northeastern flight took us, we will find that while yet in mid-air before the flight was half completed we were passing over

the largest peach orchards in the world. Investigation will show us that some of the varieties comprising those immense Middle Georgia orchards are also adapted to our initial point of Northwestern Florida, but that coming east and south from there the adaptability of these varieties gradually diminishes until before we reach an imaginary line drawn across the State from Cedar Key to Jacksonville their fruitfulness has become so impaired as to make them utterly valueless for commercial planting. Now, this does not mean that south of this line we cannot grow peaches—for, on the contrary, we can and do. It means simply that peaches for semi-tropical planting must be of tropical or semi-tropical origin. Investigation will show us that the kinds most largely planted in peninsular Florida, and which are now being shipped by the carload from sections that a few years ago did not know they could grow peaches, are to a very large extent varieties that have originated in Florida and belong to types introduced from the tropics.

FRUIT OF ALL KINDS.

In the northern portion of our State apples can be grown, although, it must be admitted, not with such degree of success as will warrant extensive planting. In the southern half of the State we have an apple that is ten times as large and ten times as luscious, the cultivation of which has assumed large proportions and has proven immensely profitable; it is the pineapple.

In Northern Florida pears have been profitably grown, although in recent years badly affected by blight. In Southern Florida a so-called pear is grown

which, while no relation to the Le Conte or other pears, holds out promising inducements and is probably no more subject to attacks of blight than is the saurian whose name it has borrowed.

In Northern Florida the cultivation of the pecan nut is assuming large proportions, and very justly so. In extreme South Florida we find that mammoth of all nuts, which produces both food and drink, the cocoanut, growing under as radically different conditions from those suited to the pecan as can well be conceived.

In sections of Northern Florida some varieties of the true Japan plum, *Prunus triflora*, have fruited well, and crosses that have been and will be produced between these and our native types promise much for a large portion of the State. In Southern Florida the *Eriobotrya*, *Japonica*, or Loquat, also erroneously called Japan plum, is of great value and worthy of being planted more extensively than at present. Several improved named varieties of these are already in existence that are very much larger and in every way superior to the common seedlings.

In Northern Florida we have the figs, Japan persimmon and grapes to consider, and many varieties of these are equally adapted well down the State; and again in South Florida, the pomelo, lemon, lime, guava and mango, together with minor fruits of even more tropical character, come in for our attention.

And now, last to mention, but perhaps first in importance, comes the orange, the fruit that, more than any other, has made us famous; the one with which the name of Florida is inseparably linked. Where shall we draw the line of demarkation between adaptability and

non-adaptability of this queen of fruits? To be sure, during storm and stress of weather that recent years have brought us, she has been seeking protection near the Everglades; but does this mean that she has abandoned her old haunts forever? We think not. We believe that all that portion of Florida that has been graced with her presence in the past will be graced with it again; that in her trip southward she is simply extending her dominion and making it that much larger than ever before. Her votaries farther up the State do not relinquish their claim upon her simply because those farther down the State have filed theirs. Already, with less than three years elapsed since the hardest freeze ever known in Florida, there are computed to be one thousand boxes of her golden output in sight in one grove within ten miles of the Georgia line.

But it is not alone the fruits of Florida that demand attention at our hands; if so, we would be a pomological society rather than a horticultural one. Pomology treats of fruits and fruit trees; horticulture embraces all of pomology and much more. Vegetables, shrubs and flowers, as well as fruits, come within the scope of a horticultural society. Our printed programme shows that all these are given a place.

Referring once more to our unique position on the map, I wish to call attention to what I believe to be a means of adding largely to the horticultural wealth of the State, if we will go at it systematically, and that is the growing of new varieties with the material already at hand to serve as a basis. Take for instance peaches, to which I have before alluded, and plant a few pits year after year from the best, earliest and most

fruitful varieties grown in the locality in which each of us is situated. If each member of this society would do this for a few years in succession I believe varieties would be originated that would be to Florida what the far-famed Elberta is to Georgia and states to the northward. It does not take much room to do this; the pits may be planted one or two feet in the rows and rows eight feet apart. After they have fruited dig up those that produce only mediocre or poor fruit, and let the others stand; not as the basis of a commercial orchard in themselves, but for further test as to possibility of varieties that may prove worthy of extensive propagation and planting. While budded varieties only should form the basis of a commercial orchard, yet the few trees to which our little plot will be ultimately thinned will be the very best varieties out of the lot of seedlings produced and, whether we have developed anything startling or not, can remain as a valuable adjunct to our home orchard.

I have especially mentioned peaches because they are easily grown, subject to wide variation from the seed and fruit while yet very young. There are thousands upon thousands of acres of land throughout both Northern and Peninsular Florida that are perfectly adapted to peach culture. We already have good kinds; we might have better ones—let us originate them. Some of us have already done something in this line, but it is needless to say that the efforts of a whole State will produce much greater results than the few could accomplish.

But it is not peaches alone that hold out inducements in the way of origination of new varieties. There are many other fruits that can be experimented

with in the same way, and our horticultural resources materially developed from within the State. With the citrus fruits, where variation of seedlings is not as radical as with some others, the more scientific method of artificial pollination presents an inviting field which has already been entered upon to a considerable extent, and crosses produced not only between varieties but species, that promise much for the future. This field is so large, however, and admits of such an almost endless combination in the assembling of desirable qualities of different varieties under one exterior covering that there is no danger of its ever being overdone.

And then in addition to the planting of fruit tree seeds, either naturally or artificially pollinated, there are numerous shrubs and flowers which are subject to the same laws of variation and which offer a delightful field of experiment to those of us to whom the beautiful in nature appeals; and to whom of us does it not?

In mentioning the possibilities that lie before us in the way of further development, I trust that none of you will think that I am belittling the actualities that already exist. On the contrary no one of you recognizes more than I the grandeur of our horticultural domain, and the grandeur of our well-established horticultural products. Let us continue to import into the State every tree or vegetable or seed or plant or cutting that holds forth promise of being an acquisition, but let us also remember that we have within our State limits, at our fingers' ends, a mine of wealth in vari-

eties yet unborn if we will but apply the wizard touch.

And now, ladies and gentlemen, I wish to congratulate each member of the Society on the fact that we are horticulturists. The pursuit that we follow is one that is broadening, ennobling, uplifting. Of all the arts and sciences there is no other the followers of which are brought into such close relation with nature; and he who can feel his own pulse responds to nature's mighty heart-throb is a king, regardless of whether he live in palace or hovel. He can, as can all of us if we are true horticulturists, appreciate the sublimity of sentiment expressed by William Cullen Bryant in "A Forest Hymn:"

"My heart is awed within me as I think
Of the great miracle that still goes on,
In silence, round me—the perpetual
work
Of thy creation, finished, yet renewed
For ever. Written on thy works I read
The lesson of thy own eternity.
Lo! all grow old and die—but see again
How on the faltering footsteps of decay
Youth presses—ever gay and beautiful
youth,
In all its beautiful forms. These lofty
trees
Wave not less proudly that their ances-
tors
Moulder beneath them. Oh, there is not
lost
One of earth's charms; upon her bosom
yet,
After the flight of untold centuries,
The freshness of her far beginning lies,
And yet shall lie."

Celery Culture With Sub-Irrigation.

BY FREDERIC H. RAND, SANFORD.

Replying to your request for information as to the plan I have pursued in the irrigation and drainage of the lands devoted to the raising of celery by the Florida Land & Colonization Company, it affords me pleasure to give you the following information:

The plot of land selected by me for this purpose was a lot of twenty acres, common flat-woods land, selected without regard to its special fertility, but as nearly level as could be found. The land measured 1,128 feet east and west and 800 feet north and south, having a very slight dip toward the north, the levels when taken showing only about three inches fall in 800 feet. On the south line of this lot I sunk four artesian wells, 280 feet apart. These wells each emptied into a receptacle made of brick and lined with cement, so as to be water-tight, sunk seventeen inches below the surface of the ground. These receptacles here are usually called "pockets" and will be referred to hereafter by that name. Extending north from the first pocket at each well is a line of these pockets, twenty feet apart and connected by water-tight four-inch pipes, the outlet and inlet from each pocket being one length of iron pipe and the rest earthen pipe. Extending east and west from each pocket is a line of earthen drain pipe, not water-tight, the ends simply being laid

together, placed in a bed of charcoal two inches deep and covered with two inches more of charcoal. From the last line of pockets on the north the four-inch water-tight pipes end in an open ditch. You will thus see that there is a line of water-tight pipes running from north to south, and a line of pipes not water-tight running from east to west, each centering and emptying into each and every pocket, by means of which the flow of water is controlled and diverted into any part of the field where it may be required by simply placing a wooden plug in the outlet from one of the pockets in the north and south pipes.

For example: We will say that the water is wanted in the middle of the field and not at any other point. We would then take water from either the first or second well; the water from the well empties into the first pocket and runs through the four-inch water-tight pipe, until it meets some obstacle to prevent its flowing. The part we wish to irrigate being in the center of the field, and there being twenty pockets, the water would flow into and out of ten pockets, but in the eleventh pocket I place a wooden plug to prevent a further flow. Now, to prevent a waste of water and to prevent its flowing into the ground before it reached the eleventh pocket, all the irrigation pipes which run

from east to west are also closed by a wooden plug in the first ten pockets; consequently the whole volume of water comes to the eleventh pocket through the water-tight pipe. The wooden plug there prevents its further flow to the north, and the two irrigation pipes running from east to west on each side of the pocket not having wooden plugs inserted in them, carry off the water, and it passes through every joint of the pipe, and by capillary attraction is drawn to the surface and thoroughly moistens the soil from twelve to fifteen feet on each side of the pipe. While I have here named the process of only one pipe, a dozen or more pipes can be used at the same time, only depending upon the amount of water delivered by the artesian well. So much for irrigation.

DRAINAGE.

Now, the same system is used for drainage. In case of a heavy rain or continued storm, when on undrained land the water would lie upon the surface of the ground, I keep my land perfectly dry by simply removing all the plugs from all the water-tight pipes or mains and also from the irrigation pipes. The surface water sinks into the ground and into the irrigation pipes through the cracks at the joints and then runs into the pockets, and from there it is taken by the water-tight pipes or mains and conducted to the open ditch outside the field. The result of an experiment made by me soon after I completed this system showed the following results on about an acre of land where I was planting some seed beds, the beds being raised about two inches above the general level: At 7 o'clock in the morning

the water was turned on; at 11 o'clock it had risen so it was standing in the little paths between the seed beds; all plugs were then removed and the water allowed to escape. At 3 o'clock in the afternoon the ground was so dry that it was easily worked with hoe and rake. The irrigation pipes should be placed fourteen inches below the surface. It is well to have the water-tight pipes or mains an inch or so lower. The pockets in my field are made of brick and cement which is lasting but expensive. The same object can be accomplished by boxes made of wood, but these will not always be water-tight, and, as they decay, would necessarily have to be replaced. It is absolutely necessary to have all pipes entering the pockets made of iron, as, if earthen pipes were carried to the pockets, they would probably be broken by the swelling of a wooden plug which might be dry when inserted and consequently expand when the water touched it.

THIRD SYSTEM OF PIPES—EXTRA PRECAUTIONS.

As water lying on the surface of the ground is very injurious to both celery and lettuce, our principal crops, I have taken extra precaution to prevent overflow from sudden and violent rains, and below the whole of the system that I have above described I have laid six-inch water-tight mains at two different points in the field, running from north to south; and connection with these is made at eight different points from the pocket; at the outlet of these pipes is an iron valve. They are seldom used—only in case of violent storms; then the valves are opened and the plugs in the

pockets taken out, and these pipes carry off all overplus of water that the regular four-inch mains may be unable to dispose of.

To guard against accident which might occur in case of a violent rain coming on in the night when there was no one to attend to the outlet of the water by removing the plugs, I have placed in the pocket, about one-third from the end (the pocket in measurement being 12x16 inches), a brick, water-tight partition rising to within four inches of the surface. This partition is in the lower end of the pocket and has in it two holes, one near the bottom and the other near the top, four inches in diameter, lined with iron thimbles or pieces of four-inch pipe; and in these holes the plugs are placed instead of the actual outlet when I wish to raise the water. You will thus see that the water, after these holes are plugged, can only rise to within four inches of the surface, as it then comes to the top of the partition and flows over and passes through the outlet pipe. If, however, I wish to raise the water up to the surface, I plug the outlet pipe itself; if I wish to raise it only part way to the surface, considerably below the level of the top of the partition, I leave the plug in the lower hole of the partition and remove it from the upper hole.

I think the above description answers your question as to the method of irrigation pursued by me. I have described what is on my place and under my own charge; the same system is used by all the other growers in this neighborhood, some with slight variations but as a general thing the same; and, therefore, in describing one, I have described all. The present year is the first marketable crop that I have raised of celery, and as the

crop is not yet marketed I cannot give you the results as to that. But I can say that on Irish potatoes, the present year, on this irrigated and drained land, I have raised an average of 140 barrels per acre, and off of 14-16ths of an acre I have already marketed 251 barrels of cabbage, and have more to ship.

PROPAGATION, BLEACHING, MARKETING, ETC.

Relative to methods pursued by me as to propagation, bleaching, marketing, etc., I can only say that thus far the growing of celery in this part of Florida is in an experimental stage, and I do not think that any two growers treat the crop exactly alike, and therefore I give you only my own methods. I plant the seed about the last of September, in beds about three feet wide and in drills four inches apart, sowing thickly. After the plant is about two inches high, I transplant it to a "prick bed" same size as seed bed, and set the plants 1 1-2 inches apart and rows four inches apart. It requires about sixty days for the plant to acquire the proper size to be placed in the field; no exact time can be stated, as the size of the plant depends largely upon the fancy of the individual grower, some preferring larger plants than others. After being set in the field, which should have been well fertilized before the plants are taken up, it is simply a matter of time and constant cultivation and frequent light applications of fertilizer until ready for bleaching, which point must be judged entirely by the size of the plant. The bleaching usually requires about ten days.

One-inch cypress boards 12 inches wide are used for this purpose, placed

close up to the side of the plant and drawn together at the top to about four inches, and held in that position by wires. In planting in the field some planters prefer the double rows, some the single. In the single row the plants are simply set six inches apart, rows three feet apart. In the double row two rows are set six inches apart and the plants set in the rows six inches apart, alternately. When ready for market the root is cut with a knife, superfluous leaves are taken off in the field, and almost all the roots are taken off, a few fibrous roots being left. The plants are placed in boxes and carried to the packinghouse, where they are assorted according to size and packed in boxes 8x20x27 inches, each box being marked the exact number of dozens and fractional parts of dozens it contains. The best marketable sizes are from three and one-half to six dozens, inclusive; the larger and smaller sizes usually sell for somewhat smaller price than the rest. The size of the crate that I have given is the size used here in San-

ford, and is known as the Sanford Standard. There are two or three other sizes used in the State, generally larger, and the California crate is larger still; but the experience of the past few years has shown that the Sanford crate is the one that meets the popular demand and gives the best satisfaction, and I believe it would be advisable for all growers to decide on that size of crate.

Experiments made the past year seem to show that with care plants can be set out in the field direct from the seed bed and thus save the expense and labor of transferring and putting out in prick beds, but I am not yet satisfied on this subject and would not like to recommend it; another season, however, will probably decide the matter. I do not see that I can say anything further in relation to the growing of plants, save that an abundant supply of water is absolutely necessary for success; therefore I would not advise anyone to undertake to grow celery save at points where a flow from artesian wells can be secured.

REMARKS.

Mr. White—The remark on charcoal is erroneous. What we use is cinders. Charcoal is rather an expensive product, but cinders are given to us.

Mr. Phelps—Charcoal has been used largely because there is not enough cinders furnished.

Citrus Fruits from a Commercial Standpoint.

REPORT OF STANDING COMMITTEE BY E. S. HUBBARD,
CHAIRMAN.

Mr. President and Members of the Florida State Horticultural Society—Ladies and Gentlemen:

As the Society's committees on Diseases and Insects, Cold Prevention, Fertilizers, Marketing, etc., cover special fields affecting citrus fruits, and it has been impracticable for this committee to submit a combined report, it has proved necessary for the members, so far as possible, to report separately. Therefore, under the changing fruit market conditions, I have thought it well to take a general view of the field and to consider as far as possible the future prospects of citrus growing in Florida.

Our country is in a prosperous condition, and the demand for fruits, both as necessary, healthful components of diet, and as luxuries, is increasing faster than the population, but the supply is also making colossal strides, and careful consideration should be given by every intelligent fruit grower to the general conditions in determining the special varieties it will pay him best to cultivate.

First in present production of citrus fruits stands California, with a crop of oranges that was estimated for this year at approximately eight millions of boxes. But unusual wet weather and frosts that damaged the keeping and carrying qual-

ities of the fruit, lack of transportation, and the low prices resulting from these conditions, have produced a state of affairs resembling what prevailed in Florida just before the '95 freeze, and there is no doubt California is suffering from overproduction of comparatively inferior fruit. The tariff has practically shut out Mediterranean oranges under these circumstances, but foreign lemons still arrive in quantity, and with climatic conditions similar to those countries it would seem California should give more attention to lemon culture, and I think she is doing so. The California oranges are marketed mainly in winter and spring, but there are others that are in market earlier. There is a small section suited for orange culture in Arizona that produces early fruit of good quality resembling Florida's; and this fruit will always find a ready market in the mountain cities.

The Mexican fruit is also early and its culture in that country is increasing, although the orange worm is also spreading and may require prohibitory legislation to keep it out of this country.

Then we have the West Indian fruit for early competition. Jamaica has a varied climate and produces fruit that averages well with Florida seedlings,

though light colored and usually insipid in midwinter. We may look for increasing imports from that island. Porto Rico is also spoken of as a competitor. I am informed, however, that the territory on the north side of the island that has sufficient rainfall and lies flat enough for cultivation and convenient to transportation is limited; and although they would have an advantage over Jamaica in the tariff, it is unlikely they will compete in any quantity for some time to come. And lastly, Cuba is an unknown future quantity. The reports as to near competition from this quarter are conflicting. It is true oranges are found growing all over the island, but as yet there are no regularly set bearing orange groves, and owing to the general clayey nature of the soil, which is mud if worked in the rainy season and bakes during the dry season, it is doubtful if oranges can be grown successfully convenient to transportation except in limited areas that are susceptible to irrigation.

The banana is the great competitor of the apple and also of the orange, and as reciprocity treaties with low tariffs are likely to be the programme, we will probably suffer as much from competition with cheap bananas from Cuba as from oranges. And then there are the West Indian limes.

FLORIDA ORANGES GO WRONG.

But with all this present and future competition to contend with, Florida the past season proved to be her own worst enemy. The bulk of the crop this year was in South Florida, and some people say South Florida fruit never did carry well; but probably this season's losses were largely due to the unusually wet

weather, which often produces soft, creased fruit, and to the rough handling in packing. Something at least is wrong when regularly packed fruit, not culls, is repacked in Jacksonville with loss, and then shrinks ten to twenty per cent. in three or four days while the retailer is disposing of it; or when a neighbor who bought a box for his own use complained that they specked so fast he and his wife were kept busy eating rotten oranges till the box was finished.

Not all Floridas were like this, however. An east coast packer who is noted for using chemical fertilizers in growing and extreme care in handling his fruit had a half box of a consignment that reached Jacksonville the 3rd of December overlooked in the salesroom, and the gentleman who bought it the 1st of March found only two spoiled oranges.

Orange growers must be careful not to get conceited. Many of us live among our trees all the year round, and we cultivate and fertilize, pet and nourish them till we almost worship them; and when the fruit matures we sample it with gusto and declare it cannot be equalled in the State of Florida. Then we may gather it carefully, cutting all the stems tight to the calyx, handle it like eggs, grade it according to our own ideas of appearance, put it up in neat boxes with fancy wraps, and though it may go in good order the buyer at the other end of the line may think some other fellow's fruit looks better and tastes finer and give him a higher price for it.

I am sure we all feel thankful for the comparative immunity from cold the past winter. Trees in my neighborhood that were boxed or tented came through all right and now look almost as well

as the unprotected ones, while trees under large sheds began growing as a rule earlier than those outside.

The question therefore arises whether with seasons averaging like the past fifty years shedding in the long run for all varieties will pay. It is true that late oranges can be carried through cold snaps in sheds without being frosted, and it would seem to be only desirable for varieties like Hart's Late Brazilian, Valencia Late, Kings and pomelos.

With early varieties whose fruit is taken from the trees before Christmas good banking will keep the buds from being lost with frosts later than the first of February, while before that time the danger of damage to tops is small, and even if the tops get frozen back they will begin bearing in a year again, and the risk will average no greater than in peach growing at the North.

THE QUESTION OF FUTURE PRODUCTION.

The question of future production therefore seems to be along lines similar to those of the past.

With present and prospective competition in both early and late oranges, the

old plan followed by many growers seems desirable yet—to grow half or two-thirds of early oranges to be shipped before Christmas, and the remainder later varieties either in sheltered locations where open fires can be used, or under sheds, if the grower can afford it. Some seasons early oranges may pay best and again the late varieties.

In any case, choice varieties only should be grown, and cultivation, fertilizing and packing should aim at quality rather than quantity.

And don't forget the old standard varieties of round oranges. There is a tendency to go to extremes in planting Satsumas, Tangerines, Kings and pomelos. There may be seasons when you wish your whole grove was budded to one of these fancy specialties, but I have never seen a season yet when round oranges, judiciously handled, did not bring profitable returns.

And remember that refrigerator transportation and cold storage are going to be the great perishable provision and fruit trade equalizers of the future, and that Hawaii, Japan, the Orient and even the southern hemisphere will send kid-glove oranges and pomelos to supply our markets.

REPORT BY B. M. HAMPTON OF THE COMMITTEE.

While I do not claim to be an expert on citrus fruits, I have had some experience in this line both in California and in Florida. For the last ten years I have been growing them in Florida, and I think I may say with success. But the cultivation of the citrus fruits extends over such a wide area—they are grown under such varied circumstances and

conditions of soil and climate—that to attempt to tell you all I don't know of this industry would simply be out of the question, in the short time the session of this meeting will be held.

It is needless to say that the culture of the citrus fruits is fast assuming its old time importance and on a more advanced scale of knowledge and enlight-

ement, so that one who thought he knew about all there was to it before the freeze of '95 now may find himself in a quandary as to just what to do for the best interest of himself and his trees, under the changed circumstances.

And with the increase of the industry comes the increase of the insect pests. So we have the scale, the white fly, etc., to contend with. Then we have mal de goma, foot rot, die back and so on, until it makes one dizzy to think about them and their cause and cure.

Oh, now we are coming to the gist of the subject—the cause and cure—and so we have the resin wash, the kerosene emulsion, etc. I don't think you can accuse me of egotism when I say he is a wise man that don't feel too sure of his ground on this subject.

There was a time when I thought that to spray with some of the many insecticides was the proper thing to do. But now—well, in the light of increasing knowledge I feel like saying—Don't! And I believe it is becoming the idea of the advanced growers of the State to use less and less of these sprays and to search more and more for, and to encourage our friends, both insect and fungus growth. Here, I believe, is the line of thought that it behooves us to investigate more fully. Now, if I leave this advice on record, to use less of these sprays and to search for and to utilize more and more your insect and fungus friends, I don't believe the future generations will altogether condemn me. And in connection with our insect pests and the various ailments the citrus trees are subject to, comes the fertilizer question. And here I may well pause before I go on record. But it is my firm belief that with

proper fertilizing and the proper utilizing of our many friends, there will be but little use for the questionable practice of spraying.

My especial experience in this line is that until I took more care of my friends and studied and experimented more with the fertilizing of my trees, I made but little headway against my enemies. Now I trust I have put my spray pump aside for good. Foot rot I have never had in my grove, and dieback but little. But I can get them whenever I want them, by simply giving my trees plenty of some organic fertilizer.

I know of nothing that will cause you to have a full crop of the various ills that the citrus trees are heir to, more surely than to stuff them with an organic fertilizer; that is, fertilizer composed mostly from material from organic sources. This can go on record, and time will prove I am right.

Now, as to the best mode of production, I will just say I have had but little experience so far as protecting citrus trees; yet so far as I can learn, I was about the first to use a tent with a lamp inside to keep off the cold.

Years ago I used various devices for covering plants and trees to protect them from the cold, but in December, 1894, my wife and I made tents out of sheets from the beds in the house. These I put over some tropical or melon pawpaw trees, then I lit a lamp and set it in the tent under the tree. I found I could produce almost any desired degree of heat in a few minutes; so, after experimenting with them for a time, I set them to burn for the night. This was a grand success; not a leaf was touched, and I believe those were the only trees of the kind left alive in the county.

But as to the matter of protection, as I have had but little practical experience, I will leave that for Mr. Hubbard and Mr. Painter to say what they think best for North Florida. So far as South Florida is concerned, numerous small wood fires will be found the cheapest and best. I have seen acres of groves fired of a night when the trees were in bud and bloom, with entire success, not a bud or a twig

being injured, and I was told they kept the temperature at 34 degrees in the groves, whilst it was 25 degrees outside; there was quite a breeze going, too. And so it seems small wood fires and plenty of them as a rule is all that will be needed in this section on the north line of South Florida, to save either bud, bloom or fruit from cold.

The Florida Orange.

A DISCUSSION.

Mr. Butler—I notice that the speaker seems to be under the impression that the South Florida orange would not keep as well as the North Florida orange. I think the South Florida orange will keep as well as the North Florida orange when grown under the same conditions. The fault was not with the South Florida orange, but with the South Florida man. For years we have been getting high prices for oranges. The shipper would sometimes get \$2 on the tree. The trees were fertilized highly. Last spring we had excessive rain. With excess of fertilizer, the nitrogen had a tendency to make the orange grow softer than usual. Many were packed green and a large portion were packed very carelessly. I have seen oranges picked from the trees wet, dealers buying and packing as cheaply as possible. Those who took care in packing have had no complaint of the condition. I know of growers who never heard of a complaint from their oranges.

Mr. Carter—I am from South Florida and I was made sad by the first article on the subject that condemned South Florida oranges as not keeping well; and the comparison between South Florida oranges and East Coast oranges was very much in favor of the East Coast. We are envious of the East Coast down there, but when the gentleman told us that in Jacksonville, where they have all kinds of oranges, people would persist in eating South Florida oranges, even rotten I felt that South Florida was not so far behind after all. I wonder if the proposition would not take, that we get some of these men of brains to go to South Florida to raise oranges on scientific principles; and on behalf of South Florida, I extend an invitation.

Mr. Porcher—Mr. Hubbard stated, I think, that some thought that South Florida oranges would not carry well; he did not compare them with North Florida or East Coast oranges, and it was only spoken of as last season. And

as a matter of fact, I think, from Mr. Butler's remarks as to bad packing and early shipping, that that was the cause; and that it was not the fault of the fruit.

Mr. S. B. Mann—During a late visit to Manatee county I learned for the first time something of the white fly, something that has never occurred to me in Volusia county; and I feel quite interested to know more about it, and I rise to ask any one from that part of the State to give us their best remedy and the probabilities of its spread; whether it is likely to come this way. If so, what is best to do for it?

F. D. Waite—In regard to the carrying and keeping qualities of the Florida oranges in South Florida, I would say that last winter in the Manatee section, with rains coming every two or three days, we had a chance to test the keeping and carrying qualities of our fruit with a system of under-ground drainage, and we found that the fruit picked early in the season (October and November) from the grove under-drained during the summer carried well. As the fruit in another grove seemed to be more advanced in ripening, we left that in the under-drained grove and commenced shipping the fruit from grove number two, leaving about three hundred boxes of oranges on the trees of the under-drained portion. On the 15th of January we commenced shipping from this grove again, and Mr. Preston, of Providence, R. I., wrote us that not 1 per cent. had decayed. The fruit in grove number two commenced creasing badly by the 25th of November, and fully 15 per cent. decayed in transit, showing that excess of moisture and lack of proper drainage has a great deal to do with the carrying qualities of the Florida fruit.

Mr. Adams—My grove is on high pine land. I began shipping oranges for myself in small lots about the middle of November. I finished last Thursday, having shipped every week. I sold to a Cincinnati house about 2500 boxes. That house wrote back after they were all shipped that there was not one rotten one in a carload that came from my grove. Now, there was another grove, one mile south of mine, with everything equal to mine, but the same house wrote me that 50 per cent. of that car was rotten. Their own man picked them and packed them in each grove; but they never had packed a box of oranges before they came to my grove in their lives and they learned something before they went to the other fellow's. I kicked from morning to night and when they asked me if I wanted my name on the boxes I said no, I would not allow a box of oranges the way you pack them to have my name on them. I have yet to hear of one single orange that went from my place rotting. A house in Providence, the next to the last shipment, stated that they were the finest they had seen through the winter. Now, I believe there is not an orange in the world that will carry or ship better than the South Florida orange, but you can't handle them like rocks.

Dr. Kerr—I had a letter from a commission house in Philadelphia some time since stating that they had handled very few oranges from Florida this winter; those that they had received gave Florida rather a black eye in regard to quality. I did not like to hear that, so I wrote back and stated that probably they were Jamaica oranges brought on a boat to Jacksonville and shipped from there as Florida oranges. I believe they have

good oranges in South Florida. Indeed I have been there and seen them, but there is no doubt that we must make an effort to put our fruit in the market in the best possible manner which will attract the buyers and not bring disgrace upon our state. As far as I am concerned myself, I shipped some oranges this year, and the reports came back that they were all first-class in every respect. But I gave them all away. Now, in regard to the paper just read, there is much that I believe to be truth. Still, a little spraying seems to me is good medicine when the insects have the leaves, but there is a tendency in Florida about these insects to let them go: something is going to clear them off. When I first came here myself I found the fleas were intolerable, but I have gotten accustomed to them and I use nothing against them to-day.

WEST COAST VS. EAST COAST ORANGES.

Mr. Hart—I don't think any one questions the ability of some South Florida or West Florida growers to grow good oranges, and grow them so they will stand shipping, but we have had fearful reports from the North on fruit this year, and the quality of the Florida orange has been reported so bad that I saw by the papers that Chicago refused for two or three weeks to receive any Florida oranges or to handle them. That is an awful black eye for our fruit. I inquired into the matter as much as I could, through sources from which the Northern markets got their supply, and so far as I could learn the East Coast stood up in transit and in market as well as ever, so the fruit that decayed must have come from other parts of the state.

Before the freeze, and perhaps at present the freight rates are very high from way down on the West Coast, and the people there had not given very much attention, as a rule, to orange growing; few there had studied into the matter as thoroughly as they had on the East Coast, where many had got it down to a pretty fine point. Twenty-five years ago Indian river fruit had the reputation of keeping very poorly, but we have learned how to grow it to stand shipping now. After the freeze the prices were such that orange culture developed very much on the West Coast, and I understand there are a good many down there who went right to cow-penning their groves and supplying them with nitrogen through other organic sources in quantities that softened the fruit, made oranges of poor quality, and such as would not stand to be shipped. We all know that such result will surely follow an excess of such food supply.

Now those who are the most intelligently interested in orange culture from that section come here to our meetings, and I have no doubt in my mind at all but that they have shipped successfully and their fruit has arrived in good condition. That is simply because they were interested enough to study into the matter and get down to the fine points, as have the older growers in the old Orange Belt—and one of the fine points is fertilizing properly, and another is handling properly. Many down that way have handled their fruit carelessly. The East Coast don't claim to have all the brains. They simply claim that some of them have had more experience than the general run of those down on the West Coast, but there are, I am told, many there who have never given fruit grow-

ing careful study, and it is only the high prices since the freeze that caused them to ship largely. Most fruit that has been properly handled has shipped well this year. My fruit has shipped well, and there has been no complaint whatever, and much of it was wet when I picked it. Many do not dare to pick fruit when wet, so they have their pickers wait until it has dried on the trees. The way I handle my fruit I can put it in my packing-house and get it dried off in one-quarter of the time that it would take if left on the trees. It goes into large trays with slatted bottoms and hung in the middle, so as to tip one way, then the other (illustrating); then open the windows and doors and in a very few minutes the oranges are dry on one side, then tip the trays the other way and the oranges roll over and dry the other side. The grading takes me about three days and in that time they cure thoroughly. I can take an orange, run a knife blade around it so as to cut through the outer cuticle, leaving it in these trays, and in three days it is ready to pack, an air-tight coating having formed over the cut that heals the wound and puts the orange in perfect shape to ship. If this was done and the orange was packed at once for shipment, it would decay and spoil others around it. If there is any orange so badly injured that it cannot be repaired by a free circulation of air, decay proceeds, and the injury is discovered before packing, as it has time to get so bad that I cannot miss it. Therefore only sound fruit goes into the box.

Here I show you one of my oranges somewhat dried up and yet round until now I think there is a soft place on one side that shows it will soon decay. (Hands it up.) That orange was picked

in December, nearly or quite five months ago. Here are others not dried at all and as fresh, firm and plump as if just picked from the tree. This fruit was also picked in December. I had intended to lay aside a lot of them, but owing to my friends' appreciation of their fine qualities I failed to do so. These here shown are culls left over from last year's picking.

Oranges will keep if you fertilize them right and handle them right, if you don't give them too much organic matter to supply their nitrogen. I have not had any preparation put on these or anything of that kind, but here is a point, those have been wet nearly all the time with pure water. They were probably wet when they were picked, and they have been ever since. Oranges kept a long time lose their brilliancy of flavor, so that you could not keep them five months and still have a first-class marketable fruit, although they are fine in appearance. You can keep them perhaps a month or six weeks, possibly longer, and still have fine marketable fruit. (Orange is cut and found to be full and heavy.)

Question—How did you keep it wet?

Mr. Hart—I have received letters from parties in Florida saying, "If you will agree to pay me \$25 or \$100, as the case may be, I will give you a recipe by which you can keep fruit in fine marketable shape for months." But I have never given them the \$25 or the \$100. I am not going to try that on you with my process. I will give it to you free next year because I am interested in the prosperity of this Society and its members, but I wish to experiment more on it. It is so simple and inexpensive that, should I give it to you now, you would not appreciate its real value. I am not

making any money out of it—don't want to, except by holding fruit for high prices—and I will give you the same chance I have of doing this after this year. But wet oranges can be kept. I feel assured that the bad keeping qualities of fruit that went down last winter must be from some other cause; or wet fruit is not allowed to dry properly before it is shipped to market. I have many times taken injured fruit, laid it up on a shelf in my packing-house, and had it keep perfectly until dried up, showing that it should go to market in good shape if properly cured.

Dr. Kerr—Next year you are going to impart to us this information, and do you intend to send around samples of the boxes of oranges that we may test them as I did, or not? And another thing I wish to know, is it possible that there was ever a cloud upon the East Coast oranges?

Mr. Hart—The Turnbull hammock oranges shipped very poorly twenty-five years ago, so much so that it was considered about an even question whether they could be got into market in sound condition or not; but it is not so now.

BLEMISHES CAUSED BY THE THRIPS.

Mr. Butler—In the last remarks the gentleman forgot that a large proportion of the South Florida growers were formerly North Florida growers and went down there. I don't know if this disease (blemish or scar) attacks us much, and I would like Mr. Hart to give the cause of that disease.

Mr. Hart—I always concluded that that was caused by the thrips in the bloom.

Mr. Butler—I thought so, although

sometimes it almost took on the form of a scar.

Mr. Hart—That would occur when there was a dieback tendency in the tree. It always seemed to me that was caused by the thrips.

Dr. Inman—I think probably between the oranges on the East and on the West Coast there is very little difference. I have shipped quite a lot of fruit this season, and of my oranges I have not lost a box by decay. In March I shipped oranges to Columbus, Ohio. Last season I shipped oranges in April which were used in August, and not three oranges in the box were decayed.

Mr. Porcher—This gives me an opportunity of speaking as to the thrips. Thrips can be controlled by spraying to some extent, at least. On pine land they will get away from you, but on hammock land the use of caustic potash and whale oil soap will destroy them without danger, and no marks will be upon the fruit. In addition to this, when the blossoms fall and the little oranges are as small as a pea, you can detect the work done by the thrips at once. In the same way that you destroy these thrips you kill the young of the common scale, you destroy the purple mite, you prevent danger from the red spider or hairy mite, and you give your trees a health and vigor that usually nothing else can give. In other words, no insect, enemy or friend, working in conjunction, can possibly live. And I, therefore, say that with spraying, if done intelligently, the thrips can be done away with. When we come to spray and you ask a man what he has done, he will say two or three times in a year, when fifteen would be best at start in some cases, and I may say six to ten times a year. At this

statement the question will be raised as to expense. When you consider that the market will give you a fine price for large fruit, bright fruit; that an orange affected by scale is injured in its quality, and sum the whole matter up, you will find about 200 per cent. against you, for any grove that will produce from five hundred boxes up; and you will see that you are in pocket a profit of 700 per cent. on the most costly spraying you can use. In my experience of past seasons I was troubled for years with scale. Now, in about 2,600 trees I doubt if you could find many scale from end to end.

Mr. Hart's position is a very strong one. I have seen the results he has obtained, and they are good. I argue, Mr. Hart's location is unique. I can show groves in my section that have never been sprayed and that have had the scale for fifteen years (ever since I have been in the State.) I have seen trees absolutely killed with the scale, and I have seen them thus not in one case but in a number. In Mr. Hart's location, were I putting out a grove next to his, I would follow his methods, but I do say that spraying should be looked upon as a fixed charge upon the growing of fine fruit, and that with it you can obtain desired results all over the State without reference to location.

SPRAYING IN THE BLOOM.

Mr. Waite—What effect does this spraying have on bees and the setting of fruit?

Mr. Porcher—No bad effect on bees. Even the spraying of water would have bad results generally on bloom. The trees sprayed during bloom are heavily laden, however. The proportion of

caustic potash to whale oil soap is one to four, that is, a quarter of a pound to a gallon of water. That proportion was sprayed upon the bloom without reference to them. It went right into the bloom. We were spraying for the purple mite and the trees were heavily laden with bloom. A bee will be attracted very often by the disagreeable smell. The thrips is destroyed, and I am quite sure it would be very difficult to find thrips upon the bloom in my grove, and as far as I have been able to examine the fruit, there is not an orange that has a thrips upon it, or is thrips marked.

Mr. Phelps—This orange that Mr. Hart has handed up to the platform as being wet so long, I find by actual test of it that there is at least 50 per cent. of water in the juice, and a large amount of acid has gone to the rind. Otherwise the orange seems to be well preserved. The juice is very thin indeed and the acid that gives the flavor has been absorbed largely in the rind.

Mr. Hart—Do you think the flavor is less than it would have been if dry?

Mr. Phelps—It is probably better preserved than if left to evaporate.

Mr. Porcher—I am agent of the Indian river orange growers. As said agent it is my duty to do or to have done the work of inspection. We have found a variety of conditions as to carrying quality of fruit. We have not all perfect fruit. We have not all perfect carrying fruit, and I must emphasize the fact that we do not claim to have all the brains of the State on the East Coast. We have found, however, that to refuse any form of organic matter in fertilizing has been absolutely our safeguard. Use chemical fertilizer and mulching. Take pine needles if you can't get anything better,

and use that in the groves around trees. We have found that groves whose fruit formerly would not carry can now be shipped across the water. The past season I sold twelve boxes of fruit out of a grove that was noted for having bad carrying fruit. It was put on a tramp steamer, along with cotton, and took twenty days to get to its destination in France. But we went further and inquired particularly that we might learn as to the condition, and there was no decayed fruit. That fruit I packed for a neighbor and sold for him; it was not quite like Mr. Hart's, but somewhat on the same plan as to fertilizing, and in that case in the fertilizing there was simply a change from the use of cotton seed meal to the use of nitrate of soda and a small percentage of sulphate of ammonia with bone black and high grade sulphate of potash. The consequences show clearly with us that this fertilizer corrected those conditions and made the fruit carry.

Walter Cooper—We have not been called upon to go into this subject on high pine lands in Lake county. I have inquired diligently around in the neighborhood in regard to anything of interest in this matter, and we have never thought of the scale or insects that have been successfully combatted elsewhere. So we did not need to go into the subject very extensively and I will let the matter close at this point, and feel satisfied that we shall have a much more complete report from some of the members on this subject.

BORDEAUX MIXTURE FOR DIEBACK.

Mr. Butler—Those of us attending the meeting last year heard the subject of

treating dieback with Bordeaux mixture discussed. A number of our members have tried that since, and would it not be well for them to give their experience pro and con after applying it?

Mr. Hart—I will say that the whole idea of cure by spraying the tree tops is entirely contrary to my theory of the disease of dieback. Through the advice of Mr. Porcher, I tried it. I regret to say that the result in my case was what I expected it to be, so far as dieback was concerned. But it has been more than that and has done more harm than I did expect, a good deal. I expected no beneficial results from the Bordeaux mixture when I applied it and got none, so far as I can see, but there are after effects which have been quite serious. That is, the purple mite has come on to those sprayed trees and they are very bad on them. Wherever I used Bordeaux they are much worse than elsewhere. Wherever I used that spray is the place where you will find what scale insects I have. If there is anything which will encourage the scale, it is spraying with the Bordeaux mixture. But I have talked with a number of intelligent orange growers who have reported it quite successful in curing dieback in their hands.

Mr. Porcher—I don't know whether the horticulturists are aware of the origin of that idea or not. With us it came from a German, a Mr. Froscher. His experiments were not entirely successful with others, because he sold the Bordeaux mixture, and it would remain two weeks before it was used and therefore was useless. As soon as the mixture was properly made and applied promptly, there was no question as to its results. But if we will use potash and

mulch the trees and cease cultivating, the Bordeaux proves a complete curative of the red rust. An application of it, and then repeat it in ten days, would cause the scaliness to be cleared off and the fruit made shipable; but at the same time where we spray with the Bordeaux mixture we should follow it in a short time with something to destroy scale. If it were followed by a spray as an insecticide we should not have the scale. It was not of my origination at all; it was simply my following out of another's ideas.

Mr. Hardee—I have used the Bordeaux mixture. Mr. Froscher wanted me to use it to introduce it. I had such little confidence in any application of the kind that I declined to use it, believing that it was a root disease entirely. I mulched some of my trees, others I could cultivate, but the dieback seemed to get worse. Mr. Porcher, who had used the Bordeaux mixture as prepared by Mr. Froscher, after he had tried it, told me how to use it. I prepared it and used it and I must confess this: I did not have much confidence in it, but after the first application I put on the trees, when the fruit was about half grown, it instantly stopped the cracking, and I was so well pleased with the application that I gave it a second time, and many of the trees that were inclined to crack were cured. I would say that the Bordeaux mixture is a very good cure for dieback. But it must be followed by an insecticide to kill scale. I have a number of neighbors around me that have also used the mixture, and there is not one of them that I have talked with but who was well pleased with the result, but they all agree that it must be followed up with some insecticide. I made only two applications

to my trees, I think twenty or probably twenty-five days apart. I used the rosin wash afterwards.

Mr. Porcher — Bordeaux mixture should not be used too often; three applications in twelve months would be sufficient. Four pounds copper sulphate to six of lime, so as to give plenty of lime. The mixture wants to be used as quickly as possible after being made.

Mr. Hubbard—Has the Bordeaux mixture any effect on the flavor of the fruit?

Mr. Porcher—None at all.

Mr. Butler—Of course, when we all heard what Mr. Froscher's mixture was, we believed it to be contrary to our ideas, but the word of an honest man is sacred, therefore I used it. I sprayed ten acres that was beginning to have a little dieback and it helped them. I also believe that it has a tendency to cure rust.

Mr. Porcher—When this question of Bordeaux mixture came up I wrote to the Department at Washington and they replied that their investigation showed that our trouble was unquestionably a sap trouble; in other words that it came from the root. You can take a tree up, remove it to another location and it does not have the red rust. I state that it is a fungous trouble which is corrected by this mixture. The Department will tell you that it is not a fungous trouble. They will also tell you the Bordeaux mixture is a fungicide. I don't know what more to say, save that I have had good results with Bordeaux mixture.

I have corresponded with many and I can find in no case a man who will give any explanation beyond the fact that possibly there were ulterior things that have helped us out.

Mr. Hart—I will meet two of the points that have been brought up. My Bordeaux mixture was made fresh for each barrel full and applied within an hour after it was made. It was made right or else the Government experts are wrong, for I tried all their tests, and therefore I cannot admit that it was wrong in any way; and yet it did not bring the results that some seem to have obtained. This was done early in June. The dieback continued right through for the rest of the year and for the next growth; so much so that on the trees that were affected the summer growths were reduced to almost nothing. They are cured now. I cured them by the old methods. I am sure we can cure dieback without the Bordeaux mixture, but it may take a year to do it. In one corner of one of my oldest groves there were about forty trees that were badly affected with dieback. I used the Bordeaux mixture on part of two rows of them, and I treated these and all the rest but three trees by leaving off cultivation and giving them potash and phosphoric acid only. They immediately got well and are now almost equal to the rest of the grove. The difference between the trees that I continued to cultivate and the others that were treated by non-cultivation, potash and phosphoric acid, now is that the latter are two-thirds larger than those three. But last fall I treated those the same and they are now healthy. The only way that I can see that Bordeaux mixture can do any good is to go into the root and there limit the action of the soil ferment, the excessive activity of which causes the disease. There are three sets of them that work over organic matter before they get it in shape for the tree

to take up the nitric acid, and warmth and moisture increase in their action. They cannot work in cold weather and they cannot work without moisture. Both conditions are just right for them in Mr. Porcher's shedded grove. Bordeaux was applied, went into the ground and checked the disease. A fungicide would check that development and in that way, it seems to me, it must bring about the change, if it does any good at all.

Mr. Waite—Had you used nitrate of soda, do you think you would have had any bad results?

Mr. Hart—I don't think I would, but I can't waste money or even run the risk of harm by using more nitrogen on these trees until its need is indicated by the color of the foliage and character of the growth.

The point was brought up about spraying the bloom. That matter has been so thoroughly tested that there is no question but that it does harm. In New York State the horticulturists were so sure that spraying should be done during blooming time that they finally got a law through the legislature allowing spraying at that time for experimental purposes, expecting to prove their side so as to allow anyone to spray then if they chose. Scientists of Cornell and others took hold of the matter, expecting to get results favoring this, but when they finally brought in their report it was such as to satisfy every one that it was imprudent to spray at the time of bloom and that the spray just before or just after would answer all purposes. They proved conclusively that spraying fruit blossoms destroyed the potency of much of the pollen and thereby greatly reduced the crop. Hundreds of tests

were made and all showed injury to the interest of the fruit grower as well as the bee-keeper.

Mr. Porcher—I am not in favor of spraying the bloom. I only cited an instance because it was unusual. I was forced to spray on account of the purple mite.

Mr. Hart—Scientists now agree upon that matter. You can spray one side of a tree when in bloom and leave the other side unsprayed, and the side which is sprayed will produce no crop and the other side will produce fruit.

The dieback was immediately following the freeze of 1895, and these trees were set in 1885, budded trees on sour stock. Mr. Porcher stated that if he were in my locality he would probably do as I do in regard to the matter of scale. He may have the idea in his head that I have not had experience anywhere else, but I think I may safely say that I have studied this matter on all classes of orange lands and I may as safely say that my environments or my particular land have very little to do with it.

Mr. Butler—There is one important point never brought out in regard to sulphate. I have produced dieback; can do it any time on my soil. Even where we have none I have produced dieback by sulphate of ammonia.

Mr. Porcher—Mine are old trees and they are on shell hammock land. It is what we term dangerous land. You have to be always watchful about shell hammock. I don't think I recall seeing any red rust on Mr. Hart's trees recently and I wish to emphasize the fact that we have in Mr. Hart one of our most careful and observant men.

Mr. Gaitskill—I have shell hammock land and there was a time when I did

have dieback. Young trees died down to the ground and I quit cultivating and using organic fertilizer and I cured the dieback. Chickens roosted in the trees and caused the dieback, and I believe the cure of dieback is in stopping the use of organic substances. I cured that tree with sulphate of potash and nothing else.

Mr. Phelps—I believe that if we use sulphate of ammonia alone, a small per cent. would do no harm, but I don't believe nitrate of soda is anything but a forcer. I don't believe in its use. I have tested it this year on celery. I have put on five pounds every ten days until I reached sixty pounds. Alongside of it I have put a fertilizer composed of phosphoric acid from bone, sulphate of ammonia and potash, and I cannot see at the end of a few months any effect from the nitrate of soda except that it tastes very salt. I believe that you can produce disease with sulphate of ammonia if you use it alone. But, where my poultry house had been I have always used sulphate of ammonia to counteract the effect of nitrogen.

Dr. Kerr—Mr. Hart, as my friend on the left justly states, has a grove that is unique. I have never been at the place, but I have been along the shore, and he speaks about his oranges being damp for so long a time. I have been along the coast when I thought everything was wet, and I presume that has a great deal to do with the keeping of his oranges. Now, on high pine land we don't require to have boards under the feet of our horses when we plow.

Mr. Hart—You would have to dig down twelve feet to get to water in my grove, Doctor.

I want to call attention to the disease of blight. Years ago at Orlando I think

perhaps I was the cause of this Standing Committee on Insects and Diseases being originated, largely for the purpose of studying blight, and we got the Government to send down experts here to study it, and they, up to the freezes of '94-'95, had studied every part of the tree, leaf, bark, etc., and they had not yet got any light as to the cause of it or any possible cure, but they had many experiments on foot to test the diseased trees and learn its nature, and if it had not been for the freeze I think that we should have found whether the disease was in the root or branches, bark or sap, and possibly found out what was the cause. The blight is with us yet, and it is the most serious disease we have to contend with. The Government then took their experts North, expecting to carry on the work from there, but from lack of appropriations the work has been mostly dropped. We must make an effort to have it taken up again.

The President—An appropriation has been made which becomes effective the first of July and the work will be resumed.

Mr. Porcher—I would like to know if anyone has ever found blight on low hammock land?

Mr. Waite—We have found in laying our under-drains a layer of rock about three or four inches thick, which covers over an area of about forty acres. Last year we picked twenty-five boxes from those trees.

Mr. Porcher—As a matter of fact, I think the "blight" is found on all soils except very low hammock. We are growing trees that are old enough to have blight, but I have yet to recall a case of low hammock with blight.

THE WHITE FLY.

Mr. Reasoner—The white fly in our neighborhood seems to have been about caught up with by the different fungi, and we no longer fear it, and the best proof of that is that there are one hundred acres near us being planted with citrus trees. In most of the groves near us we immediately caught up with the spread of the white fly. There is practically very little of it there. In fact, it is about gone. The longest time that any of our planters has had the white fly has been about two years, and there is not one of the groves but what has been cleared of white fly. I can say that the Foster groves are where the white fly first came from, and the Foster groves have turned out from eight to ten thousand dollars worth of fruit. There has been no spraying there whatever. We sprayed for several years without success.

Mr. Waite—Speaking of spraying, we had about sixty acres that we found last year was covered with white fly, small trees about six feet high, and I was talking with quite a number of gentlemen who had sprayed, and we came to the conclusion that we would try spraying. We did so in November and December, using the rosin wash. In January we gave it another application and in the spring the white fly was on the wing, and we examined the trees and found no white fly excepting on large trees.

Question—What was the extent of the damage done during the two years that the white fly was present?

Mr. Waite—There was only partial loss of fruit. Where the white fly was worst the trees dropped part of the crop.

The trees were decidedly damaged. Most of those trees had never been pruned in the center, and had they been pruned out properly, I don't think the white fly would have effected any damage. The very thickness of the tree kept out the air, but the tree in general was not damaged.

Mr. Porcher—We have years when the scale is more prevalent than others. It has to go through a certain period. I argue that there are periods when you have to submit to scale and white fly before you get the assistance of the fungi. In a period of say twenty-five years we have to pass through certain conditions of disaster before our friends come to relieve us. I argue for spraying as a thing to be done every year. I believe that while you may destroy your friends, you are at the same time destroying your enemies. I submit that they cannot grow grapes in any portion of the United States without spraying. In addition to that, here is the very point I brought forward to emphasize—that while your friends are helping you, your enemies are attacking you and leaving you in a very helpless condition. In every section of our State, if we had sprayed ever single month in the twelve, there would not be a white fly in the State of Florida. If there was a law which made it obligatory upon all to spray, there would not be an insect that would trouble us in the whole State.

Mr. Hart—The loss of fruit is very small under the plan that I advocate. There will be in a grove of a thousand trees two or three that will be bad with scale, and those two or three are the only ones that will be injured, and that only for perhaps one season. With the

white fly, Mr. Porcher thinks that if they had sprayed from the beginning they would have kept it down. Suppose they had sprayed from the beginning. They would be spraying now. They would have gone to immense expense and cost with white fly.

The largest grove near us where they have made a careful study of spraying is about twenty acres, and that has been sprayed regularly for white fly for several years, and the cost of spraying has been so heavy that the owners get but very little out of the fruit, although they get very good crops. The cost of this continual spraying is very great. You have to spray three or four times a year. Cost is several hundred dollars and the profit is reduced to little.

Mr. Porcher—The cost of my spraying last year was \$180, including everything.

Mr. Stevens—I would like to hear something as to the mealy bug.

Mr. Porcher—I can say that I entirely conquered it. It was only on two trees and it would get down between the attachment of the leaf and stem and was very persistent, but we have finally conquered it.

Mr. Adams—I cured it entirely with hard wood ashes, putting dry ashes on.

Mr. W. H. Mann—I have had some little experience with them. I could not kill them without killing the tree, and finally I cut the trees to the ground.

Mr. Adams—I had the mealy bug on one tree in my grove and nowhere else. I dug it out and tried the dry ashes and I never had any trouble with them. Sometimes I had to try the second time, but they did the work.

Lettuce Culture Under Cover.

BY W. H. DRAEGER, OF GAINESVILLE.

To grow lettuce under cover (cotton cloth), a person must have suitable soil. Lettuce likes rich, loamy, damp soil, well drained, not subject to being water-sogged after rains. To prepare for planting, have your soil well tilled, fertilizer thoroughly mixed with the soil; use a high-grade fertilizer with an analysis about as follows: Moisture, 7 to 9 per cent.; available phos. acid, 5 to 6 per cent.; insoluble phos. acid, 2 to 3 per cent.; ammonia, 6 to 8 per cent.; potash, K₂O, 6 to 8 per cent.

Well-rotted compost is especially suitable for lettuce, with commercial fertilizer added; 1,000 pounds to the acre should be sufficient, but great care must be taken to have it thoroughly mixed with the soil, especially if a liberal amount is used. Have it in the soil some days before setting the plants, say four or five days.

Care should be taken that the plants are young and strong, say from five to six weeks old, as older plants are more liable to run to seed or not head well. In preparing the land for the beds, they should be on a slight slope the narrow way. Make the lands some wider than the bed proper; say allow a foot on each side. List up ridges across the beds with a hand-plow about fifteen inches apart, smooth the lists down to about one and a half to two inches high.

Plant twelve inches apart on the ridges.

Lettuce should be set before the cover frames are put down. A very desirable sized frame would be as follows: Have the frame twenty feet wide across the bed; have the cloth sewed in eight-yard widths. For a twenty-foot bed have the center ridge stake about three feet high; the outside stakes about ten or twelve inches high; the ridge strip 1-2 2x21 feet long. Put the ridge strip over the ridge stakes, bow down and nail to the ten-inch stake a board to fit the short stake, nail on around the entire bed, so the cloth can be fastened on to the boards. A good stout string should be attached to the cloth at every stake, which can be put say five or six feet apart. The cloth must lap over the boards enough to keep the winds from getting under the cover; this is important.

The bed the long way can be made as long as the person wishes it; but it is not practical to have beds too long, as the cloth is hard to handle, especially if there is much wind to contend with. The ridge stakes should be at least 2x2 inches; in fact, all stakes should be 2x2 inches. The cloth can be tacked down or tied to the center stake, as the person chooses.

The cloth should never be down only when there is danger of frosts or freez-

ing or before heavy rains. The cloth will shed off a good deal of rain, as well as protect the lettuce from a beating rain.

Lettuce should be kept until well headed and matured to insure good prices.

Frame lettuce should be planted to come off in December, January and February, as it usually sells best during those months. Earlier or later than the above dates it generally does not bring as good prices.

Big Boston variety is the favorite.

DISCUSSION.

Mr. Phelps—It is unfortunate that the man who wrote the paper is not here to be questioned somewhat. We cannot ask questions on a paper that is simply read. One question I would ask him is, what is the necessity, in this climate, of raising lettuce under cover? And I would like to ask him, as it is contrary to what we have heard here, why organic fertilizer should be used on lettuce. I have raised a considerable amount of lettuce in this climate myself, but I have always raised it outdoors. Last year I put out thirty-eight rods and I shipped in January a first-class lettuce. Some of the heads were sent to Jacksonville. I shipped five tons from that quarter of an acre. I don't think I could have done any better under the great expense of cloth covering. This was raised entirely in the open, on land well drained, but with tile underneath so that it could be wet or drained at my choice. Lettuce does not require much moisture. It is always best on the highest points in the field. I differ with him on the point of Big Boston being the best. I am ex-

perimenting with lettuce to know which will do the best in this climate. It is a plant that I think will yield as much benefit to Florida, if properly cultivated, as the celery is doing. The past season has been one that has been most affected by insects in any of the twenty-six that I have spent in Florida, on trees, ornamentals and on vegetables. Usually I have grown with perfect impunity collards, but during this year I have been unable to grow collards. They have been entirely consumed by insects. Butterflies lay an egg that is very bad on lettuce and the cutworm is simply terrible, and the enemy that we have most to combat in raising lettuce is the cutworm. I saw last year where the lettuce was left on the land. This year I saw that land where the lettuce had been left over, not shipped, and I turned over a lot of it, and I could scrape up the cutworms by the quart. If that debris had been burned it would have been different.

Mr. Waite—I think perhaps I can explain why the people of Gainesville grow lettuce under cover. It is to protect it from frost. I have seen lettuce fields injured by frost to such an extent that at times it became unsaleable. At other times, after remaining in the field perhaps a week longer, one could brush away the leaves affected by the frost and ship it as second-grade. We have grown lettuce on Manatee plantations and sold it at \$14 a crate.

Mr. Embry—How much expense attends the culture of an acre of lettuce to put it on the market? How are the seed beds put in? Is it by turning or other methods; and how soon are the plants ready? Do they have to be transplanted, or are they put direct from the

seed bed, and how often is it cultivated?

Mr. Phelps—There are no two people that cultivate lettuce alike. The majority of people make a seed bed and raise it about two inches high; put on the seed and brush over very lightly, and in about three weeks time from the time it is sowed it is ready to prick out. Some work it daily, others work it but once; and my experience is that those who have well fertilized with chemical fertilizer make as good lettuce from working it once as from working it many times. And my experience is, to work it with a wheel hoe, run it through once and then

stop. I think it is the best method. However, where the land has been under cultivation a couple of years, I would sow it in the check, and not have the trouble of transplanting. Last year we realized about \$1,000 to an acre. The early lettuce did not bring as large a price. The midseason lettuce brought from four to five dollars a basket. In the first shipment, perhaps of twenty crates, I got \$3 per crate. I think \$1,000 gross per crate was what was generally realized, but it was an extraordinary season as to prices.

Pineapples and Other Tropical Fruits.

BY CYRUS W. BUTLER, OF ST. PETERSBURG.

Mr. President, Ladies and Gentlemen:

As our gathering here naturally constitutes an experience meeting, and my experience with pineapples is confined to the Pinellas peninsula, I will try to give a short synopsis of the industry as it exists there, without making any pretensions of adding to the knowledge of informed growers, and with apologies to them for repeating that which they already know, which, however, is not the case with the majority of those who read the Report of our Proceedings.

Until 1890 no pineapples were grown upon the Pinellas peninsula, excepting a few small patches of Red Spanish, which were grown in open fields.

About that time a few small sheds were erected over Abbakas, Porto Ricos,

and the various Queens, but without financial success.

In 1895, S. N. Perkins & Company erected a two-acre shed and planted it out to Smooth Cayenne and a few Abbakas. At that time it cost \$2500 per acre to put out Cayennes under shed, but the first crop of fruit and suckers paid for the pinery and left a good profit besides. The financial success, aided by an appeal to the eye of great beds of "living green," each plant topped with its beautiful fruit, was an example that needed only to be set, and during the last four years about fifty acres of sheds have been erected within two miles of St. Petersburg, and the industry is rapidly increasing.

The sheds are those known to most

growers and are made by placing 8 1-2 foot lightwood posts eight feet apart north and south by fourteen feet east and west, upon which, running east and west are 2x6x15 feet stringers, or some use 1 1-2x8x15. On top of these stringers rest the 1x3x16-foot slats, though some growers use 1x4 slats. Still others use lath for top, but the woven wire and lath top is not popular.

The land chosen varies all the way from low pine, through pine and willow oak, to rosemary and sprucepine scrub. Probably the growing tendency is toward the lower land.

The preparation of the land is as thorough as if intended for an onion bed. When practical to do so, stable manure, cow manure, tobacco stems or even oak leaves are plowed under and allowed to rot before planting. Cowpenning is also a good preparation, but in the majority of cases from one to three tons of blood and bone is harrowed in after plowing.

While planting may be done at any time of the year, it is seldom advisable to do so between September and March, and probably seventy-five per cent. of the sheds are planted during the rainy season.

After being stripped of their small basal leaves, the plants are set out eighteen inches east and west by twenty-five or thirty inches north and south, in beds nine feet in width, leaving a five-foot walk between the beds. The usual distance of 18x30, with walks, will give 8295 plants per acre, while 18x25 inches gives nearly 10,000 plants per acre. Before the roots get near the surface of the earth, wheel hand hoes and rakes can be used to an advantage, but after the

shoots get up the scuffle hoe only is used. With young plants, the more cultivation, the more growth; but by the time the plants have got their growth, cultivation is almost if not entirely stopped, both because it is difficult and of doubtful utility.

FERTILIZERS.

After mixing and using twenty-four different formulas, I now use blood and bone and potash, with an occasional application of hardwood ashes. On new ground we usually apply blood and bone only for the first application and increase the potash with each application until by the time that the plant is about grown, when equal parts of low-grade potash and blood and bone are used (1-2 potash, 1-2 blood and bone). One successful grower uses high-grade potash and thereby gets twenty-five per cent. of actual potash.

Nitrogenous fertilizers should be used with caution, if at all, during the growth of the fruit; for at last when the fruit is well advanced, it has a tendency to cause it to crack open at the base. An average application would be four ounces per plant, with three or four applications per year.

DISEASES.

Blight is perhaps the only disease affecting our pineapples, but it seems to visit almost every pinery. In some cases the percentage is as low as one plant out of 2,000, but again as high as fifty out of 1,000 plants. So far, we have discovered no cure for a plain case of blight, though if taken up, stripped and planted in a new place, the plants usually throw out a new

root system, and, after fruiting, nice-looking suckers. But I think that such suckers should not be used, for although they may not inherit the disease, they may inherit the tendency to contract it. Unless some blighted plants are wanted to experiment with, it is best to pull them up and throw them away. Plants on low ground are less subject to blight than those upon higher ground.

This year five of our pineries have been affected by what is known as curl, which is a condition of the plant in which the bud turns over until it has assumed a horizontal instead of an upright position. During the winter it looked quite serious, as from five to fifteen per cent. of the plants of those pineries were affected, but now they seem to be outgrowing the conditions.

A committee from our local Pineapple Growers' Association was appointed to examine into the cause of this defect. While we came to no conclusions as to the cause, it was found that pineries fertilized with blood and bone and potash only were free from this trouble, while it did occur in pineries where nitrate of soda or nitrate of soda and sulphate of ammonia were used. I would suggest that possibly it was caused by those strong forms of ammonia getting into the plant.

INSECTS.

Under this heading, only the mealy bug and pineapple scale come to trouble us, and they are seldom sufficiently numerous to justify a combat; and when they are they die easily when fought with any good insecticide, at one-half of the usual strength used for citrus scale.

Ground tobacco used freely upon the

plants has a strong tendency to keep them down, and it is worth from fifty to seventy-five per cent of its cost as a fertilizer. But few growers have paid any attention to either of these pests.

As to the different kinds of plants, I can see no difference between the results from rattoons, suckers, slips, stool plants and crowns; provided that they are all equally good of their kind. Am inclined to think that crowns produce a slightly larger apple than the other plants, but they are somewhat subject to rot when planted.

EFFECTS OF COLD.

While it would perhaps not be desirable to have the temperature go below 35 or 40 degrees Fahrenheit, the plants, even when blooming, have stood a temperature of 28 degrees Fahr. for some hours with a loss of the tips of the taller leaves only. I have never known of pineapple plants being killed in the neighborhood of St. Petersburg, when under a walled shed, but since 1895 I do not go to bed on cold nights.

As to varieties with us the Smooth Cayenne has taken the place of all others.

COSTS AND PROFITS.

At present prices, it costs about \$1600 to plant out an acre shed of Cayennes, and nearly \$2,000 to bring the same to bearing, but regardless of this high cost, all pineries of one-quarter acre or more that I know of have paid all expenses with the first crop of fruit and suckers, and usually a good profit besides. The best returns that I have heard of for a single crop of fruit only was \$700 from

2300 plants, which was little more than one-quarter of an acre. The best returns for both fruit and suckers that I have met with was from a pinery 1 1-15 acres in extent, four-fifths of which was in Smooth Cayenne and the remainder in Abbakas. This pinery was planted three years ago last August, and up to this date \$7,602 has been received from the sale of fruit and suckers, and these figures will easily reach \$8,000 during the next three months. This is an exceptionally profitable pinery, but I hear of another said to be more so.

More money has been realized from the sale of plants than for fruit, and while it would be natural to expect the price of suckers to decline, they sell for more to-day than they did three years ago.

Winter fruit sells higher than summer fruit, and early spring higher than winter, but the fruit grown during the dry spring months is best in quality.

Taken as a whole, the pineapple business ranks with orange growing, the two being the most profitable industries of our locality.

OTHER TROPICAL FRUITS OF THE SUB-PENINSULA.

Prior to 1895, mangoes, avocado pears and guava trees shaded almost every door yard, while an occasional tamarind, sugar apple, soursop, sapodilla or papaya was thrown in for variety sake. The three first named were the most important, and of these the mango and avocado pear were highly profitable until our mango crop overstocked our local market, when we found that the only cities where this fruit could be sold

were those containing people from the tropics.

The palate of the North has not learned to understand the language of Miss Mango and therefore were dumb to her sweet accents, but to most of our local residents either the mango, avocado pear or guava was considered of more value for local use, during their season, than the citrus fruits at any season.

I would say that mangoes and avocado pears were greatly superior to the same species as brought from Cuba. The Cuban fruit being picked green may possibly account for the difference in part.

The freeze of 1894 destroyed not only our tropical trees, but also our courage to care for them, so that to-day we have only an occasional small mango tree and about enough avocado pear trees and guava bushes to furnish fruit for our local use. Not that we could not have had them in abundance by this time, had we planted during the spring of 1895, but we lacked faith, and without faith man eats but the fruit of neglect.

DISCUSSION.

Mr. Porcher—I have no report to make. I am not a pineapple grower nor a grower of tropical fruits. I don't think I could add anything to Mr. Butler's excellent paper. One or two have suggested that I should be on the committee because I am the agent of the pineapple growers; but that is entirely a question of marketing, and one I don't think should be considered here. The point is that this is the season when it may be a little inopportune for me to speak on the subject of marketing, as we have in our section quite a little opposition on

that very question this year. In fact, the new movement there claims a large percentage of the fruit, and while the old Association is going on with its business there has been quite a little comment by the press on this subject. In our plan of marketing the design was simply to have an agent at the most effective point for receiving and forwarding the shipments to the proper markets, with a system of local agents in the markets we would need who would be our agents. That is to say, that they should handle no other pineapples during our season. On those lines we appointed agents in sixty-one markets which have been reduced to thirty-nine. Starting in with the crop of 1896, we have gradually increased the net result, until last season, with 132,000 crates of pineapples in the territory in which we operate, we marketed 51,248 crates, and our net result, including culls, ripes, etc., was \$1.73 a crate. We have stated in print that we are proud of that net result; that it is the highest that has been made. In addition to that, there were f.o.b. sales of about 35,000 crates; the prices ranged for a few as low as \$1.50, for most of them \$1.75, and as high as \$2.25. Now, when you consider that the Red Spanish pine yielded as high as 600 crates to the acre, with that net result, it is one that is worthy of the attention of anyone, and in fact our growers to-day are assured that despite the conditions against them, we have made conditions that insure a good net result for good Red Spanish pines.

The conditions have been such from our section that this season a large part of the fruit will be sold, and with the two organizations working, there is practically no fruit that will not go through an

organization. The new party has so far endorsed our plan, with the exception that they contemplate selling more fruit on orders.

I would state that when we first took hold of this system we used the large barrel crate. We now use the standard crate. With that crate we can wrap and pack the Red Spanish pines and we can have those pines transported to the most distant markets, with practically none of the fruit spoiled. In addition to that, we organized a close intercourse with the markets and with the transportation men. We watched those cars in Jacksonville on the transit. We could send a car to Cincinnati and have fruit cut out and sent on to Columbus and delivered, and we even put fruit in less than carload lots through on car-lot time. The West was always opened to us for car-lot shipments, and we were in position to make those lots. With a simple system of marketing any of the products that go out of this State, be they what they may, with a local agent and a system of agents appointed and understood to be solely representing that Association, success can be assured in any direction, whether it be pineapples or oranges. Any other system will certainly meet with failure. Where auction is the system, there is bound to be loss between the buyer and the man who grows the fruit, whereas we have withdrawn from markets where our fruit would be lowered through competition against itself. Under our conditions and with this watchfulness, the proper markets can be found, all fruit can be used, and those who had never heard of pines on the plant rushed in to see fruit on plants we exhibited until the policemen had to separate the crowd. This was in Cleveland, Ohio. In Buf-

falo we started off with five carloads and we have gotten up to thirty. Therefore for the Red Spanish pine the field is open and is increasing. Our only necessity is to grow a marketable fruit. Of course, if we will grow 48 to the crate, instead of 24, the one selling at \$1.50 gross and the other at \$3, the one taking 48 pines, the other 24 to the crate, the man who grows the 24s and 30s is the man who will win.

The use of ice is deadly to any pine. It will cause it, if green, not to ripen; if ripe, to decay. We load those cars with crates well spaced, well ventilated, so that if you place small pieces of paper at one end they will be carried right through the car to the other end by the draft; there is a strong current of air, and the fruit is kept in perfect condition. The only time we have any difficulty is after July; from this on toward the end

of the season we have our trouble. Up to that date we can strike an average, and it is surprising to know how it stands. Late in season local fruits are coming in plentifully. Peaches will sell 12 1-2 cents to 25 cents per basket. People have been eating pines since the first of April. The canning has been done and even the men to make the juice for medicinal purposes and soda fountains have stopped, and at that date we have the most difficult time. We have to urge our agents and this is the time we have to fight hardest for the success of our work. This is when returns will come in sometimes very poor and unjust growers will be dissatisfied. We cannot fail to have these difficulties every season and we cannot do more than do our best. But all we aim for and ask is to make the net result on the whole for the good of the grower.

Protection, Cold Weather Cycles, Etc.

A DISCUSSION.

Mr. Porcher—I think we all recall cases where the reading of the thermometer has been given in various sections. I have always thought that many times a man was right where he was accused of being wrong; that there are big dips of cold that there is no accounting for. I have known on the East Coast on one occasion where the fruit was injured by a southwest cold wind. On another, West Palm Beach and Lemon City were struck, and no harm done elsewhere.

Dr. J. W. Plummer had his pines absolutely frozen and ruined and those at the north and south of him were uninjured. Last winter when the lowest reading of the thermometer in Rockledge was 30 degrees, we recorded 18 degrees at my grove on Merritt's Island for a short time. Some young trees were killed; we have not a guava this year. Two miles south of us there was no injury done. The same north. It did not cross the river. When we made fires

under my shedded grove to protect the bloom, the wind drifted the smoke out on the river, showing that the wind was from the east. We had it for several hours at 24 degrees, and some fruit near the ground we cut into and it was full of ice. We have been unable to find any explanation of these conditions, but the foregoing are the facts.

Mr. Taber—I have had some experience, and we have found that after the wind has blown for twenty-four or thirty-six hours from the northwest, and finally goes around and blows from the south, that we have it just as cold from the south as it was from the northwest, and we have actually lighted fires at 4 o'clock in the morning to protect the trees from the south wind.

Mr. S. B. Mann—in regard to the north end of a south wind, it is as cold as the south end of a north wind. In our county there has been a great deal of money expended in tents, in sheds and in open fires, and those who have made no attempt at protection, except the banking-up of the sand as high as you could make it stand, are just as well off to-day, so far as I know, and I have come to this conclusion—perhaps you would not all agree with me—that if I cannot grow oranges where I live without sheds or artificial protection, then I must quit it and do something else; and that, I think, is about the wisest thing we can any of us do.

Mr. Stevens—We have about fifty-five acres under sheds, and we are very well pleased with the results. We find the trees grow better under the sheds, they take less fertilizer, they have more moisture. We found the moisture warmed the surface and I will say this, that the trees under the sheds so far

take up ammonia so fast that it is very difficult to give them any regular fertilizer. They take up too much ammonia. We gave less of it and in some cases none whatever, and still results showed they had too much. Whether it is the ammonia has been taken out, I cannot say. Those trees showing sappy growth have no fruit. I think they will. One thing about the shed is that we have not got to hurry the fruit off for fear it will freeze.

Mr. Mann—I did make an exception of those sheds where there was fire kept up, and I think it is commendable in Mr. Stetson, who has the millions to do it with. We have not.

Mr. Russell—if it is true, as Mr. Stevens informs us, that we don't have to fertilize with nitrogenous fertilizers those orange trees which are under sheds, is that not a big item? That is the great thing we claim in the pineapple business, and so it is in growing oranges. If we can escape that big expense, if we can feed that orange tree with bone and potash, and get good fruit, I think we are ahead of the game. The nitrogen is the greatest expense.

Mr. Fairbanks—I can only give information from the result of some fifteen years of experience in Florida, and I think it will be encouraging. I came to the state about seven years after the freeze of 1835, and from that time on the trees were growing well until the scale insects attacked them and nearly destroyed all the groves. That seemed to be a destructive plague that would render groves impossible, but in a few years that passed away, and with care the orange trees were brought forward and grew.

From 1835 to 1895, sixty years, there

was no weather cold enough to kill a grown orange tree. Then it came, and it came in a double way. There came a freeze on the 30th of December, 1894. In the course of two weeks those trees all started up again and promised to have a crop that year, until, on the 8th of February, there came another freeze as severe as the other; but the difference was that the trees had then begun to grow again and had thrown out sprouts, the sap was up, and that freeze, with the sap up, killed the trees.

During all this period that I speak of there never was five years that there was not cold weather. There never was five years that the thermometer did not go down in the region of 20 degrees. Some of you recollect that in 1884 and 1885, when the thermometer went down so low that it took off the ends of the limbs. We will grow orange trees and they will withstand any ordinary freeze. It is only these extraordinary freezes which kill.

Now, whether we have or have not entered upon a new period of sixty years, Providence only knows, but what has been will be, and I believe that there will come a time, not very far hence, when these severe freezes will merge into the ordinary winter climate of Florida. What we want to do is to carry these young trees up to a hardy stage, and when you reach that hardy stage you are fixed for the future. I don't think there is any reason for us to be discouraged. I think that those who have cared for and banked them will reap a reward. I don't think that the climate is changed. We simply know that within a certain period there will come, some time or other, these very severe blizzards or freezes, and if it should happen to take

place in 1834 and 1894, we may look for them now. The question is, of course, open.

It is questioned by Mr. Stevens whether we shall protect these trees with sheds. A large number of orange growers may not be able to go to that expense, but there is a mode of preserving the young tree by banking, by means of which we have brought forward that portion of the trees which has been covered by the banks, and enabling us to bring our trees up to the stage where they will be able to resist the cold. The tent that I have been using for the past winter was a very simple device, consisting of three poles, with a tent that fastened around the top, gathered together at the bottom, and a good-sized lamp put inside. It is a cheap tent of twelve feet in height, costing not over \$1.50.

Mr. Barber—I ask for information on this subject. Is it not a fact that in past years the winter was as cold as it is of later years, but it was in the first part of the winter, and that these freezes that have done the damage are freezes that have come later in the spring? It seems to me, while I am a young man, that twenty years ago the winters were equally as cold as they are now, but I think that it was in the first part of the winter, and the seasons are changing and the cold is coming in the last part of the season, and is catching these trees after the sap is up and they are growing. If that be the fact, with the experience that the orange men have had in this State, could not these trees be cultivated and fertilized in a way that would hold back the starting of the growth to a certain extent later in the spring?

Mr. Fairbanks—It is undoubtedly true that the cold weather used to come at an

earlier season. In fact, we generally considered that there was danger any time after Christmas. The first two weeks of January were the point of danger. The great freeze came on the 8th and the second the 12th, and the last came as late as the 19th of February, which is the latest cold. Mr. Gaitskill has a theory that there is an evolution from the stars by which the cold weather is being removed on, and that when it is absorbed in the warmth of April we will have no cold weather. But, like everything else, this period in which the cold will come is a matter of controversy. Now, the Chinese have a system of keeping back their peaches and other fruit by removing the earth from the roots. If we can manage to keep the sap back to the 20th of February we will probably have no danger whatsoever.

Mr. Hubbard—There is a way for keeping back the growth of small trees, but the effect is bad. This last winter we had several rather cold snaps. On the 24th of February, on the surface of the ground, the thermometer was 35 degrees. Some of my neighbors covered trees with veneer boxes. Some of the trees were not covered. Inside those boxes where they had been kept tight and dark no growth had been made at all. It was as cold inside the boxes as it was outside. No damage was done to the trees because they had made no growth. But keeping them shut up retarded them, and after the cover had been removed some of them were a month later making growth than those that were outside, and the trees which had been boxed up tight had practically no fruit. As far as my observation went, it would seem that keeping

trees shut up close and dark has a bad effect.

Dr. Kerr—With six years passed and the next hard freeze to come in fifty-four years, although a comparatively young man, I am not afraid of that freeze. But, what little experience I have had in the covering of trees in the past winter, I have had just the opposite experience of that which Mr. Hubbard has spoken of. The trees that I had enclosed were not affected at all. I had them banked two and a half feet high. Then I had a strong string drawn around the trees, and drew them together and built a box over them. I had a loose cover top, and when the weather was pleasant I removed it. The boxes were only three feet square. All the trees that I had treated in this way, the first of March, when I removed the boxes entirely and took down the banks, the growth was six inches, and they are the only trees to-day that bloomed and have fruit upon them. Other trees looked well, but they were a month later catching up to these trees. They looked better, were greener, and showed it in every respect. One night I was a little frightened and I had all lamps ready, but concluded that it was not necessary. Only one night did I place lamps in these boxes, and then I believe that it was unnecessary.

Mr. Russell—I believe Dr. Kerr has said that he took the top of the cover off at times to air those trees, and Mr. Hubbard told about boxing his trees.

Mr. Hubbard—The trees that I spoke of where the growth was retarded were kept covered up tight. Trees, of course, that had the covers removed, except on cold nights, made more growth than those outside. Where cloth covers

were used instead of wooden covers, the trees made as much growth in these boxes as where the wooden top covers were removed.

Mr. Butler—Last winter I covered a quarter of my grove so that there was almost no sunlight at all, just to see what the result would be; and the only result I know so far was that it was three weeks behind the other part. I suppose, because I kept the sunlight off.

Mr. Hart—I would like to cite Mr. Shooter's case. He covered a grove of seven acres tight during the winter and he found he could keep his trees dormant for three weeks later. My shed is covered so that it gives a half shade, and those trees start earlier than they do outside. It is largely a matter of shutting off the light or admitting it.

What Mr. Stevens said in regard to dieback is one point that I spoke of last year, and cautioned those in regard to working their trees too much. I saw an indication of dieback at that time. It was one of the things that we had to learn under the new conditions. I learned that it would do that and the reason is because there is so much more moisture and warmth in there, which makes the soil ferments more active. And if you work your soil a little too much or fertilize with an excess of nitrogen, you have a case of dieback. I just quit working in the shed, and don't intend to work my trees until they show some sign of need of nitrogen again. This has cured the trouble and the trees have put on a fine growth.

Where the covering laths are an inch or more thick, they shut off the light very much more than laths three-eighths of an inch thick. If the laths are thick, the sun's rays cannot get down between

them until it gets high in the heavens, and they are soon shut off in the afternoon. More than that, the thick lath does not last as long, for the moisture cannot dry out before fermentation begins and causes rot, while thin laths dry out, keep sound and only wear out. The result of having thin laths and having more light is that my shedded grove put on a full bloom this year, and, as stated; a good even crop right through the grove, so I have no reason to complain. Anyone who would grumble and want more would be a little selfish. The mercury went down outside to 24 degrees at my place. That is lower than it went up this way. At that time the growth under the shed was perhaps two to six inches long and carrying blossom buds in plenty. I had about one fire to five or six trees under my shed and kept the temperature above the danger point. Out in the open grove I had small fires. I had a small pile of wood at each tree. I fired every other pile, every other row. It seemed to be a perfect success, protecting those large trees covered also with fruit buds with small fires in the open ground. I don't think we could have done as well with small trees. Only one fire to four trees kept the mercury six degrees and more above outside temperature, while I was prepared to fire at every tree, but had no need to do so.

Another point that I want to discuss is that we have freezes every four or five years that will destroy the crop if it is on the tree at the time. With the shed, you can save your crop; the shed is an added safety. Mr. Fairbanks thinks and I think that if the trees could get large, as they were before, they would be less liable to injury by freeze. With the

trees we have that we have not set out since the big freeze, there are more callouses near the ground, so that if our present old trees got back to the old size they will not be as safe as before, but trees planted now would be just as safe as they were before the freeze.

Question—How much did your shed cost?

Mr. Hart—My shed cost me \$450 an acre. It will cost a little more than that now, because material is a little higher priced.

Question—What would it cost per acre if lumber could be had at \$6 a thousand?

Mr. Hart—That is exactly what I paid for mine; it is thin pecky cypress; that is the lumber which covers the sides and the laths for the roof cost \$1.25. The only thick stuff which I used, costing \$10, was 1x6 run across the top of each line of posts one way. The top is fifteen to sixteen feet.

Mr. Painter—I would like to ask if Major Fairbanks remembers, in his experience in Florida, any year in which we had frost as late as this year.

Mr. Fairbanks—I think not. I have known on one or two occasions a late frost that would take the bloom, but it never got down as late as this year.

Mr. Waite—in 1890, the 17th of March, we lost 1280 trees in Marion county that were eight to ten feet high.

Mr. Hubbard—A few days ago I was talking with a native of Florida whose father lived here at the time of the freeze of 1835 and who hunted the Seminole Indians. He told me that his father always told him that the first freeze in 1835, although it did a great deal of damage to the trees, did not kill them all out. Then they had a frost the 10th

of April that killed them to the ground.

Major Fairbanks—I should doubt very much that statement. We have authentic information on the subject in Williams' History of Florida which gives a somewhat detailed account of that freeze, and I think we can assume that this history of Mr. Williams, which was written in 1837, is authentic. I have also seen it stated that it occurred on different dates. I think that my recollection is fixed that the freeze of 1837 occurred on the 17th of February.

Mr. Hubbard—This gentleman said there were two freezes that year.

Miss — : I would like to tell of a cover that my father has tried at Dade City. It is made of slats and lined with palm leaves, two layers, about four inches thick, and inside the palm leaves is moss. One of them he tried this year was round, the other two were square and fastened with hinges, and during the winter weather he would take the cover off the top so as to have ventilation, and he found them very successful. I have not heard anything of that kind mentioned. The other trees around were damaged badly.

Mr. Potter—We have four acres of grove and will have two or three hundred boxes of oranges. There were 117 tents and where we put these up the trees were a month later in putting out. One was a grapefruit, but it has no fruit on it and no bloom, while of the other trees, one-half have fruit on them, and the tangerines have one-third less fruit than those which were outside. I would like someone to explain whether it was the fault of the tent or what?

Dr. Kerr—I believe it was because they were not sufficiently ventilated.

Mr. Potter—They were put up the

middle of November and taken down the middle of March, opened on all pleasant days. They were only closed up five times during the season.

Mr. Mann—Can anyone explain to us why it is, as seems to be a fact, that the temperature inside of a tent with the lamp is lower than it is outside at the same time?

Mr. Butler—I don't know about the tent business, but the first year we had sheds up I never found a single night in which the thermometer was not 30 degrees in it, or lower. In many instances I found that the thermometer was as low inside as outside, and one night I found that it was a little lower. That is the way we stand with the thermometer. Those variations occur to a less or greater extent.

Mr. Mann—The tents were put on every alternate tree, and of course they could not test all of the grove; they could only test part of it. The trees outside of the tents were not injured; those inside of the tents were almost ruined.

(Note by Secretary—The following remarks were made later in the day, but are placed here in order to preserve continuity of the discussion.)

Mr. Hubbard—This afternoon I received corroboration of the statement that I made in regard to the 10th of April frost in 1835. It seems that one of the oldest inhabitants of St. Augustine—Mr. John Masters, who lived here all his life—was here at the time of the Seminole war, and died about a year ago over 90 years of age. He had a grove right north of the town and he told my informant a number of times that there was a second frost in 1835, in April, which did most damage to the orange

trees which were full of sap and growing. Of course, with everything lush and growing, a heavy white frost, say 28 degrees or even 30 degrees, would kill the sprouts and young trees. I thought it would be of interest to the Society to know that there were two freezes in 1835.

Mr. Mann—I would like to ask Mr. Hubbard if he learned in any of his inquiries whether the winters following 1835 were cold winters as we have had for the last four or five years? I have been told that the freeze was followed by a series of cold winters.

Mr. Hubbard—Well, I don't remember. There are several gaps in the records. Mr. Mitchell, the weather bureau director in Jacksonville, has compiled records from all the information he could get as to frosts, and I don't remember now just how that was. By reference to the 1899 report of the Society, which contains the weather map of the historic freezes, and those records of Mr. Mitchell's, one could follow it up pretty well. But there have been cold winters at intervals of five or six years since records have been kept. In a recent article in the Florida Agriculturist I showed the connection between cold winters and sun spots which have periods of five to six years.

(Note—The article referred to by Mr. Hubbard is as follows:)

SUN SPOTS AND FREEZES.

Sir Norman Lockyer, the eminent astronomer, in a recent article, quotes the following table that has been prepared by meteorologists who have been studying the effects of the eleven-year periods

of sun spots on the rainfall of India and other countries:

| | |
|-------------------------|-----------------------|
| Rain from—pulse..... | { 1897. |
| | { 1898. |
| | { 1879 (part.) |
| No rain pulse..... | { 1879 (part.) |
| | { 1880 central year. |
| | { 1881 (part.) |
| Rain from X pulse | { 1881 (part.) |
| | { 1882. |
| | { 1883. |
| | { 1884 (part.) |
| No rain pulse..... | { 1884 (part.) |
| | { 1885 { central y'r. |
| | { 1886 } |
| | { 1887 (part.) |
| Rain from—pulse..... | { 1887 (part.) |
| | { 1888. |
| | { 1889. |

It is often asserted as a fact by old residents of Florida that wet summers are usually followed by mild winters. In studying rainfall it was found to be the greatest at the maximum and minimum of sun spot activity. In other words, it would appear that there is greatest heat activity in the sun during the years of these periods about five and one-half years apart, more moisture being evaporated into and precipitated from the atmosphere. It follows, therefore, that during the dryer intermediate years there is greater liability to cold winters. I have therefore prepared a table of these years, and it is interesting to note how closely the historic freezes in Florida come to these periods:

| | DEG. |
|---|----------------|
| 1836 | Feb. 7, 1835 8 |
| 1841 { No record. | |
| 1842 } | |
| 1847 | 1845 20 |
| 1852 { | |
| 1853 { | 1852 20 |
| 1858 | 1857 16 |
| 1863 { No records. February 20, 1864, snow; | |
| 1864 } orange trees killed at Brooksville. | |
| 1869 | { Dec. 1868 20 |
| | { Dec. 1870 19 |
| 1874 { | { 1873 24 |
| 1875 { | { 1876 24 |

| | |
|------------|--------------------|
| 1880 | Dec. 28, 1880 19 |
| 1885 { | { 1884 21 |
| 1886 { | { Jan. 12, 1886 15 |
| 1891 | March, 1890 27 |
| 1896 { | { Dec. 30, 1894 14 |
| 1897 { | { Feb. 8, 1895 14 |
| 1902 | { Feb. 12, 1899 10 |
| | { Feb. 18, 1900 19 |
| 1907 { | |
| 1908 { | |
| 1913 | |
| 1918 { | |
| 1919 { | |

NOTE—Bracketed years follow maximum and single years minimum sun spots.

In looking over this table it is most natural to suppose that variations in extremes from the years indicated as far as Florida is concerned have been equalized by severe cold in other parts of this or the Eastern continents, or perhaps in the Southern hemisphere.

It would appear also that the cold extremes have been coming ahead of the culmination of the cycles for the past two periods.

There has been a gradual tapering off in the intensity of the extremes for the past three years.

It does not appear from this short period whether intensity of extremes is greatest after a maximum or minimum of sun spots yet there is an approximate regularity that would lead to the expectation of three or four years of comparatively mild winters before extremes are encountered again.

The uncertainty as to whether the mountain billows of cold air will break from the polar regions with greatest force on the Eastern or Western continents, the small knowledge that has been gained of the light warm upper air currents that flow North to replace the heavy cold air waves, the short periods, comparatively, for which data have been gathered of magnetic and meteorological

changes, and the uncertainty as to whether extremes of heat, cold or precipitation will be equalized gradually over wide areas or suddenly within narrow limits, will make general predictions of weather changes for years or even months ahead, of comparatively small local value. Yet, as we look back at the

vast advances that have been made in all sciences in the past century, it is reasonable to hope that equations of the almost unknown forces can be prepared in the future that will give more definite answers to the problems of abnormal local conditions.

Culture of Early Peaches.

BY J. P. MACE, OF THE COMMITTEE.

Mr. President, Ladies and Gentlemen:

Anyone who has listened to or read the reports of your Committee on Peaches, Pears and Plums, with the discussions following these papers, for the past four or five years, I am sure must feel that if anything is said we will have to thrash over old straw.

The growing of early peaches in Florida has not been an unbroken success the past five or six years. The freeze of '95, killing trees back to the stump, again in '99, with perhaps twenty-five per cent. killed below the bud—in this '99 freeze my Angel and Waldo trees were killed back to large branches—crop of all early varieties lost by cold in 1900—a good crop of Angels and Waldos in 1901—all this, with the San Jose scale to contend with, must convince every one that the South Florida peach grower's bed is not one of flowery ease.

But with all these drawbacks, we believe there is money to be made in growing peaches in Florida. I still pin my faith to the early varieties, Bidwell's

Early, Suber, Maggie, Jewel, etc.; and to prove my faith by my works, I am preparing land now on which to set a new orchard this coming winter. Seventy-five to eighty per cent. will be of these early varieties.

The trees I have at present were set in my orange groves, about 300 in November, '86, about 900 in December, '95. The older 300 have been killed to the stump the second time; the others, except the latter kinds, once. High winds play havoc with the new limbs, splitting them off the stump because of this weakness; and I have strong hopes that the orange trees are to be spared to spread and grow and fill all the space with their incomparable beauty. And for reasons given before in this Society, I believe that the peach and orange trees should be in different plots of ground on account of different modes of cultivation. For these reasons, I have decided to set a new orchard. Will hold on to the old trees until new ones fruit, or for two more crops after the present one.

The present crop was saved by open fires—only lighting every other row. Fired five times during the winter, but know now that three times would have been enough. At the time was afraid to take chances. Orchards in our section not fired will have some fruit, but a very light crop of the early varieties. For all ordinary cold snaps, down possibly to 22 or 23, I believe it entirely practical to save young peaches with open wood fires placed northwest of each tree. But with such a freeze as we had that Monday morning in February, '99, if you could rest contented, my advice would be, stay in bed, sleep on, take thy rest; believing that it may be years before we will again be visited by such a blizzard. We have faith to push on.

Given a first-class piece of virgin high pine land, well cleared and plowed, set with first-class four to six feet trees as our worthy President knows how to grow, not closer than 20x25 feet, with a little good fertilizer, thorough cultivation, dig out the borers, fight the San Jose scale with kerosene or kerowater, thin the fruit, don't pick until well colored (not ripe enough to be soft), handle like eggs, grade and pack carefully, full measure pressed down, ship to good houses only—and await returns with an assurance and satisfaction that is sure to come with experience.

At one time in my life I was the happy possessor of forty Leconte pear trees, but as demands arose for more profitable uses of the land, they have slowly but surely disappeared, until only a beggarly half dozen is left. These are kept so that when my friends say, "Do you have pear trees?" I can truly say, "Sure. Why not?"

Led on by the glowing accounts of

fortunes to be made growing Kelsey or Satsuma or Blood plums, by our agricultural writers and nurserymen, not wishing to be left behind in any good thing, I set out 300 of these trees, fertilized, pruned and digged about them for three or four years, without results. They were uprooted and used for a glorious Fourth of July bonfire, to the delight of the small boys of the neighborhood. We now boast of only one plum tree, an Excelsior, set in '94, bearing a light crop in '97, better in '98, in '99 sold plums to the amount of \$11 and had all we wanted for home use; in 1900, shipped seven crates, which sold for from \$2 to \$3.50 per crate. Had some home sales and uses. Tree bending under present crop. Two or three of the newer Japan plums, Botan and Wickson, set three years ago, but no fruit to show yet.

As between peaches, pears and plums, give me peaches every time; three times a day if you please, sliced, with sugar and good Jersey cream, with an occasional cobbler thrown in for variety.

PEACH TREES UNDER PROTECTION.

Report by C. C. Shooter, of the Committee.

Mr. President, Ladies and Gentlemen:

The last few winters have emphasized the fact that if we wish to grow very early peaches some kind of protection is necessary. The old Peento, which is one of the earliest peaches to ripen, and also one of the best in quality, is going out of cultivation because it is so seldom that we can get a crop from it. In the few mild winters previous to 1895 it was the best paying peach we had.

That peaches will grow, thrive, and

fruit, and that the bloom and fruit can be saved, even in case of heavy freezes, I have proved in my two-acre grove, under cover, where for the last three winters we have never failed to get a crop, when all the peaches of the same varieties outside were frozen.

The most curious fact that I have observed is that the peaches will bloom in almost darkness not more than a week or a fortnight later than the same varieties outside, and that they will set and mature well colored fruit of fine quality with one-quarter shade and three-quarters light.

The main object, however, is to get the earliest peaches, and this can be done—

1st. By arranging the cover to give sufficient light, but so that it can be closed up quickly in case of frost.

2nd. By entirely changing the method of cultivation.

In outside culture it is our object to fertilize and cultivate late in the year, so as to retard the early blooming. In a shed, however, we want this early bloom, and must therefore cease cultivation in August or September, so that the trees can harden up the growths. They will bloom all winter. If the firing is properly attended to this bloom can be saved and a very early crop secured. The shed must be built high enough so that the trees will not require any pruning.

DISCUSSION.

Dr. Inman—I am engaged in growing peaches probably as far south as it has been attempted on any important scale; and I may say that I cannot report uni-

form success. Last year the trees did not do well. I do not think it was the fault of the trees for I obtained them of reputable nurserymen. I gave them good care, but both these and some of my neighbors' trees did not do as well as those which I have planted this year. Some of my old trees had the appearance of dying. I headed them back severely, they sprouted out from the stubs and have grown and made magnificent trees. They seem to be in better condition than even the young trees. It was only a small per cent. that had the appearance of dying. Most of my trees had a good crop. We have had peaches ever since January. This was from a scattering bloom that came on in the fall, and after the birds took in their share there was not much left. I think that there is no place in the State or South where peach growing can be engaged in as profitably as in South Florida. I don't think there would be any hazard in planting a peach orchard in Polk county on new land. I think there would be a great advantage in taking the virgin soil in planting a peach orchard. I have some very fine trees that are seedlings.

Major Fairbanks—Have you planted them in hammock or high land?

Dr. Inman—All in high pine land, land that has been cultivated in tomato crops for several years.

Major Fairbanks—I have had some experience in planting hammock land and the trees would flourish for a year and then die off.

A Member—My experience has made me believe that that is true, that they will die back sooner or later, and quicker than they will on high land. They must not be planted with oranges. To go into the peach business, my expe-

rience is that you must go into the peach business.

Dr. Inman—I would say in regard to planting them with orange trees, they seem to do equally as well; I have them growing where the peach trees are almost interlocking over the orange trees, and the orange trees are doing finely. I have five thousand orange trees and five thousand peach trees planted in the same forty acres of land. There will be two or three poor trees and two or three which I may not fertilize alike or may not care for alike, all right otherwise.

Mr. Porcher—Are those the trees that have had their tops cut off and have recovered?

Dr. Inman—Yes, sir; and those new tops on old trunks stand there now twelve or fifteen feet high.

Walter Cooper—The gentleman referred to the peaches on the hammock land. Now, we know it is a fact that in the muck land of Kissimmee the early peaches have done remarkably well. I have never been in the orchards; I have seen photographs of the orchard and of the fruit, but a neighbor of mine has been over the grove, which was eight or ten years of age at that time, and the trees were enormous and bearing well. There may be some conditions or some questions of hammock land that I know nothing about. My efforts have all been on high pine lands.

In regard to growing peaches generally speaking, I say that to do this to-day

the peach grower has got to tackle the business in a systematic manner. That he has got to adopt spraying as a part. I am certain of it and I did not learn it until this winter. I learned it too late to profit by it. I am troubled with a scale. This is the case where I would advise spraying. Of course, I would not make a general rule of it, but I believe that this work, as far as the peach is concerned, had better be prepared before the buds are out. There is a work that has been issued by the Department that is most comprehensive as applying to peaches in cultivation. But since they have adopted spraying as a part of their business, the result is so satisfactory that one cannot help but believe in it. Even spray one-half of a tree and it will have hundreds of full grown fruit on that half and hardly a single sign on the other half. I have some trees that I would like to spray, but I am afraid to do it. This year I lost them on the 10th of February. For sick peach trees, Dr. Inman's remedy, that is, cutting back, is one of the best remedies I ever knew of. After the freeze of 1899 we had 300 late peaches that were injured very badly. The matter was put in my hands. What would you do? I would go in there and saw their heads off. I saw one of the handsomest groves I ever looked at, about 400 unproductive trees. I said if they were mine I would saw their heads off and next spring I would have buds on every single tree.

Some Fungous Diseases of Citrus and Other Fruits.

BY PROFESSOR H. HAROLD HUME, OF THE STATE AGRICULTURAL COLLEGE.

Mr. President, Ladies and Gentlemen:

In the paper which I have prepared for this occasion I have decided to touch but briefly upon a few of the common diseases which affect the fruits of the State. To go into a thorough discussion of each and every disease would be entirely out of place. Such a paper would be much too lengthy and you would be thoroughly tired of the matter before I had finished. In the course of my remarks I shall touch upon a new disease of the orange, the scab of the Satsuma, pecan leaf blight, strawberry leaf blight, the crown gall of the peach and the pear blight.

A NEW DISEASE OF THE ORANGE.

In March Mr. A. E. Stebbins forwarded to the Department a number of diseased orange twigs affected with a trouble new to him. In some respects it resembles dieback, but must be considered entirely distinct from that disorder. The twigs appear in many respects to be quite healthy, but scattered here and there over the surface are rather circular, elevated, light brown patches. In some cases the elevated patches have a second elevation in the center. In diameter they vary from one-eighth to one-half an inch. In some cases they are confluent, forming patches of considerable area, frequently surrounding small

portions of apparently normal bark. In the early stages the spots show in the form of a number of small, dark, elevated dots, arranged in a somewhat circular group, and surrounded by a light yellowish band. This light band appears to mark the size of the spots when matured. In the later stages the elevated portions of the pustules cover nearly the whole surface of the twig, becoming somewhat grayish in color and giving to the bark a very rough and uneven appearance.

I have sought diligently for the cause of this trouble, but a microscopical examination has revealed nothing. It is possible that in some later stage of the disease something will be found which will point to a specific cause. Upon investigation of the literature of orange diseases I have not been able to find anything relating to it.

It is not common and has as yet done but little damage, though in one case a tree was found badly affected and nearly killed. I advised Mr. Stebbins to make an application of a fungicide, but have not yet heard whether it had any beneficial effects.

SCAB ON THE SATSUMA.

During the past year a considerable number of Satsuma fruits and leaves affected by scab have been forwarded to

the Department, and in spite of the fact that this disease is so commonly present in the State, it would appear that there are a considerable number who are unacquainted with its cause, nature and the means by which it may be controlled. For the reason just indicated I shall give a short description of this well marked disease. The fruit, when affected, is covered with wart-like corky elevations. Beneath these the tissue of the kind will be found to be somewhat thickened. The warts are at first yellow, translucent, then grayish, later becoming dusky in color, still later quite dark, and the tops of the excrescences break open. These warty elevations are frequently confluent and of considerable extent and irregular in shape, but when they occur singly they are cone-shaped. The disease is caused by a fungus, a species of *Cladosporium*. It affected the sour orange, lemon and bitter sweet.

METHODS OF CONTROL.

So far as I am aware, there is no other means by which this disease can be controlled except by applying a fungicide to the trees. The trees should be sprayed at least three times, giving the first application just after the fruit has set and the other two within the next six weeks. Use either ammoniacal solution of copper carbonate or Bordeaux mixture.

CROWN GALL.

The disease now generally known under the above name is widely distributed throughout the United States, and it is responsible for the death of many peach trees in the peach districts of the coun-

try. It annually costs the peach growers in the neighborhood of \$500,000. In Florida it is quite common and seems to confine its work to no one locality or class of soils, and it is without doubt a disease to be dreaded and guarded against.

How long it has been at work in the peach orchards of the State it is difficult to say. Its history goes back many years; presumably it has been present in Florida almost since the beginning of the industry.

The disease is characterized by the formation of galls of different sizes upon the crowns and roots of the trees. It is not to be confused with the galls formed by the Nematode, as they are characteristically different. Neither is it to be confused with the gummy, often rather hard, enlargements formed by borers at the crown of the tree. Usually the grower first notes its presence upon the tree just at or near the surface of the ground. Upon examination, galls will generally be found upon the roots as well and frequently diseased trees may be found, upon which the galls are formed entirely beneath the ground. The galls are excrescences composed of hypertrophied tissue. In the early stages they are small, usually somewhat rounded in form and attached to the root or stem by a somewhat constricted neck. They are quite smooth in the early stages, but as they become older and increase in size, they become rough, corrugated and wrinkled. They are at first light in color and the tissue is quite soft. Later they become brown, firmer and still later hard and brittle, which stage is characteristic of the dead gall. The life of the gall is about one season. It then dies, but about the old dead

one a gall in the form of a solid ring or a broken ring of galls will in all probability develop the next season. The disease frequently extends to the roots. The word "extends" is used advisedly, for it seems that in nearly all cases the trouble originates at or near the crown. Beneath the gall the wood in due time dies. The tree is weakened and, if not broken off by the wind, eventually succumbs. If the trees become affected while young it is quite safe to conclude that they will never reach bearing age.

The disease according to the excellent investigations of Toumey, is caused by a slime mould, *Dendrophagus globosus*. Tou. It belongs to the lowest form of plant life, that group over which botanists and zoologists generally disagree, each claiming that they belong respectively to the plant and animal kingdom. These low organisms are known as myxomycetes.

The vegetative stage is known as the plasmodium. During this stage it consists of free protoplasm capable of amoeboid movements. It lives within and feeds upon the contents of the cells. While it is developing in the tissues of the host the cells grow at an exceedingly rapid rate, and the gall in consequence becomes greatly enlarged. This rapid cell multiplication and enlargement in the host is caused by the stimulating effect produced by the dendrophagus and the effort on the part of the plant to overcome its enemy. The mold passes from cell to cell and produces in each new cell the same effects as in the one from which it has just made its way.

After a period of growth the plasmodium works to the outside of the gall and fruit is produced upon the outer surface. The fruiting bodies are almost spherical,

of a dark orange color, and contain large number of spores. These spores, under favorable conditions, give rise, once more, to the active plasmodium.

HOW THE DISEASE SPREADS.

If a few infested trees stand in the orchard, it may be carried from tree to tree while cultivating. A gall or portion of a gall is broken from a diseased tree by the passing cultivator and carried on to the next. Perhaps the trunk of this may be slightly injured in some way and the disease gains an entrance. It may possibly in some cases spread from contact of affected roots, and we must not forget that the spores can be readily blown about by the wind.

It is doubtless true, however, that the disease is most generally introduced into a grove by planting affected trees or trees which have upon them infectious material. One gentleman with whom I had some conversation regarding this disease told me that he purchased from a nurseryman a number of peach trees and found galls upon some of them. He destroyed the affected ones and planted the remainder. To-day there is plenty of crown gall among his trees. This is, I believe, the way in which the disease is only too frequently introduced, and an infested nursery from which trees are sold can be considered nothing less than a menace to the peach industry of the country.

OTHER TREES AFFECTED.

The disease affects the plum, prune, cherry, apricot, almond, apple, pear, raspberry, and probably other trees and shrubs. My attention was called to a

diseased rose bush not long since. Some distance above the ground there were excrescences which appeared very much like the crown gall and I was, I think, correct in pronouncing it that disease.

METHODS OF CONTROL.

These have in part already been suggested. Do not plant infested trees or knowingly plant those which have been in contact with infested ones. Nurserymen who have the best interest of the State at heart will not sell diseased or doubtfully healthy trees. Trees should not be sold from an affected lot and certainly no honorable man will place upon the market trees showing the disease, and certainly no wise fruit grower will plant them.

Such trees should be burned; old diseased trees should be dealt with in a like manner. They are generally unprofitable and must simply be regarded as a menace to their healthy neighbors. I do not deem it advisable to plant diseased ground again. If it is desired to treat the trees, and it may be a good policy, if they are still vigorous and but slightly affected, they may in some cases be made to serve some seasons of usefulness if treated in the following manner: Carefully cut out the galls down to clean healthy wood. Cover the wound with a paste made as follows: Take four pounds bluestone (sulphate of copper), 2 pounds sulphate of iron, 9 pounds of unslaked lime, or bluestone and lime, in equal parts, will likely answer as well. Slake the lime, mix with it the bluestone and sulphate of iron in a finely pulverized state. To the mixture thus formed add sufficient water to reduce it to a paste.

PECAN LEAF BLIGHT.

It has always been stated that the pecan has no fungous enemies. During the last year, however, I have observed that the leaves of young pecan trees were affected by a disease to which I have given the above name. Several correspondents have also written me regarding it, and have enclosed specimens. I have not observed that it is injurious in any marked degree to old trees, but it has done considerable damage to nursery stock and to young trees recently set out. So far as I am aware, this disease has not before been reported.

The disease is characterized by the browning and withering of the leaves. At first small brown areas are noted. These become larger and eventually embrace the whole leaf. Trees affected by the disease make no progress.

The disease is caused by a species of cercospora, which I believe to be *Cercospora Halstedii*, E. & E. At least, it corresponds in nearly all particulars with that species. The spores of the fungus are borne upon conidiophores on the diseased spots. When examined under the microscope they are seen to be hyaline in color or somewhat smoky and are club shaped. They are divided into three or four cells, each cell being capable of germination. The conidiophores upon which the spores grow are darker in color than the spores, being quite brown. The spores when ripe are blown about by the wind, and, falling upon the leaves, produce again the disease.

METHODS OF CONTROL.

If the trees are small, they can be conveniently sprayed with Bordeaux mix-

ture, which will keep the disease in check. They should be sprayed just when the young leaves are coming out, and at least twice afterward at intervals of two weeks. The fallen leaves should be gathered and burned. By carefully following out this line of prevention, there will be no difficulty in holding the disease in check, as it is not of a serious nature, though when left to itself it causes a very considerable amount of damage.

STRAWBERRY LEAF SPOT.

The leaf spot disease of the strawberry must be regarded as the most serious fungous diseases of that crop in our State. In fact, it is the only fungous disease at present known to the writer which causes any amount of damage to the plant.

The disease affects the foliage and the first marks of its presence is the appearance of minute, purplish spots upon the leaves. These spots gradually enlarge and change in color, becoming a light gray in the center, but the periphery remains purple in color or with the inner edge shaded into brown. The spots are of different sizes, some are as much as three-quarters of an inch in diameter, though frequently a number of them coalesce, forming blotches of irregular shape and of considerable extent. In the natural process of the disease the substance of the leaf is destroyed. It becomes withered, brown and at length dry and dead throughout. If the season is in any wise unfavorable for the development of the plants, they are usually killed outright. If, however, this is not the case, the vitality of the plant is sapped, and the same quantity and quality of

fruit need not be expected from affected plants.

The disease is caused by a fungous parasite, *Sphaerella fragariae* (Tul) Sacc. Two kinds of spores are produced; those commonly known as summer spores are born upon conidiophores, which are produced in tufts. These are to be found upon the discolored areas. The other spores are commonly called winter spores and are produced in small spore cases called perithecia. Both kinds of spores serve to spread the disease, and the latter (those produced in the perithecia) are useful in carrying the disease through unfavorable periods. The disease exists upon the strawberry plant throughout the whole year in Florida, so that winter spores can scarcely be considered as necessary to its continued existence in the State.

METHODS OF CONTROL.

Two or three different methods have been recommended for the control of this disease. For old plantations, some writers have recommended the burning over of the crop. This, however, is not feasible, after the plants commence to bloom or are making growth previous to the blooming period. In small beds the diseased leaves should be cut off when first noticed, and if a little attention be given in this way it is not likely to give much trouble. In larger plantings, however, this is not feasible, and these should be sprayed. The results of my experiments at the Experiment Station this past season have been very satisfactory. In October forty-five different varieties of strawberries were planted. The leaf spot disease soon made its appearance and was allowed to run its course

in order to determine, if possible, the comparative resistance of different varieties of the disease. After having obtained results from that portion of the experiment, the beds were sprayed with Bordeaux, four pounds of copper sulphate, four pounds of lime to forty gallons of water. The first application was made on February 26, the second on March 8 and a third on March 18. By the time the last spraying had done its work the disease was completely checked and it was a difficult matter to find a leaf at all diseased in the whole patch. By May 14, however, it was noticed that the disease was making some slight headway, and the plants were again sprayed. It may be thought by some that Bordeaux mixture would be objectionable to the crop while fruiting, as the berries might be stained by its use; but on account of the habit of growth of the strawberry I do not think the objection has much weight. The ripened or partly ripened fruit is quite well protected by the leaves above, and as the spray is directed down upon the top of the plant, but little of it has a chance to reach the fruit and I have never been able to detect any staining when the crop was gathered. It is best, however, to make the application just after the ripe fruit has been picked. It may be of interest to make a few notes upon the relative resistance of different varieties to this disease.

Cobden Queen, Lady Thompson, McKinley, Improved Newnan, West Lawn, Aroma and Jesse were almost entirely free from the disease. Cloud, Pride of Cumberland, Howell's Seedling, Haverland and Earliest were slightly affected, while Murray's Extra Early, Mary Stu-

art, Seaford, Sample, Warfield, Parker Earle and Tennessee Prolific were very badly diseased. In fact, some of them were almost killed out.

PEAR BLIGHT.

The pear blight has been quite as common this year as formerly, although at Lake City the disease appeared to produce but little effect on the leaves and twigs. No fruit was, however, set on the trees, due to the destruction of the flowers by the blight. The pear blight is unfortunately very common in Florida. Hence it needs little or no description. Shortly after the flowers have opened it will be noticed that the ovaries and pedicels have become black and this blackening extends to the fruit spur, the young leaves, and eventually down into the older branches. It usually takes, under average weather conditions, about one week and a half to reach the branch. Throughout the whole season the affected or diseased branches can easily be picked out. They are dead and the black dry leaves still remain attached to them.

The cause of this well known disease is a bacterium known as *Bacillus amylovorus*, Burrill. It is a minute, rod-shaped organism, which develops within the tissues of the host. It is carried from flower to flower by honey-seeking insects. These gather honey from diseased and healthy flowers and as a certain number of the germs remain attached to their proboscis they are carried from one place to another. On the other hand it is doubtless probable that certain of the biting insects assist in some measure in disseminating the disease.

METHODS OF CONTROL.

It has been noticed time and again that a sappy condition of the trees accompanied by a vigorous, succulent growth is a condition extremely favorable for the development of blight. This condition should not be favored. Nitrogenous fertilizers should not be applied at all or only in limited quantities. Potash and phosphoric acid should be given in normal amounts. Cultivation should cease and it is best to plant the ground about the trees with Bermuda grass, leaving a circle of four or five feet in diameter about the tree from which the grass should be cleared away from time to time. The method of treatment outlined above, together with careful pruning, constitute the means of control. As soon as the blight has shown in spring, the twigs should be cut, and again in fall diseased branches should be taken out. They should be cut three or four inches below the line between the dead and living tissues, carefully removed and burned. This treatment has been given to one of the trees on the Station grounds. It was very severely pruned, but will, I believe, mature about one bushel of fruit. Others not treated have no fruit whatever.

If pear blight is ever to be brought well under control it will call for a united effort on the part of all those who have

pear trees in a community. One man may give the disease careful attention, but unless his neighbor does likewise the insects will carry the germs from the diseased to the healthy trees, thus rendering his efforts in a large measure futile.

DISCUSSION.

Prof. Hume—I have touched but briefly upon a few of the common diseases which affect the fruit trees of the State. To go into the matter at length would be entirely too much. I would say in relation to this new disease of the orange, that it may be a new phase of an old enemy, and I would like some of the orange growers to take this twig and see if you ever saw it before.

Mr. Porcher—I would like to get Prof. Hume to give us, if possible, some information as to the foliage affected by this new trouble?

Prof. Hume—I am sorry to say, Mr. Porcher, that I have not seen the foliage —nothing but those twigs. I have a suspicion that it is allied to the red rust. This came from Manatee county and was forwarded to me by Mr. Stebbins.

Mr. Baker—How far back does your investigation of this disease of the peach tree date?

Prof. Hume—I only started on it this present year, and have been working on it four months perhaps.

Blight of the Pineapple.

BY E. N. BROWN, OF PUNTA GORDA.

Mr. President and Members of the Florida State Horticultural Society:

As I am a young man in the pineapple business, I feel somewhat timid in presenting to this intelligent body a few of my thoughts on the pineapple disease called blight, especially since so many learned professors have been racking their brains to find the cause and remedy for this devastating malady.

But then, we should all be willing to be laid on the altar of criticism until this mysterious disease is fathomed.

In presenting our thoughts let us look into the anatomical or physiological structure of the plant, in a small way, before entering upon the disease proper. We notice at the base of the plant, after removing a few of the basal leaves, there are eyes for root sprouts something similar to the petals. The roots always start from these eyes and nowhere else, as there are no other places for them to start from. These roots grow long and slender like a shoe-lace, without any branches, absolutely, but are covered all along with fibrous feeders. These feeders are attached to the main lateral in a way peculiar to the pineapple plant, much like the slips and suckers growing on the main stalk of the plant, both of which have their origin in potato-like eyes. These feeders are as easy to detach from the lateral as the slips and

suckers are from the main stalk. In making this comparison, size considered thrown in.

I believe we all agree that the disease we call blight is a root trouble; that is, improper conditions of the roots. As these roots are not in condition to give the plant the proper food to sustain life, the plant turns yellow and dies. Now, I claim that anything causing the death of these roots will necessarily also cause this improper condition, and so they are unable to impart the life fluid to the plant, which causes this so-called blight, which merely means starvation, in my humble opinion.

And the causes for the death of the roots, you will readily see, might be many, such as worms or insects, moles, scuffle hoe, too much caustic fertilizer, too much or not enough of air around the roots, and the last I'll name, but not least by any means, stagnant water, which is more far-reaching than all the rest combined.

But this brings us to the proper soil condition for a pinery, which belongs to the subject of pineapple growing; but I shall not touch upon that here, but confine my paper to this so-called blight. Cut a root off at the body of the plant; that root never starts again. Cut it off a piece from the plant; the remaining root may feed the plant to the extent of

its feeders left between the stalk and the point where the root is cut. But said root will never branch out and form new laterals to extend such root or lateral, like the orange, apple, or vegetable kingdom in general.

I have seen the feeders extend themselves several inches in length at the terminus of the roots, where roots have been severed, trying, as it were, to form new laterals, very much like Aesop's fabled jackdaw which swooped down and tried to carry off a sheep, to emulate the strength and flight of the eagle, and so became entangled in the wool. The farmer came along, clipped his wings, and taking him home, his children asked what kind of a bird it was. He replied, "To my certain knowledge, he is a daw, but he will have it that he is an eagle." So with the pineapple roots, it is impossible to make laterals from feeders, no difference how much they try—enforced by heavy feeding—to emulate the lateral. They will, to my certain knowledge, be feeders still, and nothing else.

This is a significant fact in studying the pineapple, and especially this disease called blight. For if many of these roots are cut the feeding capacity of the plant is injured, and if all the roots are damaged or cut off close to plant, that plant will die as sure as roots become damaged or cut, unless there are more eyes further up on the stalk to furnish new roots. And if the plant is of good size, the chances are mighty slim for enough roots to form to insure the plant proper nourishment to maintain growth already started, for new roots do not start only from these root eyes, and a large plant needs many roots for healthy

growth. And if a sufficient number do start out, the plant will be nearly, if not altogether, dead before enough feeding capacity is furnished to sustain life and a sufficient growth of the plant.

Then again, if there are more root eyes, the chances are the basal leaves have not been pulled off high enough to permit the growth of these roots; so they form what is called or commonly known as tangle root, and so are not permitted to give the plant any help. Hence deep setting may cause this so-called blight, for these lateral roots don't take kindly to deep setting. Deep setting will put these deep in the soil, while the natural place is very close to the surface where they can obtain plenty of air and warmth, which are absolutely necessary for good growth for this luscious fruit of the tropics.

Some may ask what is the remedy for this. In answer, I would say, for a medium to large plant, there is practically no remedy. Better pull up and replace. But a small one may revive if the soil is removed, so that one can pull off basal leaves, which would permit these root eyes to put out new roots wherewith to feed the plant. But never by any means should the plant be pulled up to remove roots and to trim, which destroys all roots already started and feeding the plant, as these are absolutely needed to carry on the good work.

Now, I have presented my views. To me they seem reasonable, but to you maybe otherwise. If I have made any statements you don't agree with, give them a good breezing, which will be a benefit to all of us, by helping to unravel this mystery.

Ornamentals.

REPORT BY REV. LYMAN PHELPS, CHAIRMAN OF COMMITTEE.

The orange tree leads on the list of ornamentals. It is not only the queen of fruits, but it stands royally at the head of our ornamentals, as we closely examine its cell formation, so highly and beautifully developed, or when we breathe its exquisite fragrance.

Citrus Aurantium is naturally a low-branched tree, always graceful, with greenish brown bark, elliptical, ovate, coriaceous leaves of intense green, often with winged petioles and fragrant white flowers. The tree also is very long-lived. It is also most prolific in fruit, bears a large globose berry of eight or ten membranous cells, which are packed with pulp of fusiform cells, distended with an acid refreshing juice.

I single out no one variety in this description, but include the whole family of citrus. There are as many differing tastes as people in this respect. I include the heavily laden kumquat, especially when worked on the bitter sweet as a stock, as well as the pomelo when doubly worked on the bitter sweet, first to the Messina lemon and then to the pomelo. This last combination was pronounced the most beautiful tree Prof. Van Deman saw during a protracted stay in Florida.

As in architecture, all ornamentation, to be truly beautiful, must be useful, so our most ornamental trees are our most

useful ones. I have met a score of tourists who literally went wild over a row of kumquat trees worked on a bitter sweet stock. I did not oppose their tastes. I once on a December day gave a dinner to a party of Ohio editors and their wives, in an orange grove under the shade of the trees; they plucked pineapples, cut roses, pulled oranges, drank orangeade and lemonade, but most admired the well laden kumquat trees.

I need not speak of the rose as the ornamental before which all other flowers pale. You know it. You all have your favorites. It is the flower that befits the christening, adorns the marriage feast and is in good taste at the burial obsequies. It should be in every garden as an ornamental.

THE PALM.

The Oreodoxa granate stands at the head. The tree is characterized by the petals being united at the base in the pistillate flowers. There are six species of tropical America, all handsome, with tall, smooth, robust trunk. Some of the species are very tall, reaching one hundred and thirty to one hundred and fifty feet in height, with small white flowers, and small violet to deep garnet fruit on the slender drooping branches of a large spadix.

Oreodoxa regia, the royal palm, grows ninety to one hundred and thirty feet, and is found sparingly as far north as Florida.

The sabal palmetto we all know. We are pleased that the committee who decorated this hall so beautifully for us recognized it as ornamental. The cabbage tree, from its commonness, is not always appreciated.

Melanodendron integrifolium, the black cabbage, is a very grand tree, eighty or ninety feet in height, with symmetrical trunk crowned with strong composite leaves very much recurved.

The *Oreodoxa granata* has withstood

the cold, save in the Alaska-destroying blizzard of '99. It is by far the handsomest of its species, and the name freely translated means crimson glory of the mountain.

The needle palm is one of great beauty and symmetry for decoration. It is worthy of a place on all lawns.

Bigonia vanusta is a rampant growing tropical vine, with glossy dark-green foliage. It is the best of our tropicals in leaf and flower. It is a flame of flowers for fully two months, in its season. Its common name, flame urn, well describes it.

REPORT OF MRS. FLORENCE P. HADEN.

Mr. President, Ladies and Gentlemen:

The conditions in the extreme southern part of Florida are very different from the rest of the State. We have a great many trees and plants that have not been successfully grown in the open elsewhere. The committees on ornamentals of late years have confined themselves to trees and plants that stand frost. But as it has been shown that many tropical plants adapt themselves to moderate changes of climate, I will mention a few that are very ornamental and that would well repay the effort if they can be grown.

Several of our best fruit trees are as ornamental as most trees grown only for their beauty. The mango is a beautiful shade tree, remaining green all the year, as do the roseapple, canistelle, avocado, loquat, seagrape, tamarind, olive and others.

Among the purely ornamental trees,

the royal poinciana perhaps ranks first, especially when it is one gorgeous mass of scarlet flowers in a bed of fern-like leaves. Another handsome flowering tree is the geiger, but I do not believe it would stand much frost. Of course, the oleanders, hibiscus, the numerous foliage plants and crotons which grow so well in our section deserve mention and should be utilized, even where they require a little protection. The many stone fences in our rocky country would be beautiful if covered with vines, and there are a great variety that grow well. The Cherokee rose and other climbing roses, the sweet scented honeysuckles, the alamanda that always attracts attention from strangers, the star or wild jessamine and many others.

Mr. Davis, in Cape Florida, has made a specialty of palms, and his beautiful grounds show that he has chosen wisely. Of course, the most handsome of these

is the royal palm. On account of its usefulness, we plant more of the cocoanut palm, and are beginning to grow the date.

DISCUSSION.

Mr. Hubbard—It may be of interest to the Society to know of those palms which withstand our freezes. What appears to be the best of all is the *Cocos australis*. The foliage is similar to that of the cocoanut. During the 1894 and 1895 freezes it was not injured at all. The *Sabal palmetto* would show frozen spots on the leaves, which was also the case with the *Phoenix sylvestris* and the *Phoenix canariensis*. It is also interesting to note the California palms. A *Washingtonia robusta* on Mr. E. H. Hart's place, the trunk of which was twenty or thirty feet high, was killed out entirely in the 1899 freeze, and the *Filifera filamentosa* escaped. The fan palm I was speaking of is a *Latonia borbonica*, a Chinese fan palm. This was not killed out in the freeze, but the leaves were all killed back. The needle palm, *Chamaerops hystrrix* seen on the stairs, is said to be the only one of the *Chamaerops*, the European fan palms, found in America. Botanists first discovered it near Savannah. You will notice the needles about the base are six or eight inches long.

Mr. Phelps—It is the most brilliant green of all the palms, and its stem sometimes grows up four feet before it spreads out in the dark green leaves.

Question—What fertilizers are generally used to make such a success of bignonias?

Mr. Phelps—I used a fertilizer very much the same as I used on my orange trees, only I don't want one that has too much ammonia. The one that I use has 5 per cent of ammonia and 7 per cent. of phosphoric acid. This vine stands the sun very readily and does not require as much water as others. I do not use on any of these things any fertilizer that has organic substances; I use only chemicals. I do not put it into the soil; I put it on top of the soil, so that the rain will wash it in. I don't think I have stirred the soil at all during the past ten years among my bignonias.

Mr. Parmenter—I want to say a few words in a general way as to the great advisability of having in ornamentals as many as you can. From time to time I have studied Mr. P. J. Berckmans' catalogue, with the idea that what will grow in his vicinity will grow here, and I have noted down a few that have grown very nicely. One is the sycamore, and of all shade trees I think the sycamore is the best. I carried one home in my hand from San Mateo several years ago. I think it must be now sixty feet high. I have a Texas cottonwood which is ten years old, and it must be thirty feet high. It is recommended for a quick shade and for a quick shade it certainly fills the bill. I have a Japanese varnish tree. It is perhaps twenty feet high and has withstood all the cold and is perfectly hardy. The Carolina poplar is another very fine tree. These I speak of in particular; those that have succeeded and been very satisfactory. The Australian linden, I think, would succeed very well in Florida.

Civilization Increases Bird Life.

BY S. POWERS, OF JACKSONVILLE.

Mr. President, Ladies and Gentlemen:

Farmers sometimes grow a little weary of the oft-repeated lament over the destruction of the birds. There is no doubt that there has been a ruthless slaughter of plume birds, but some intelligent agriculturists who have given thought to the subject believe that man feeds more birds than he kills.

Let us take the continent as it was in its primeval condition. In the "starving time" of Jamestown Captain John Smith found no birds that he could use for food for his perishing colonists except a few water-fowl and wild turkeys obtained from the Indians. In the history of my native state, Ohio, I have read the writings of over fifty men describing pioneer life, and not one of them mentions any birds except wild turkeys and passenger pigeons. In Fremont's narrative he mentions no birds until he gets beyond the forests and emerges upon the plains, when he speaks of "millions of water-fowl," "flocks of screaming plover," "a supper of sea-gulls," etc. Arrived in California, he found "some pretty birds in the timber, and partridges, ducks and geese innumerable." Again, "Flocks of blackbirds announced our approach to water" (the San Joaquin river).

Every farmer has observed the lonesomeness of a great forest—only a mournful chirp at long intervals from

some solitary vireo or similar frequenter of the deep woods. Only birds with strong bills like the passenger pigeon can feed upon the oak and beech mast; hence these birds practically monopolized the mighty forests; while turkeys and water-fowls occupied the streams and grouse the prairies. There were very few of those smaller, more obscure, but more useful birds, of which untold millions now wait on the footsteps of man. The showy, spectacular birds—what may be called the stage properties of "the great sloven continent" as it stretched out waste and silent before the discoverers—have been extirpated; but the little friends of man, the insect destroyers, have been multiplied beyond computation.

For instance, take the bird called in the South the rice-bird, and in the North the bobolink. In the early history of the Carolinas and Georgia, before rice culture was introduced, they were comparatively scarce. Nowadays, on the rich feeding grounds of the rice fields, they have propagated like locusts. They become so fat on rice that when one falls a distance to the ground it bursts asunder; if a match is touched to the body, it will burn. The rice-bird is not a friend of man in the South, but in the North it is; and in both sections it is uncommonly good eating. Man raises this bird al-

most as directly as he does the Leghorn.

Again, take the quail. In the vast piney woods and wiregrass belt along the South Atlantic and Gulf there is nothing for the quail. The mast is scarce and precarious, and needs a stouter bill than the quail's, and the wiregrass makes no seed. There is not a more hopeless region on the continent for birds. But man clears away the forest and plants corn, and after the corn there comes up a jungle of beggarweed, a rich legume (*Desmodium tortuosum*), densely covering the field, hiding the cattle out of sight and even the cornstalks. It covers the ground with millions of tiny beans which nourish flocks of quail and make Old Florida the sportsman's paradise in winter. These countless quail and many other birds all feed on the bounty of man.

Take the mockingbird, or the mocker, as Floridians affectionately call it. Primeval Florida had millions of parakeets and other gay-plumaged, harsh-voiced birds, fit companions for the stoic savage; but the sweet singer in its humble dress, appointed to cheer the lonesome orange grower, remote in the piney woods, awaited his coming. When the orange groves were planted they took possession of them; they were satisfied and increased greatly. Many a night in May and June I have listened to their midnight serenade, especially on moonlight nights, one answering another in some distant grove, in a wide-circling chorus, a polyglot antiphone.

Then came the disaster of 1895. The mocker had seen the orange trees defoliated before, but it built its nest with cheerful confidence, thinking that the leaves would come and cover it from the sun. But that spring, the saddest of

Florida's history, gloomy alike to man and bird, the leaves came no more. I had cut down my dismantled trees and one morning I stood on my veranda and watched the bewildered mockers, searching in a solitary palmetto, in the ivy at the chimney top, in the brush piles, for a place where they might build. They put a nest in a brush heap and laid their eggs, but the sun beat down hot on it, and they quitted it in disgust. That was a lonesome, silent summer in Florida; but now the groves are growing up and the mockers are heard again.

The same with the shrike or butcher-bird. Both he and the mocker delight in an orange grove. I believe that their number actually diminished that summer; that many of them raised no young because they had no homes, no orange groves.

In the wise economy of nature, man has destroyed the birds he did not need, but propagated those that were useful to him as consumers of the weed seeds and the insects that pillage his crops. The pigeons were excellent food, but they required the beech mast, and beeches grew on the richest land which man needed for his farms. The pigeons of England were once as numerous as in America, proportionately, but when the beech-nuts were gone, as Gilbert White relates, they fell to eating turnips, which ruined the flavor of their flesh.

The grouse on the prairies were valuable for food, but few in number, for prairie grass produced no seeds.

The spectacular plume-birds of Florida are gone or rapidly going. Is it not just as legitimate to kill one bird for its plume as to kill another for its flesh? Their beauty pleases man and honors the Creator far more when displayed on the

bonnet of a comely woman in the city than it does when wasting and rotting in the unpeopled swamps of Florida. More than that, these plume birds consume the fish that Florida needs for food and for fertilizer on her thin, sandy soils. Whatever the Anglo-Saxon race does is right, for it is the nearest representative of the Creator on earth.

DISCUSSION.

Mr. Butler—I would like to ask Mr. Powers why he don't stick to the text. He began with the influence of man upon bird life, and ended up with the influence of birds upon man.

Dr. Kerr—I generally have a great

deal of respect for what our Secretary says; and I thought he was an advocate for the protection of birds. His subject was the influence of man upon bird life. Not its protection; I believe he has not advocated that. The closing of his remarks would show that he was anything else but an advocate, and I quote what he says about the plumes looking so nice upon the ladies' bonnets. Now, I wish to say that the ladies of America are beautiful enough without the stolen embellishment of these beautiful birds. They don't require to be decked up with these things. Away with them! Leave the birds to float in the air, filling our hearts with the songs of heaven for ever and ever.

Pecan Culture.

A DISCUSSION.

Prof. Hume—I hoped to avoid the question because I have prepared nothing especially for the occasion. I started out nearly two years ago to give this subject some attention, and I still continue to work on it. In fact, I am making it one of the special lines of my investigation. I am very sorry that Dr. Curtis is not here, and would not like to say too much, because I might be trespassing on his ground. But the line of investigation that I am pursuing at present is that of top-working pecan trees. I am becoming more and more disgusted with the seedling pecan. I have no use for it and I have but little faith in the

statement regarding the pecan coming true from seed. I have not been able to get hold of any nut from a pecan tree that is just like the nut that was planted. I have gone through a number of the groves when they were in fruit and when I find a tree giving nuts no larger than the tip of my finger, I am pretty nearly in a state of mind to ask the owner to cut it down immediately, and there are hundreds of trees that bear nuts of that description. They are little larger than chinquapins. All sorts of opinions are brought forward against budded or grafted pecans, but to my mind they have no superior. Why a pecan should

not bear as well as any other tree when they are budded is a question I cannot understand. Some bring forward the statement that the grafted orange is not long-lived, and so they say it will be with the pecan. Men who make that statement don't know what they are talking about. Then again if you bud the tree and then transplant it, it will not grow well. Top-working can be done as well on the pecan as on a plum, peach or any other tree. The methods by which it is accomplished are three in number.

The cleft graft is probably the most successful for top-working. The work has to be done in Florida between the middle of February and the first week in March. I would run down as closely as possible to the commencement of growth. Of course, if you have a large number to work over, you cannot leave it off until the last three or four days. The budding is principally of two forms, or one with a modification of it. The common form is the annular method. The budding should be done between July and August, and I believe by giving this matter attention they can be very successfully worked over to a new variety, and I believe it would be very profitable.

PECAN ON HICKORY STOCK.

Mr. Fairbanks—I would ask what is your experience with grafting the pecan to the hickory?

Prof. Hume—I have in mind a large grove of hickory trees where it is being carried out, but I cannot speak of the result.

Mr. Fairbanks—I have had experience of grafting the pecan into the hickory. So far as the graft itself is

concerned, and not the growth of the pecan on the hickory, there is no question of success. There seems to be a natural adaptation between the two. If we can successfully graft the pecan into our young hickories, we have a source of income which is well worth looking into. So far as the actual fact is concerned, there is no question on that point. If the graft grows on the hickory, I do not see why the fruit should not be as good as any other tree which is grafted. Although I don't know the result, still I see no reason.

Prof. Hume—I did not refer particularly to the quality of the nut, but to adaptation of that stock. I don't see why it can't be successfully done. The pecan and the hickory are as closely related as the sour and the sweet orange. We have the different varieties of hickories which belong to the same genus and are very closely related. While we can graft and work the pecan upon the hickory successfully, I believe it will never come into favor with the nurserymen, for it is easier for them to get pecans for stock.

Mr. Porcher—I would like to ask Mr. Fairbanks what is known as to the results of grafting the hickory, such as is grafted to the pecan. As I understand, it is usually scrub hickory, which very seldom attains beyond a certain size, and in a few instances they grow for a time and then stop.

Mr. Fairbanks—The hickories are in character equal and otherwise the same.

Mr. Cooper—I grafted some hickories this spring, got a specially fine variety from Orlando, and there was a row of young seedling hickories on that place. I got only four grafts and we had a very dry spring, but I spared no care and the

nuts were very fine. Of the four grafts that I inserted into the roots, they are not very large, but they were some of them three or four feet apart, and there was only one of those grafts that tried to live. A little later, about the first of March, I had a seedling pecan that is only four or five years of age, and I took off grafts just previous to the budding out and tried four more of those hickory seedlings, and I have not got one to live. I would like to ask Professor Hume in regard to this budding. It would be difficult to get limbs low enough. Would you saw the tree off or would you head the branches back?

Prof. Hume—I would prefer to leave the stubs of branches and let them come out.

GRAFTING AND BUDDING.

Mr. Griffing—When we started in the pecan business we tried grafting and we got very few to live. After a good deal of experimenting we gave up the grafting. In July and August we have found out that budding is most successful. Year before last I had fully 50 per cent. of our buds to grow, and we are very much in favor of budding. All the way through we find the percentage is very much higher.

Mr. Gaitskill—I have had some experience with the hickory and had fine success with grafting. It was as easily done as anything I have ever done. I had no trouble at all.

Mr. Hart—Mr. Adams, the former President of this Society, years ago had a good many sprouts come up in his grove, so he put grafts into them. I don't know whether he did any budding or not. The trees are scattered over his

grove, the result of that grafting. The trees when I saw them a few years after were full of nuts, and those nuts, according to his taste—and he was a very tasty man—he considered better than almost any he had ever eaten. They seemed to be exceedingly fine. They were not very large, but twigs were as large as the ordinary pecan scions then, and as soon as I was allowed to go home from the court I took some with me and cleft-grafted them into the hickory with great success. A year ago in February I took a scion from one of them and cleft-grafted it a little below the ground. They made a growth one of about seven and one about eight feet, and had several branches from two to four feet long; made a most remarkable growth. It seems to me that one of the best ways is to cleft-graft below ground. There are a number of trees on the Halifax river that were grafted on the hickory. They grew very successfully.

Mr. Wiley—I have had some little experience this spring in grafting both the pecan and hickory, and I found that wherever I grafted under ground, the success is very much better. Very unfortunately, this spring I have lost over 50 per cent. of my grafts on account of dry weather. Between the first and middle of March they had started to grow beautifully, but when this dry weather set in I think I have lost over 50 per cent. of them. I have done very little grafting until this year. I would like to know if there is any member of the Society that has had any experience this season in grafting.

Mr. Gaitskill—My grafting this year was usually under ground, and my success was very poor. I don't claim that this result is conclusive. I have laid a

portion of the blame to the dry spring. Heretofore I have always taken the precaution to mix up a clay putty, and after inserting the graft I applied clay, and if the season was dry I applied Spanish moss, and this year I did not take that precaution. So I have no reason to blame the weather. At the same time I took such trouble with the insertion I expected better results. I had much better results in the same soil with the persimmon.

Mr. Taber—Success or failure in grafting the pecan depends very largely upon the weather that ensues. If the ground is moist there is very little danger of any natural loss; at least, success is practically insured. But if the weather turns very dry and the cions dry out, which they will do, the loss will be heavy. A gentleman who had grafted some pecan seedlings had a method that was quite interesting to me. He cut off the limbs anywhere from an inch to an inch and a half in diameter and inserted cions well waxed over, and the next thing he did was to fill a bottle of water and tie it on the stub of the tree. Wrap the cion with one end of a cloth and keep the other end in the bottle of water. Capillary attraction keeps the cion wet and prevents drying out.

Mr. Butler—I grafted a citrus tree and found by putting a jelly glass over it it did much better.

Mr. Mann—I have about forty seedling pecan trees. I planted the nuts

some six or seven years ago and they now range from four to twelve feet high. Last fall I was very much surprised to find the limbs all cut off. Looked as if someone had taken the clipper and clipped off the ends. I picked up the limbs and on close examination I saw that there had been an insect at work. I remember that I had heard that that was one of the ways which insects have of propagating themselves, by cutting off the limbs, and I did not know of any other way than to gather up all those twigs and burn them.

Prof. Hume—I would simply state that what Mr. Mann did was the best and the only thing to do. The egg is laid toward the top (?) of the twig and then the insect walks down a short distance and cuts off the twig.

Mr. Mann—Is there any way to prevent his work before we find the limb cut?

Mr. Cooper—I would just say for the benefit of this gentleman that five years ago I put out about a hundred very fine pecan trees. They were seedlings and bore fine fruit, but that little insect would cut off the twigs. I got my foreman, got a cane rod, wrapped moss around it, sent out a man very early in the morning and burned them off. We have headed them off in that way, so they don't cut them at all. Take this moss with oil on it, not too much of a fire, and you will stop that work.

A Grape Experiment Station.

BY H. VON LUTTICHAU, OF EARLETON.

Mr. President, Ladies and Gentlemen:

This report will be confined to the experiment vineyard I have in charge for the Department of Agriculture, Division of Pomology.

I leave to the other members of your committee to report on grapes in general.

The object of the Department is to find, if possible, some varieties of *Vitis vinifera* that can be recommended for general planting and that may prove a benefit to the State.

We cannot say that the grapes we are growing now in Florida, American or hybrids, are satisfactory. If we want a grape for market outside the State we must have one that comes as near as possible to the hothouse grape; for that we have to go to *Vitis vinifera*. Two years ago the Department invited me to take charge of an experiment vineyard or grafted *Vinifera* varieties to be established on my place at Earleton. Should I accept, the possible benefit to the State was apparent, and personally it could not fail to be of interest to me, as I have always been interested in the culture of the grape.

Early in March two years ago I received about 500 vines of about 125 varieties, all grafted on *Vitis riparia* and *Vitis rupestris*. To attempt to grow *Viniferas* on their own roots is useless;

they will invariably die in a year or two. *Vitis riparia* and *Vitis rupestris* are the only suitable stock for Florida. Our own native wild bunchgrape, a Southern *Aestivalis*, is also not suitable. The very close trimming necessary to produce the best fruit of *Vitis vinifera* does not agree with any *aestivalis* roots; it strengthens *Riparia* and *Rupestris*, but weakens all *Aestivalis*.

The vines arrived in poor order, poorly rooted; naturally there were losses, twenty per cent. perhaps, which were replaced by the Department the following year. They were set out in proper vineyard form, a stake of fence-rail size and two pounds of blood and bone to each vine. Clean culture, in fact, extra good culture, was given all the time, and by fall the vines completely covered the five-foot stakes and hung down to the ground. No disease whatever.

During the following winter a trellis of three wires was built, the vines were cut back to one or two good eyes and again fertilized with about two pounds of blood and bone. I had the most luxuriant growth on these vines I ever saw; they covered not only the trellis, but the ground as well.

They were sprayed with Bordeaux mixture about every ten days; the leaves remained perfect until fall, the wood ripened to the end. January last a

fourth wire was added, and all vines of the first planting were trimmed to fruiting spurs, the best and only principle for Florida. All my vines begin their spurs ten inches from the ground; to get them depends on the management of the spring growth the year before, which naturally is all-important, in fact, the foundation of the vine.

Each vine received about April 1 two and one-half pounds of blood and bone and potash, and at this writing they have again covered the four wire trellis, and with very few exceptions are full of most

promising fruit. Spraying is done every ten or twelve days, depending much on the weather, and will be kept up until fruit shall begin to ripen. By the end of June I shall be able to present to anyone the finest collection of ripe Vinifera grapes ever seen in Florida.

Still, no variety could yet be safely recommended; but at your next meeting I shall be able to name some varieties that can be planted with a fair chance of success—if grafted on *Vitis riparia* or *rupestris* only.

GRAPES, FIGS, KAKI.

By W. D. Griffing, of the Committee.

Mr. President, Ladies and Gentlemen:

Very little interest is manifested in any kind of fruit growing for commercial purposes, outside of the citrus family, by this Society; and for this reason many of the meetings have been of very little value to some of the members in the northern and western part of the State.

The subject of grapes, figs and kaki will, no doubt, be of interest to some of the members of the Society, as fruits for home uses at least. We try to have a few of all the varieties we grow in fruiting, which amounts to the same thing as the average grower having a few for home use. In grapes we have quite successfully fruited all varieties of the Muscadine class, and believe them perfectly at home in any part of Florida. The Thomas is the earliest with us by about ten days, and is about the best for eating out of hand. This is closely followed by

the Scuppernong, which by many is considered best of all. Tenderpulp is valuable for canning. The James is comparatively new and is a very large, fine-looking fruit that sells well in local markets; is also of fair quality, but in my estimation not up to either Thomas or Scuppernong. It ripens later and lasts longer. We have had James until frost.

We have also succeeded in getting very fine specimen bunches of most of the trellis varieties that we have tested, but find they must be on thoroughly well drained land of good quality. Ives, Concord, Niagara and Moore's Early are the most easily raised, but with special care we have raised as fine Delawares as I ever saw.

FIGS.

My experience with figs has been mostly with the native varieties, of which

Celestial, Brown Turkey, Lemon, Green Ischia and Brunswick are leading sorts. These all do well in our part of the State, but I consider Celestial the most valuable, as the tree seems to be hardier, and it is the most prolific and regular bearer. The fruit though small is very sweet and excellent for preserves. Old fig trees will stand much more cold than young ones. I have noticed in Jacksonville that very few trees that were five to six inches or more in diameter were killed by the '99 freeze, while all smaller ones were killed to the ground. I think it will pay to bank all fig trees, at least in North Florida, quite high in winter, as it is possible to save enough of the tree to make fruit the following season, even if the top does freeze.

We are experimenting with about thirty varieties of figs, mostly from California, some of which promise fruit this year, and we are in hopes to be able to increase our list by finding something of larger size and more hardy. In my opinion, the dampness in Florida would make it as impossible to dry figs, as we are used to seeing them on the market, as it would be to cure raisins; but if we can succeed in producing an abundance of fine fruit I believe there will be great possibilities in canning, also in fresh fruit in near-by markets.

KAKI.

The kaki or Japan persimmon is a grand 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. A friend of mine has shipped them to England, and reports that they were received in fairly

good condition and sold well. On the strength of this he has planted an orchard of about 2500 trees, using Hyakume, Hachiya and Tanne Nashi. He does not expect to market them all in England, but will give that market a thorough trial. He has had good success in our Northern markets.

The right soil for persimmons is quite an important factor, for while the native persimmon seems to thrive in almost any kind of place, I have noticed that the Japanese varieties on it do not last long on wet or heavy soils, while on well drained, sandy soil they last much better. It is my opinion that the best soil for them is the high, sandy land of which there is an abundance in Florida, and there is no objection to planting in old fields.

For home use there is no variety of more value than the Zengi. The most of its fruit is good while hard, and improves as it gets soft, until it is as delicious as a persimmon can get. It makes the best tree, and is the most prolific and regular bearer. The Hyakume, Hachiya, Tanne-Nashi, Yemon and Okame are the favorite market sorts. The Costata, Tsuru and Triumph are good late varieties, but must be thoroughly ripe, in fact so soft that they will hardly hold together, before they are good to eat.

DISCUSSION.

Mr. Bradt—I would like to ask what success, if any, there has been derived from shipping persimmons?

Mr. Embry—Mr. Stevens told me that he had applications for many more than he could supply, at advanced prices.

Mr. Bradt—I have made an effort to

cultivate them, and succeeded, but they did not keep any time at all, and unless I find some way to cure them I should consider it a total failure.

Mr. Pierson—Did the trees hold the fruit well?

Mr. Bradt—They have not fruited heavily as yet. They don't mature all at once. Last year they bloomed for an extended time. This year they seem to be blooming all at once. I had several trees that I was watching very carefully, and they promised a very nice crop, but during the rainy season their fruit dropped and I was wondering if it was usual, or if others had better success.

Mr. Parmenter—I would like to know what experience anyone has had in shipping Niagara grapes?

W. A. Cooper—It is so long ago I almost forgot, and I wish I had. I don't ship them; don't stand shipping at all. They fall off the stem. When they get to Cincinnati or New York, you lift them up, and the grape stays in the vessel while the stem comes up in your hand. The only thing I can say is, don't.

Mr. Embry—I have had some experience in the shipping of grapes, and it was a success. Sold them at \$2 a crate, and have also shipped to St. Petersburg and made a success.

Mr. Cooper—We shipped a carload of very fine ones to Chicago to the World's Fair; sent a gentleman on to represent us, and he was to sell them. We were

going to ship him a car every day or two. He got there, thought the market was very favorable indeed to handle grapes, and he was a little stiff about it with the commission men; was going to handle those grapes himself. I had a hundred pounds that I shipped and got back twenty-two cents in stamps for my share. Five of us went on a note in the bank to pay the freight on those grapes and to ice them and we had that note to pay. That was my experience with Niagara grapes.

Mr. Porcher—The trouble with the Niagara grape is that it is too early. It comes into the market when the market is full of all other kinds of fruit. The consequence is that it is practically impossible to sell them. I have been North and seen them arrive, and they literally could not bring the freight charges, and yet that grape, coming in later, if it could be induced to hold on to the stem, it would be sold at very good prices.

Mr. Embry—I would like to say that Salem is a very desirable grape to grow.

Question—What of the Delaware and the Catawba?

Mr. Embry—It will take a Delaware vine four years to get up to the size of almost any other vine of two years. The Delaware grape is a good grape, but I would hardly recommend it, and for any near-by market I would say that the Ives was preferable. In quality the Delaware cannot be beat.

Official Business.

ELECTION OF OFFICERS.

The Nominating Committee, consisting of F. D. Waite, Dr. George Kerr and Cyrus W. Butler, presented a ticket to the Society, re-electing all the old officers.

C. T. McCarty moved that a formal ballot be dispensed with and that all the old officers be declared re-elected. Carried.

(See list in front pages of the book.)

Dr. Kerr said the situation was truly appalling to him, as he was one of the committee, and the others dragooned him into nominating himself for re-election.

President Taber made a graceful acknowledgement, and the Secretary said he would simply say "Ditto."

Treasurer Hart returned thanks for this renewed evidence of confidence.

Vice-President Cooper said he was

surprised last year, and now he was more surprised than ever.

Chairman Phelps said he felt it a high honor to be elected to the same position fifteen years consecutively.

Mr. Hubbard said the Society had done a great work, and he had felt it an honor to serve on the committee so many years. The Society still has a great work of education to do, and he illustrated this point by a story of an ignorant old man who pointed out the ladybug feeding on the scales and said to him, "Mr. Hubbard, you ought to kill them there lady-bugs. They breeds the scale. You ought to kill every one of 'em."

Mr. Painter made a humorous speech, punning on the names of the other officers.

SELECTION OF NEXT PLACE OF MEETING.

C. W. Butler—A citizen of Tampa expected to be here and extend to you a cordial invitation to hold your next meeting there, but the party did not arrive. This morning and last night so many members and especially those from the East Coast expressed a desire to go

to the West Coast that we concluded to put forward the invitation from Tampa for the next meeting. Looking over the situation as a whole, Jacksonville has done nobly by us, and St. Augustine is to me the most delightful place I have ever visited. But in the language of a

member whose words bore weight, this question is a business one and should be settled upon a business basis. The object of the Society should not be forgotten and the greatest good of the greatest number should be considered; and there seems no place that so much needs your aid as the part around Tampa. The seeds of good you could sow there would be very great, and with the encouragement that comes from the presence of the Society I doubt not we should get new members. I would be willing to guarantee seventy-five. I am more than sorry Mr. Gillett was not here, because in my feeble way I am not able to present the situation, but I ask each member to think of this matter and to accept his better impulses.

Mr. F. D. Waite and Mr. J. C. Carter supported Mr. Butler in his invitation.

Mr. Painter—I move that we meet at Tampa.

Mr. McCarty—I believe the question is before the house now. Mr. Chairman, there is probably no necessity to say much, but there are some phases of this matter that ought to be placed before the members of this Society in order that we may all understand each other, in order that harmony may prevail now and in the future.

Standing in a hall so beautifully decorated as this has been by the hands of the hospitable people of St. Augustine, and taking this vote, it might be enough to give them the impression that we do not appreciate their hospitality. There never was a meeting where we have enjoyed ourselves more, where there has been more cordiality and hospitality extended to us, and in parting with them this year we wish to assure them that

they have a warm place in our hearts. No other place in the State was better able to entertain us in an emergency like this. They had everything necessary. They have done so nobly we wish to extend to them the token of our regard and appreciation.

Last year I, in conversation with many members of this Society, reached the conclusion that the time had arrived when this Society should have a permanent home. When we should not be a jumping Association from year to year running around the State. We believe that we should have a permanent home where we could have a hall and a library and many other things that this Society needs. Events have transpired that have swept these things away, that have dashed that for the present from the lips of Jacksonville. I wish to say this in favor of our meeting in Tampa, that we appreciate that magnanimity with which they submitted to defeat last year. There is no nobler trait in the human race than to take disappointment gracefully. We pay them that tribute now and if they ever had a sore spot in their hearts, we hope that we are forgiven. Further than that, I wish to say this with reference to our future, and when I say this I speak not only for a large number of the individual members of this Society, but for some of its ablest members, we do not relinquish, in going to Tampa this year, the position that we took last year, that Jacksonville offers the proper place for the permanent home of this Association.

With these few statements, I take pleasure in seconding the motion that the meeting be held at Tampa next year.

Mr. Amsdem—This year we had only one day in which to purchase our tickets and we had to start on that day.

Mr. Taber—In regard to the rate itself, the one-cent-a-mile rate is not only a special rate, but a very special rate. I don't know of any other society in the State that has secured that rate. It is a rate that the railroads are very chary about giving to any society. One fare and a quarter for the round trip is as good a rate as any other society gets. Some years ago Mr. Healy, through his influence, obtained the special rate, and we have had that rate every year since. The railroads have very kindly recognized our position and accorded us that rate ever since. This year they accorded the cent-a-mile rate asked to Jacksonville, and it was announced just the day before the Jacksonville fire that notice had been received from Mr. Richardson, by the Secretary stating the rate had been accorded. Of course, that fire changed altogether our place of meeting, and we then had to go to them and ask them to put into effect for St. Augustine the rate that they had made us to Jacksonville and they did so. Now, in relation to the time of getting to our destination, I would say that when Jacksonville was decided upon as the place of meeting, the representatives thought

that the date set was sufficient to get the people into Jacksonville before the evening meeting, and it was for almost every one in the State. And when we got them to change our place of meeting to St. Augustine we did not ask them to give us more time. Perhaps we should have gotten it in that way, but at that time in Jacksonville the railroad officials and all other officials were all up in arms. There was that terrible calamity upon them and we did not ask them any more than we could help.

The vote for Tampa was unanimous.

Mr. Butler—if you derive one-half the benefit that I do or one-half the pleasure from the entertainment the next year, I believe you will be well satisfied. I should have stated that, in regard to the railroad fare, one cent a mile has been promised already.

Mr. Taber—I think I am safe in saying that we can obtain a longer time during which the rate will be applicable.

Dr. Inman—in behalf of Polk county, I extend you our thanks. I think it is a wise move; I think it will conduce to the growth and the health of the Society and I think that we can give you one hundred new members from Polk, DeSoto, Manatee and Hillsborough counties during the next year.

Officers' Reports.

REPORT OF SECRETARY.

If the members of this Society will come with me I will conduct them through the streets of Jacksonville to the ruins of a certain house. In the middle there is a little heap of yellow ashes, and in places you can still trace the outlines of books and decipher some letters. Take up a handful of them and they have a very soft and velvety feeling. There is a large amount of good brain matter in those ashes, but our enterprising fellow members who manufacture fertilizers would not pay twenty-five cents a hundred for them for use in their goods. That little heap of yellow ashes is all that remains of the voluminous records and reports of this Society.

I happened to have a few copies of the reports in my office. Mr. W. S. Hart, Mr. E. S. Hubbard and Dr. J. M. Hawks have kindly supplied some missing numbers, and with a little further assistance I can reconstruct the file.

On behalf of the Society, I wish to return thanks to several gentlemen for their zeal in securing new members by a personal canvass. Prominent among these are Messrs. F. D. Waite, James Henry, E. S. Hubbard, E. V. Blackman and Rev. Lyman Phelps. Several years ago the Executive Committee authorized the Secretary to appoint such deputies to conduct personal canvasses, and

experience has certainly demonstrated the value of the practice.

Up to date I have received 280 fees from annual members, and our list of life members has been increased this year by nine recruits, making 240 annuals, 49 life members, and 2 honorary.

RECEIPTS FOR THE YEAR.

| | |
|------------------------------|----------|
| Back numbers sold | \$ 86 25 |
| Membership fees | 280 00 |
| Life members | 90 00 |
| Donation by Amos Wakelin ... | 2 00 |
| <hr/> | |
| Total receipts | \$458 25 |

EXPENSES.

| | |
|------------------------------|----------|
| Postage and stationery | \$ 24 00 |
| Printing | 28 60 |
| Addressing envelopes | 1 00 |
| Telegrams | 1 25 |
| 210 badges | 10 00 |
| Drayage and freight | 1 00 |
| <hr/> | |

Total expenses

\$ 65 85

Balance paid on Secretary's salary

\$44 25

Retained for immediate use....

18 15

\$128 25

Turned over to Treasurer Hart \$330 00

STEPHEN POWERS,
Secretary.

P. S. I have the pleasure of stating that, since the adjournment, President Taber has donated to the Society over sixty volumes of the back Reports, and other members have contributed a few. The Secretary will now be able not only to restore a complete file, but also to present to life members who may subscribe in the future nearly complete sets of our Reports. Of the first three years and the last two there is still a scant supply, however, and donations of these to the Society will be acceptable.

TREASURER'S REPORT FOR 1901.

| | | |
|--|----------|----------|
| 1900. | Dr. | |
| May 3rd, to balance from last Report | \$277 30 | |
| Sept. 12, to Sec. Powers, Cr. on salary acct. | 44 25 | |
| 1901. | | |
| May 22, to Sec. Powers, cash.. | 330 00 | |
| | | \$651 55 |
| | Cr. | |
| Aug. 2, 1900, by Sec. Powers, draft No. 19 | \$244 11 | |
| Sept. 2, by Sec. Powers, draft No. 20 | 75 00 | |
| May 22, 1901, by balance in treasury | 332 44 | |
| | | \$651 55 |

The Treasurer takes pleasure in stating further that he now has in hand the further sum of \$42.25 contributed by the members at this meeting for the relief of the sufferers from the great fire in Jacksonville.

W. S. HART,
Treasurer.

REPORT OF EXECUTIVE COMMITTEE.

The members of the Committee not present, by letter to President Taber at the time of the Jacksonville fire, authorized him to change the place of meeting at his discretion, under the extraordinary circumstances, and this action is now fully approved, and the Secretary is instructed to embody it in this report.

The Committee has held no other meeting since the last annual meeting in Jacksonville, and the members by letter authorized the Secretary to publish the proceedings, and approved the bills presented by him for this printing.

The Executive Committee held a full meeting at 8 a. m., May 23, 1901, passed upon and approved the annual reports of the Secretary and Treasurer.

LYMAN PHELPS,
E. S. HUBBARD,
E. O. PAINTER,
Executive Committee.

REPORT OF SPECIAL COMMITTEE ON LIBRARY.

Your Committee would report that they have received a cash donation of \$20 from President Geo. L. Taber for the purpose of starting a library for the Society, and three donations of books. One of the donations was from Mr. W. S. Hart, and consisted of files of valuable horticultural and apriarian periodicals. The other contribution, deserving special mention, was made by Mrs.

Frances E. Manville, widow of A. H. Manville, who was for years an active member and officer of this Society, and was always foremost in good works for the benefit of the horticulturists of Florida. These books had been carefully preserved and labelled by Mr. Manville, and consisted of several standard works on orange culture, files of Insect Life and various horticultural magazines and last, but by no means least, an almost complete file of the Reports of the Department of Agriculture.

With the funds donated the Secretary purchased a small sectional book case

and had bound and placed in it a set of the bulletins of the Florida Experiment Station (presented by himself), two volumes of Semi-Tropical Florida and six volumes of Insect Life.

The outlay was as follows:

| | |
|---------------------------------|---------|
| Book case | \$12 00 |
| Binding 10 volumes | 10 00 |
| Putting lock on book case | 85 |
| | |
| Total | \$22 85 |

G. L. TABER,
S. POWERS,
W. S. HART,
Committee.

Grafting and Budding.

Considered from the Standpoint of an Orange Grower.

BY W. S. HART, OF HAWKS PARK.

Having been appointed chairman of the Citrus Committee to prepare the first report it ever presented to this Society, I asked my co-workers to assist in so framing that report as to constitute an enduring basis on which to build through future reports and resulting discussions, as comprehensive and up-to-date a treatise on citrus culture as this Society proved itself capable of constructing. That the cumulative results of all the past work of that standing committee and other members, through discussing this branch of horticulture, have, in a measure, come up to my early

conception of what they should be, was lately impressed on my mind by the suggestion, from a non-resident orange grower, that a digest of the back reports of this Society would result in a much-needed work on citrus culture, and one of far more value than could be hoped for from the pen of a single writer. A desire to assist in filling in the gaps that would necessarily occur should such a digest be made at this time is one of my excuses for presenting this paper.

In discussing the subjects of grafting and budding, I will do so from the standpoint of an orange grower in the hopes

of saving time thereby, while yet meeting the needs of the greater portion of those of this State who require assistance in these matters.

In all this class of work the first thing to consider, after you have the stock to work on, is the variety or varieties you wish to propagate. If a nurseryman, you need more or less of all valuable varieties, but such men know their business, and need no instruction from me.

To the novice in the business and to those just entering it let me say, don't mix many varieties in one grove for market uses. Two or three at most are enough and put these in solid blocks. This would not be good advice to the pear tree planter, but with citrus fruits long practice shows it to be so. If many varieties are desired for novelty's sake, or for exhibition, etc., put them, a tree or two of a kind, in a block by themselves. Having decided, say in the fall, what varieties to propagate, cut your scions in fall or winter before the active movement of sap begins, in late January or in February. At this time the finest of scions can be cut in plenty. In March, April or May much nice growth must be sacrificed to secure a few poor buds, as nearly every well-developed bud has put out a sprout that is still too tender to use.

BEST BUDS TO USE.

In an emergency, however, as where it is the only chance of securing a much desired variety, almost any kind of bud, if rightly handled and the proper stock is found, can be made to grow. In such a case, buds that have already put out one or even two shoots, small buds from tiny growth, immature wood freshly cut, or

buds from the very tips of a scion, will give the skilled hand a hope of adding to his list of fruits. My choice for fall cutting is fairly matured wood of late summer or fall growth, showing well developed buds and thornless. Angular wood is not objectionable, but rank watersprouts, so-called, from the body of the tree should be avoided. Wood from a bearing limb is preferred by many, but I have little choice between that and wood from a thrifty tree of younger growth. Either one will give fruit as soon as it ought to, rightly handled. Cut the scion with a sharp knife, trim off the leaves immediately to prevent evaporation, then lay them on the ground in a shady place and cover with sphagnum moss, or put them in a box of old, partly rotted sawdust. In either case, place them where they will be exposed to the weather, and they will callus at the ends and keep in good shape for months.

From the apparent dormancy of winter until the blossom buds reach the size of turkey shot, cleft-grafting may be done. Here, from January to early March, is usually the best season for the orange.

WAX AND KIT.

For the work one needs a ball of grafting wax made of three parts rosin, two of beeswax and one of tallow, melted together thoroughly and then turned into cold water. When cool enough to handle it should be pulled like molasses candy until a light yellow color. A small lump of tallow to prevent the wax from sticking to the hands should be in the kit. A sharp saw, a thin-edged, strong knife, three or four hardwood

wedges six or eight inches long and of varying widths, a light hammer or mallet and, if working near the ground, a stiff brush. Of course, a pair of hand pruning-shears should always be in such a kit as well as a small whetstone.

CLEFT-GRAFTING.

Cleft-grafting is especially useful in working over trees or sprouts from the root or trunk of injured trees of larger size, that range from three-quarters of an inch to three inches in diameter. It is also a good means of working over large tops by grafting limbs, as is done with apple trees. Where sprouts or limbs are grafted a part only should be worked, and the rest left until the grafts have made a fair leaf surface. It may be necessary to lop them by cutting partly off and laying down, but don't cut them away until the sweet top can take care of the root.

The stock or limb to be cleft-grafted is sawed off at a right angle to the course of the stock, shave the top smooth, then split it by driving the knife down into it through the middle, unless the stock is too large for this, in which case it can be split near one side or a saw cut can be made to receive the scion. The grain of many orange trees being quite crooked, it is sometimes well to drive the knife in at the side a little way before splitting the stock. This gives straight surface to hold the scion. Remove the knife and open the cleft with the wedge best suited to the size of the stock, allowing plenty of room on one or both sides for the sprig of buds. Now cut the scions to a wedge-shape that will fit the cleft, leaving the outer side a trifle the thickest, and with two buds above the

cuts. Slip these firmly into place, so that the cambium layer (the soft layers just under the bark) of stock and scion may come in contact as much as possible. If the scions are set at a slight angle with the stock, this contact is pretty sure to be obtained. Now withdraw the wedge, coat airtight with wax all cut surfaces, not forgetting the top of each scion, and the process is complete. This kind of grafting is especially successful in working kaki, pecans, grape and many other trees and vines at or below the surface of the ground. If well below, as is best with grape vines, no wax is needed. Banked with moist earth nearly to the top bud, after being tied with cotton twine to hold the parts firmly together, they can be left without further attention, as the twine will rot off at the proper time.

CROWN-GRAFTING.

Crown-grafting is usually practiced with large stocks after the sap has become active in the spring, so the bark will slip easily. The tree is best cut off some inches under ground, the scion wedged by a long, slanting cut on one side, leaving two or three buds above, then pushed down under the bark at a point where its outline is concave. Were swelling or convex surfaces chosen the bark would crack and not hold the scion firmly. If the trunk is large, several of these grafts may be inserted so the top will spread from the ground. Moist earth is then packed to the scions, leaving only the top bud exposed. This method puts the junction of stock and graft, the weakest part, below the reach of cold, in trees too large to cleft-graft, so that if frozen to the ground they will

start growth from grafted wood. It also gives a surprising growth of wood and a quick return of the tree to a profitable bearing condition. In hot weather shade should be used to prevent the roasting of the grafts. A notable instance of the successful use of this kind of grafting was that of our late lamented President Dudley W. Adams, immediately after the freeze of 1895. The only drawback in its use for restoring groves of citrus fruits on sour stock is that it carried the sweet wood down where it is liable to attacks from foot rot on lands subject to that disease. It puts the tree about on a par with sweet seedlings in this respect. Foot rot (*mal de goma*) will often jump up a foot from the ground to reach sweet wood, that is, on resistant stock.

Crown-grafting can, however, be done at any height in sound stock.

SIDE-GRAFTING.

Side-grafting is the simplest of all the methods and is applicable to large wood at any time when the bark will slip sufficiently to allow of fairly successful budding. It is also often successful when budding is not. In the case of large seedlings or other trees to be worked over, side-grafts put in in the fall, left dormant until the spring and then started out by lopping the tops, will allow of a fine crop of fruit from the old top while the new one is being grown.

There is quite a knack in properly laying down the old tops, so as not to throw off the bark at the bud. To do this successfully, saw pretty nearly through the old trunk a little way above the graft, put a firm bearing against it a few inches above the cut, then pull the

top over in a way to make a long split upward. It is surprising what a crop of fruit can be made, even on a shy bearer like the navel, through a wide, thin sliver connecting the top with the root.

After cutting, as above, cover the wound with liquid wax. I have given the recipe for this wax before, but it is good enough to bear repeating here: Melt one pound of rosin with two ounces of tallow, remove from fire and when slightly cooled add six ounces of alcohol and, last, one ounce of turpentine. Keep well corked in large-mouthed bottle with brush thrust through the cork.

The mode of side-grafting is to take well matured twigs, cut to a taper from one side, as in crown-grafting, except that I cut a little deeper at first, and then run out the rest of the way in a thin tapering tongue that will easily bend to the curvature of the trunk.

Small wood for grafts may not make as vigorous a first growth as larger wood, but it is easier to use and will soon make up in growth. A vertical cut is made in the bark of the stock about three-quarters of an inch long and slanting in the direction the graft is to take. With a slight twist of the knife the bark is started from the wood and the wedged part of the scion slipped under at an angle of twenty to fifty degrees from the course of the stock. If well done, there is little need of wrapping. If poorly done, wrap and then stick an orange thorn under the wrapping at each side of the scion to hold the bark close. After a good-sized top is made from the grafts the old top can be cut away.

Tongue, shoulder, lip, saddle and that class of grafting are in little use among orange growers. They are mostly

adapted to small stock where we use the shield bud, so I will not stop to describe them.

SHIELD BUDDING.

Shield budding is a process that allows of the rapid working of nursery or other small stock, and has in years past been the one in almost universal use in Florida for that class of work.

A very few are now grafting nursery stock to some extent and charging more for the trees so worked under the claim that they make more rapid growth.

Much of this budding being done close to the ground, it is an excellent plan to have a box arranged to serve as a seat and a tool-carrier combined. Mine is made of three-eighths inch white pine except the top, which is seven-eighths and covers a little over half of it. It is 10x14x7 inches with two compartments and several sockets for scions, knife, pencil, etc., on inside, and for pruning saw and record book outside. The front end is tapered down to four inches high. My kit of tools include scions in a damp shot bag, budding knife, hand pruning shears, a ball of twine, a roll of waxed cloth, a small whetstone, a stiff brush, a pruning-saw, pencil and record book. I also usually have a small hammer and tin box of slim, wire nails, of assorted sizes, from half-inch to inch, to use in inarching whenever I see need of it. A person can bud with only a knife and ball of twine, but I have done a good deal of hard, steady work in badly cramped positions, and I have learned to make it as easy and convenient as possible.

It is important that the knife should be sharp. If flat on the upper side and

rounded a little on the under, it works all the better.

Annular or ring budding is seldom practical on the citrus, but is found useful in working the pecan and some other difficult stocks.

It is done by simply removing a short ring of bark from a sprout and replacing it with one of like size having a bud upon it, from the scion. This should fit the wound nicely and be well wrapped.

PREPARING THE BUD.

Take the scion in your left hand, butt from you, holding it between forefinger and thumb, so that the bud to be cut is about over the middle of the palm. Holding knife blade at an acute angle with the scion, make a drawing cut from a little below the bud to about the same distance above. So holding and cutting prevents the knife from running with the grain of the wood, a smooth under-surface to the shield being very important. If the wood is full and round, an even shield shape with the bud near its center is cut. English horticulturists and some Americans take the wood out of the shield. This is not at all necessary.

A cross-cut is made through the bark of the stock and a perpendicular one, from the middle of that, running up or down as desired, the corners of the bark raised and the shield slipped under its full length. If the scion is angular or flat, the shield is cut with the bud at one side and it is slipped under the bark at one side of the perpendicular cut only. There are many odd notions as to slipping buds up or down from the cross-cut, taking out the wood, burning the bud upside down to make low-topped

trees, etc., but equal success can be attained by any one of them, if one is trained so that it is the handiest to use.

The best buds are in the upper half of the stick, but these are often discarded because of being flat. If properly cut, they can be successfully used even to the terminal buds.

For wraps, bast, raffia, woolen yarn and many other things are used, but nothing is better for rapid work than cheap bleached cotton cloth torn into strips four inches wide and some yards long and wrapped about a straight stick a half-inch square and seven inches long, until a diameter of one and three-quarters to two inches is reached. Prepare several of these, then put them into hot grafting wax such as heretofore described, and let them soak until bubbles cease to form; they will then be saturated. Don't get the wax so hot as to burn the cloth. When budding unwrap six to twelve inches, according to size of stock to be worked, and tear it off, then strip it lengthwise as you need it, a wide strip for large wood, a narrow one for slim stocks.

Start wrapping at the bottom, drawing fairly tight. Just below and just above the bud make a half turn in the wrap, that it may bind more closely, give the end a final rub with the thumb to make it tight and stick closely. Some wrap directly over the bud, thinking to keep out rain. I have not found this necessary.

WRAPPING AND UNWRAPPING.

In dry weather cotton twine makes fair wrapping material, but takes a little more time to fasten the end unless it is drawn into a downward cut in the bark.

One of the members of this Society suggested that the ball of twine be soaked in wax. This I did and have found it to work well through the past two seasons.

In ten days to three weeks, according to the condition of the trees, the buds will have "taken" and the wraps can be removed. If a non-elastic wrap like twine is used, this should not be neglected too long or strangulation will ensue. The top should now be cut partly off, cutting from the side the bud is on and a little above it, and bent down. The new bud now being the highest will be one of the first to push. All others about it should be kept rubbed off. This kind of shield budding can be done at any time when the bark of the stock slips easily. In working the orange, it is best done between March 1 and July 1, or left until fall for dormant budding. If done in July or August there is great danger of causing a flow of sap that will drown out the bud and make a running sore for a time. Commencing in late September buds and side-grafts can be inserted to be left until spring before forcing out. This is a most excellent way of working citrus stock, as the dormant buds can be safely covered in with banking until time to force them to growth in February or March. A part of the banking can be removed for this purpose, but so left that it can be quickly used to cover the buds if cold threatens.

In preparing scions for cleft-grafting, usually one good bud is cut away. This can be utilized in what is called "winter budding." The shield is cut as for a summer bud, a smooth downward cut is made in a small stock in a way to leave a tongue of thin wood and bark, a little longer than the shield carrying the bud, the thickest part of the tongue being at

the bottom. This tongue is cut off at a point that will come just below the bud when the shield is slipped down under it. The shield should have as much of its cambium layer in its upper two-thirds, in contact with that of the stock, as possible. Wrap the bud well and leave so until well healed in.

INARCHING.

Inarching is the process of grafting by approach. It is sometimes done to bridge a girdled place on a tree trunk and bring about a new connection between the cambium of the top and root. Since the cold of February, 1895, it has been practiced largely by orange growers in using the several sprouts that put up from the roots of frozen trees to brace and furnish an increased sap supply to the buds by inarching the former into the latter. Much is undoubtedly gained by this, provided the work is done low enough to allow of covering in the callusses with banking of earth in the winter. Where this was not done, it has often proved a source of weakness through the bark being loosened by cold at the junction.

There are several ways in use in inarching, the simpler ones being to make a cut in the bark of the bud, or surface that is to receive the sprout, as if to receive a shield bud, having the perpendicular cut above the horizontal one. Now cut off the sprout on a slant at a height that allows of its being slipped under the bark by entering at the cross-cut. When adjusted so that all the cut surface comes in contact with the peeled part of the trunk, nail it in place with a slim wire nail. This prevents its working loose on windy days, as it is apt to do

when wrapped only. They will usually heal in without wrapping, but it is often best to wrap them and stick an orange thorn under the wrapping at each side of the sprout. With a larger sprout the top can be bevelled from both sides, a cut made into the wood of the stock and this end fitted to it so that a lip comes down over and matches the outer bend, then nail in place and wrap.

DISCUSSION.

Mr. Porcher—As to wax Mr Hart gave me a recipe which is of the highest value. It makes the finest wax I ever used; so pliable that it can be applied with a brush. The wax that is ordinarily used is composed of three pounds of rosin, two pounds of beeswax and one of tallow. Then take one pound of this, heat it hot, take it away from the fire and add three gills of alcohol; this makes a most perfect wax; so that the same wax that you use for other purposes can be used for the finest work with the addition of three gills of alcohol to the pound—a wax as smooth and fine as varnish.

Major Fairbanks—I would ask Mr. Hart whether he has found the spring or fall grafting the most successful in the long run?

Mr. Hart—I will say that I have never found spring budding unsuccessful until this year, but it has this year been unsuccessful in a great many cases. I don't think I see any difference as to the success of the two. Skilful budders will succeed in the spring and the fall too. But I like dormant buds in the fall, and I think you gain by it, as you do it at a time in the year when you are more at leisure. In the spring you are busy packing oranges, working the groves,

etc. The dormant buds are started with the first growth in spring, and time is gained in getting ahead of grasshoppers and black ants.

Major Fairbanks—Is there not a little danger of late cold taking the dormant buds, starting a little early in the fall?

Mr. Hart—The bud is banked, of course, and the banking does not need to go much above the bud. I expose it to the sunlight and lop the top as soon as growth starts in the tree, and it will push. If there is danger of cold, all you have to do is to press the dirt together, where it has been parted for the bud, and it will be protected even if it has grown.

Question--Do you cut the stock in the fall or leave it until spring?

Mr. Hart—Until spring. You don't want to lop the top until growth starts in the tree. In other words, by leaving the top on the tree until danger of cold is over you would get rid of that risk that you incur by forcing the bud out, but whenever growth starts in the tree I want the bud to grow. One of my points in budding in the fall is to have them push as soon as the other buds of that tree do in the spring. If you don't top it the growth goes to the top of the tree and I find in my practice that it is a gain to force the bud at once. A nurseryman, having thousands of buds in, could not safely do this.

Mr. Taber—From a nurseryman's standpoint you don't want to force a growth from anything in the citrus line in the spring. I would say that in dormant budding the bud should be inserted as late as possible and prevented from starting out. I have inserted dormant buds in the latter part of Septem-

ber and in the spring we would find one hundred of them from six inches to sometimes a foot in length.

SHOVE UP OR SHOVE DOWN.

Mr. Painter—Mr. Hart made the remark in his article that it does not make any difference whether the bud is shoved up or shoved down. I would like to know whether this is really the experience of budders. We all know that the sap goes up the wood and returns within the bark, and the first thing after the wound is made this sap heals the wound. If the bud is shoved down, the shoving prevents this, while if it is shoved up it heals the new wound. I am fully aware that the buds will take if shoved down and sometimes a bud will take put in almost any way. Sometimes with the most careful budding they refuse to take, but it seems to me if shoved up they will stand a better chance than if shoved down.

Mr. Griffing—In my experience in budding the orange tree we always shove the bud up, so as to shut the water out from the bud, but in pears, peaches, plums we always shove the bud down. We see no difference in the buds shoved up or down, but in the orange we see a marked difference, the bud shoved up taking better. The oranges we wrap with a wax cloth, and sometimes that don't keep the rain out. Others we do not wrap with anything except twine.

Mr. Reasoner—In budding we have the buds all shoved up, and we never use anything to wrap with.

Mr. Carter—I shove buds upward just because I learned that way. I use wax cloth and wrap it so that when I

finish up I have the two ends together, and just twist them.

Mr. Pierson—My experience has been to shove the bud down, possibly because I learned that way, and they seem to take very readily with me. I use altogether raffia to tie with and when starting out I used waxed cloth, but I found that the buds would scald.

Mr. McCarty—There are two points not touched on. One is in reference to the way you hold your knife in making your cross-cut. The man whom I put in to bud took the knife and cut right square across. I have seen no difference in shoving up or down, but shoving up is probably the best way. Another point which has not been covered, which is important with me, is whether you bud on the south side or north side of the tree, with reference to the sun striking it. We usually do it on the north side so as to have it shady. We believe we have better results on the north side. I just merely ask for information on that point.

Mr. Phelps—On the north or south side, either one, if there is an excessive sap or rainy season, the buds will ferment. They will not ferment as quickly on the north side as on the south. With me it has been a very good way, if I am using wax cloth, not to bring the two edges together, so as to allow air. They will not heat as quickly. This is another reason why I have budded on the north-east side.

Mr. Reasoner—As far as buds on one side or the other is concerned, in either the fall or the spring when most budding is done, there is very little difference as to the heat. The sun rises so far in the north and sets so far in the north in the late spring, that the north side is as warm as the others.

Mr. Taber—I do believe there is a little something in that. Late in the summer putting the bud on the north-east side of the tree; it will keep better during a hot time than anywhere else on the tree. The sun strikes them, but it is the morning sun. Then the sun goes round to the south and does not strike them.

Mr. Carter—You say you do not use water sprouts for budding. What is your objection to them, please?

Mr. Hart—My objection to water sprouts is that if you practice using them you will get wood that is immature, for one thing, but I have always been under the impression that it makes a tall, thin tree. Right after the freeze I had some buds sent me that were apparently from water sprouts, and those trees shot right up. I choose a thornless bud.

Mr. Reasoner—It is, of course, necessary that buds should be cut from the best part of the tree. Water sprouts are always thorny, and I think it would be best to save the budwood from the best wood on the tree. The best is none too good.

Economic Entomology.

REPORT OF STANDING COMMITTEE, BY PROF. H. A. GOSSARD, CHAIRMAN.

Mr. President, Ladies and Gentlemen:

This year's report from your Committee on Entomology must be in some respects one of encouragement, and in others of not such cheerful character.

COTTONY CUSHION SCALE.

The citrus growers will be glad to know that cottony cushion scale need no longer be considered a serious economic factor in orange growing, even where it is now established. We have kept the insect and its enemies under observation for more than two years before making such a positive announcement, and make it now because we are sure the statement will stand. Those of you who are upon the Experiment Station mailing list will receive full details of observations and conclusions in bulletin form in a few days. Last summer's work and observations with the insect may be summarized as follows: As predicted in the last report on Entomology, made to this body, the scale became very numerous and threatening in June and July, at which time it was attacked by fungous disease, as it had been the preceding summer, and by the middle of July from fifty to seventy-five per cent. of the scales had succumbed. It was evident, however, that a grove

could not live through more than four or five summers of undisturbed attack and that the crop would practically fail after the first two years.

About the first of June three colonies of Australian lady-bugs were received at Clearwater from Mr. Alexander Craw, of the California State Board of Horticulture, one being sent to Mr. John Thomson at the request of the Entomologist, the other two going to Mr. H. C. Markley by request of his brother residing in California. Mr. Thomson was advised to have an infested tree tented with cheese cloth for the reception of the insects upon their arrival, as previous experience in putting bugs upon open trees had failed to give satisfactory results. Mr. Markley followed the same plan, using canvas instead of cheese cloth. One of his colonies was liberated upon a tree standing in his yard in Clearwater, and the other, by advice of Mr. Thomson, was sent to the grove of Mr. Wm. McMullen, about seven miles from town. Instructions were given to remove the tents in about ten days after the insects were received, so they might scatter to other trees, and also that the conditions for fungus attack upon the scales might be made as unfavorable as possible. An examination made about one month after the lady-bugs were

loosed showed that they were scattered over perhaps twenty different trees adjacent to the one upon which they were liberated; and while they were not so widely scattered at Mr. Markley's place, they were much more readily found in numbers. During July and August colonies were started in various places by Mr. J. H. Brown, who had been placed in immediate charge of the insects, and the scales were practically cleaned up by the lady-bugs and disease together by the first of October. A few scales were present this spring in March and April, but were accompanied by the lady-bugs. We feel satisfied that this insect will not again command very great attention, or excite any special fear.

EXPERIMENTAL WORK WITH WHITE FLY.

The Experiment Station regards the white fly problem as the largest single insect question in the State at present, and indeed one of the largest in the country. We have, therefore, decided to either solve the question or prove that further advance cannot be made with ordinary means of insect warfare, before devoting a great deal of attention to other questions.

Perhaps seventy-five per cent. of the groves in Manatee county are infested. Infested orchards usually give a good crop one year, with a very short crop the following year, the flavor, quality and shipping powers of both crops being much reduced. Supposing 250,000 boxes of oranges to be a representative crop for this county, worth \$3 per box, and that the loss in yield and quality, with consequent lowering of reputation and price of all Florida oranges, whether having suffered from white fly or not, is

one-half of what it would normally be, we easily have an average annual loss of \$250,000 for this county alone. Perhaps almost anyone personally acquainted with the conditions in the county referred to will agree that we are well within the bounds of fact in making this estimate. We believe that our State is losing a half million dollars every year from the ravages of this insect and that with the present rate of extension of citrus growing and of fly dissemination our loss will reach a million dollars per year before a half-dozen years have passed. Were it not for the enemies of the fly, it would be impossible to produce even half-crops, and we doubt if the fungus will thrive in the dryer and interior parts of the State.

Our present recommendation is the one first given by Prof. H. J. Webber, to spray with rosin wash two or three times per year. Examinations made within twenty-four hours after the thorough application of such a spray have shown about seventy-five per cent. of the insects killed, and since it is reasonable to suppose that some died later it is seen that two good sprayings, properly directed, in winter, will give the trees a good clean start for the summer. Additional applications may be made in spring and summer, but not while the trees are in full bloom or the fruit is small, unless the bloom is exceptionally heavy, when a spray given at about the close of the blooming period may be an advantage rather than the contrary. Experiences in this regard have been variable.

FUMIGATION.

Our chief experimental work has been to determine the value of hydrocyanic

acid gas under tents against the insects and the conditions under which it may be applied. Since Prof. C. W. Woodworth, of the California Experiment Station, has made a study of fumigation questions with special reference to citrus trees, and had a year's leave of absence from California to study in the East, we succeeded in securing his services for a month to help introduce the process into Florida.

We experimented with various patterns of tents, hoop tents, sheet tents and box tents, for small and medium trees, and bell tents for very large trees. We developed a new form of derrick for handling the bell tents that has some good points, and may prove to be superior to the California patterns.

Besides carrying on investigations relating to the life history and physiology of the white fly, our chief aim was to determine the susceptibility of the insect to poisoning with hydrocyanic acid gas, and the effect of the gas upon trees fumigated under different conditions. Without going into details, we found that the fly yielded very readily to the gas, much more readily than the common scales, and that they were practically exterminated with lighter charges than are used in common California practice. In looking over thousands of leaves upon many different trees that had been fumigated two or three weeks previously, we were able to find but a single insect living. Many of these single leaves had hundreds of living insects on them when they were fumigated. We feel sure that an infested grove, if thoroughly fumigated once, would need no further attention for two or three years unless insects came in from the outside.

The fumigating was done at night, in cloudy weather, in bright sunshine, and at varying periods of the day. The behavior of the gas seems to be somewhat capricious, but no great permanent injury was done under any circumstances. Sometimes all the foliage would drop from the trees, sometimes part of it, and sometimes almost none of it. Fumigating done with the sun at high meridian seemed most dangerous to foliage and crop, but results were sometimes contradictory. All trees are reported to be in good condition at the present time, but some with extra full crop and some with light crops, some with marked difference in crop in different quarters of the same tree. The general bearings of the experiments seemed to indicate that the dropping of the foliage from trees in Florida did not injure them as in California; that fumigation with the winter brood of insects can begin in the winter and continue until the middle of February; that it can be carried on safely and effectively from 4 o'clock p. m. until 9 o'clock a. m. the following morning, or throughout the day, if cloudy and not windy or wet. The variation in crop on different sides of the same tree is possibly explained by supposing the wind to cause variation in the density of gas in different parts of the tent.

It is not wise for one to undertake fumigating work on a large scale without the assistance of some one who has had practical work in the field. It will be sometime before such work can be generally practiced in Florida, but we expect to see thousands of tents in use inside of three or four years. In short we expect to see a large part of our great annual loss eventually saved.

PEACH AND PEAR GROWING MENACED.

We fear the peach and pear growers over large districts of the State are facing conditions hardly less serious than the citrus growers in white fly districts. The last Annual Report of the Experiment Station states that San Jose scale has been received from thirteen different counties of the State, some of the counties having more than one case of infestation. More new cases have come to our notice during the past six months than in any equal period of the Station's previous history, and it seems there can be but little doubt that the entire peach-growing section is honey-combed with it. Any notion that San Jose scale, left to itself, will not kill about nine out of every ten orchards that it finds in Florida may as well be abandoned. Those of you with whom it has taken up quarters, and who contemplate letting it take its own course, should make your bank accounts last as long as you can, because you are not apt to have others soon again, unless you have other sources of revenue than your own peach crops. Those who feel disposed to fight it procure a good kero-water sprayer, and use a twenty-five per cent. mixture of crude petroleum, specific gravity of 43 degrees to 45 degrees for winter treatment, and a fifteen per cent. mixture of kerosene and water, or some good whale oil soap compound, such as that of Leggett Bros., for summer treatment.

The value of crude petroleum and the limits of its usefulness as an insecticide are now fairly well known, and its superiority over kerosene as a scale destroyer, during the winter months, upon deciduous trees, is generally conceded. The

same precautions that are observed in using kerosene should be observed with petroleum, at least until wider knowledge enables us to say whether any of them may be modified or omitted.

The distribution of the scale has been chiefly due to careless nursery shipments, a good deal or all of which could have been avoided by careful fumigation of the stock before shipment. I have pretty good evidence that there are nurseries in Florida, upon whose grounds the Entomologist has never been, that now are or recently were infested with the scale and were distributing it. The proprietors may have discovered their conditions themselves, for anything we know to the contrary, and may be using proper measures to insure the safety of their stock. On the other hand, they may be selling scaly trees by the carload without hindrance from anybody.

Contrary to general belief, San Jose scale will attack the trifoliate orange, and this variety of citrus stock should always be fumigated before shipment from any suspicious quarter.

Parasites are beginning to attack the scale in all quarters of the country. Some of our lady-bugs seem to be acquiring a taste for it, and we believe that in ten years from now it may not be worse than many of our other scales, but until that time it is our belief that it must be fought with energy.

OTHER PEACH AND PEAR INSECTS.

The West Indian or Jamaica scale, *Diaspis amygdali*, is said to be decreasing some in West Florida, owing to an onslaught of lady-bugs. This insect is also established at Nesbitt, Duval County. We believe it to be almost, if not

quite, as serious as San Jose scale. Petroleum, kerosene or whale oil soaps are the proper remedies.

Two severe cases of infestation with gopher scale, *Aspidiotus juglans-regiae*, have come to our notice during the past year; one at Lake City, the other at Lady Lake. The latter example was remarkably well parasitized. This is the largest of the *Aspidiotus* scales and at times needs the same treatment that has been suggested for the species preceding, though it is very subject to parasitic attack.

MISCELLANEOUS INSECTS.

The pineapple scale, *Diaspis bromeliae*, is of frequent occurrence and seems to be widely distributed. It is at times a scourge. We usually recommend tobacco extract or Rose Leaf insecticide for it, as these substances do not injure the plants like kerosene emulsions or resin wash by destroying the crown. One correspondent reported that he had poor success with resin wash, but almost exterminated the scale by using strong kerosene emulsion. Care must be used with both the latter insecticides that they do not reach the crown of the plants.

The mealy bug is the commonest pineapple pest, and like the scale, is best reached by tobacco preparations. We feel sure that tobacco dust used freely as a fertilizer upon pineapple plantations will act as a preventive against mealy bug infestation. Its value when so applied against the woolly aphid or root louse of the apple, *Schizoneura*, has been experimentally proven and the mealy bug will hardly prove more difficult to reach in the same way. When the

insects are noticed on ground that has been so treated, an application of tobacco extract or tobacco dust sifted into their hiding places is recommended. More than one dusting may be necessary.

We found the cabbage Plutella, *Plutella maculicollis*, quite destructive in South Florida in February and March. The larva is a small greenish caterpillar easily controlled by arsenical preparations.

Several different species of pecan caterpillars have been received. Most of them were case-bearers belonging in the family Tineidae; others were leaf-rollers belonging in the family Tortricidae. Others probably the large larvae of the Catocolas or under-winged moths.

For all of these leaf-eating insects there is no more satisfactory application than arsenate of lead. This insecticide can now be procured upon the market already prepared or it may be made as follows:

Take eleven ounces of acetate of lead and four ounces of arsenate of soda, or in this relative proportion for a greater or smaller quantity, and dissolve together in one gallon of water to be kept as a stock preparation, or in 100 gallons for immediate use. This spray is more adhesive than Paris green, costs rather less, and will not scald or burn the tenderest foliage as most of the arsenicals do. It can be used at ten times the strength given upon the tenderest foliage, such as that of the peach, without injury. In a few years it will probably supplant all other arsenical sprays at present used.

The strawberry flea beetle, *Haltica ignita*, was reported from Daytona recently. Arsenate of lead or Paris green

will kill the beetles, but should be applied before or after the fruiting season. It might be risky to use it without an interval of at least three weeks between the application and picking time, with one or two good rains during the interval.

Mr. Phelps.—I would like to ask how many men it would take to handle that bell tent?

Prof. Gossard.—About four. It can be handled by a smaller number, but I don't think anything is saved by it. I think about four men, including the fumigator; three men who have nothing but the mechanical part to look after.

Dr. Inman.—How long would it take after the tent was up to generate the gas and fumigate the tree?

Prof. Gossard.—About forty minutes. We ranged our time from thirty minutes up to considerably more than that. If you use a light dose increase the time. With a large dose shorten the time. About four tents would keep a crew of four men just about busy. It requires about ten minutes to shift each tent.

Mr. Porcher.—I would like to ask Prof. Gossard a few questions. First, If it is not necessary to have an expert capable of computing the area that each tent has each time it is placed on the tree? Is it not impossible to use the tent in bright sunlight? Is it not also true that in high winds few applications are found to be effective? And is it not true that the scales have not been killed while under a protecting coat while in the form of an egg?

Prof. Gossard—Measuring will cause a little difficulty at first. We marked off ounce doses on a tape line and used it to measure both over the tent and around. Thus having a mathematically correct

reading of amount of dose until we could make a safe estimate from observation. The exact dose is not a matter of such great importance as you might infer. That is, an orange tree will stand a good deal more, for instance, than a June peach would do. So that a little over or a little under the dose would not make so much difference as you might think.

Second, in relation to the use of the tent in high wind, it would be a little hard to use those large bell tents in a very high wind; and in using the single-sheet tent, if you were to go on the windward side of the tree it would probably help you instead of hindering. I think the great objection to wind is likely to be from the effect upon the density of the gas. That is, the wind is apt to drive the gas from one side of the tent over to the other, and make it more dense on that side.

In relation to the egg of the white fly, I cannot tell you positively from experiment what will happen to it. During the winter season when we did our experimenting, you cannot find an egg unhatched. Every white fly egg is hatched at this season, and no other eggs are laid until spring, so there are only larvae and pupae. I will say there is hardly one chance in a thousand that the eggs would escape. There are very few insect eggs that are not killed by the gas. The red spider's eggs, I believe, are unaffected by it.

Mr. Porcher—The reports from California have shown that they have not killed the eggs of the red scale.

Prof. Gossard—That is, you mean they have not been exterminated absolutely?

Mr. Porcher—No, sir; that they were

not killed, only a very small per cent.

Prof. Gossard—When were those reports issued?

Mr. Porcher—I got them from Prof. Hilgard; their experience was that the eggs were not killed.

Prof. Gossard—The object of the Horticultural Commissioners of California as set forth at present is to use stronger doses of gas than formerly. They have increased their dose to one-half more than they used a few years ago, and the purpose for which they do it is, they state, to kill the eggs of red scale, and other insects of like character; so I think they must have pretty good evidence that they are killed. Of course, with an open tent we cannot expect the thorough work that we would get in a perfectly air-tight fumigatorium, but I think we can kill most of the eggs.

Mr. Gillett—I would like to ask if, in the treatment with the gas, it killed the red, brown and purple scales?

Prof. Gossard—I did not make any investigation with special reference to these.

Mr. Gillett—Did it kill the lady-bug?

Prof. Gossard—Yes, sir, about ninety per cent. of them. There are published statements saying that they are not readily killed, so I made special investigations with them, collecting two or three hundred ladybugs that had dropped, and maybe about ten per cent.

of them recovered and crawled away, but the others were dead and staid dead.

Question—Does it hurt the fungi?

Prof. Gossard—Not the gas; it does not destroy plant life at all.

Mr. Hart—How about mites?

Prof. Gossard—I cannot say positively as to that. The trees that we were working on had no mites that I noticed. I noticed that some of the case-bearing tineids came through all right. They seem to have been sheltered enough by their cases to come through without harm. The little case over them seems to be gas-tight enough to shelter them perfectly.

Mr. Waite—Were not the trees in bloom in those Manatee county experiments?

Prof. Gossard—The trees were commencing to blossom; a few of the blossoms were fully open, and a great many of the buds were open far enough so you could see the white of the bloom.

Prof. Gossard here read a letter from Mr. C. P. Fuller, indicating that while results were variable, the fumigated trees were carrying good crops on the average.

Mr. Porcher—Did I understand you to say the Australian lady-bug, *Novius cardinalis*, has been introduced into this State?

Prof. Gossard—Yes, sir, at Clearwater Harbor.

The Study of Forestry.

BY GEO. R. FAIRBANKS, CHAIRMAN OF THE COMMITTEE.

Mr. President, Ladies and Gentlemen:

The subject of forestry has attracted much attention in the last few years. It has been the practice, and regarded as a most practical course to pursue, from the settlement of this continent, to clear away its forest growth in every direction. Log heaps and forest fires have been looked upon as the necessary adjuncts of progressive civilization.

We have at last reached a point where we have been forced to look forward to the eventual results of this destructive policy. Fields, first denuded of all timber, have been cultivated to the point where nature has revenged itself by barrenness, and, scarred and seamed, they have presented a waste of unsightly baldness. The fields taken in have undergone the same process of being reduced to worthlessness, and profitable culture of staple crops has only been attained by a large expenditure for artificial fertilizers, needing annually to be renewed. The water supply has diminished, streams and wells have gone dry for long periods, to be succeeded by destructive torrents, sweeping down the barren hillsides, engorging the streams and carrying death and destruction along their borders.

The Southern States were originally clothed with magnificent forests of pine, of a species combining all the best qual-

ities of beauty and durability, superior in every respect to any other known timber for all the uses to which timber is applied. We have vied with each other in destroying these monarchs of the woods, to be manufactured for others' profit, at a price to us insignificant and profitless. We now begin to realize our folly and to look with anxiety to the future, when the remainder of our once splendid forests shall have disappeared.

Few of us realize how rapidly our pine forests are being destroyed. There was shipped during the year 1900 over one hundred million feet each from the ports of Fernandina and Jacksonville. To make two hundred million feet of sawed lumber, counting four trees to a thousand feet, would require 4,000 trees to each million feet, and 400,000 trees to furnish the lumber shipped from these two ports alone; and, taking an average of four trees to the acre, it would take the mill-logs off from 100,000 acres of land. If we add to this the millions of crossties, we shall to some degree realize how fast the destruction of our forest growth is proceeding. But we have been counting the lumber destruction alone. After going over the pine lands of North Carolina, South Carolina and Georgia in part, the turpentine or naval stores operators have come into Florida and spread like locusts over all the lands

they could reach. After three years' active operations in one location, they seek new fields of labor, leaving behind them scarred trees, which in a few years will perish by storm and fire. And when the mill men and the naval stores men shall have gotten through, we fear Florida will in smut and ashes regret the im-providence which has sacrificed its future wealth for a present pittance.

HOW SHALL WE RESCUE THE FUTURE?

The natural inquiry is then what can best be done either to preserve or renew our forest growth. It goes without saying that these lands which have been stripped of their timber will not, except in selected spots, be occupied by cultivators of the soil for a long period to come. A portion, no doubt, will be enclosed for grazing lands, where the conditions are suitable for such a purpose, but the great body, comprising millions of acres, will lie out, to be overrun annually by fire, and what little chance they might have for improvement will thus be prevented.

This destruction of forest growth is by no means peculiar to the Southern States. Michigan, Wisconsin, Minnesota and other Northwestern States formerly covered with pine forests have been made barren by the immense destruction of timber for export, and a consequent exposure to forest fires, which it is claimed have destroyed ten times as much timber as the mills have cut. So far as Florida is concerned, this source of destruction is only to be feared in tracts which have been boxed for tur-pentine; the open pine forests here do not suffer like the close-grown pine forests of the Northwest, where a fire once started will burn over thousands of acres,

until it reaches a water course or is checked by abundant rains.

The United States Government has recently given special attention to fore-stry and made it one of the special branches of the Agricultural Depart-ment. Upon application, a special agent will be sent to inspect large bodies of timbered lands, and will through sub-agents go over a tract of timbered land, designating such trees as should be re-moved and the treatment best calculated to improve or restore the remainder.

The American Forestry Association was organized in Washington in 1882. The United States Secretary of Agricul-ture is now the president. It issues a monthly magazine called *The Forester* at one dollar per year. The States of Michigan, Wisconsin, Minnesota and others have Forestry Commissions es-tablished by law.

DUTIES OF A FORESTRY COMMISSION.

The Michigan law requires the Com-mission to "institute inquiry into the ex-tent, kind, value and conditions of the timber lands of the State, the amount of acres and value of timber that is cut and removed each year, and the purposes for which it is used; the extent to which the timber lands are being destroyed by fires, used by wasteful cutting for con-sumption, lumbering, or for the purpose of clearing the land for tillage. It shall also inquire as to the effect of the dim-inution of timber and wooded surface in lessening the rainfall and producing droughs, and the effects upon the ponds, rivers, lakes, and the water pow-ers and harbors, and affecting the cli-mate and disturbing and deteriorating natural conditions, etc." The Commis-sion was directed to prepare and report

to the Legislature such legislation as they deemed necessary.

A commission of this nature, which would involve but moderate expense, would be very advantageous to Florida.

One of the most important things in this matter is to arouse public attention to the necessity of considering the value of our forest growth, and the great importance of taking measures to prevent improvident waste and destruction. Fortunately, in Florida the pine tree re-plants and reproduces itself if protected while young from fire. Legislation is needed to prevent the general firing of the woods, destroying young growth as well as valuable timber and oftentimes fences and houses and groves.

Yale College has a school of forestry devoted to the instruction of students in this branch of knowledge. The State of New York has a similar school at Cornell. A school of forestry is in operation at Asheville, N. C., and there are probably some others; such a department should be established in the Florida Agricultural College.

The Agricultural and Horticultural Societies have given special attention to this subject and have promoted all the existing legislation on this subject. To this Society naturally belongs an interest so important to the future welfare and prosperity of the State. No part of the United States possesses such varied and useful timber. We exhibit with pride, at the great industrial expositions, specimens of our forest products, and they excite the admiration of the public for their variety and beauty, but we ought to do much more than this. We need a forestry commission to investigate the whole subject and recommend suitable legislation for the preservation of our

forests from fire and reckless destruction. To encourage the preservation of young trees and to promote the renovation of districts from which the timber has been denuded, to promote the propagation of valuable species, to ascertain and take measures to guard against the effects of the removal of timber upon water supply and sudden overflows. These and many other subjects may be profitably considered by a forestry commission.

DISCUSSION.

Mr. Waite—It would seem to me that there should be some law in regard to preservation of shade trees along our roads. I noticed last year in Massachusetts that the commissioners had caused zinc tags to be nailed to certain trees and there was a heavy fine attached to the cutting of any of those trees; and it seems to me that possibly we should preserve the palmettoes in our section of the country which are cut for the cattle. In the city of Jacksonville and the city of St. Augustine they are transplanted at great expense to beautify the streets. There they grow naturally and if preserved would be a beautifying feature to the country.

Mr. Hart—It strikes me that it would be a splendid move if we could in any way preserve the natural growth. I live about two miles and a half south of New Smyrna. A few years ago we got a road through there along the front next to the river and shelled it. On one side were natural trees. There was a little strip between the road and New Smyrna. Two years ago we had a nice lot of beautiful cedars a part of the way that were perhaps a foot through the

trunk. One day when I went down, I noticed that there were several camps of fishermen who had come from the interior to get fish. They camped along there and cut down those cedars for camp fires, because they were easier cut than oak. I soon put a stop to it, but we had lost perhaps twenty or thirty of our fine cedars. I go along there occasionally and I find palmettoes with the tops cut off, trees six or eight feet high. They cut off the cabbage to eat. I value the trees along that road very much. If we can do something to prevent this vandalism it would certainly be a move in the right direction. Anything that could accomplish it I would give all my strength toward putting through. And this matter that Mr. Waite speaks of in Massachusetts seems to me to be an excellent way to preserve them.

Dr. Kerr—A few years ago there were resolutions introduced for something of that kind by myself, and the Society took hold of it. The attention of the Legislature was called to it, but nothing was ever done. Resolutions come up to-day. What those resolutions I speak of amounted to I cannot tell. What they may amount to to-day we cannot tell.

But it is evident to me in mixing with the general masses of the people of Florida, that they are indifferent to the beauties of their State, of their home; and this condition of things has become so implanted in their minds that it is impossible to lift them out of the mire. I sometimes go among them and I say, "Why do you not plant a tree here to shade the door?" "We have no care for it," is the reply.

Now, I am not saying anything against the resolution offered previously nor the one to-day; they are all right, but we stand, probably, a little too high. That is, we are in the second story; we are above the people, in other words, but our duty to the people is this, that we should go among them and create a sentiment that will go into their hearts that will work and work until the State is made to feel, until the citizens of the State of Florida are made to feel that there is a necessity in this direction; and I believe that this sentiment being inculcated into the minds of the people is the only thing to be done, and we have not performed our duty when we have spoken of it in our Society.

Fertilizers, Spurious Ashes.

A DISCUSSION.

Prof. Stockbridge—I wish to present a few results of some trials which I have been making of interest to horticulturists, but first I wish to call attention to

two or three facts which have impressed themselves upon me as particularly important to the fruit growers of Florida in as much as I am satisfied that many

of them are to-day following a practice which is extremely uneconomical and from which they should turn as soon as possible. The first of these practices, in degree of importance, is that which I find in several parts of the State, more particularly among pineapple growers, of insisting upon the use of wood ashes. There is no evidence to prove that potash in the form of wood ashes possesses one particle of advantage over potash in certain other forms, and if it could be absolutely demonstrated that potash in the form in which it exists in wood ashes, and that therefore wood ashes as raw material, did possess a value greater than that which could be secured from potash in some other form, the very same material can be secured in more economical ways than in the use of wood ashes. The time has gone past when actual commercial wood ashes exist to any extent worthy of consideration, but by far the greater part of the material for sale under the name of wood ashes never existed in trees. It is an entirely manufactured material which had for its base the ashes of the leacheries, the residue of which was gathered up and used for a basis of the Canada wood ashes, but even that material has to-day almost entirely disappeared, and the so-called wood ashes of to-day are entirely artificial. I know they are manufactured, for I have seen them made, and they are entirely spurious. The manufacturer takes advantage of the user who thinks that because genuine potash bites, that when he takes a sample of this material and puts his tongue to it, and it bites, he believes that it is potash; he forgets that quick lime will bite just as well as potash. There is much of this material sold. It is being dumped upon unwary consum-

ers in the State of Florida. I can give many instances of consumers during the past two years who have bought this material under the supposition that they were getting the best of material. Down on the East Coast recently, in the center of the pineapple business, I found a large pineapple grower who stated that he had secured a good bargain in three carloads of Canada hard wood ashes high in potash. They contained about 40 per cent. of potash, he claimed. As a matter of fact, no such thing as that could exist. The best wood ashes contain only from nine to eleven per cent. of potash, and I succeeded in inducing him to show me the original analysis. It contained actually 38-100 of one per cent. of potash. The consumer had paid about \$14 per ton for material the actual value of which was less than 50 cents a ton. I give warning against such practice, which is unquestionably taking thousands and thousands of dollars from the State.

Coming back to the results of fertilizer experiments mentioned, I will give a few results of some rather extensive fertilizer trials on Irish potatoes, this having become a very important shipping crop. For three years we have been growing experimental crops of potatoes on a somewhat large scale, making a very large number of tests, and I have the average of three years both with fall and spring crops. As a basis for this test I take what is called a normal fertilizer composition, and the object of the test was to find out the maximum amount of the three fertilizers constituents.

Phosphoric acid, nitrogen and potash, which could be used with profitable results, and to reduce, if possible, the amount of either of these constituents,

and by so doing to ascertain if it were possible to reduce the cost of the Irish potato fertilizer now on the market, without diminishing their crop producing power, I used the following materials: 500 pounds of acid phosphate; 200 pounds of sulphate of potash; 500 pounds cotton seed meal, for the "normal" mixtures mentioned. I used multiples of that, namely, one and a half times, and twice that application to determine exactly how large an application was possible with economical results, and then from different plots I omitted consecutively one-half of each of these ingredients to reduce the cost of the fertilizer without interfering with the crop.

The first important consideration is that this so-called application varies very materially from the usual potato fertilizers. It contains approximately four per cent. of phosphoric acid, three per cent. of nitrogen and eight per cent. of potash. The result of the application of this mixture gave me the following yields of crop:

The normal application produced per acre 3576 pounds of market potatoes. The one and a half normal application produced 3390 pounds of market potatoes. The double normal application produced 3240 pounds of potatoes. The one-half normal phosphoric acid produced 2718 pounds. Reducing the nitrogen one-half gave 2160, and reducing the potash one-half, 2076. The facts, therefore, that seem to be demonstrated are: First, that the normal application contains as large a quantity of the different fertilizers as can be profitably used, and that neither by increasing or diminishing the application do we increase the crop. As a matter of fact, the best yield was that obtained from the

normal application, and by increasing one-half we obtained really a smaller crop, showing that the crop-producing power of that soil cannot be increased by increasing the fertilizer. Neither one of the three constituents could be diminished to any considerable degree in this mixture without very materially decreasing the crop. By dropping out one-half of the cheapest ingredient the crop fell off, and dropping one-half of the potash application the crop fell from 3576 to 2076, or fifteen hundred pounds exactly, by reducing the amount of potash one-half.

There was one other interesting point considered in connection with this same crop. Two check plots were planted, one of them without any fertilizer whatever, the land being new land, and the result of this test showed the extreme variability of the soil itself, and therefore, the uncertainty of results. One of the check plots yielded 1218 pounds of potatoes, and another plot, only a few yards away and apparently of the same soil, produced only 455 pounds, or a difference of seventy per cent. with no apparent difference of soil, the result showing an extreme difference for which there is no explanation. The average yield of potatoes on the different plots was approximately 108 bushels per acre, showing a fair yield.

It seems to me that these points are worthy of consideration, particularly in view of the fact that they differ in many respects from the actual practice to-day of most of the large potato growers, particularly those in the Marion county and St. Johns county sections. But the soil on which the tests were made were of the better class of mixed pine lands, and although the results could not apply to

all places, it seems to me that they hold out suggestions which, if followed, would reduce the expense of growing and fertilizing this crop.

The crop would, in my opinion, have been better and the yield would have been heavier, had it not been for dry weather, though it was not an abnormally dry season.

DISCUSSION.

Mr. White—The potato experiments were absolutely contrary in result to mine. We require a fertilizer heavier and heavier every year, and I believe perhaps it might account for it that the soil conditions were such that you could not use as large amounts of fertilizer.

Prof. Stockbridge—The explanation perhaps lies in the fact that you are increasing your total application without increasing the balanced condition of the ingredients. You do not state the total application that you found unprofitable. What is your total application?

Mr. White—Our mixture starts with 600 pounds cotton seed meal, 600 pounds of acid phosphate, 250 pounds potash. My application this year was about 700 pounds cotton seed meal, 800 pounds acid phosphate, 300 pounds sulphate of potash. On my experimental plot my yield this year was not large at all, and in fact the yield was nowhere very large, only about twenty-seven barrels to the acre.

Prof. Stockbridge—My tests were intentionally made upon new land that I might be sure there were no varying conditions preceding the planting of the crop. Therefore, under those circumstances, it would be profitable to use a total application such as would be re-

quired by the deterioration of the land.

Mr. White—We are working for early potatoes. Now, the earliest crop that I know of is that shipped as green potatoes. I know of potatoes planted February 6th being dug on the 20th of April, and being dug because they had the blight so bad we did not dare leave them in the ground, and we made forty barrels per acre. We used 1000 pounds cotton seed meal, 1000 pounds acid phosphate, 250 pounds potash, three acres to the patch, and had forty barrels to the acre.

Dr. Kerr—I would like to ask the gentleman if he heard the report upon oranges that were shipped from this State in such a condition that they were unsaleable when they arrived in market? I would like to ask if there would be any danger in shipping potatoes, that they might be in the same condition?

Mr. White—When the market gets so that it demands the green potatoes, we furnish them.

Dr. Kerr—Would you ship a potato to me to eat that you would not eat yourself?

Mr. White—if you would offer me eight or nine dollars for potatoes that I would not eat myself, you could have my whole crop.

Dr. Kerr—I don't know what I am getting until I get your potatoes and I am stuck.

Mr. White—As to the applications of this fertilizer—whether they were made directly, whether the potatoes had an opportunity to take up all the fertilizer—how about that?

Prof. Stockbridge—The application in each case was made at two different times, the first in the furrows, the second broadcast.

Mr. Prevatt—Would you prefer your form of fertilizers or the high-grade fertilizers?

Prof. Stockbridge—I would say, personally, I don't buy any so-called high-grade fertilizer at all. I believe I can mix them for my own soil and crops better than anyone else, but I would not mix this same formula for every farm. I believe that you or I can arrive at conclusions that will enable us to have a fertilizer made that can meet our own conditions a great deal better than a man in New York who never heard of you can reach your requirements by mixing up a high-priced, high-grade fertilizer.

Mr. Prevatt—Major Healy has been mixing his fertilizer for the last five years, and he has never made a crop. Last year with Wilson & Toomer's potato fertilizer I gathered twenty-two barrels where Major Healy with his formula, made as Prof. Stockbridge said, grew but four. I want nothing to do with mixing. I have seen it tried side by side.

Dr. Kerr—Brother Prevatt should remember that our friend Major Healy is an agriculturist, and not a horticulturist.

Prof. Stockbridge — The fact that he has not made a successful potato fertilizer is perhaps easily explained. The Major has conceived an antipathy to potash, and he will not have any potash. Most of us find it exceedingly important.

Mr. White—Do you put your fertilizer on in the raw state?

Prof. Stockbridge—I buy the raw materials and mix them myself.

Mr. Gaitskill—I will say that Mr. Painter mixes the fertilizer, but he mixes it to suit.

Mr. Prevatt—I have a brother that used his fertilizer this year and I used Wilson & Toomer's. He got stuck on Mr. Painter and I got stuck on Wilson & Toomer. I never have tried Mr. Painter's fertilizer. Neither of us would have anything to do with the other's fertilizer. (Laughter.)

Mr. Butler—in regard to ashes, I think he is laboring under a slight misapprehension as to that. Very few pineapple growers of any intelligence but what would know better than to buy ashes to get potash. But I will say that of the pineapple growers, I know of very few who use wood ashes, but once in awhile I have seen a case when an application of wood ashes did good.

Prof. Stockbridge—I said that if there was any reason why the material in wood ashes was actually desirable, it could be obtained in some other form, exactly the same material in some cheaper form. My statement that the pineapple growers were very largely deceived in the purchase of wood ashes for this purpose referred perhaps to the open culture pineapple growers, and not those who grow them under sheds.

Fertilizing and Irrigation.

BY E. D. PUTNEY, OF AVON PARK.

The successful and hence profitable production of different fruits demands such variable conditions, properties and proportions of soil, sunshine, air, fertilizer and moisture as are best suited to the particular species of fruit-bearing plant.

We are obliged to add to our title "Soil, Sunshine and Air," because they are so inter-related with fertilizing that one is of no effect without the others. Indeed, it may be truly said that soil, sunshine, air, manure and moisture are all elements of fertility.

The conditions necessary to the successful growth of the pineapple differ materially from those necessary to the successful growth of the citrus. The pineapple and strawberry will succeed on comparatively shallow soil with a maximum amount of fertilizer and moisture and a minimum amount of sunshine and air. The citrus must have a liberal depth of soil together with a minimum amount of fertilizer and moisture and a maximum amount of sunshine and air. The peach, however, demands a maximum amount of soil, fertilizer, sunshine and air and a minimum amount of moisture. The peach requires more air than any other fruit.

Air is best secured to the roots of fruit plants by use of the plow, cultivator, harrow and rake.

Sunshine we have nearly always with us, soil we may select, and fertilizing elements we may save from refuse on our estates and by purchase; moisture we may secure by irrigation.

HOW TO OBTAIN FERTILITY.

In Florida most soils suitable for fruits are lacking in fertilizing elements. How best to build up such soils is the great economical question for horticulturists. Nearly all fruit growers in Florida give the soil credit for more power to produce a crop than it really has. Hence many failures. We do not believe that with the present low price of good land that it will pay to try to improve poor land by planting cowpeas, velvet beans, etc., with the intention of turning them under. Land good enough to produce a crop of peas or beans to work into the soil will produce a crop of crab-grass, which is quite as good for the purpose of soil renovation as peas or beans. If groves already planted need a grass covering, it may be secured by harrowing in about 500 pounds of blood and bone to the acre, applied about June 1 on land that has been cultivated at least twice within three weeks previous. No seeding is necessary for crab-grass.

Where the soil is good to start with and crabgrass comes in promptly, a tree

may be planted and good results secured by the use of so-called commercial fertilizers. These consist mainly of tankage, blood, bone, nitrate of soda, sulphate of ammonia, muriate of potash, sulphate of potash, lime, boneblack and dried fish.

APPLICATION OF FERTILIZERS.

The so-called organic fertilizers, such as tankage, blood, bone and dried fish, are no doubt valuable for plant growth, but their exclusive use is detrimental to the health of the tree. On very good soil, rich in humus, strictly chemical fertilizers are much superior and give a higher quality of fruit. Organic fertilizers on most soils may be used during the first four years in moderate quantity, but never exclusively. Our own practice has been to alternate fertilizers in the same manner as many farmers alternate their crops.

At the first application on strawberries we use at the rate of 600 pounds to the acre of a special vegetable fertilizer, mixing it in the row two weeks before planting. The next application, a month later, we use tankage at the rate of 400 pounds sowed in a shallow furrow made with a hand plow close to the plant. A third application of 400 pounds of high-grade sulphate of potash is made as the plants begin to bloom, sown broadcast very carefully so as not to injure the foliage or bloom. This is cultivated in with the harrow or rakes. If it is desired to secure very late pickings, another application of a complete fruit fertilizer may be given during February or early March. It is only a matter of fertility and sufficient moisture

to be able to pick strawberries from December 20 to July 1.

Where the soil is rich in humus the exclusive use of a high-grade, strictly chemical fertilizer analyzing four per cent ammonia, six per cent. phosphoric acid and fourteen per cent. sulphate of potash is advisable. Five hundred pounds should be sown in the row and well mixed with soil three weeks before the planting of the strawberries, and 500 pounds should be broadcasted between the rows about December 1.

Very nearly the same kind, quantity and method of fertilizing will answer also for pineapples. The addition of 500 pounds of high-grade tobacco dust broadcasted over the beds dusting the leaves well is advisable twice a year.

CITRUS FRUITS NEED PLENTY.

For many years past growers of citrus have not fertilized enough to get maximum results. We are safe in saying that our groves of orange and pomelo may be made to produce a profitable crop one and two years earlier than the general average for the past ten years. For several years past our nurserymen have recommended the use of one pound of fertilizer the first year. This may do on very good soil, but three pounds in three applications the first year is little enough on our average citrus land. The second year use six pounds, the third year twelve pounds, and you may look for a profitable crop the fourth year.

The treatment recommended for strawberries and pineapples is of little value unless timely rains give sufficient moisture. Growers, knowing this, select lands naturally moist, and if favored

with a few showers make a very good crop of fruit; but there are cases where a supply of strawberries or pineapples is desired for home use or a profitable local demand, and there is no moist land available. In such cases some method of irrigation is a necessity.

METHOD OF IRRIGATION.

A head of water must be secured by means of a windmill or a hydraulic ram and then distributed by means of pipes. Instead of using a hose a sufficient number of lawn sprinklers may be permanently attached, and the simple turning of a valve will in a few minutes give the plants a good drenching. We have tried various methods of irrigation and believe the method of piping and the use of sprinklers is by far the best. By this same method you can have a superior vegetable garden on the highest, driest sandhill.

We know of two very superior strawberry and vegetable gardens grown in this way. They are freer from frost and insects than gardens in bayheads, and are so arranged as to be convenient to the house.

With citrus and peach trees it is different. We have yet to learn of an irrigating plant that has paid a profit on the investment.

The late Dudley W. Adams claimed that it was more profitable to give the tree more area in which its roots could find moisture than to go to the expense of an irrigating plant.

There is no doubt that if we planted ninety-six trees to the acre, as they do in California, we should need an irrigating plant during our dry periods.

IRRIGATION.

Mr. Parmenter—I had expected quite a talk upon irrigation, but as there seems to be nothing to be presented on the subject I will take this opportunity to speak of a method of carrying artesian water about a garden, which I have found convenient. Thirty-foot lengths of three-quarter inch iron pipe are used, connected by ten-inch pieces of rubber hose. Into the couplings at each end of the pipe screw a brass tip which has a standard thread at one end to screw into the coupling, and a hose thread at the other to screw the hose to. Always leave the piece of hose on the end of the pipe toward the hydrant when shifting; then the coupling will always come right.

The system gives an iron hose with limber joints. It is more economical and more convenient than hose. Have fifty feet of hose to attach to the end of the line of pipe. Have paths through your vegetables, and keep the hose in the paths. The pipes may be carried on supports over the beds, if necessary.

If the force of water is good, revolving sprinklers can be used. If it is desired to sprinkle long beds, gem nozzles on two-foot standpipes, set about ten feet apart on a length of pipe with short pieces of pipe screwed in to tie on the ground, and hold the standpipes perpendicular, are quite satisfactory. Three standpipes on a twenty-foot length make a convenient size to carry about. Two such sets coupled together will sprinkle a strip sixty feet wide ahead of a gang planting strawberries or lettuce, or the pipe and hose can be used to keep a barrel full, from which water can be dipped in buckets or water pots when setting plants.

Tomato Growing in Dade County.

BY REV. E. V. BLACKMAN, OF MIAMI.

The conditions that surround the trucker in North Florida, both in soil and climate, are very different from those confronting men in the same occupation in the tropical regions of the State. It is also evident that those living on the West Coast, or in the central part of the State, in the same latitude as those living on the East Coast, have different soil and climatic conditions to meet, so that it would be impossible to cover the entire ground in one paper.

But, fortunately, we have on this committee Mr. White and Mr. Healy, who will represent the northern sections of the State.

The season just passing has been one of the most successful since the opening of the tropical part of the East Coast, by the completion of the Florida East Coast Railway to Miami. To say that there have been no failures would be a misstatement. But when we say that there have been fewer failures and greater successes than ever before, we are simply stating facts as we find them.

EXPERIMENTAL.

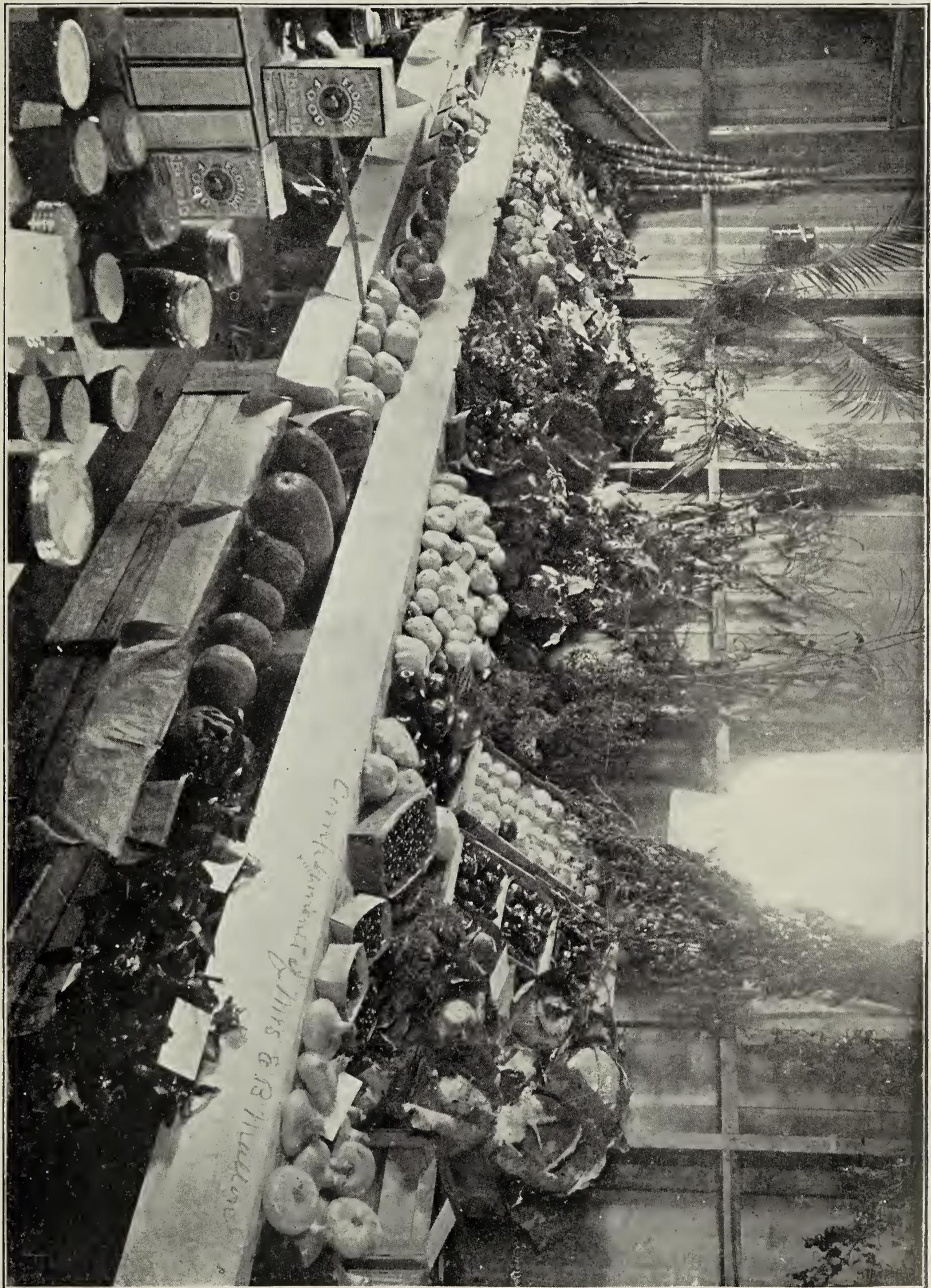
Six years ago the lower East Coast was a wilderness. The extensive acreage of alluvial prairie land lay as it came from the hand of the Creator, having lit-

tle or no value, while the forest remained in its primeval state, except for a settler here and there, who either desired to get beyond the pale of civilization, or a more daring spirit, who looked forward to the time when the lands would become valuable. The first crops of vegetables planted were entirely experimental. Some succeeded, others failed. There was a sufficient number of successes, so that the next year there were many hundred acres under cultivation, the growers on a whole meeting with phenomenal success. Each year since the business has increased, until this year there will be sent to market in the neighborhood of 500,000 crates of tomatoes, besides Irish potatoes, eggplant, peppers, English peas, cabbage, etc. Prices have ruled high, as a whole.

Among the most noted failures with which we have met have been those made by old vegetable growers, who for years had been growing and shipping vegetables from the northern parts of the State. Some of the greatest successes have been made by those who for the first time made battle with mother earth for a livelihood. But the day of experiment in a great measure has passed. The up-to-date trucker, whether he plants on pine, prairie or muck land, plants with the assurance that he will succeed. In the past five years many

PART OF DADE COUNTY FAIR EXHIBIT.

Tomatoes, eggplants, turnips, rutabagas, cauliflower, lettuce, celery, parsley, green beans, wax beans, roasting ears, okra, peppers, watermelons, Irish potatoes, Bermuda onions, red onions, pumpkins, vegetable oysters, beets, cabbage, cucumbers, collards, kale, muskmelons, Brussel sprouts, radishes, English peas, carrots, Lima beans, parsnips, spinach, sugar cane, sweet potatoes, Hubbard squashes, Boston squashes, summer squashes, Seminole squashes, kohlrabi, cassava, etc.



of the laws of nature have been mastered, especially those relating to the adaptability of certain plants to certain soils and the adaptability of certain fertilizers for certain crops. To say, however, that the most advanced and successful trucker has reached perfection—either in method of culture or fertilization—would be a mistake. Each year the older and better class of truckers are demonstrating that “the half has never been told,” and each year there is rapid advancement in the vocation of trucking.

It is an indisputable fact that the average number of crates per acre is yearly increasing. This results from a better cultivation, a more thorough knowledge of what kinds of fertilizers are best adapted to the crop, and a larger and more intelligent application of fertilizers.

However, the growing of the crop is not the planter's greatest difficulty. Experience and observation have taught them, so that nearly all grow a paying crop, in quantity. After the crop is grown begins the planter's real trouble. During the picking season pickers and packers are scarce, and the planter is forced to take any kind of help that offers itself.

PICKING THE CROP.

We will speak more especially of the tomato crop, as this is grown most extensively.

Among the difficulties the planter meets, there is none greater than the picking. At first sight it would seem that any one with a little care and attention could become an expert picker, but this is far from the facts. The greatest care should be exercised in the

gathering of the fruit. This year, as in years past, there has been a constant complaint along these lines, and much fruit which, if it had been properly picked, would have sold as “Fancy,” was sold in the market as choice or even in lower grades. However, there has been some improvement in this direction, and there will continue to be, as the careless picker is getting some very valuable experience on the wrong side of the ledger.

PACKING.

Here again the planter is met with another difficulty. Good packers are scarce. Many of the farmers have learned this by experience, and now instead of trying to pack their own fruit it is gathered and taken to a packing house, where none but expert and careful packers are employed. We have a class of growers who insist on placing the finest fruit on the top of the basket, while the under layer is made up of small, knotty fruit. A buyer told us a few days since that he purchased a car of tomatoes. A certain percentage was to be “Fancy,” the remainder “Choice”—with no culls. While they were loading the car the purchaser concluded to examine a few crates. On opening the first, marked “Fancy,” he found the top layers well packed and really fancy goods. On removing one of the layers, he found the lower layer made up of a small, knotty unwrapped fruit; in fact, the poorest class of culls. Another crate was opened, with the same results. He called the attention of the grower to these conditions, which resulted in the sale being declared “off.”

There is also too much carelessness

shown on the part of the packer as to the ripeness of the fruit. The greatest possible care should be taken to select fruit that will ripen evenly, so that when it reaches the market and the crate is opened the fruit will present an even appearance. We know of growers who watch all these details carefully, and their fruit is in demand at the highest market price. There are shippers in the Biscayne Bay country whose packages are never opened, the buyers taking them at a little above the highest market quotations.

Each year there is a marked improvement on these points, and throughout the entire North, East and West there is a great demand for the Biscayne Bay country tomatoes.

ACTUAL EXAMPLES.

In closing this already too long article we wish to give a few results that we have gathered from the farmers. In each case we give the acreage, kind of land, number of crates shipped, average price received:

No. 1—Twenty acres; marl; fertilizer, stable manure and commercial fertilizer; 8,000 crates; \$1.44, net average price; total, \$11,520.

No. 2—One-half acre; marl; stable manure and commercial; 216 crates; \$1.50 average net price; total, \$324.

No. 3—Irish potatoes; 1 acre; marl; 65 barrels; fertilizer, stable manure and commercial; no price.

No. 4—One-half acre; tomatoes; marl; stable manure and commercial; 275 crates; \$1.40 average net price; total, \$385.

No. 5—Fifteen acres; tomatoes; sand prairie; intensive cultivation; 1 ton fer-

tilizer to the acre, commercial; not all returns in yet, but the owner said it will net from \$5,000 to \$7,000. Many of our best growers are of the opinion that this crop will net the grower from \$7,000 to \$10,000; the grower is one of our most conservative men and puts the net results as first stated.

No. 6—Two acres; high pine land; net proceeds, \$1,520; 1500 pounds fertilizer used on the two acres.

No. 7—Five acres; marl; 7,000 pounds commercial and 1 ton stable manure; commenced plowing December 20; new land; No. 7 is not through shipping yet. So far he has shipped 300 crates to the acre; net average price, \$1.65.

No. 8—Five acres; tomatoes; sand prairie; fertilizer used, 1000 pounds commercial to the acre, besides 6 barrels stable manure. No. 8 is not through shipping. So far he has shipped 305 crates to the acre, and his net average price has been \$1.65.

No. 9—One and one-third acres; tomatoes; sand prairie; fertilizer, commercial and stable manure; 1100 crates; \$1.82 net; net returns, \$2,002.

No. 10—Ten acres; plowed three times; muck; 1500 pounds commercial fertilizer to the acre; 400 crates estimated; not through shipping; do not know average price.

No. 11—Ten acres; plowed once; muck; same amount of fertilizer as above; 250 crates per acre; no average price stated.

No. 12—Ten acres; muck; listed; total failure; fertilizer the same as the two above.

No. 13—Nine acres; marl; 2 1-2 acres plowed in August, all plowed in December; total shipment, 2,600 crates; shipments from the 2 1-2 acres plowed in

August, 1,200 crates. The 2 1-2 acres plowed twice yielded nearly half of the whole crop on nine acres.

No. 14—One-half acre; sand prairie; fourth crop; 260 crates; \$1.60 crate; net returns, \$416.

Potato Culture in the Flatwoods.

BY C. G. WHITE, OF HASTINGS.

The yield of marketable spring potatoes this year was about 14,500 barrels on 535 acres. Last year it was over 13,500 barrels on 300 acres. Up to this time the increase in acreage has been a normal growth.

Hastings soil is the typical flatwoods sort, underlaid with clay about two feet down. The land as a whole has so little fall and percolation that the matter of drainage is a most serious one. Ridges twelve to twenty inches high are a necessity.

The fields can be easily irrigated by turning water from flowing artesian wells into the drainage ditches and carrying it where wanted by means of dams.

Land is often broken in November for the first time and planted the following January. Two crops of potatoes are often taken from the same piece of land in a year. There were fifty acres in second-crop potatoes last fall.

Small uncut potatoes from the spring crop are used for fall planting; but experience condemns the use of culls. This seed is best preserved during the summer by spreading thinly in a cool place. Considerable light is often a benefit, but not much summer sun.

This crop is planted in late September or early October; grows until killed by frost; and is dug as the demand is for it, or if the land is wanted, it is dug and banked. This fall crop cannot be beat as an eating potato. Thirty barrels per acre is a good yield. Few of these potatoes leave the State. They are jobbed off at \$3 to \$4 per barrel, often as late as April.

SPRING CROP.

The best preparation for potatoes is a preceding crop of cow peas. Tool preparation varies, but the result aimed at is a thorough plowing, harrowing and ridging. Ridges about four feet apart, with the fertilizer well distributed in the lower halves.

Some people ridge five feet apart and plant sugar cane between the rows. It is quite common to plant corn on one side of the ridge, but not so high up but that careful digging will leave the corn plant intact.

Fertilizer is usually scattered by hand on a slight ridge, or on the level, thoroughly incorporated with the soil by harrowing, and then the ridge is thrown over it. A week or ten days before the

planting is a safe time to fertilize, and it has the further advantage of being done and out of the way.

FERTILIZERS.

I have yet to know of a fair test at Hastings between ready-mixed and home-mixed fertilizer in which the latter was not superior. The largest yields have been on home mixtures. When one considers that, pound for pound of actual plant food contained, a fancy brand like Mapes costs from a quarter to a half more than the stuff in acid phosphate, cotton seed meal, blood and bone, potash and nitrate of soda, the question arises whether an unbranded dollar's worth would not give as good results and build up the soil faster. It seems to do so at Hastings.

The fertilizer used generally runs about the following proportions per acre: 700 pounds bright cotton seed meal; 700 pounds acid phosphate; 300 pounds high grade sulphate of potash. I mix in a large, low box divided into two compartments. The ingredients, about half a ton, are placed in layers in the proper proportions in one side, then shovelled over; put through an inclined screen having quarter-inch meshes, into the other side; then screened back again and sacked. It is well mixed, free from lumps, at a cost of fifty cents per ton. A curtain round the back of the screen restrains the flying dust very decently.

I made some careful experiments this year, which are as valuable as one set of experiments ever are. Each plot except the Mapes and the heavy mixture was intended to contain proportional amounts of plant food. The blood and bone patch received 150 pounds nitrate

of soda by mistake. The Mapes patch exceeded the normal patch in cost by about \$4.

The list is arranged in the order of yield of large potatoes per acre.

Patch 1—Mapes; 62 1-2 bushels large, 50 bushels small; total marketable, 112 1-2.

Patch 2—Nitrogen as sulphate of ammonia; 67 1-2 bushels large, 30 bushels small; total marketable, 97 1-2.

Patch 3—Nitrogen as castor pomace; 77 1-2 bushels large, 32 1-2 bushels small; total marketable, 110.

Patch 4—Normal mixture and dose; 77 1-2 bushels large, 47 1-2 bushels small; total marketable, 125.

Patch 5—Potash as muriate; 85 bushels large, 45 bushels small; total marketable, 130.

Patch 6—Phosphate as slag meal; 87 1-2 bushels large, 45 bushels small; total marketable, 132 1-2.

Patch 7—Nitrogen as nitrate of soda in two doses after plants were up; 105 bushels large, 32 1-2 bushels small; total marketable, 137 1-2.

Patch 8—Nitrogen and part phosphate as blood and bone; 107 1-2 bushels large, 37 1-2 bushels small; total marketable, 145.

Patch 9—Heavy dose; 2800 pounds regular mixture; 126 1-2 bushels large, 37 1-2 bushels small; total marketable, 164.

The sulphate of ammonia and the Mapes patches bear out former experiences.

Theoretically, sulphate of ammonia is injurious to most plants on soils deficient in lime. Mapes does not show up well as a forcing manure.

Slag phosphate does surprisingly well and, so far as one test goes, sustains the

European experiments as to its value on sour soils, and also the results at the Ohio Experiment Station.

These patches were planted January 25, and dug May 3, when about half grown. Vines were once frosted to the ground, underwent a long, excessively wet spell, and grew in a very backward season.

SEED.

For seed, the No. 4 Rose is a decided favorite. It is used at the rate of from three to five barrels per acre. Other things being equal, the larger the seed piece, the earlier, thriftier and hardier the plant. This difference is particularly noticeable in a bad season. It is best that the plant should grow from the first sprout out of an eye. Potatoes having white sprouts long enough to break off, or that have had these sprouts removed, are not first-class seed.

Personally, I cut to size of seed piece, whether it has one eye on it or four; and I always try to split the cluster of eyes at the bud end, so as not to have so many on a piece, and also because these eyes make the earliest potatoes if backed by a proper chunk of potato. People who cut to one eye or two eyes almost invariably cut too small as they near the bud end. If the bud eyes have not their share of potato, they are handicapped. Regularity in size of seed piece is an aid to uniformity of crop. The eye at the stem is least useful of all. There is yet another way of insuring a stand of potatoes. Potatoes exposed to a strong light or even exposed to the winter sun until they green and start dark, strong, stubby shoots are nearly indestructible when planted, and are early and prolific

growers. This treatment is said to kill what scab germs there are on the potato.

Cutting seed is not a job for cheap labor, nor should potatoes of doubtful vigor or bad shape go into the seed pile.

For cutting large potatoes, that attractively advertised curved-bladed knife is a positive disadvantage. It does good work in very close cutting and in cutting long slender potatoes full of eyes. A medium sized thin-bladed knife is usually best. The ideal striven after in cutting is a chunky piece, having as little cut surface as possible, and the eye placed as near the center as possible.

The experience of the Cornell Experiment Station and a number of others is that the sooner a cut potato goes into the ground the better. There is no gain and possibly no loss in carrying cut seed some days. But there is danger of spoiling, through heating; and the cut seed freezes easily if cold comes. Cut seed had best be spread thinly until wanted, if the delay is a matter of days.

A careful man can use a machine cutter to advantage on seed full of eyes, and of the Early Rose type. I should hardly care to use it on the No. 4 Rose. I want every seed piece a good one, and a plant every foot in the furrow. It pays.

PLANTING.

The ridge is split open for planting and the seed piece dropped on what would be the normal level of the ground or a little higher. If dropped by hand, it is covered with a disc cultivator. This leaves the seed piece in the center of a well-stirred ridge, about three to five

inches above the furrow bottoms. When the plant is laid by, the seed piece is often six or eight inches above the furrow bottoms, and covered with five or six inches of earth. Extreme ridging is not a theory at Hastings.

I use an Improved Robbins potato planter, and prefer it to the Aspinwall, because when a piece gets crushed by the machinery it can be replaced; and with a good man on behind there need be no skips. But if the tender is careless or incompetent, the Aspinwall will do better work. It plants about ninety-five per cent. correctly, and takes only one man. I have used both machines. Cultivation is largely done with riding disc cultivators—an ideal tool in ridge work and in trash. We rig them with a sixteen and twenty inch disc on a side, and set them either to stir the ridge sides or to throw earth over the whole ridge. I use a Hallock weeder to stir the ridge tops until the vines are six inches high. Hand hoeing in a wet season costs me perhaps 25 cents per acre.

The furrows on each side of the ridges are kept constantly open at the ends, so that rain water need not stand in them. I go over these outlets after every cultivation and after every hard rain. My crop gets seven or eight cultivations at least.

If the plants are only two or three inches high, and a freeze threatens, the disc is used to cover the vines, which are left to grow out again of their own accord. If the plants are larger, they are often uncovered by hand. I doubt whether covering six-inch plants pays. The frosted-back plants seem to catch up before the end of the season. Covering small plants certainly pays.

Bacterial blight bothers in new land,

sometimes badly. Early blight appeared very generally this year. No potato bugs bother as yet. The greatest danger is wet rot.

The bulk of the planting is in late January, the digging in early May. The crop is then half to two-thirds grown, otherwise the yields would be unusual.

DIGGING.

Digging is usually done with hooks; the ridge is barred off, leaving only a balk to handle. Three rows of potatoes are thrown together, making a heap row. Labor costs \$1.25 a day during harvest and there is not enough of it. We ship on a falling market and everybody wants to rush his crop off at once. All the surrounding towns are ransacked for extra teams and men.

Two farmers use the Dowden digger, a four-horse machine. I have tried the Dowden, the Hoover, the Aspinwall and the Hallock. I do not care for any of them if I can get enough men. Our conditions in every way are almost too extreme for standard machines.

After digging, if the sun is at all hot, the potato should be immediately barrelled; the sun ruins them quickly. They are sorted into firsts, seconds and culls, and the first two sizes are shipped. Sorting is a hard job to get well done. I have a special boss for this work. The firsts are picked up, then the seconds. No darkey seems able to pick up both at the same time and keep them distinct. I like a half-bushel patent stave basket and a pail bail for this work. Barrels of firsts are placed in one row and barrels of seconds in another, so there will be no mismarking, and the hands can see where the last unfilled barrel of each sort is. When a barrel is headed and sten-

cilled on the top and side, it is laid down, so that the finished barrels can at once be distinguished by the wagoner. One man this year sorted under cover, but this involves a lot of extra handling and is not likely to prevail unless the pack is much improved by it. The immature potatoes skin easily, so they need careful handling. They are well shaken down in the barrel and the head is forced home with a lever press.

PACKING.

Florida potatoes, to bring top prices, must not only be well sorted, but well packed. The last potato crowded in is worth the first three.

Barrels are usually too much ventilated. Sixteen one-inch auger holes in the sides of a barrel are sufficient. Potatoes have often left Hastings in such a ventilated barrel, so wet by the rain that water ran out of the holes when loading, and yet they reached New York in fine shape.

Too much ventilation causes the potato to shrink and to lose its bright new look.

We are mostly all-rail shippers, despite the 20 cents or so additional cost over boat freight. This is not all notion, either.

Most people seem to believe that treating potatoes as a fancy product is a huge joke. Prof. Rolfs' advice in his book on Vegetable Growing, to use old crates and disreputable barrels, is the worst possible. A nice, large, new eleven-peck barrel is none too good for the best trade; to use a crate of any kind is, I believe, to throw away money. The Western markets do, however, quote early potatoes by the crate. They are not so

progressive in this as the Eastern markets.

If a pack is uniformly good in uniform barrels, if it is such that you would rush to buy any barrel in a lot in preference to any other barrel in any other lot, because you were certain of what you were getting; then the way to get the best money from the crop is to ship in such a way that the brand can become known, so that it will be called for. When that point is reached, the commission man is able to ask 50 cents or a dollar above what just as good but miscellaneous stock is selling for, and when a glut comes this stock sells first and best. A good reputation is money in the truck market.

Hastings potatoes will average to bring the shipper from \$2 to \$4 cash per barrel for the season. The yield is from anything up to eighty-five barrels per acre; thirty is considered poor, fifty good. Gross expense runs from \$50 up.

A BIG ACRE YIELD.

The following is an account of an average acre of my own last year. This includes cost of all mule and man labor at hiring prices:

| | |
|---|---------|
| Rent of ground | \$ 5 00 |
| Preparation of ground | 3 30 |
| Fertilizing, harrowing in and ridging | 2 60 |
| Cutting and planting seed..... | 2 00 |
| Fertilizer | 23 10 |
| Seed potatoes | 10 88 |
| Barrels | 18 30 |
| Tending | 3 65 |
| Digging, barreling and hauling.. | 12 73 |
| Other expenses | 4 00 |
| | _____ |
| | \$85 56 |

| | |
|-------------------------|--------------|
| Credit 61 barrels pota- | |
| toes | \$206 10 |
| Expense | <u>85 56</u> |
| Net profit | \$120 54 |

It is too soon for complete statistics this year. It is needless to say they are not so good.

The potato at Hastings is not a bonanza vegetable. It is with good management capable of an average net profit per acre of between \$50 and \$75. This is a good farm profit. My experience is of seven years.

Dwarf Orange Culture.

BY S. POWERS, OF JACKSONVILLE.

Doubtless the title of this paper will not especially commend it to most Americans. We are accustomed to associate the word dwarf with those fantastic creations of Chinese and Japanese gardeners, who prune and compress trees into shapes as unnatural as the feet of their women; or with the delicate dwarf pear tree, which is the only dwarf thing in pomology with which most people are familiar.

The dwarf pear has been rendered unjustly objectionable to the American public by having been the subject of one of those crazes, such as the morus multicaulis or sorghum, which occasionally afflict this country. A dwarf pear, carefully nurtured, is one of the most profitable as well as beautiful objects in the orchard. But when it is treated in the rough-and-ready manner to which most farmers and even orchardists subjected it more than twenty-five years ago, it dwindle away unfruitful and dies.

The typical American farmer respects

bulk and strength, such as the French pear trees near St. Louis, several hundred years old, healthy and prolific, or the famous Occlotree pear near Vincennes, Ind., over 150 years old, which has produced 140 bushels of pears in a single season. In the presence of such orchard patriarchs our countrymen generally look upon a dwarf a few feet high, even though it bears the choicest fruit at two or three years of age, with ill-concealed contempt. A boy in an Iowa town was asked by a traveler what religious creed prevailed in that town, and he replied, "We mostly believe in the Durham breed." But skilled and scientific orchardists know that dwarf pears, when properly cared for, are best and most profitable. Eugene Curtis, of Massachusetts, it is said, sold \$1400 worth of dwarf pears from an acre.

They also know that the dwarf cherry, *Prunus pumila*, worked on the mahaleb stock, is most suitable for small village orchards; the fruit being most easily protected from birds with netting, and

thus allowed to become thoroughly ripe on the trees, which is so essential to the high quality of the acid varieties.

In the Wellhouse orchard in Kansas, which came into bearing in 1883, and in 1890 produced 79,000 bushels, the trees are headed low and pyramidal, and five-sixths of the apples can be picked by men standing on the ground. In the burning summer winds and winter blizzards of Kansas this low-headed form, branching from the ground, is necessary.

ORANGES IN JAPAN.

In Japan the Oonshiu, which we call the Satsuma, is grafted or budded on the citrus trifoliata, indigenous to Japan, which gives it hardiness. It has a very different growth from our trees, being really a large bush. It does not often grow over ten feet in height, the highest about twelve, but it covers a great area. H. E. Amoore, the Japanese traveler and importer, speaks of measuring one which was seventy feet around the branches, which rested on the ground. They are not pruned on the stem, but the young shoots are cut off from the upper part of the tree to keep it down. The branches starting from the ground are very irregular and completely hide the trunk. They are planted on the sides of the hills, on ledges or terraces, thirty to fifty feet, generally only about ten feet apart, the branches interweaving so close together that passage is impossible except by crawling under. In the valleys they are not planted regularly, but dotted about with rice and vegetables.

These dwarf trees are very prolific; the branches are literally laden with fruit. Amoore states that the oranges general-

ly attain a diameter of three and a half inches. It is the universal opinion throughout Japan that this variety is the best orange grown in that country. If the Satsuma on trifoliolate stock is the best orange in Japan, we see no reason why it should not be a good orange in Florida. This opinion, if coming from the Japanese alone, would be open to suspicion, for they often eat both oranges and persimmons when they are green and of a vile flavor; but Americans in Japan all say that when the Satsuma is allowed to ripen it is delicious.

The trees bear very young. Trees imported into California only eighteen inches high have arrived in San Francisco with fifteen or twenty oranges still hanging to their branches after the long voyage.

DWARF ORANGES ON OTAHEITE STOCK.

In 1875 Dr. C. J. Kenworthy settled in Jacksonville, and having been previously interested in growing the dwarf apple on Paradise stock and the dwarf pear on quince stock, he turned his attention to the subject of dwarfing the orange on the Otaheite stock. He sent to Long Island and obtained one plant of this stock from which he propagated others. In a letter to the writer he said:

"One of my bushes, less than three feet high, and within thirty months from the time the Otaheite branch was layered and budded, produced thirty-three large Homosassa oranges. All my bushes produced full crops of fruit within three years from the time the branches of the stock were layered and budded. The next winter a blizzard destroyed both my standard trees and dwarfs.

"As to the longevity of the stock, I cannot express a positive opinion. The variety is vigorous and appears to endure harsh treatment and neglect when grown in pots and in private houses. I see no reason why it should not live as long as the ordinary orange or lemon.

"The Otaheite possesses an advantage as a stock—that of inducing early fruitfulness. From experience I am convinced that it can be successfully and profitably cultivated 6x6 or 8x8 feet apart, if summer pruning is resorted to.

DWARFING BY PRUNING.

"The tendency of the citrus family at an early period is to make a vigorous growth, in the way of one or more branches; and to form productive bushes this must be prevented by summer pruning. I applied to my bushes the mode of culture advocated and adopted by Thomas Rivers, of England, in the culture of dwarf apples and pears. At an early period the leader was stopped and made to branch near the ground. After this the leader was regularly stopped by nipping out the top after it had made eight or ten leaves. After the side branches had made a growth of six or eight leaves the tops were removed. After the bushes were developed each growth was stopped at from four to eight leaves, according to the vigor of the bush. This procedure caused my bushes to assume the form of a cone, producing large leaves and an ample supply of fruit. I would suggest to experimenters to go over their bushes occasionally, and as soon as any branch made a certain number of leaves to stop it by nipping out the top. This process will keep the bushes dwarf and will add

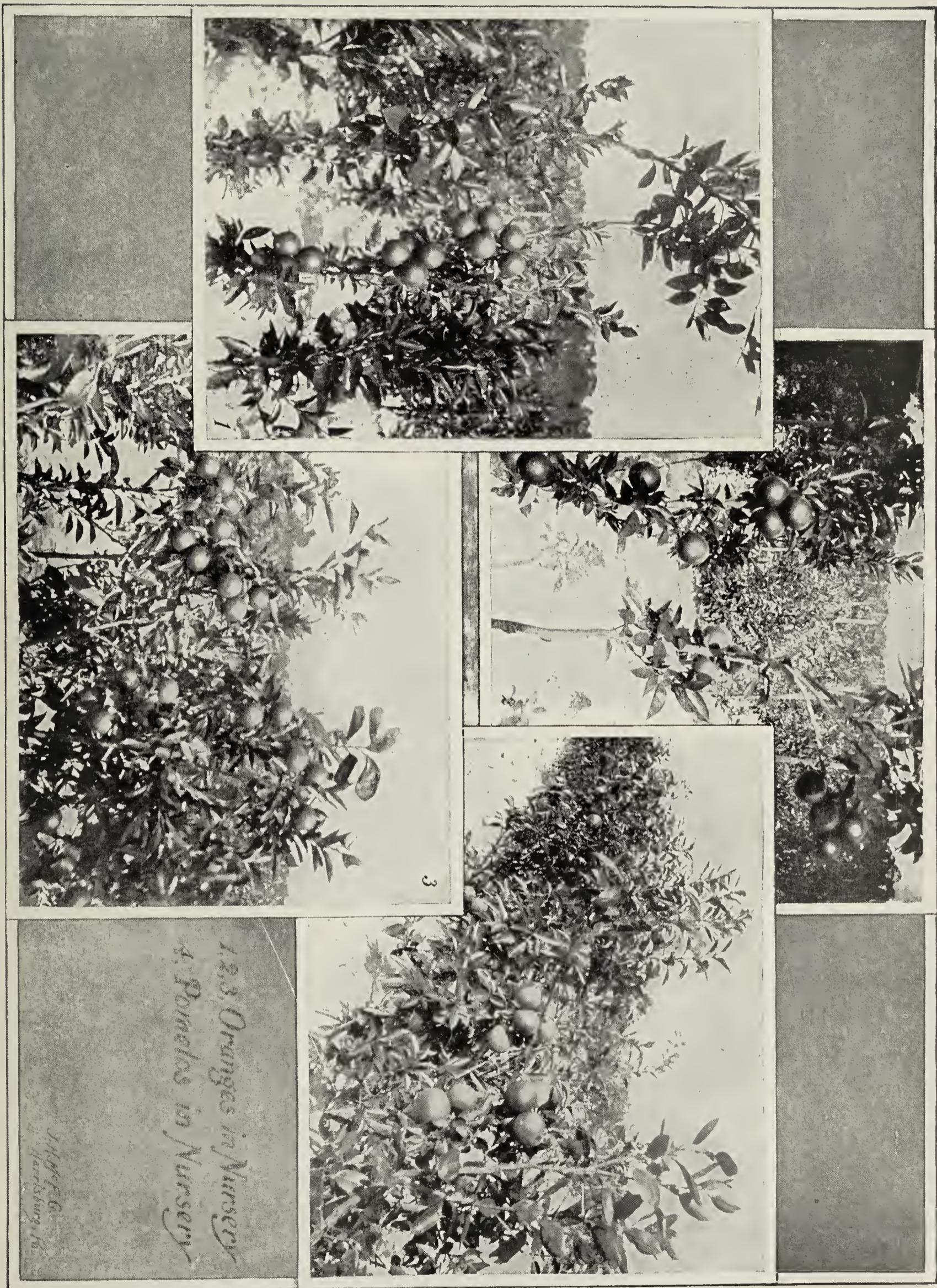
to their fruitfulness. By causing the bushes to branch near the ground the soil will be protected from the sun, weeds would not grow, the stems would be protected from sun and cold winds, insecticides could be conveniently applied, and ladders would not be required to gather the fruit. Some will remark that the summer pruning would require much time and labor. But in one day a man could go over a large number of bushes; and the result would prove remunerative in the way of increasing production of fruit. If you desire fruit, prune in summer; if a luxuriant growth of wood, prune in autumn or winter. By summer pruning, winter pruning would be avoided.

"Unless summer pruning is resorted to the budded portion will form a large, straggling top, out of proportion to the stock and roots, and the trees will be prostrated by strong winds. No person should attempt to cultivate the citrus family on the Otaheite stock unless they resort to summer pruning and the preservation of the bush form.

DWARF CITRUS CULTURE.

"I believe that dwarf citrus culture has a future. For cultivation in gardens dwarf bushes would occupy but little space, and could be easily protected from frost by boxes or other covering. Dwarf apple culture in England proved a commercial success; and I cannot see any reason why dwarf orange culture on a large scale should not prove profitable. In conclusion, I would say to your readers, don't engage in dwarf orange culture unless you are disposed to do the bushes justice and resort to summer pruning. Winter pruning produces

TWO-YEAR-OLD ORANGE TREES ON TRIFOLIATA STOCK.



wood and summer pruning fruit, and plenty of it. Don't neglect your bushes and they will reward you with an ample supply of large, luscious fruit. By thinning the fruit a full crop can be obtained annually—no 'off year' in the way of fruit. Limit production and the fruit will be better developed and more salable."

A writer in *The Florida Dispatch*, in May, 1882, gives further particulars of this interesting plantation of dwarf oranges. When he visited them it was about twenty-two months since they had been budded, and they were carrying all the way from fifteen to forty oranges apiece, "larger and farther advanced toward maturity than those of the same varieties on older standard trees overhead." They were further described as follows:

"These miniature trees, ranging from two and a half to four and five feet high, are mostly of perfect form; branching near the ground, limbed out symmetrically, and presenting generally the shape of an obtuse cone, the true form for all fruit trees in this climate. The foliage of these Liliputians of the citrus family is also larger, thicker and darker in color than that of the ordinary sweet orange trees growing around them; and they present an air of thriftiness and vigor which we were at first disposed to refer to the liberal use of fertilizers and extra care and cultivation. Dr. K. assured us, however, that such was not the fact, and stated that all his trees, dwarfs and standards, have been treated precisely alike, and that there are no favored, forced or pampered ones among them."

The mode of propagation is thus described:

"He plants out a number of the Otaheite shrubs or trees in a fair soil, and at the proper season, that is, when they are making a vigorous growth, he carefully layers, in the usual way, every available limb or branch. When these layers show signs of growth, he buds into them, very near the ground, such varieties as he desires to propagate. When the buds start, he does not cut off the stock above, but ties a ligature of cord or fine wire around and near the top of the stock, retaining the leaves to assist in nourishing and pushing forward the young bud. If this budding is done very early, the bud will make several growths during the first season, and the little tree will be large enough to transplant the following winter. When thus removed, the dwarfs may be planted six or eight feet apart—the Doctor's are only five feet—and they will afterward require no more care than any good orange grower bestows upon the trees in his garden or grove."

DWARF ORANGES ON TRIFOLIATE STOCK.

The complete destruction of all orange trees in North Florida by the freeze of 1895 gave great importance to the question of protection; and the question of protection is very largely conditioned upon the size of the trees. Everyone will recognize that it is absurd to consider for a moment the protection of thirty-foot seedlings as a matter of profit. In North Florida it is, therefore, a simple alternative—either trees of smaller size or no protection and no guarantee of oranges. The practicability of raising dwarf or semi-dwarf trees on the trifoliolate stock—though it may require tubbing or other cramping

of the roots to reduce the trees to dwarfs—has been fully established; and the trees are perfectly healthy and very prolific. But how about the quality of the fruit? Last fall Mr. George L. Taber, the well-known nurseryman of Glen St. Mary, sent me samples of a number of varieties grown on nursery trees, which I had seen a few days before in his nursery; none of them over 1 1-2 inches in diameter and six feet high. In his letter, after mentioning the varieties, he says:

"With the exception of the one Hart's Late, above alluded to, all the other samples were taken from trees grown on citrus trifoliata stock. They are all from stock grown thickly in the nursery rows.

"While some of the varieties have not yet reached their best stage of ripeness, I think you will find them all fairly good eating. Blood markings, as you of course know, do not generally appear until late in the season, and hence some of the blood varieties sent may not show much of this characteristic. The only fair way to make a comparison of varieties is from the same varieties on different stocks of the same age and varieties and grown under exactly the same conditions. By another year I hope to be able to show all varieties growing side by side upon both citrus trifoliata and sour stocks."

It may be well to state a point which Mr. Taber omitted—that, owing to the trees being still in the nursery rows, they were fertilized for growth and not for fruit. This rendered the peel slightly thicker than it otherwise would have been, especially in the Navel, though in the Tangerines no such effect was visible. When I saw this fruit there were

hundreds of nursery trees, two or three years old, carrying from one to twenty oranges each. The varieties were:

1. Maltese Oval: fancy bright, about 176 size; flavor excellent.
2. Hart's Late on citrus trifoliata: about 176; fancy bright; not quite mature; rather tart.
3. Hart's Late on sour: about 250 size; blemished, not fully colored; peel thin; some raw acid.
4. St. Michael Blood: fancy bright; size about 176; blood markings in splinters; quality best, delicious.
5. Du Roi Blood: fancy bright; oblong; about 176; not mature yet; a little tart; no blood markings yet appear.
6. Magnum Bonum: fancy; fully ripe; quality excellent, sprightly.
7. Ruby: fancy bright; size about 200; well ripened and colored up; blood markings diffused through and through, almost blended; quality delicious, thoroughly satisfactory.
8. Majorca: fancy bright; oblong; not thoroughly matured; juice a little tart.
9. Washington Navel: bright; about 126; navel mark slight; peel about 3-8 inch thick; juice of a heavy sweet flavor, but lacking in the sprightliness of most of the above; would be popular in the market.
10. Tangerine: fancy; small; peel noticeably fine-grained and smooth, thin; flavor delicious, satisfactory.

Considering that these oranges grew on nursery trees four feet apart one way and six inches to a foot apart the other, they are really a remarkable lot of fruit. We leave our readers to figure out for themselves the possibilities which they suggest.

TRIFOLIATE, SOUR AND SWEET.

In March, 1898, Mr. Taber planted trees on these three stocks, same age and size as near as possible, and June 20, 1901, he took the following careful measurements of height and breadth of trees and number of fruits on each:

ORANGES.

| Variety | | Stock, Hgh't, | Brd th, | Fr't | No. of |
|--------------------------|-------|---------------|---------|------|--------|
| Bessie..... | Sour | 6½ | 7½ | 0 | |
| Bessie..... | C. T. | 4 | 5½ | 58 | |
| Centennial..... | Sour | 6 | 7½ | 1 | |
| Centennial..... | C. T. | 4½ | 4½ | 87 | |
| Du Roi | Sweet | 6½ | 5½ | 0 | |
| Du Roi..... | C. T. | 6½ | 7 | 61 | |
| Early Oblong..... | Sour | 6½ | 7 | 0 | |
| Early Oblong..... | C. T. | 5½ | 6½ | 95 | |
| Hart's Late..... | Sour | 6½ | 8 | 3 | |
| Hart's Late..... | C. T. | 4 | 5 | 44 | |
| Homosassa..... | Sour | 6 | 7½ | 4 | |
| Homosassa..... | C. T. | 6½ | 5½ | 26 | |
| Jaffa..... | Sour | 6½ | 6½ | 0 | |
| Jaffa..... | C. T. | 5½ | 6 | 34 | |
| King..... | Sour | 8½ | 5 | 81 | |
| King..... | C. T. | 8 | 5 | 281 | |
| Mad. Vinous..... | Sour | 7 | 8 | 4 | |
| Mad. Vinous..... | C. T. | 6½ | 8 | 36 | |
| Magnum Bonum | Sweet | 7 | 7 | 0 | |
| Magnum Bonum..... | C. T. | 5 | 6 | 9 | |
| Majorca..... | Sour | 6 | 5 | 0 | |
| Majorca..... | C. T. | 5 | 4 | 4 | |
| Maltese Blood..... | Sour | 5 | 5 | 0 | |
| Maltese Blood..... | C. T. | 3½ | 3½ | 35 | |
| Maltese Oval..... | Sweet | 5½ | 6½ | 96 | |
| Maltese Oval..... | C. T. | 3½ | 4½ | 62 | |
| Nonpariel..... | Sour | 6½ | 7½ | 0 | |
| Nonpariel..... | C. T. | 6 | 6½ | 50 | |
| Old Vini..... | Sour | 6½ | 6½ | 4 | |
| Old Vini..... | C. T. | 4 | 5 | 44 | |
| Pineapple..... | Sour | 5½ | 6 | 0 | |
| Pineapple..... | C. T. | 5½ | 5 | 41 | |
| Ruby | Sour | 6 | 4½ | 0 | |
| Ruby..... | C. T. | 4½ | 3½ | 38 | |
| St. Michael's Blood..... | Sour | 5 | 4 | 0 | |
| St. Micheal's Blood..... | C. T. | 3½ | 5½ | 75 | |
| Tangerine..... | Sweet | 6 | 5 | 43 | |
| Tangerine..... | C. T. | 4½ | 5 | 78 | |
| Washington Navel..... | Sour | 5½ | 6½ | 0 | |
| Washington Navel..... | C. T. | 3½ | 4½ | 32 | |

POMELOS.

| | | | | |
|---------------------|-------|----|----|----|
| Duncan..... | Sour | 5 | 7 | 60 |
| Duncan..... | C. T. | 6 | 7 | 27 |
| Marsh Seedless..... | Sour | 7 | 7½ | 10 |
| Marsh Seedless..... | C. T. | 3 | 4½ | 33 |
| Triumph | Sweet | 7½ | 6½ | .0 |
| Triumph..... | C. T. | 6 | 6 | 75 |

OTAHEITE VS. TRIFOLIATE STOCKS.

The trifoliolate is a very hardy stock, and imparts some of its hardness to the tree grown upon it. The Otaheite is tender. Mr. E. V. Reasoner, of Oneco, the well-known nurseryman, says of it:

"We do not think much of the Otaheite as a stock, judging from the Otaheite tree itself; it looks just like a rough lemon, and grows to a good-sized tree; and so far as we can see, it is no better than the rough lemon in any particular and is even more tender."

On the contrary, Mr. A. J. Pettigrew, of Manatee, wrote me as follows:

"My oldest trees on Otaheite are only sixteen years old. They have been perfectly healthy in every way and I think the Otaheite is exempt from foot-rot, because its fruit is a small, insipid orange, entirely seedless, and it has to be propagated from cuttings. I have stuck the cuttings into all sorts of ground at all times of the year, and a large portion of them grow and have no foot-rot; but the very young growths as cuttings cannot stand the July and August sunshine. My Otaheite stocks flourish on all sorts of soil, from the poorest white sand to the richest hammock."

"I have not yet had sufficient experience and proof to speak positively on

all points; but if it as stock will 'behave' with all varieties of the citrus family as it does with my oldest trees, which are good native seedlings budded on the Otaheite, I can raise more oranges with less trouble and more satisfaction on one

acre of land planted in these dwarfs than I could with any other trees. For places where shedding or tent protection is needed, the dwarfs possess special advantages."

Good Roads in Florida.

BY CHARLES HENRY BAKER, OF GRASMERE.

The modern movement in favor of good roads, gaining daily in strength and achievement, is what interests us here. It is singular that with the Roman roads before them as an object lesson, it has required some thousands of years for the people most familiar with them, despite their advance in civilization, to make roads approaching them in essentials. It is also perhaps as singular that the good road of to-day is not invariably traceable to the Roman road as prototype, but has been, largely through the improvements in animals and in wheeled vehicles, developed independently alongside of it.

The good road of to-day is not the same as that of antiquity. This brings us to the question, What is a good road to-day?

A good road to-day, speaking briefly and generally, is one as nearly straight and level as may be and of adequate width, having a smooth, resistant surface, and of such stability in form and construction as enables it to withstand its customary heavy travel with but

small cost for maintenance. Though it may be said that a road built according to such a definition would be difficult of realization, if not in many cases and places practically impossible, it is nevertheless necessary to establish a standard that shall embody the maximum of advantage, toward the realization of which effort shall be directed; and such a standard should always be as high as possible. Roads have indeed been built that conform quite closely to the definition, carrying out in fact what science and experiment have declared to give the best results.

WHAT A GOOD ROAD IS.

They are broad highways, composed of broken stone of uniform size laid on a base of finer stone or gravel, and steam-rolled to extreme solidity, with a hard smooth surface like a floor. From their superiority over other roads they may be said to be the best of the good roads.

For obvious reasons such roads can-

not yet be built everywhere and different sections direct their energies toward carrying forward the construction of their good roads as near to a high standard as possible with the best materials at their disposal. In this worthy work Florida is fairly embarked and almost every day witnesses the extension and completion of roads far better than any heretofore available. A great part of the state has a loose sandy surface, and the roads have been, and in many parts still are, of the worst possible character. Experiment has demonstrated that to move wagons over loose sandy roads requires a pull in pounds about equal to one-fifth of the weight of the load. Now, the same load on an ordinary earth road requires a pull of only about one-ninth of its weight. This simple statement makes it clear that almost any dry surface would be better than on sand roads.

GROOVED WHEELS.

It is not out of the question that travel over loose sand might be rendered measurably easier by using wheels of suitable construction. Sand when firmly enclosed is one of the most obstinate of substances. Broad tires might be used having a broken central groove rolled into them, leaving hollows say six to eight inches long, an inch or more in width, and three-quarters of an inch or more in depth, thus forming a continuous series of small compartments in the center of the tire, which, when running over sand, would always be compressing it into solidity and firmness in a small mass as each compartment came below the center of the wheel, thus giving additional stability to the

wagon moving over the road. The sides of the compartments in the tires should slope gently inward, so that the sand may have a chance to leave the compartments. Rather deep felloes, coming to a fairly sharp angle inward, so as to prevent the sand from binding the rim of the wheel, would be of use in this kind of wheel.

Such a device, if carried out, might aid where no improvement in roads is in contemplation.

The natural tendency, however, is to make an improved road. Good roads have been made in Florida by using several different materials for surfacing—rock, shell, clay and pine straw. These are, of course, not equally durable or useful, and their employment has always been governed by their presence and accessibility. If one was not available, perhaps another would be, and thus the work could go on.

GOOD ROADS IN DIFFERENT COUNTIES.

The work of making improved roads has progressed differently in different parts of our State. Some counties, it would appear, have done nothing in this direction, while in others it has taken an important position in public work. In speaking more particularly of this, the writer will, no doubt, be pardoned for beginning with Orange, since that is his own county, and with her sixty to sixty-five miles of good roads she stands well to the front.

In Orange county, after the road line is definitely located, the roadway is carefully excavated to the requisite depth and width by a road machine. The surface material is then filled in to a depth sufficient, after a thorough roll-

ing, to result in the proper finished thickness in the center and at the sides. It is then carefully surfaced. If shell is used, it breaks down under treatment, and ultimately cements into a firm mass. In using clay, the last feature of the work is a thorough sanding, which improves the surface and prevents rapid washing. Some shell road has been built, but the good road of the county is the clay road; and the clays here found and used are exceptionally well adapted for such purposes. They are really what are scientifically known as "sand-rocks," containing seventy-five per cent. of white sand, resembling sugar, intimately mixed with the clay. They vary in color from white to dark red, and stand exposure to various seasons, both wet and dry, better than anything similar with which the writer is acquainted. Their use has really transformed the county roads and they have rendered a great service to the community. The roads in Orange are ten feet wide, filled in six inches at the sides, and eight to ten inches in the center when finished.

DIFFERENT MATERIALS USED.

Shell road costs \$1,000 to \$1,100; clay road, about \$700 per mile. In going through flatwoods sections the roads are finished and surfaced with the heavy top soil; shallow ditches are dug; the material is thrown into the center and subsequently dressed into shape; this costs about \$200 per mile. In some places where improved roads are not to be built immediately a simple grubbing out of palmetto roots in flatwoods sections is a great help, as the surface is usually hard enough to afford quick travel. Such grubbing can be done for about \$50 per

mile. The dominant idea in Orange is to get a road through in good shape and add any further improvements later on.

In Volusia improved roads have been built to some extent. Shell and pine-straw are used. The finished road is eight or ten feet wide with side depths of six to eight inches and a center depth of eight to ten inches. Shell road costs about \$600 per mile and pine-straw, where used, about \$40 per mile. Pine-straw is an excellent material for light travel; it lasts about a year on a moderately frequented road and then is run down in such a way as to afford an elastic basis for new straw, better than one could make purposely. Roads finished with it should be carefully "scalped" over new ground, since grass tussocks underneath do not crush much, and remaining hard make the road uneven and uncomfortable. Pine-straw is a great improvement where nothing more substantial is immediately available. Its principal weakness is its combustible nature, and roads finished with it must be carefully guarded.

MATTERS OF DETAIL.

In making good roads in Florida, as elsewhere, it is best to make them as nearly level as practicable, to follow around hills if it can be done, rather than build on steep grades, which adds so much to the draught. It is advised that, as a grade of one foot in thirty-five is the steepest down which a horse can safely be driven rapidly, this rate should be kept in view, and not more than doubled in the degree of the slope. That is to say, one foot in thirty-five is about 151 feet per mile; a slope

twice the former makes a grade of one foot in twenty-three or 231 feet per mile. Hauling on the best roads we can secure is greatly increased by the grades and it pays to do a little grading if it can be accomplished. In finishing a road also it would be desirable to leave the center a little overfull, as this crowning is one of the first points to give way under travel.

It is the writer's hope that the work of good roads in Florida, which has made so fair a start, may go on and spread throughout the State. In conclusion, thanks are returned to the many commissioners of different counties who have kindly responded to requests for information.

Some Productive Pomelos.

Seeing the dwarf orange trees mentioned in these columns as having come from Dr. Inman's groves, we had a curiosity to learn whether this departure was likely to increase, and wrote to Dr. F. W. Inman, of Winter Haven, asking him for further particulars. In his reply, among other things, he said: "If you will come down I will show you five-year-old trees carrying ten boxes of fruit." This statement decidedly staggered our credulity, but we determined to go anyhow.

DR. INMAN'S GROVES.

On his own groves there are about 175 acres; with these he has enough more in charge for Northern residents to bring his count up to about 300 acres. The management of them is left entirely to his discretion, and the various groves bear a general resemblance. The thirty-acre grove directly north of the residence is the Doctor's pet; it receives his best care and study, and the results obtained here are an indication of the

best that can be accomplished in Polk county.

Probably most of the Florida readers of the Farmer and Fruit Grower are aware of the nature of Polk county soil; to others it may be well to state that the greater part of it is of a very thin and light description. At Winter Haven, except in a narrow margin around the numerous lakes, it would be classed as high pine, though there is evidently a bottom to it, holding the water of the lake as tight as a barrel. Red clay occurs about five or six feet below the surface in places, and is extensively quarried as a material for making turnpikes.

Striking out north from the house with Dr. Inman and Mr. A. B. Harrington, we drove slowly along among the tangerines. These trees have all grown up since 1895 and are about eight feet high, with an equal spread, and beautifully picked out with the bright red fruit. The tangerine is a superficial growing fruit, largely on the periphery of the tree, and its brilliant color and comparatively small size render it deceiving. It

shows on the tree for all it is worth, and generally about ten to twenty-five per cent. more. A tree seldom comes up to expectations; when picked and measured, the fruit is not there. We guessed at the load on this tree and that tree, and the Doctor's views were more moderate than our own. We had requested him to bring along a tapeline to do some measuring and estimating, but the trees so far, at the utmost we could reckon, were manifestly so far below ten boxes that we said nothing about it.

It developed later that he meant pomelos, not oranges.

The Doctor frankly said he did not believe he had a tangerine with over three boxes on it, the average being about two or a little over.

THE POMELOS.

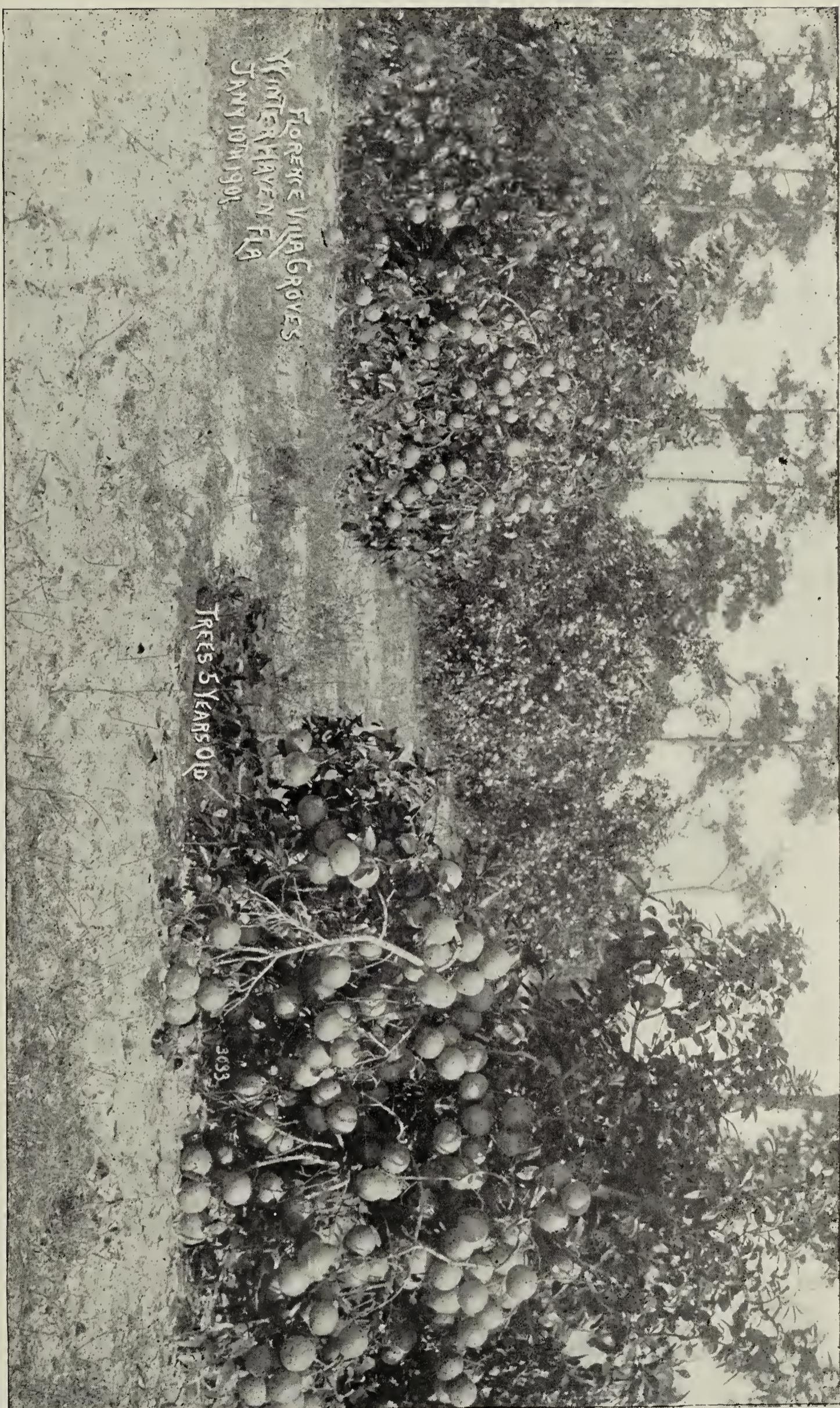
We drove out into the road, then down a few hundred yards, and into a pomelo grove. The trees are rather irregular in size, but we noted that the tallest ones only reached a little above the buggy, even the topmost tips. The fruit was all contained on boughs not above the buggy, and very little as high as that even. The middle of the trees were fairly bulging with fruit. It was getting decidedly interesting. Finally we came to a tree which we all decided we ought to alight and measure. The modest pomelo is very different from the showy tangerine. The pomelo has its fruit hidden in the middle, like a quail's nest, with the eggs piled up two or three deep. "Part the leaves and look in there," said the Doctor. We could not do it; the fruit was in the way. "Stick your head in there and see what you can find," he said, laughing. After looking

around a little we found a rift where a man's head could be inserted between the fruits. There was nothing much in there but fruit. We withdrew our head and thrust in an arm full length, touching the trunk, and felt the fruit as thick in there as on the outside.

We are free to admit that we never saw the equal of this before. On this and other trees there were masses of fruit where, if we could have cut away two cubic feet of it just as it hung, picked it off and placed it in a box (two cubic feet), it would have filled the box two-thirds full if not more. Dozens of the fruits hung down on the ground, and resting on these, tier after tier, was built up in regular fashion to the summit—a broken, leafy, pale-lemon pyramid of fruit. If this tree had been cut off at the ground it would not have fallen over; it could only have canted over a foot or two; the fruit would have held it up. Great masses of fruit hung here and there, which the wind could no more shake than it could a sackful of Nova Scotia potatoes or a quarter of Chicago beef.

MEASURING THE TREES.

In view of this unequaled spectacle, we felt a little backward about measuring the tree, as implying a skepticism concerning the Doctor's estimate which we no longer entertained. But he produced the tapeline and we proceeded. We threw one end of it over the tree, then the other end over, at right angles, thus dividing the tree into quarters. Two of us attempted to count the fruits in one quarter, but it was useless; we had to abandon the attempt. The tree was twenty-eight feet around the



FIVE-YEAR-OLD POMELOS IN DR. INMAN'S GROVE.

branches, six feet six inches to the highest fruit, and eight feet to the top of the tallest shoot.

We drove across the road and into another pomelo grove belonging to Mr. Harrington. These trees were smaller, and we decided to make another attempt to measure and estimate a tree's load. Selecting one as well loaded in proportion as the one above described, we found it to be seventeen feet in circumference around the branches and five feet to the topmost fruit. Quartering the top as before with the tapeline, two of us counted the fruits in one quarter, although with great difficulty on account of their crowded condition. One of us made seventy-nine, the other eighty-five, and we agreed to call it eighty. It was the best quarter of the tree, and we agreed to figure the load at 300 fruits. They were about of the 64 size,

which would give five boxes to the tree. The larger tree above described will easily yield ten boxes, if not more.

It is only just to state that the pome-lo, especially a young tree, after bearing such an excessive crop of fruit, generally rests the following year, yielding little or nothing.

Ninety-five per cent. of this fruit is bright. It is generally regular in form, though occasionally squeezed out of shape by the dense crowding, and even the fruits growing on the ground show no blemish as a result of it. The secret of these remarkable crops is good judgment and careful personal attention to details, frequent shallow cultivation of the tree rows, the growth of beggar-weed in the middles, the use of Mapes manures, and slight heading back of the tops.—S. Powers, in Florida Farmer and Fruit Grower.

Report of Committee on President's Address.

Mr. President, Ladies and Gentlemen:

Among the many valuable facts presented by our President for which we extend the thanks of the Society this committee would call special attention to the remarks on improving old or introducing new varieties of peaches by propagating seedlings in hedges. The first systematic effort in this direction was probably made by the late A. J. Bidwell, who, from a limited number of seedlings of the Peento, supposed to reproduce itself always as a flat peach, introduced three new varieties of clings of round or oblong form, which he named Bidwell's Early, Bidwell's Late and the Seminole. Other experimenters worked along the same lines, and we have the Waldo and Jewell by T. K. Godby, the Imperial and others.

The efforts of the experimenters should be directed to midseason and late peaches for home market and family use, as well as to early varieties for the Northern markets, and to varieties that will succeed in Southern as well as Northern Florida. A suggestion for a shipping variety would be a peach blooming and ripening like Waldo, but

of double size, a free stone and slightly more acid in flavor. With the immense crops of Georgia Elberta peaches, it is improbable that Florida can produce peaches for the Southern markets that will compete successfully with Elberta, but the point is worth considering in testing new varieties.

For home markets and home use there is room for improvement over the present varieties on general sale by nurserymen.

For preserving especially, large clings of good quality covering the season are desirable, and when such varieties are discovered they should be disseminated as rapidly as possible to prove whether they are adapted for general culture.

Gradual inbreeding or crossing of the Chinese or Oriental strains with the old varieties that were generally cultivated in Florida before the introduction of the former, will doubtless in time produce peaches that will give Florida a longer season of this delicious fruit than any other State in the Union.

LYMAN PHELPS,
S. H. GAITSKILL,
E. S. HUBBARD.

Final Resolutions.

RETURNING THANKS.

The following resolutions were unanimously adopted:

Mr. President—Your committee on final resolutions beg leave to report:

Whereas, The Florida State Horticultural Society expected to hold its fourteenth annual meeting at Jacksonville, but the great disaster which swept that city on May 3 rendered it impracticable; and,

Whereas, The citizens of St. Augustine not only opened their doors and pocketbooks to their stricken sister city, but offered to furnish housing and entertainment for the expected guests; and,

Whereas, The Florida State Horticultural Society has just completed one of its most pleasant and profitable sessions within the walls of St. Augustine; therefore, be it

Resolved, That this Society tender our stricken metropolis our heartfelt sympathy in her hour of trouble, and hope that she may soon rise from her ashes, a more beautiful, prosperous and happy city; and that we appreciate the courtesy extended to us fully as much as though we had participated in her well-known hospitality.

Resolved, That the Society return its hearty thanks to the good people of St. Augustine for their unbounded gen-

osity in furnishing such an admirable and beautifully decorated place in which to hold our meetings, and in thoughtfully supplying stationery, badges, etc. We shall always retain a pleasant memory of our visit to the Ancient City; that is ancient only in name and some of her buildings, but is up-to-date in everything that is generous, open-hearted and loyal.

Resolved, That our thanks be extended to the passenger departments of the Plant System, Florida East Coast, Seaboard Air Line and Georgia Southern & Florida Railroads, for their courtesies in extending a special rate to our members, which made it possible for a large number of them to attend.

Resolved, That the thanks of our Society be extended to the St. Augustine & South Beach Railway Company for their courtesy, which added greatly to the pleasure of the Society; to the ladies for their enjoyable and pleasant reception in Fort Marion, and the promenade concert on the Plaza; to the hotels which reduced their charges, and to the Historical Society and the Institute for the Deaf and Blind for their invitations.

Respectfully,

E. O. PAINTER,
GEO. W. ADAMS,
E. V. BLACKMAN.

FLORIDA STATE HORTICULTURAL SOCIETY**FOR THE FLORIDA STATE FAIR.**

The following resolutions, offered by S. H. Gaitskill, were adopted:

To the respective branches of the State Legislature of the State of Florida: The Florida State Horticultural Society, now in session in the city of St. Augustine, in token of its high appreciation of the value to all the material interests of the entire State of the Florida State Fair, to be held within the State during the present year, and realizing that the time has arrived for the successful holding of a modern State Fair, for the mutual benefit of the agricultural, horticultural and business and industrial welfare of all our people, and realizing that, in the presence of the ap-

palling calamity that has befallen the metropolis of our fair State, the resources of the city of Jacksonville will be taxed to their utmost in their own recouplement; therefore be it

Resolved, That the Florida State Horticultural Society respectfully and earnestly urge upon the State Legislature the passage of the bill appropriating the sum of \$2,500 for the Florida State Fair.

Resolved, That the Secretary be instructed to forward at once to the President of the Senate and the Speaker of the House of the Florida State Legislature copies of these resolutions.

FOR THE PRESERVATION OF FORESTS.

Resolved, That the subject of forestry merits the attention of the Legislature of Florida, and we recommend suitable legislation for the preservation of our forests from fire and reckless destruction; and the establishing of a forestry commission to suggest the necessary legislation to encourage the preservation of young trees, and to promote the reforestation of districts from which the timber has been stripped off, to promote the propagation of valuable species and other matters relating to the preservation and care of our forests.

Resolved, That while we recognize the necessity of legitimate naval stores

operations, we strongly deprecate and denounce the wholesale destruction of very young trees by "boxing," as a reckless discounting of our resources, a needless impoverishment of our posterity, and a grave menace to the balance and equability of our climate.

Resolved, That the Legislature of Florida be urged to pass such laws, so far as they do not already exist, as shall enable counties, cities and towns to give proper protection to shade and ornamental trees, and to punish all persons who shall wantonly destroy or injure them.

Necrology.

WILLIAM H. BIGELOW, JR.

of Tarpon Springs, died on December 19, 1900. He was born in Sioux City, Iowa, July 22, 1861, of the best New England ancestry. While still a youth he spent two years in Europe, studying one year in Paris. After returning to this country he studied at Easthampton, Mass., and at the famous Hopkins Grammar School in New Haven.

After the death of an older brother in New York city he came South with his younger brother, who was obliged to change residence on account of ill health.

Coming to Tarpon Springs, he was at once attracted by the natural beauty and the genial climate of the place. After a few weeks a residence on the beautiful bayou was purchased, to which he brought his bride in October, 1893. In spite of repeated freezes and discouragements, Mr. Bigelow bravely pushed forward his attempt to make a valuable and attractive Southern home.

Quiet, conservative, yet persistent, he was a model of honest industry and

practical husbandry. He had improved the orange grove and peach orchard surrounding his home, planted new varieties of fruit and shade trees, and the last few months had become much interested in planting and protecting a pinery.

Always fond of reading and study, he had devoted much time to the investigation of subjects connected with his chosen pursuits.

For the purpose of gathering guano he had constructed at various points on the Gulf bird rookeries, affording a resting place for large numbers of cormorants and other seabirds. Mr. Bigelow paid these rookeries periodical visits, using the product for fertilizing purposes. It is believed that the accident which caused his death was due to a heavy wind which had suddenly risen. Although he was an expert sailor, his boat becoming unmanageable, both he and the man with him were drowned by the sinking of the boat.

After three days the body was recovered and taken to Brattleboro, Vermont, for burial.

FLORIDA STATE HORTICULTURAL SOCIETY.

1901.