Proceedings of : : :

AMERICAN POMOLOGICAL SOCIETY

SESSION OF 1915

BERKELEY MEETING

PROCEEDINGS

of the THIRTY-FOURTH BIENNIAL MEETING *of the* : : : : : : : :

American Pomological Society

Held in

BERKELEY, CALIFORNIA,
SEPTEMBER 1, 2, 3, 1915.

COMPILED AND EDITED BY THE SECRETARY.
PUBLISHED BY THE SOCIETY
1916.

CONTENTS.

CONTRIBUTORS.

To the following list of persons are we indebted very largely for whatever of value there is in this report; and the Society, through its Secretary, takes this means of expressing its deep appreciation of the services rendered. To those others who in various ways, by means of entertainment, discussions and as "aids" on one or more of the many interesting excursions, side trips, or "events," appreciation is hereby recorded:

R. W. Allen, Prof. R. J. Barnett, Dr. L. D. Batchelor, F. T. Bioletti, E. A. Bunyard, Dr. T. J. Burrill, Leonard Coates, Dr. J. E. Coit, Prof. Ira J. Condit, Dr. A. J. Cook,* D. W. Coolidge, Dr. W. C. Deming, J. L. Dumas, Dr. W. W. Fitzgerald, V. R. Gardner, L. A. Goodman, A. H. Hendrickson, Dr. W. L. Howard, W. N. Hutt, Prof. W. R. Lazenby, Prof. C. I. Lewis, W. T. Macoun, B. B. Meek, Geo. W. Pierce, Eltweed Pomeroy, Wilson Popenoe, Frank W. Power, Dr. H. S. Reed, F. C. Reimer, E. C. Roberts, Dr. J. P. Stewart, Prof. A. V. Stubenrauch, R. H. Taylor, Prof. C. C. Vincent, Dr. H. J. Webber, P. J. Wester, Dr. E. J. Wickson.

*Dr. Cook's article was published in "California Fruit News," December 18, 1915.

AMERICAN POMOLOGICAL SOCIETY

Organized 1848.

Incorporated 1887.

ACT OF INCORPORATION.

COMMONWEALTH OF MASSACHUSETTS, 1887.

SECTION 1. Patrick Barry, of Rochester, New York; Charles W. Garfield, of Grand Rapids, Michigan; Benjamin G. Smith, of Cambridge, Massachusetts; J. J. Thomas, of Union Springs, New York; Prosper J. Berckmans, of Augusta, Georgia; Robert Manning, of Salem, Massachusetts, their associates, the Officers and Members of the Association known as the American Pomological Society, and their successors, are hereby made a corporation under the name of "American Pomological Society," for the purpose of promoting and encouraging the culture of fruit, with all the powers and privileges and subject to all the duties and liabilities set forth in the general laws which are now or may hereafter be in force applicable to such corporations.

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

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

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

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

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

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

CONSTITUTION AND BY-LAWS.

CONSTITUTION.

ARTICLE 1. The name of this Association shall be the AMERICAN POMOLOGICAL SOCIETY.

2. Its object shall be the advancement of the science of Pomology.

3. It shall consist of delegates appointed by Horticultural, Agricultural and kindred Societies in the United States, and British America, and of such other persons as take an interest in the welfare of the Association, and are desirous of promoting its aims. They shall pay two dollars for each session, and twenty-five dollars paid at one time shall constitute a life membership.

4. The meetings shall be held biennially, at such time and place as may be designated by the Society; and special meetings may be convened at any time on the call of the President.

5. The officers shall consist of a President, a First Vice-President, one Vice-President from each State, Territory and Province, a Treasurer and a Secretary, who shall be elected by ballot or otherwise at each biennial meeting.

6. Libraries and educational institutions may become life members upon payment of twenty-five dollars; such membership shall be limited to thirty years.

BY-LAWS.

1. The President shall have a general superintendence of the affairs of the Society during its vacation; give due public notice of the time and place of meeting; preside at its deliberations; deliver an address on some subject relating to Pomology, at each biennial meeting; and appoint all committees unless otherwise directed.

2. In the case of death, sickness or inability of the President, his official duties shall devolve on the First Vice-President, or such one of the Vice-Presidents as the Society may elect by ballot or otherwise.

3. The Treasurer shall receive all moneys belonging to the Society, and pay over the same on the written orders of the President.

4. There shall be a Finance Committee of three members appointed by the President at each biennial meeting.

5. The Secretary shall, with the assistance of a reporter appointed by him, keep a record of the transactions of the Society for publication.

6. There shall be an Executive Committee consisting of five members, together with the President and Vice-President, *ex-officio*, five of whom shall constitute a quorum, who shall manage the affairs of the Society during its vacation.

7. A Chairman of Fruit Committees, for each State, Territory and Province and a General Chairman over all, shall be appointed biennially. It shall be the duty of such Chairman to appoint four additional members of his committee, and with their aid and such information as he can procure, to forward to the General Chairman one month before each biennial meeting, State Pomological Reports, to be condensed by him for publication.

8. A Standing Committee on New Fruits of American Origin, consisting of eleven members, shall be appointed by the President, immediately after his election. It shall be the duty of this Committee to report biennially on new fruits of American origin, and also to examine, and before the close of the session report on, all new seedling varieties that may be exhibited and to make an AD INTERIM report on those that were exhibited in an unripe condition at the meeting of the Society, but had subsequently attained a state of maturity; and on such other seedlings as may have been submitted to their inspection during the Society's vacation.

9. A Standing Committee on Foreign Fruits, consisting of eleven members, shall be appointed, whose duties shall be similar to those of the committee in By-Law Eight.

10. A Standing Committee on Tropical and Sub-Tropical Fruits, consisting of eleven members, shall be appointed, whose duties shall be similar to those of the committee in By-Law Eight.

11. A Standing Committee on Nomenclature, consisting of seven members, shall be appointed biennially.

12. Vacancies occurring in committees shall be filled by the chairman of each, and in case of his death or inability to serve, his place shall be supplied by the President of the Society.

13. The order of business for each meeting shall be arranged by the Executive Committee.

14. The Constitution or By-Laws may be altered or amended, at any regular biennial meeting, by a vote of two-thirds of the members present.

OFFICERS AND STANDING COMMITTEES.

of the

AMERICAN PROMOLOGICAL SOCIETY.

For The Biennium 1915-1917.

President

W. N. Hutt, Raleigh, North Carolina.

Vice-President

W. T. Macoun, Ottawa, Canada.

Secretary

E. R. Lake, Washington, D. C.

Treasurer

L. R. Taft, East Lansing, Michigan.

VICE-PRESIDENTS FOR STATES AND PROVINCES.

Alabama..... Ernest Walker, Auburn.
Alberta.....W. H. Fairfield, Lethbridge.
Arkansas..... E. S. Miller, Bentonville.
British Columbia..... R. M. Winslow, Victoria.
California..... Geo. C. Roeding, Fresno.
Colorado.....W. S. Coburn, Paonia.
Connecticut.....Chas. E. Lyman, Middlefield.
Cuba.....C. F. Austin, Herradura.
Delaware..... Wesley Webb, Dover.
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Maine.....Robt. H. Gardiner, Gardiner.
Manitoba.....A. P. Steveson, Morden.
Maryland.....C. P. Close, College Park.
Massachusetts.....Wilfred Wheeler, Concord.
Michigan.....H. J. Eustace, East Lansing.
Minnesota.....J. M. Underwood, Lake City.
Mississippi.....Theodore Bechtel, Ocean Springs.
Missouri.....Geo. T. Tippin, Nichols.
Montana.....M. L. Dean, Missoula.
Nebraska.....A. A. Schenck, Omaha.
Nevada.....P. A. Lehenbauer, Reno.
New Brunswick.....A. G. Turney, Fredericton.
New Hampshire.....J. H. Gourley, Durham.
New Jersey.....H. F. De Cou, Merchantville.
New Mexico.....Fabian Garcia, College Station.
New York.....W. A. Mackay, New York City.
North Carolina.....J. Van Lindley, Pomona.
Nova Scotia.....W. S. Blair, Kentville.
Ohio.....W. W. Farnsworth, Waterville.
Ontario.....F. S. Reeves, Vineland.
Oregon.....C. I. Lewis, Corvallis.
Pennsylvania.....J. P. Stewart, State College.
Philippine Islands.....P. J. Wester, Manilla.
Porto Rico.....Linn Bartholemew, Gamochales.
Quebec.....T. G. Bunting, Quebec.
South Dakota.....Chas. McCaffree, Pierre.
Texas.....Eltweed Pomeroy, Donna.
Virginia.....W. A. Macomb, Staunton.
Washington.....O. M. Morris, Pulman.
West Virginia.....H. W. Miller, Paw Paw.
Wisconsin.....H. D. Locklin, Wauwatosa.
Wyoming.....Aven Nelson, Laramie.

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Wm. R. Lazenby, Chairman..... Columbus, Ohio.
E. W. Kirkpatrick..... McKinney, Texas.
F. C. Sears..... Amherst, Mass.
L. A. Goodman..... Kansas City, Mo.
J. L. Dumas.....Dayton, Wash.

FINANCE COMMITTEE.—(AUDITING.)

J. P. Stewart..... State College, Pa.
Ralph T. Olcott.....Rochester, N. Y.
Chas. E. Richardson.....Brookline, Mass.

COMMITTEE CHAIRMEN.

General Fruits	Wendell Paddock	Columbus, Ohio.
New Fruits	C. P. Close	College Park, Md.
Foreign Fruits	D. G. Fairchild	Washington, D. C.
Tropical & Sub-Tropical Fruits	Wilson Popenoe	Washington, D. C.
Inspection and Grading	C. I. Lewis	Corvallis, Ore.
Nomenclature	F. W. Power	Orenco, Ore.
Score Card and Judging	S. A. Beach	Ames, Iowa.
Wilder Medals	Wm. B. Alwood	Charlottesville, Va.
Revision and Catalogue	E. R. Lake	Washington, D. C.
Ad-Interim	C. P. Close	Washington, D. C.

SUB-COMMITTEE CHAIRMEN.

Pome Fruits	U. P. Hedrick	Geneva, N. Y.
Stone Fruits	J. Van Lindley	Pomona, N. C.
Citrus Fruits	W. S. Hart	Hawks Park, Fla.
Grapes	Chas. Dearing	Washington, D. C.
Small Fruits	Geo. M. Darrow	Washington, D. C.
Nuts	T. P. Littlepage	Washington, D. C.

ANNOUNCEMENT.

The President announces that there will be an executive meeting in Washington, November 16-18, 1916, for the purpose of considering the questions of Federation, Finance and New Lines of Work. The Executive Committee has decided to accept the invitation of the Massachusetts Horticultural Society and associate bodies to hold the thirty-fifth biennial session in Boston, November, 1917, probably about the 20th of the month.

AGRICULTURE HALL, UNIVERSITY OF CALIFORNIA.
(Place of Meeting, 1915.)

L. A. GOODMAN.
(President 1905-1915.)

PROCEEDINGS

—OF THE—

AMERICAN POMOLOGICAL SOCIETY,

Thirty-fourth Biennial Session, Agriculture Hall, University of California, Berkeley, California, September 1, 2 and 3, 1915.

PRESIDENT L. A. GOODMAN, presiding.

PROFESSOR E. R. LAKE, Secretary.

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September 1, 1915,
10 O'clock A. M.

The president called the meeting to order at ten o'clock a. m.

THE PRESIDENT: The American Pomological Society will come to order.

The Reverend Mr. Eldridge of St. Thomas Presbyterian Church of Berkeley will ask the invocation.

REVEREND DOCTOR ELDRIDGE: Almighty and Most Gracious God, our Father, we lift our hearts to Thee this day, asking for light and guidance and wisdom. Wilt Thou by Thine own gracious spirit reveal unto us Thy truth, showing us our duty and Thy will concerning us. We thank Thee for the work Thou hast given us to do for its worth and its greatness and its providence. We pray for Thy blessing on the work of our hearts and our hands. We pray Thy blessings today to be upon our great American people who live in the open country; for the youths brought up on the field and farm; and may they be made to see how Thy world shows forth Thy love. Make them worthy men and women, serving Thee in the place which Thou hast appointed to them.

Bless our life and our thoughts; and may we seek first the Kingdom of God and its righteousness. Give us the comfort and ease which Thou thinkest is best for us.

We thank Thee for a land of prosperity, and yet we thank Thee for a land of peace and perpetual kindness. May every one of the people in the land lift up to Thee a thankful heart, and may this people sing Thy praise.

This we ask in the name and for the sake of Jesus Christ, our Lord, Amen.

THE PRESIDENT: It is very appropriate and fitting that the American Pomological Society returns once more to the land of flowers and sunshine. We entered California at the southern part of the state; and we have found warm weather ever since.

Twenty years ago it was my pleasure to be with the American Pomological Society as it met in California, and since then we have seen wonderful changes here. We have always been welcome at every place where the American Pomological Society has met, and certainly we know we will receive a welcome from California, as California belongs to us all. I do not know of any state in the Union that has not some representative in California, so it belongs to us all. I am glad we will have the first word of welcome from our old friend Doctor Wickson, who will respond for California.

DOCTOR WICKSON: Mr. President, ladies and gentlemen: You notice by the program I am to do an utterly impossible thing, and that is to fill the place of George C. Roeding of Fresno. That is physically impossible, as Mr. Roeding is the California fruit grower with the very greatest hull displacement, as you might say, and no ordinary Californian can fill his place. (Laughter.)

Another thing, it is practically impossible to fill his place emotionally or otherwise. Mr. Roeding could make you more welcome by simply looking at you than I could by talking an hour and a half. He has that expansive smile which is unrivalled in this state, although there are many good "smilers" in every part of the state.

You will notice there are three speakers to welcome you, so indeed it will be proper to be very brief.

I will only undertake to offer you one thought which seems to be a good reason why we are glad the American Pomological Society has come to California in the past, and is here now, and will continue to come to California; and that is because the American Pomological Society is that organization which stands for the very highest things in Pomology, in fruit-growing. It always has, and therefore it should continue to exercise somewhat of a corrective influence in Pomology.

California has set up here a commercial standard of fruit-growing, a commercial aim which is commendable from a commercial point of view, but which does not include the highest things in Pomology. One likes to think of the points of view held by the old leaders of this organization; how distinguished they were as amateurs, and how they held to the fact that fruit is desirable for its own sake, for its very beauty, and how highly they esteemed Pomology as a branch of science; of course, we are not forgetting that point of view as we have societies of Pomology and the science of Pomology has made great advances. But still there is a view which exists in California, and that is the one about which I have just intimated. Now a California fruit-grower is apt to see nothing in the beauty of the peach unless he can see twenty dollars through it, and the most beautiful fruit in the world seems to him to be worth nothing but hog-feed unless he can see money in it at two cents a pound dry. I am not at all discounting some of the fine efforts, and would perhaps be the first to object if you took the same position. Still, I

am sure we need in this state more people who have a regard for Pomology for its own sake; for the esthetic things if you like; and I think it is particularly fitting there should come into this state from time to time just as often as your arrangements will possibly permit this association, which for more than one-half of a century has stood for the highest things in Pomology. That is the particular reason why we welcome you. We think your meeting in our midst and your contact with the people of California will lead them to appreciate the fact that it is not alone the dollar in it that makes fruit great. (Applause.)

THE PRESIDENT: I do not know whether Oregon is part of California or California is part of Oregon and Washington, but it is part of the Pacific Coast, and it takes more than one speaker to welcome this association to San Francisco and to California, so Mr. E. C. Roberts from Oregon, we would like to call upon you for a few remarks. (Applause.)

MR. ROBERTS, Oregon: Mr. President and members of the American Pomological Society, fellow-fruit-growers, ladies and gentlemen: After listening to the remarks from our brother of California, and looking the situation over carefully, and recognizing the fact that the Chairman has stated that we lie between Washington and California, it seems that Oregon is up against the real thing this morning. (Laughter.)

The greatest blessing with which the human family is endowed is referred to in that line "Hope springs eternal in the human breast." Some of us have hoped and hoped, and our hope has given way to despair, but later we have found the flower of hope springing up anew, and we have hoped that somewhere, somehow and in some place the American Pomological Society would see fit to meet with us again on the Pacific Coast, that we might receive from it the influence and the encouragement to lead us on to better and greater things in horticulture. And this morning, in the name of the great state of Oregon, and in the joy of a hope realized, I welcome you all to the Pacific Coast.

I was a good deal surprised at the maidenly modesty of the gentleman who preceded me as he spoke of California and the influence of the American Pomological Society on the industry here. I was surprised that he did not exhibit to you what to my mind is the greatest thing in this magnificent state, and that is the California spirit. The spirit of California that sees the silver lining to every passing cloud; the spirit that turns defeat into victory; the spirit that takes a great calamity and turns it into a blessing, and goes out and gathers up millions and millions of dollars to stage the greatest International Exposition ever held.

That spirit that goes out and says, "Here is the place we will build" and it builds; and it comes here to the ocean and it says, "Thus far the water shall come and no farther" and it erects this splendid sea-wall. It is a wonderful thing to me that they did that—the building of this Exposition. I hope I am not presuming in taking to myself the honor of speaking of the spirit of California, to welcome you in the name of Oregon, yea thrice welcome you, to this

Pacific Coast and to this magnificent state. Thank you. (Applause.)

THE PRESIDENT: The wonderful possibilities of a country or of a district or of a state amount to nothing except for the men who are there. I think we have had some men come out to this Western country, to California and to Oregon from Eastern points. The two places we are most fearful of in the central part of the United States are these two northwestern states with their apples (laughter), and that is especially true with the class of men we have here. We will have now a word from Mr. J. L. Dumas, of Washington. (Applause.)

MR. DUMAS: Mr. Chairman and members of the American Pomological Society: We, of the north Pacific Coast, represent the upper crust of the sandwich. We are glad to welcome the Society to this Pacific Coast. We had hoped that you would come up and visit us in the state of Washington. We thought that was the place where the Society really should have met, as we consider ourselves as the Pomological center of the universe up there. (Laughter.)

We think we have a wonderful state. You have viewed the beauties of California; you have seen the orange groves of Riverside and of Redlands; you have seen the raisins at Fresno; you have seen our Exposition, but still the greatest pleasure awaits as you go farther north; it is only in Washington, where you will find that Pomological excellence which you are expecting on the Pacific Coast.

A few years ago, like most fruit-growers, I tired of chasing coddling moths. I thought there was possibly a better place and so I persuaded a man to give me an I. O. U. for my orchard, and I decided I would start East to look over the country and visit the various fruit sections. I spent several months at the work. I first went into Colorado, where the Pomology of the east and the west meet, where the barrel and the box meet. I then went on to my old home place in Missouri. I visited Columbia, and there fifteen hundred farmers and fruit-growers met, and we had a magnificent time, and we were most royally entertained. To close the festivities we had a great banquet. We had the best which the country around there produced. We had most of what was produced on a farm. We had meat from a slaughtered ox which had won prizes at Chicago and we had milk and butter from a wonderful cow; and we had wonderful things of the best quality, and to crown all, Mr. Chairman, those princes of hospitality gave us for desert twelve boxes of Washington Apples! (Laughter.)

I visited West Virginia and met a number of good friends, and among them was Doctor Fletcher. We were delightfully entertained and they showed us some Grimes (Golden) apples, but the only real apples we could find on sale there had nice large letters across the box, reading thus: "Oregon Apples."

I went to Virginia and visited also the city of Washington and Brother Lake. He went out and got apples to serve us and they came from a box eighteen and a half inches long, ten and a half inches deep and eleven and a half inches wide, and when unwrapped they also proved to be Oregon and Washington apples! (Great applause.)

I visited the South, Mr. Chairman, and I remember the welcome we had at Tampa, Florida, and there we heard a New York fruit-grower; how he scored all fruit-growers of the Pacific Coast; he said we had beautiful fruit, but it had no flavor. But I want to prove to you that our fruit is not only beautiful, but that it has a most delicious flavor; and I call attention to the fact that where people know what is best to eat they offer Oregon and Washington apples!

I hope, gentlemen, you will visit the state of Washington as you go back. You should visit Yakima and get apples out of the box with a big "Y" on the end. Then visit the Wenatchee Valley. They say that is the home of the apple; and do not forget to visit Walla Walla. We are always glad to welcome you; and in the name of the Evergreen State, fourteen hundred miles away, we welcome you to this meeting, and we hope your stay here will be most pleasurable and profitable. I thank you. (Applause.)

THE PRESIDENT: Fortunately, no part of this grand country of ours, or of North America, has all of the good things, or we would all want to go there. I think some of us like rather our own states, even after seeing California and Oregon and Washington. We do not want to forget that this North America is a most wonderful country, and we have here men and women from different states and different parts of it, and we have developed a fruit industry in a most wonderful way; and we are going to learn what we can and tell some things which we know in the East.

MONTANA TELEGRAPHS WELCOME.

"Missoula, Mont., Sept. 2, 1915, 3.10 P. M.

E. R. Lake, American Pomological Society, Berkeley, Cal.

Montana sends congratulations and a welcome to the West. We stand for better co-operation of all horticultural interests for the maintenance and upbuilding of the industry. Regret cannot attend.

M. L. DEAN."

COL. BRACKETT'S LAST LETTER.

Now, I will read a letter from the beloved Colonel Brackett, written only five days before his death, expecting to be here with us on this trip just as much as you or I did, and we have counted on it for two years. This letter was written on July 27, this year, and he died on the second of August.

"Members of the American Pomological Society and Fellow-Fruit-Growers:—

Greeting: Yours is to be the best meeting our beloved Society has had. I had expected to be with you, but Fate has willed otherwise. I want you to carry forward the good pomological work begun by Warder, Downing and the rest of us old pioneers. My blessings upon you, and may the fruit harvests of the future tell of your successes!

Uphold the hands of my trained assistants in office, the persons I leave in charge of Fruit Nomenclature, Fruit Identification and the Section of Fruit History. They are carrying forward the work I have outlined, and that has meant so much to the Fruit Industry. It is valuable and *must live!* Help them, and they will help you.

As I enter the Valley of the Shadow, I face death fearlessly. Remember this truth: The law of *Justice* is invincible and always demands "an eye for an eye and a tooth for a tooth." Play life's game fairly and you will, at last, have no regrets. While sorry to leave the work, I feel that I am leaving it in good hands, and I go without fear. There are many problems in Pomology for you to solve — more of them in the future, I fear, than we have had in the past. I trust you. Carry forward the good work.

Good-bye and God bless you!

Yours in friendship, love and truth,

G. B. BRACKETT, Pomologist."

The responses to these various welcomes will be given by men from different portions of the United States, as the United States and North America amount to nothing except as the different localities are filled with good men. And you must remember that Canada and the British Possessions are part of this Association. W. T. Macoun of Ottawa will make the first response:

MR. MACOUN (Ottawa): I do not know that this is the time to refer to the death of Colonel Brackett, but as Canadians we looked up to him and esteemed him very highly. As Canadians we will miss Colonel Brackett very much. We always felt we could send to him for information we could not get in Canada in regard to fruits, and he was always most happy to give us any assistance in his power. Fortunately he left behind him those imbued with the same spirit of friendly interest in the various causes and I believe they will uphold the good name of Colonel Brackett and his work.

Mr. Chairman, I had a neat speech prepared, but the fine speeches of welcome which have been given to us have completely driven it from my head. But I can say for the members of the American Pomological Society who came from Canada and who traveled over the southern parts of California, that we assure you that the members of Canada have been charmed with the receptions which they have received at all points, and the wonders which have been shown to them of the diversities and the richness of California in the matter of horticulture. It is a great privilege as Canadian members of the American Pomological Society that we have been able to be associated with the members from the United States of this great Society, which has had a glorious past, and I trust will have a great future.

I consider that in the American Pomological Society there is plenty of the best of the amateur spirit as well as of the commercial spirit and surely it is well to have some society which will have among its membership those who will keep in view the great ideals which the amateur has before him and which the commercial man

should have before him; and I think the commercial man would have a better ideal if his interests kept in closer touch with the man who has the love for horticulture. As Doctor Wickson said, the commercial man must have the love of horticulture in him which is the first impulse with the amateur pomologist. I was much interested in receiving a letter, since leaving home, from Professor Stuart, Secretary of the National Potato Society. Last winter I attended a meeting of the National Potato Society in Cornell University, and in the discussion there I suggested that they change the name to the American Potato Society, just as you have the American Pomological Society, and I was pleased to find in Professor Stuart's letter that at the coming meeting of the National Potato Society they propose to take up the question of the change of name of the society. I believe if we had more international societies in America that the question of war and peace would not have to be very much discussed in future. I believe more and more we shall get the spirit of international relations from a co-operative standpoint rather than from a political one. (Applause.)

As I say, it has been a great delight to Canadian members to visit all the interesting parts of Southern California — Redlands, Riverside, Corona, San Diego, Los Angeles, Pomona, Whittier and Fresno. We were met with the open hand and given every possible opportunity to see the districts and we were very cordially entertained, both by word of mouth and through those channels which appeal to the inner man.

I do not know what part of that trip I enjoyed most, but at Fresno it put me more in mind of Canada than anything else. Fresno has an atmosphere all its own, and it stands out distinctly from the other places, as we had a temperature there ranging from 110° in the shade upward; and at the close of our visit we were taken by Mr. Roeding to the raisin-growing house, where the raisins were going through the process of having the seeds removed, and it took me back to the kitchen at my home, where the temperature used to be from 110° to 120°, but where the delightful odor made one forget every other consideration or suggestion but the pleasures of the kitchen and the cooking.

The people around Fresno seem to be the most contented of any place in Southern California. I understand the temperature is high at Fresno. It is not only high at times but continuous. Where you get a changeable climate the people are apt to be discontented and fretful. In the east the weather is the topic, but in Fresno I cannot imagine what they do for conversation, as the weather is always hot and always the same!

I never saw happiness and heat combined so beautifully as I saw it at Fresno, which reminded me of a rhyme:—

"As a rule man's a fool;
When it's hot he wants it cool;
When it's cool he wants it hot;
Always wanting what is not."

Those of you who have been in Canada know we can show you something better than Washington. If you will come to Canada and see the apples we grow there you would never think of buying a Washington or Oregon apple again! I intend to give you the opportunity of going to the Canadian exhibit at the Fair. I would like you to test the Northern Spy Apples, which we have there from the 1914 crop, which I venture to say you will find as fine in quality as if taken the other day from the tree.

I thank you for listening to me, and I would like to say again, the Canadian members wish to express again their hearty appreciation of the courtesy which they have received on all sides. I thank you. (Applause.)

THE PRESIDENT: The Far Eastern States come next. I will call on Doctor Stewart for a word of Response.

DOCTOR STEWART: As a member from the Eastern states, my particular topic would seem to refer to the "New England states" as printed on the program; but since the Middle Atlantic states do not have a place here, I will assume that the New England states include New York, Pennsylvania, New Jersey, Delaware, Maryland and others.

As a member from that section I wish to express the appreciation we have felt of all the things we have seen since reaching the Pacific Coast. It is my first trip out here and I may truthfully say that everything so far has exceeded my expectations. I do not know whether we will be able to keep up the climax as we go north through Oregon and Washington, but it seems to me almost a series of climaxes so far through this state. Our introduction began at Needles and lasted until we reached Barstow. In a steel pullman car we traversed that part of our route in six hours, from nine to four, and in one of your "very best days." The temperature rose to the limits of the thermometer, and as one of the porters said, "the thermometer done busted and jumped over the top." It was at least 110° in the shade that day and we had to stay in the shade. It became a painful process to stand in front of an electric fan, in that hot car, but we realized this was merely a part of the welcome which was being extended! (Laughter.)

We, in the East, have learned many things from the Pacific Coast. Your methods of marking and packing fruit have certainly been an eye-opener to the East. They should recognize it; they are recognizing it, in fact, they are following in the footsteps of the West in this regard. They, of course, feel they have a great many advantages over the West, especially since they take advantage of some of the things which the West has taught us. We, of course, usually have an abundant water supply. We have excellent climate with the exception of a little cold weather sometimes, and incidentally we have by far the greatest actual production of fruit of any section of the country. That is, excluding citrus fruits. California leads in the production of all fruits, but then it is followed by New York and then Pennsylvania uniformly. Incidentally the production of apples in Pennsylvania during the past six years is about equal to the total production of apples in the three Pacific Coast states. So we

can produce the quantity. It has been produced with such ease in the East that, as a general proposition the quality has been neglected and hence the final product is not always in nearly as good shape as the product which comes east from the Pacific Coast.

In addition to these possibilities, we have still great opportunities for people to get started right on the ground floor of the Horticultural Industry in the East. The land values are much lower than they are here; and there is already quite a tide of immigration moving backward toward the East. We welcome any of the Pacific Coast people who have learned the intensive methods of production; we welcome them back to the Eastern states whenever they may get enough of it out here, and I am sure we will do our best to get you started right. (Applause.)

THE PRESIDENT: California is a large state, but we have a still larger state which belongs to the Union. The difference between Rhode Island and Texas is tremendous. We have a man, Eltweed Pomeroy, from Texas, who will respond for the Southern states.

MR. POMEROY: It is with a good deal of diffidence that I come here to speak and to take the place of Mr. Kirkpatrick of Texas, and my diffidence is all the more burdensome when I recall what fine speakers have preceded me.

When speaking of the Southwest states, one naturally thinks of Texas. It is farther from the northern part to the southern part of it than it is from Chicago to New York; and farther from the east to the west of it than from New York to Chicago. We have all sorts of things there. In my early days we looked upon Texas as the resort of any convict or cut-throat who had gone unhung. We used to put "G. T. T." after his name, meaning "Gone to Texas."

But we have had some Horticultural pioneers who have done great work in Texas. T. V. Munson thirty-three years ago started hybridization work in connection with grapes, and he did something wonderful in that line. He was experimenting, among other things, on obtaining a white hybiscus. He was also experimenting on Japanese Plums. He was honored by the French Government because of his success in some of his experiments; and they wanted him to come there to live. You also know of Onderdonk, whose varieties of peaches have done so well. He was offered a life position by the French Government, but he said he would sooner live in Texas and develop the Flora and Fauna there. Then you all will recall the older Ramsay and the older Watson and Mr. Kirkpatrick, and Mr. Kerr and the Ramsays at Houston.

I do not know that you know of the work done on pecans by Judge Edwards. He, by successive graftings, has obtained different qualities, i. e., has put different qualities into them. You can get a report on his work from the Commissioner of Agriculture of Texas. It is a wonderful creative work. And then there is Mr. Conver, who is slowly developing Amarillas, which rival those grown by Kerr at Liverpool and Redding in England.

I myself am in the extreme southeastern corner of the state of Texas, and I have met these men in Texas, and know they are doing wonderful work there. In the extreme southeastern corner where I

live, down by the Rio Grande, we have a comparatively new country. The wave of immigration skipped over us and went to the Pacific Coast and other places out here, but now it is coming our way. The railroad went there ten years ago and land sold for very low figures.

When Mr. Goodman asked me to speak of events there, I sent to my foreman and told him to send me a little box of whatever kind of fruit he had there. I got this package yesterday, and have hardly looked at it. But I think in time we may even rival California in fruit production. I know that is a very courageous thing to say; but my friend, Mr. Musser of Los Angeles, visited me for a period of about two weeks last spring and when he got through he said, "Well, if our real estate men could see the seven or eight hundred thousand acres of level land here and the climate which you have, they would go crazy." I told him not to say that when he got back home, or there would be trouble for him.

Well, here (exhibiting fruit) are some of the little Japanese Kumquats which were grown on my place. We make a delicious preserve of them; and here (indicating) is the Jujube or *Sisyphus vulgaris*, fruit which is ripening on my place. And also the new hardy guava from the Hawaiian Islands (exhibiting); the Department of Agriculture says it has the combined flavor of the pineapple, the strawberry and vanilla; here are a few of the Japanese Persimmons (exhibiting persimmons), which have ripened in many other places and which are coming there; here are a few of the Persian Limes (exhibiting limes). I had one in the car and Mr. Goodman and the others there said the acid in it is exceedingly fine; here (indicating) is a little bunch of our dates ripened on my place, and they are very nearly dead ripe, and they are delicious eating in that condition; here are some tender guavas (holding them up); here is a small example of the Ponderosa lemon (exhibiting them), and they make delicious lemonade and drinks of that sort, and we grow them for marmalades and jellies. I made three or four tons of this material last year. I have had one tree four years old with five hundred of these lemons on it, and I have made two and one-half gallons of marmalade from ten of these lemons. (Applause.)

Here (holding aloft) is a pomegranate which was grown down there on my place. I also have two thousand or three thousand citrus trees. We can grow the grape fruit there, and with a flavor I have tried to find in California, but have not; it is equal to the very finest Florida grape fruit. Then there is another plant there known as the Roselle. It is a jelly plant, and we made three to four tons of it last year. That is dried, and there is a company down there with three hundred thousand dollars paid up capital and they have been growing it, but friend Carranza wants from thirty to forty cents a pound export duty, and that is, of course, confiscation. Here (exhibiting) is some of the dry roselle, making a fine vegetable acid which will keep indefinitely, and you can make your jam and jelly or pudding or pie with it when it is put on the market. These things show some of the capabilities of that wonderful valley down there where I am located. I have between a quarter and a half a million bulbs down there. I have wonderful photographs of the amarillas

and other bulbs which we grow down there. We have a small valley which we think in time will equal the finest anywhere else on the globe and we would be glad to welcome any Californians there with their able methods.

I have one little quotation to make applying to these fruits and plants. It is from Oscar Wilde. He said: "Devotion to beauty and the creation of beautiful things is a test of all great civilization. It is what makes life a sacrament and not a speculation." You and I are here today with the devotion of the beautiful and creation of beautiful things. It is the highest joy that man can know, the creation of beautiful things, and it is making our life not a speculation but a sacrament. (Applause.)

THE PRESIDENT: I am glad the speakers have told us something of their own localities in these various responses and not confined themselves to the Pacific Coast. Professor W. N. Hutt of North Carolina will respond for the Southern Atlantic states.

PROFESSOR HUTT: Mr. Chairman, ladies and gentlemen: I believe this is the only part of this program which I will not enjoy. I have had a splendid time up to now, and I have greatly appreciated the welcome which we have had from the West. Under other circumstances it would be a pleasure for me to tender these greetings. I feel unequal to the task. One can but be impressed with this wonderful country. Ever since entering this state we have been looking at nature and the creations of man, and one cannot but feel that you have a great country with great things in it, but still, I think there is something greater than what we have seen. One of the old philosophers said, "There is nothing great in the world but man, and nothing great in man but mind." And I think the great thing you have in this great country is your fine men and fine women. And we, from the East and from the South, when we look at this Western country, consider it a place where people do things. You know down South they say we take things very easy, and when you get farther South they say the things can be done as well tomorrow as today, but in the West it is the cry to do things today, and it is a pleasure for us from the South to see what you have accomplished here.

One of the best things of the West is the splendid spirit of optimism which pervades all of your people. And it reminds me of the rather droll statement that the difference between the optimist and the pessimist is that the optimist "sees the doughnut, while the pessimist sees only the hole in the doughnut."

The Western man does not see the hole, but the Eastern man sees these great deserts and these canyons, and he thinks the West is a good place from which to keep away. But when we see these Western people doing these great things under these disadvantageous conditions, we then know what can be done.

It is a pleasure for us of the East to visit the West because you have a different viewpoint. When you see the difference in conditions between the East and the West, the difference of potentiality between the rain-drop and the sunbeam, you appreciate the fact that a per-

son's education is not complete until he has learned the value of the rain-drop and the sunbeam mixed.

In the Southeast we think we have a great region, and I think we are about in the condition that you were out here twenty-five years ago. It was Horace Greeley who said, "Go West, young man," and it was good advice at that time, but now I think the "Go West" advice may be questioned; for when we hear of three thousand dollars, four thousand dollars, five thousand dollars or six thousand dollars being the price per acre, we wonder whether it is a good thing to go West, and whether the advice of Horace Greeley is not out of date at this time.

In the South the advice we give is, "Go South, young man." And in our great Southland we have the manless land waiting for the landless man. And in the great West I think the time has passed for the pioneer to come to open up the place and start in with the hope of making a living; he generally comes out now to spend his millions after he has made them elsewhere. I believe this is a splendid place to spend one's millions, and when I get my millions, I will try to get into that Pasadena class and live down there with them.

But we have, we feel, in the cotton country in the Southland, a great country for the man with a little capital and a great deal of energy, and the ability to work and the desire to gain a home. Our country is generally considered as a cotton and tobacco country, and probably some of that good tobacco you smoked last night came from there, but it is more. It is said that in the Government Census Bureau, they designate North Carolina as the sample state, as they say we grow something of everything, but not very much of anything down there. I do not know that I should tell you that; but we have now changed that and we excel all other sections of the country in peanuts and sweet potatoes. The possibilities in the Southeast we think are fine because the land values have not gotten to such a height that a person with very meager means cannot make good. We raise what we think are the most magnificent apples. We have taken them to many expositions and are not ashamed of them. North Carolina cannot raise the tropical fruits, but rather the fruits of the sub-tropical or sub-temperate zone. We are trying to raise what we call quality fruit. Many of our products are so luscious they will not travel to market. That is the kind of fruit we are trying to raise, and to put it into the market, and I came here to study your Western markets and to study how best to put the North Carolina apples on the market.

It is a pleasure for me to be here and to travel as far as we have done to see these wonderful things. We have always received a glad hand, and I think this is the country of the larger heart and the kindler hand. I think every man stands on his own merits out here. It is the place where a man has a face value. In some of the older parts a man travels on what his ancestors did.

We certainly do appreciate the splendid welcome you have given us, and we hope when we get back to our home country, that we will have sometime the pleasure of entertaining you Western folk; and

although we do not think we can do as well as you have done, we will give you the best welcome we know how to extend. (Applause.)

THE PRESIDENT: California is a great country; Texas is a wonderful state; the Eastern Atlantic section has some wonderful states; but the gem of the United States is the Mississippi Valley. We will now hear about the Valley States by Doctor T. J. Burrill. (Applause.)

DR. BURRILL: What is that they say about scratching someone's back? Ever since we reached California, with five minutes of conversation, and even less than that at times, I could say, "Well enough I know you, however you are dressed up." I can place you in position, you are a Californian. Were we at Redlands, or at Riverside, or at the other places around here we knew you to be all Californians. I frequently heard in my earlier days of the value of faith and works as a matter of theological discussion. It was on the one hand, "Faith, faith, faith." If you do not have faith, you went to some place spoken about this morning. On the other hand it was "Works, works, works" and "Faith without works was not good." I find in this state of California that it is faith and works. Every man we have talked with believes in his own locality. If it is Redlands, the native there thinks that Redlands is the center of the universe, not only the center of California, but of every place, and it is the same with Riverside and the same with Fresno. Fresno is the real center. And so, we had it with other places all through. Faith and works are your watchwords. You believe in your own locality and your own affairs, and you distribute your works well the country over, and they are in everybody's mouth.

When I was seventeen or eighteen years of age I saw a young lady tossing an orange in her hand. How did that young woman get an orange? I thought it was a wonderful thing that a human being could be walking the streets of a town in Northern Illinois and could be in possession of that golden fruit which should be looked upon as the gift of our Grandmother Eve—we know it was not an apple—the Good Book says nothing of the apple; nothing, never mentions a fruit of that kind, but it is this long luscious California orange. Everybody is glad to get one in his mouth, although they do not furnish them on the tables here in California and in San Francisco. If I could sketch out here a map of North America, I would place as near the center as I could get, the middle of the Mississippi Valley. The center of population is right there in the Mississippi Valley of the United States. It is within a mile of the campus of the University of Indiana. It is a little to the northwest. I do not pretend I am a youngster, but I am going to live to see the time when the center of population of the United States is in the campus of the University of Illinois, and I will not be one hundred years old either at that time (applause). That is because of the magnificent development of this great Northwest. First, I thought it would go South, but Texas, big as is the state, has not been able to swing it that way. It is this great Rocky

Mountain region, this that is tempting the population in this direction.

Now, I must quit with a word or two because if I should enter upon the subject at all, I should take more time than can be squeezed in here. It is a great area, one thousand miles square, of richness, of fine climate, and magnificent men and women, growing in population. The people in the Mississippi Valley make their piles at home and come out to California and live in Pasadena to spend them (laughter). The fortunes which have been brought to California which have been made in the Mississippi Valley are very great, and they are growing all the time, and they will contribute to the growth of this magnificent Pacific Coast region.

My neighbor, Senator Knapp, has devoted himself for the last twenty years to the raising of apples and this year he built a fine rural residence, built it on a farm at a cost of forty thousand dollars. I asked him after it was completed early in the year, "Senator, how did you do it?" "Ben Davis apples." he said. (Applause.)

If you live in Mr. Goodman's locality, and if you knew what the Ben Davis apple is, you would not wonder. I do not know whether Mr. Goodman has accumulated a great fortune or not, and therefore is able to attend this great meeting of the American Pomological Society, and I do not know whether his fortune has come from Ben Davis apples; but it could come from them. Down in the Ozark region, where he is, they raise peaches; and on the Eastern coast of the shore of Lake Michigan they also raise peaches and also other things which bless humanity.

Mr. President, I must suppress my great admiration of California for this visit and I wish I could fairly represent the great region you have assigned to me, but I will leave it where it is. (Applause.)

Receptions.

The President: In honor of the ladies of the Society, there will be an informal reception and tea to be held Thursday afternoon from two-thirty to five at the home of Mrs. Stubenrauch, No. 747 Woolsey street.

This evening there will be a reception in this hall and a personal invitation is extended to all of you.

The following committees I will appoint now:

Appointment of Committees.

On Credentials: The Secretary will take that work up. I would like very much to have every member of the Society give in the name of the Society which he represents, whether a state society or a local society or other society.

On Resolutions: Messrs. Pomeroy, Burrill and Macoun.

On Nominations: The Vice-President of each state, unless the delegates from that state choose to select someone else to represent them, acts on the committee on nominations. If there is only one

delegate from a state and he is not a vice-president, he may represent that state. This committee will be called together at the will of the Chairman, Mr. Stubenrauch.

On Finances: Messrs. Hutt, Stewart and Roberts. That committee is to pass on the Treasurer's report and to audit his accounts.

On Wilder Medals: I have chosen the committee which acted as judges at Washington, and I think they are the best fitted to work on that as they are the ones who judged the scores of the teams. Professors Close and Taft, and Mr. Macoun.

On Obituary: Professor Close, very intimate friend of both Colonel Brackett and Professor Van Deman; Dickens of Kansas; Lewis, of Oregon.

Mr. Dumas was called to take the Chair and Mr. Goodman presented,

THE PRESIDENT'S ADDRESS.

All pomological work needs a threefold helper, a threefold influence, a threefold power. Faith and belief in the power of the hands as man's first helper; trust in the possibilities of the head and the influence of the will in its dealing with all the labor of the hand; thinking out, then working out the thoughts and getting results from such thoughts, making it science. See things, think things, then do things. The third of this trinity of pomological work is the heart, enthused, on fire with love of the cause. This heart co-operation is one which will carry through almost any line of development that the mind may undertake, and carry it through successfully. This union of hand, head, heart in the work of Pomology is one which every true horticulturist always and everywhere recognizes and adopts as his guide.

I believe that no class of people more than pomologists use the hand and head and heart with more equal balance, more uniformly and persistently and thus make their education more complete and more correct. This principle is being recognized by all our educators, in almost every department of college and university work, as well as in the high school and graded school life. We study better, learn better (use the head better) when hands and heart are helping, whether in the building of a character, of a business or a profession.

The producer fulfills the glory, the worth of life. This joy of success, and achievement, of power to do things is and should be the aim and ambition of many thousands more people than are now engaged in such work. The producer has to do with physical toil as well as brain toil and it is the one lacking consideration in all our educational matters, that mental and physical ability do not grow up together, that their mutual and necessary interdependence are not acknowledged and acted upon.

The producer, therefore, the fruit grower, meets this much to be desired condition, the combination of the muscle and brain, making a complete education of the man.

This Society can stand and should stand for this new order of education, honoring the toil and labor of the hands fully as much as the toil and labor of the head, and insisting that both have the hearty co-operation of the heart in everything that is undertaken.

We can surely lend all our influence, experience, and knowledge to this demand for perfect manhood, in this the only perfect plan for perfect education, the training of the hand for labor, the head for thought, the heart for love and inspiration, in whatever task we have to undertake.

The business and growth of this Society has prospered since our last meeting here in California in the year 1895. What wonderful changes we have seen in the growing, packing and marketing of all our fruits. How astonishing has been the increase in the florists trades, the nurserymen's business, the landscape and park work in these last twenty years. Twenty-seven years ago it was my good fortune to make the trip (with the American Horticultural Society) up and down the valleys, over the mountains and plains of California seeing the marvelous possibilities of this wonderful state; and now we see all these prophecies more than fulfilled in a hundred different ways, many new and unforeseen. California has become almost a nation by itself in the wonders of its climate, its mountains and valleys, its fruits and flowers, its trees and grains, but above all in its men and women who have made out of this land of wilds, a land of milk and honey, such as has never been seen in all the old world in all the time of its development. No wonder Californians are proud of their state, but let them not forget that it belongs to us all, and that we have also half a hundred other states and lands belonging to us all.

Many important matters are to come up at this gathering and we hope that they may be settled in the very best way and for the very best interests, not only of this Society, but for the good of all branches of pomology in our land.

Federation.

First of all, I think a closer union of all our horticultural organizations is a necessary step in the future development of pomological and horticultural interests in America; and then a hearty co-operation with the foreign societies. So many points come up yearly, that need final settlement, that it seems necessary to have a co-operative and conclusive and final authority to decide these questions.

I notice that both the Royal Society of Great Britain and the National Society of France, as also others, are as anxious as we are to have some final court to decide the nomenclature of varieties in those countries and in the exchange of varieties from one country to another to prevent the misuse and confusion of names. The idea of "Federation" which has been discussed in a limited way is the most important and I have asked the Executive Committee to take it in charge and to submit a report of their findings at this meet-

ing, after consulting with other members, other societies, other organizations, and getting their suggestions and recommendations.

I sincerely trust that all our membership will give earnest thought and advice and criticisms of the report when presented and if we find that it cannot be conclusive and settled at this time then that there be a special committee appointed to act with the Executive Committee to work out a perfected plan as near as may be and as soon as possible.

My suggestion as to a plan would be to have as little formality and red tape as possible, that every State Horticultural Society become a member of the Federation with one delegate to attend to Federation matters. That District Societies embracing more than one state have two delegates, and that every National Society have three delegates. This delegated body to have charge of all matters pertaining to the direct work of regular affairs of this American Pomological Society the same as other Society members do of their own society. We can thus keep our individuality and yet secure a complete "Federation."

The meetings of the Federation could be held at such time and place as would be most convenient and then each component organization hold its sessions as sectional meetings.

In this way those interested in several separate lines of study and work would be able to attend several at one time instead of missing most of them or going, at extra expense, to several different places at varied times. The American Pomological Society would be the basis of such a Federation and all other kindred organizations become members of this Society as 30-year members with powers as suggested above.

The sections of the Federation would be such as Pomology, Floriculture, Seedsmen, Growing Nurseries, Landscape Architecture, State Horticultural Societies, Gardening, each of the seven sections to have their own Chairman, and Secretary and other officers as may seem necessary to do the best work.

I believe that such an organization with its various sections would come to be recognized as the final authority in all matters pertaining to these departments.

Besides all these important matters entrusted to these different sections, it would give an opportunity for all of us to meet the best men of the land in each section and be in closer sympathy and understanding with the other great divisions of horticulture, and so know each other better by getting in touch with all their business troubles and trials, their successes, their failures, and their possibilities.

For such an organization, in order that the name may embrace the ends desired in a "Federation" and yet that the American Pomological Society may retain its identity as the central Society around which this Federation will hinge, the name that suggests itself to me as appropriate is "American Pomological Society and Horticultural Federation."

I fully realize the many, many interests that should be combined in such an organization and the extreme difficulty of harmonizing them all, adjusting them equally, but so much more the reason for the effort, and so much greater the reward if the aim can be achieved. I believe it can be, I believe it should be, I believe it will be done and I believe this is the time to begin to work this plan out to a finish.

"Somebody said it couldn't be done,
But he with a chuckle replied
That maybe it couldn't, but he would be one
Who wouldn't say so until he tried.
He started to sing as he tackled the thing
That couldn't be done, *and he did it.*
There are thousands to tell you it cannot be done
There are thousands to prophesy failure,
But just start in to sing as you tackle the thing
That 'cannot be done' and you'll do it."

Man is the factor in all this new development and he is not following the old bounden rules of past ages. We find ourselves changing and modifying our rules and ideas with experiences as the years go by.

Cultivating, pruning, healing of the wounds, spraying, the insect and fungus life, marketing and co-operation, all these are being modified day by day from the experiences of growers.

Let us hold fast to the truths and facts as we prove them, but let us not be afraid to change or modify our opinions when experience proves we are wrong.

Recommendations:

(1) That our Executive Committee decide on what shall be the permanent badge for this Society. It seems that there is some question or objection to the last work of the Executive Committee on this point.

(2) That the Honor Roll be confirmed, so that names can be entered upon it by a three-fourths vote of the members present.

(3) That the effort to secure funds through an endowment be pressed to final action.

(4) That a systematic and definite plan be decided upon to secure membership in our Society representing every state of our Union. We need and must secure a larger representative membership. I trust something will be done at this time to this end, and that the Treasurer, Mr. Taft, be authorized to push the campaign for this membership to the best of his ability.

(5) That the Committee on the Wilder Medal be requested to make a final report of their work for the past two years and be asked to continue to act for the next two years also.

(6) That our Committee on Grading make a report on the manner of indicating the three grades of apples, 1, 2, 3, or XXX, XX, X, or A, B, C, and thus settle our confusion.

(7) That the Committee on Revision complete its work and submit the plan for reliable catalogues for the nurserymen's approval, and that the rules of A. P. S. be strictly adhered to as to names and synonyms.

(8) While in the Mariposa Grove and noting the names of the various big trees I thought how wonderful they all were and said to myself that the very society which stands for all tree growth had no "memorial tree" and decided that we should at once make application for the selection and naming of one of those giant trees, American Pomological Society.

Over-production is not the question for us, so much as Transportation and Distribution. There is no reason at all why we should not, by thorough co-operation, have always and everywhere enough fruit for everyone, rich and poor. The consumption of the apple has been curtailed to a great extent by inadequate distribution and by the high prices for fancy box apples. There is a very large loss of eaters that would consume ten times the quantity of apples, provided they could get them at reasonable prices.

Let us then keep in mind this large proportion of our people, the working class and provide medium priced apples for their use in unlimited quantity.

This question enters more closely into the status of American Pomology than any other one question I know. This was shown too plainly in the hundreds of car loads of bulk apples delivered last year at our various consumption points at a low price for a medium apple. It is better, then, to have everybody eating apples even if they are not so fine in quality, provided they are sound and cheap enough. The status of American Pomology, therefore, depends on the transportation problem so far as the apple is considered.

I am glad that some of the railroads are taking up this question of markets for the products on their lines. This much is sure: If the railroads do not take up this matter of distribution and help put things in shape so that the growers can make some money out of their products then the railroads will kill the greatest developer along their lines, instead of fostering it.

The co-operative organizations all over our land are trying to solve this puzzling question and now we need the assistance of the railroads to bring this transportation and distribution problem to a successful solution.

Too many problems there are for me to enumerate to you even, and we find we can touch only a portion of them in our program.

We have come a long distance to hold this meeting and it will be well if we keep in close attendance and close touch with every session, with each paper and speaker and the discussions. We bespeak for each paper your earnest attention and consideration, so that the discussion (ofttimes the best part of the meeting) may proceed in an intelligent and definite manner.

Let all our committees do their work quickly and well, and make their reports as soon as possible. Let all business matters be well in

hand and in definite shape so that they may be acted upon quickly and intelligently. Let all papers on the program be ready on call, that there may be no delay in their presentation.

Let us have all invitations and excursions arranged definitely and simply and when we accept them let us all attend in a body that it may be an enthusiastic acceptance.

Twenty-seven years ago it was my happy fortune to visit with the American Horticultural Society all parts of California from San Diego to Mt. Shasta. This land of wonder, even as seen at that time, has come to be still more the wonderland of this whole country.

With us at that time was one of the most noted historians of the United States, John Clark Ridpath. He gave a most vivid description of this trip and land of promise, which is published in the report of the American Horticultural Society for 1888. One of his noted sayings I have always remembered because of its prophetic vision; he gave it as we were standing at the edge of Golden Gate Park viewing the vast expanse of the Pacific Ocean before us.

The idea he gave is written in these words.

"The civilization of the world has gone westward, always westward, crossing the Atlantic with the Pilgrim Fathers, through the forests, across rivers, over the plains, up and over and through the mountains until it has reached this Western Ocean, its first circle of the earth.

"The next step will be this same Western civilization stepping across the Pacific Ocean and starting in those far Eastern countries for its second circle of civilization of the world; and on this second journey it will be imbued with power from the American Idea, so that it will accomplish more and greater things than ever were known or thought of."

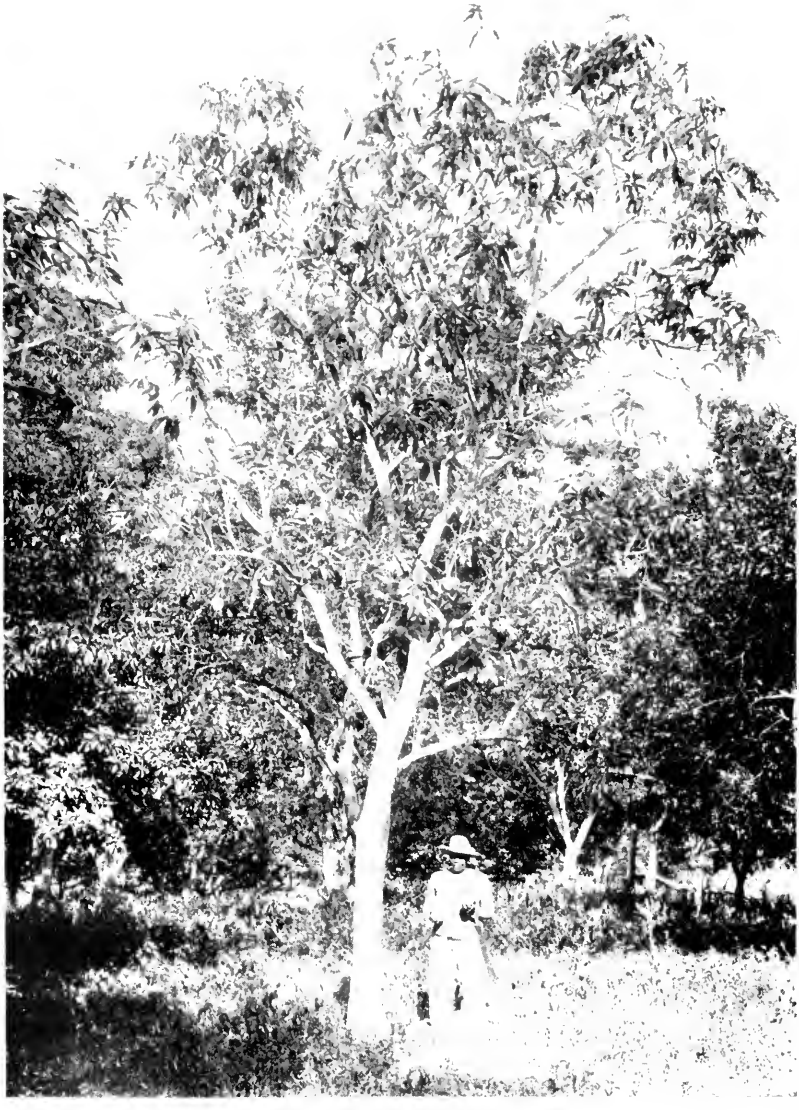
How true this prophecy is we see today in the events of the present. Twenty years ago this American Pomological Society met here in California and the report of 1895 will give you an idea of the great times and the splendid visions the members then saw in the fulfillment of all the "prophecies." And now again we are viewing this beautiful land, with a glad desire to make it part of our life to enjoy for many years.

The unity of ideas, this meeting in various parts of our great America, at different times, with different men, both old and new friends gives a new inspiration to better, greater things. We meet here, therefore, under peculiarly happy circumstances, a joyous, interesting, delightful time, we are having—a better time in a horticultural way we never expect to have. (Prolonged applause.)

Announcements.

The Chairman: Mr. Taft, our Treasurer, wants to make a statement.

Mr. Taft: Mr. President, I wish to call to the attention of the members the matter of badges. Quite a number are present who are members and who have not yet registered. The funds are at a



SEEDLING TREE OF MANGO CHINO IN FRUIT, QUINTA AVILES, CIENFUEGOS.

very low stage, and to print the report we need all the funds we can get from our membership. We hope all will enroll for the next two years; the fee is two dollars; and for life membership, twenty-five dollars; a life membership secures copies of all of the reports now on hand. We can supply the reports back to 1889, and a few beyond that. We would be glad to have those who represent colleges see that the colleges they represent are supplied with the papers and reports. When you go out I would be glad to have you stop in the hallway at the registration desk and register and get your badges.

MR. TIPPEN: I have a little announcement to make, and I wish to say before I give it that it gives me great pleasure to do so at this time. Especially as it is on behalf of the state that adheres to the principle "We will show you, instead of asking you to show us." I am especially gratified with the arrangement of apples now placed on exhibition at the Exposition. We have a number which were to come over here for your disposition, they were ordered over yesterday morning, and they were delayed in transit across the bay, and did not get here until this morning. Had they not been ordered yesterday morning I am quite satisfied that my friend Dumas would think we had ordered them today as a come-back at him for his comment on Missouri. He stated to you that when he came to a farmers' banquet at Columbia several years ago, after eating all the splendid things on the table he found we had to go to Washington for apples to adorn the table. Now, my friend Dumas, that bears out the fact that Missourians have a high feeling for you and for your apples, but now and then when some citizen becomes oversolicitious in advance on the commercial side of horticulture, and puts into the background the social and the ethical, and the better side of it, we have sometimes yielded to his demands. To get beautiful specimens they did go to your country. But we have found that the better side, the ethical side, has suffered from the quality and the flavor of the fruit which has been served, and so last year we decided that the Missouri product should be improved in quality. We have placed in the hall out here some Ingraham apples, and some Winesap apples, and we hope you will partake of them liberally at the recess time for luncheon.

Dr. Wickson asked that we place at his disposal for the members of his class whatever was left over. (Laughter.) These apples come to us as a contribution from the Horticultural Society and the Missouri Exhibit at the Panama-Pacific International Exposition. (Applause.)

THE MANGOS OF CUBA.

WILSON POPENOE, *Washington, D. C*

Cuba must be numbered among those tropical countries in which the mango is King of Fruits. Whether one grants that it is the finest fruit in the island—and there is no lack of Cubans who will affirm this to be a fact—one is forced to admit that it is by far the

most abundant. It springs up on all sides, wherever a seed chances to fall upon favorable ground, forming a large, handsome tree which embellishes the landscape and provides in the summer months a wealth of luscious fruit.

It is but natural that there should be found, among the innumerable seedling trees scattered over the island, a number of distinct races and types. It has long been recognized, in certain parts of the tropics, that many seedling mangos come more or less "true to type" when propagated from seed, and because of this fact the natives have learned to recognize certain of the best defined types and have distinguished them with varietal names. With the avocado, another fruit extensively grown in Cuba, this is not the case; seedling forms are innumerable, but names are not used to distinguish the different ones, probably because it has been learned that the offspring of a superior tree do not reproduce the characteristics of the parent to any extent, and because no well defined classes of seedlings can be pointed out.

With mangos a different state of affairs obtains. The best known seedling races and types, such as *mango*,* *manga amarilla* and *manga blanca*, are recognizable by anyone who has the least familiarity with the fruit, and there can be do doubt but that seedlings of these classes will, in the majority of cases, reproduce the characteristics of the parent to a great enough extent to make them recognizable as belonging to the same type as the parent. We must admit the possibility, for the time being, that occasional seedlings may depart from the type, perhaps because of cross pollination, perhaps because of some other cause. Occasional aberrant forms are found in Cuba which can only be accounted for by some such explanation as cross pollination. On the whole, however, it can be considered that the various races and types described in this paper come true from seed, in so far as concerns the characteristics which distinguish the group.

This peculiar characteristic of coming true from seed, a thing very rare among tree fruits, must be attributed in seedling mangos to polyembryony, a phenomenon which has long been known to occur in mangos. While it has never been thoroughly studied, and much remains to be learned about it, the investigations of Belling have thrown considerable light on the subject. Belling, working at the Florida Experiment Station in 1908, found that in one race of mangos, known as No. 11 in Florida and Jamaica, *mango* in Cuba, the seeds were commonly polyembryonic, *i. e.* contained more than one embryo, and gave rise to as many as eight or ten plants. A microscopic examination of numerous young fruits showed that these several embryos were not the product of fertilization of the egg cell in the ovary (the normal method of producing new in-

*To those unfamiliar with the popular classification of mangos in Cuba, it may seem peculiar that this name, which properly belongs to all fruits of *Mangifera indica*, should be used to distinguish a race. It must be explained that the natives commonly divide mangos into two classes, which they distinguish by the names of *mango* and *manga*, the masculine and feminine forms of the word. It has been thought best, therefore, to retain this name in its Cuban application.

dividuals in all the higher plants), but that they arose as minute vegetative buds in the nucellar tissue surrounding the egg cell. The trees which they produce are, therefore, comparable to budded or grafted trees, in that they should reproduce more or less exactly the characteristics of the parent. Belling did not find a single embryo which had developed from a fertilized egg cell, but it is possible that the occasional trees of these well known seedling types which do not come true may have developed from fertilized egg cells, and would, therefore, be as capable of variation as ordinary seedlings of other tree fruits. It remains to be shown whether the egg cell ever develops into an embryo in polyembryonic mangos, and to what extent they may be affected by cross pollination. No investigations have been made with monoembryonic mangos, such as Mulgoba, Bennett and other grafted varieties grown in Florida and Cuba, but with these we are not concerned here.

As Cuba was known to possess a large number of interesting races and types, it was thought worth while to devote the month of July, 1915—the season during which most of the mangos ripen—to a thorough investigation of Cuban mangos, in order to learn as much as possible concerning their relationships, productiveness and other characteristics, and to bring to light choice types which might be worthy of propagation. This work was greatly facilitated by the hearty co-operation of the Cuban Sub-Secretary of Agriculture, Sr. Arias, who appointed Sr. Gonzalo M Fortún, Ayudante Tecnico of the Departamento de Botanica at the Estacion Agronomica Experimental to travel with me through the island and assist in the investigations. I am also greatly indebted to Prof. J. T. Crawley, Director of the Estacion Agronomica Experimental, and to Prof H. A. Van Hermann, Chief of the Division of Agricultural Vulgarisation of the Department of Agriculture, for valuable assistance in the work.

Distribution of the Mango in Cuba.

The mango is widely distributed throughout Cuba, but it was seen most abundantly in the region around Habana, where it is a conspicuous feature of the landscape, and in the hills back of Santiago de Cuba. Toward Pinar del Rio, the tree was not seen as commonly as farther eastward, though for the first thirty or forty miles after leaving Habana it is abundant over the countryside. Between Habana and Matanzas the tree is fairly common, and it is rather extensively grown in some of the old Quintas of the Yumuri Valley, near Matanzas. Farther west in Matanzas province we found it less abundant. Around Santa Clara it is fairly abundant. At Cienfuegos there are a number of groves and quite a few scattering trees, but it is not so abundant outside the town as in some other sections of the island. At Trinidad, on the south coast a short distance east of Cienfuegos, we found plenty of trees, many having become naturalized in the mountains from seeds dropped by the *guajiros* (countrymen), returning to their homes in the mountain

valleys. Toward Camagüey the trees were less frequent on the plains. Around the town of Camagüey itself, however, the mango is fairly abundant, but the types are seemingly rather inferior. The nomenclature of the groups seems to change in this region, and the names applied in Habana, Matanzas, and Santa Clara provinces, are no longer used. At Santiago de Cuba mangos are very abundant, and during the season they are hauled into the markets every morning by the cart load. Farther east in Oriente province, however, we saw comparatively few trees, and at Guantanamo most of the best mangos were being shipped in from Santiago de Cuba.

The common seedling races, *mango* and *manga*, are pretty well distributed throughout the island, and in most localities are practically the only ones grown. There are, however, a few places which possess unusually choice types and are noted for them throughout the island. Chief among such places are Cienfuegos and Santiago de Cuba. With the exception of the Filipino, which is found around Habana and which I have never seen in eastern Cuba, the best mangos of the island are probably grown near these two cities. In the outskirts of Cienfuegos there is a garden known as the Quinta Aviles, now the property of the Asturian Society, which contains a large number of old mango trees, including a wider range of types than I have seen in any other Cuban collection. The well known mango Chino and manga Mamey are found in this quinta, and from it the markets of Habana are supplied with fruits of both of these types. Mango Chino is now grown in other gardens near Cienfuegos, the seeds having been taken from the Quinta Aviles.

At Santiago de Cuba there are several types of very superior quality which are not quite so limited in distribution as are mango Chino and manga Mamey of Cienfuegos. Along the hillsides around El Caney, a few miles back of Santiago, are scattering trees of the type known as Biscochuelo, a fruit which I believe to be, everything considered, the most desirable seedling type which we studied. While inferior to Filipino in quality, it is a good fruit and so much more productive that it seems to me more valuable. The names Señora and Obispo are applied to several large and fine types which are also found around Santiago. Corazon, Mamey and Toledo are common and well defined types, but of no great merit. They were not observed elsewhere in the island. A considerable number of types appear to be peculiar to this region, and it seems to be the belief in Oriente that they were introduced by some of the French immigrants who came over from Haiti when they were driven out of that island by the blacks.

Classification.

The classification of mangos presents some interesting problems, and as yet very little has been done toward the solution of any of them. The subject is large, and will require an infinite amount of study, yet everything seems to indicate that we will, in time, be able to have a system which will bring out the relationships of different

groups and be of practical value in studying varieties. For example, the Indian variety Sandersha is characterized by unusual productiveness. Two or three other varieties which have been grown in Florida appear to belong to the same group and are also unusually productive for Indian mangos. It seems, then, that productiveness is a characteristic of this group of varieties, and when we learn that a variety belongs to this group we can at once infer that it is likely to be fruitful. The various forms of Alphonse or Alfonzo, Indian mangos which are now grown in Florida, also seem to have much in common when it comes to bearing habits. The question may, therefore, be considered a practical one, and not unworthy of attention.

First of all, it is necessary to emphasize the need of a natural system of classification, as opposed to an artificial or arbitrary one, in which mangos are grouped according to the shape of the fruit or some other character of this nature. Such a system, while perhaps useful, does not really meet our needs, and should be avoided. A system taking into consideration natural affinities of varieties or types, however, cannot fail to be of great value in our study of the mango.

Arbitrary systems of classification have been proposed by one or two Indian pomologists, but have never been used. A few attempts have been made in India to classify varieties into natural groups, and these have been somewhat more successful, but they have never been carried far enough. The best known instance of a natural classification is probably that attempted by Maries, in Watt's Dictionary of Economic Products of India, but the field is so extensive that Maries probably covered but a small portion of it, and did not make a very thorough study of even that portion.

In this country, practically the only effort to classify mangos is that which has been made by Professor Rolfs of Florida, and is set forth in his bulletin "Mangos in Florida" (Bul. 127, Fla. Agricultural Experiment Sta.). Prof. Rolfs has formed nine groups into which he places the mangos of the Miami region, both those of Indian origin and the local seedling forms. This is an effort along the right line, but much remains to be done before the subject will be thoroughly worked out.

In this attempt at classifying the principal seedling mangos of Cuba, an effort has been made to recognize relationship and degree of relationship as well. The first and broadest division is therefore into groups for which I have used the term *race;* the second is into *types,* of which several may be comprised in one race. This classification has been made necessary by the fact that the *manga blanca* and *manga amarilla* of Cuba, though quite distinct, are evidently more closely related to each other, judging by characteristics of growth, inflorescence and fruit, than they are to any fruits of the *mango* race. As they are seedlings, however, we cannot apply the term variety to them, and I have, therefore, termed them types. Some of these types correspond to the divisions Prof. Rolfs

has termed *groups,* but for seedling fruits I believe the term *type* is better. The word group rather implies an assemblage of related horticultural varieties or forms, while these seedling types such as *manga amarilla*, as seen in Cuba, are so constant that the term group does not seem fitting. In considering horticultural varieties, however, it would seem more natural to throw them together into groups, each group containing a number of allied varieties, or those having several characteristics in common. There is naturally some slight variation within each type and any of these variations, if propagated asexually (by budding or grafting) would constitute a true horticultural variety.

This classification would comprise, then, three divisions; the first and broadest one is *races*, the second seedling *types,* several of which may be included in one race, and the third horticultural *varieties,* which are propagated by budding or grafting, and of which several may be included in one type.

Key to the Principal Cuban Mangos.

A. Tree erect, height 60 to 70 feet; crown open, oval or ovate in form; panicle 8 to 12 inches long, the axis rather slender, reddish maroon; fruit strongly compressed laterally, with curved and beaked apex, color yellow, often blushed with crimson, the fiber long and coarse; season June to July.

———Race 1. *Mango.*

AA. Tree not erect, but spreading, height only 35 to 40 feet; crown not open, but dense, not oval or ovate but dome-shaped or flat-topped; panicle shorter, 6 to 10 inches long, the axis very stout, pale green, tinged reddish; fruit not strongly compressed, very plump, the beak wanting, color yellow to orange without reddish blush, fiber long and fine; season July to August.

———Race 2. *Manga.*

B. Fruit elongate, oval to ovate, deep orange-yellow, the flesh bright orange.

———Type 1. *Manga amarilla.*

BB. Fruit nearly or quite as broad as long, decidedly oblique, bright yellow in color, the flesh whitish yellow.

———Type 2. *Manga blanca.*

AAA. Tree erect, height only 30 or 35 feet; crown not open but very dense, oval or rounded; panicle very long, 12 to 24 inches, axis rather slender; pale green, sometimes

tinged reddish; fruit strongly compressed laterally but sharply pointed rather than curved and beaked at apex, color lemon yellow with no reddish blush, fiber short and scanty, usually limited to ventral edge of seed; season July to August.

———Race 3. *Filipino.*

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Race 1. Mango.

The mango race is by far the commonest throughout Cuba. It seems, in fact, to be the common race in other parts of tropical America as well. In Florida it has become established (at least on the east coast, near Miami) under the name of "No. 11." The tree is easily distinguished from *manga* by its form, which is erect, tall, with the crown rather open, not dense and umbrageous as in both the *manga* and *Filipino* races. The fruit also is not difficult to distinguish, being characterized by its elongated, curved form and compressed sides, making it decidedly reniform as a rule. The color varies from light yellow to crimson, there usually being a reddish blush on the cheek of yellow fruited forms. The flavor is not as sweet and rich as that of *manga*, hence the latter is nearly always preferred by the Cubans. The fiber is coarse and long, but not so abundant as in *manga*. This race is the first to ripen, coming into season in June (sometimes in May); by the time *manga* commences to ripen it is nearly gone by. It is much more subject to anthracnose than *manga*, and clean fruits are rarely obtainable. As a rule the fruits come into market badly stained with fungus, and when they are fully ripe, the disease spreads rapidly and they are soon unfit for use.

There seem to be no well-defined types of this race recognized in Cuba, though the fruit of different trees varies quite noticeably. Varietal names are often applied to individual trees. *Mango manzana* and *mango corazon* are two of the commonest names, these being applied to quite a number of forms. The race appears to have been established in Cuba a long time, and its origin is obscure.

The flowers are produced on rather loose panicles 8 to 12 inches long, the axis bright reddish maroon. The lateral branches are rather scattering, and the flowers are not so crowded as in the *manga* race. The proportion of perfect to staminate flowers is good, but not as high as in the *Filipino* race.

The characteristics of this fruit, as seen in Cuba, are as follows:

Form varying from reniform to oblique-cordate, always somewhat compressed laterally and more or less beaked at the apex; length 2½ to 5 inches, weight 5 to 12 ounces; shoulders rarely equal, the left shoulder usually high and broad, right shoulder falling more or less abruptly; nak ¼ to ½ inch from longitudinal apex; surface smooth, color yellow green, greenish yellow or deep yellow, often washed with carmine toward the basal end, the subcutaneous dots minute

and inconspicuous, rather numerous; skin thick and tough, of firm texture; flesh light orange yellow in color, very juicy, flavor subacid to sweet, not very rich nor piquant, the aroma very faint; fiber abundant, long, coarse, extending from all parts of the seed; quality rather poor; seed oblong-oblique, 3 to 3½ inches long, thick, containing 2 to 10 embryos, endocarp rather thin.

It may be possible to consider *Mango chino* of Cienfuegos and some of the other types of limited distribution as belonging to this race, but for the present I have kept them separate. The Cubans themselves usually speak of *Chino* as belonging to this class. The tree has the same characteristics of growth and the fruit is quite similar in nearly every way.

I have classed this as a *race*, since it presents many more variations than should be found in a *type*. Its seedlings in Cuba, however, usually bear a strong resemblance to each other.

Race 2. Manga.

This race includes two distinct and widely distributed types in Cuba, and there are a number of minor types, such as *Manga mamey* of Cienfuegos, which are usually considered by the natives as belonging to this class. For the present, however, I have only included in it the two important types.

The tree is easily distinguished from that of the *mango* race by its low and spreading form, dome-shaped or flat-topped, the crown being dense and not open as in *mango*. Usually it is not difficult to identify a tree of this race, unless it is growing under somewhat unnatural conditions—crowded among others, for example, so that it is forced to seek the light and hence grows abnormally tall. The fruit is not strongly compressed as in the *mango* race, being nearly or quite round in cross section, and the color is light to deep yellow or orange, the crimson blush being absent. The flesh is nearly concolorous with the skin, and is of very sweet, rich flavor, generally preferred to that of *mango;* the fiber, however, forms a dense mass around the seed, and extends throughout the flesh. It is finer than in *mango,* and is so extremely abundant that the flesh is eaten with difficulty, hence the common practice of sucking the fruits. In season the race is practically one month later than *mango,* rarely coming in before the latter part of July. The keeping qualities are very good. The fruits are not affected by anthracnose to the same degree as are those of *mango*, and are nearly always clean when offered in the markets. The race is exceedingly productive, surpassing in this respect all other mangos with which I have come in contact. In eastern Cuba (Camagüey province) it is known under the name of *mango de hilacha,* the classification of mango and manga not being recognized in that part of the island. In Oriente it seems to be extremely rare.

The flowers are densely crowded on short, stiff panicles usually 6 to 10 inches long, the axis being decidedly greenish. The tree blooms very profusely, but the proportion of perfect to staminate

SEEDLING TREE OF THE MANGA RACE, NEAR SANTIAGO DE LAS VEGAS.

OLD SEEDLING TREES OF THE MANGO RACE, NEAR SANTIAGO DE LAS VEGAS.

flowers is not as high as in the Filipino race. It agrees approximately in this respect with the *mango* race.

In southeastern Florida this race is predominant. The type *amarilla,* described below, is the commonest one found in the vicinity of Miami, and is usually called turpentine or peach mango. The type *blanca* is also grown, but not so extensively as *amarilla;* it is known as apple mango, or sometimes as Bombay. The Eleanor mango probably belongs to this same type, but of this I am not certain.

Type 1. Manga amarilla.

This is the commonest form, and seems to be a general favorite. It is very abundant around Habana and toward the end of July the fruit fills the markets of the city. It is of oval or ovate form, plump to almost round in cross section, sometimes slightly impressed on the ventral surface near the apex, but never distinctly beaked. The color is deep, bright orange-yellow, the flesh concolorous with the skin, and very juicy but fibrous.

The type may be described as follows:

General form oblong or oblong-ovate, rounded in cross section, the base slightly oblique with oftentimes a shallow, irregular cavity; length 2½ to 3½ inches, weight 4 to 8 ounces, left shoulder full, rounded, frequently with a broad ridge extending down the ventral edge of the fruit, right shoulder rounded to angular, not broad; apex rounded to broadly pointed, never prominently beaked and commonly depressed on the ventral surface around the slightly raised nak; surface smooth to slightly undulating, deep orange-yellow, sometimes blushed with dull salmon, and overspread with a thin grayish bloom, dots numerous, large, and conspicuous, as seems to be the rule in the manga race; skin moderately thick and very tough, peeling readily from the flesh when the fruit is fully ripe; flesh bright orange in color, becoming very soft, pleasantly aromatic; quality rather poor, flavor sweet, rich and very pleasant; fibre abundant, fine, extending from all parts of the seed through the flesh; seed oblong, rounded at both ends, 2¾ inches long, plump, containing 1 to 5 embryos, endocarp very thick and woody.

Type 2. Manga blanca.

Not as common as *amarilla,* but abundant around Habana and plentiful in the markets during the same season. It is somewhat difficult of description, being oblique-cordate in form, decidedly oblique at the apex, and usually as broad as long. It is lighter in color than *amarilla,* and the flesh is whitish-yellow, whence the name *manga blanca.* It is scarcely as rich in flavor as *amarilla,* and not so popular, but is preferred to fruits of the *mango* race. From what I have seen of it I do not believe it is quite so prolific in fruiting as *amarilla.* The fiber is even more abundant than in the latter.

It may be described as follows:

Form oblique-cordate, broad and somewhat flattened at the base, obliquely flattened at the apex, not quite round in cross section; length 2½ to 3 inches, weight 5 to 8 ounces; left shoulder somewhat broader than right, cavity very shallow and broad; apex rounded or slightly flattened, often depressed above the nak; surface smooth, bright yellow to orange-yellow, with very large and conspicuous dots; skin thick and quite tough, peeling readily from the flesh when the fruit is fully ripe; flesh pale whitish-yellow, very juicy, faintly aromatic, quality poor; flavor sweet and pleasant; fiber very abundant, fine, extending from all parts of the seed through the flesh; seed broadly oval, nearly 2 inches long, plump, containing 2 to 5 embryos, the endocarp not quite so thick and hard as in *amarilla*.

Race 3. Filipino.

The fruits of this race are of unusually good quality, and it is unfortunate that the trees should be unproductive. To the American palate, there is probably no mango in the island equal to a good Filipino, but the Cubans usually seem to prefer a sweeter, richer fruit. Trees of the Filipino race are not common, and though distributed pretty generally over the western part of the island, they are grown in small numbers and the fruit is never very abundant in the markets.

This race has undoubtedly come to Cuba from the Philippines, probably by way of Mexico, where it is grown to a limited extent under the name of Manila mango. The fruit is nearly free from the objectionable fiber which characterizes most seedling mangos, and is of a delicious, spicy flavor which is exceedingly agreeable. Occasional trees are found in gardens as far west as Matanzas and Cienfuegos; we failed to find any in eastern Cuba but it is quite probable that a few exist. In Florida the race has become fairly well known under the name of Philippine, a shipment of seeds from Cuba having given rise to most of the old seedlings which are now found near Miami. Were it not so unproductive it would be a remarkably valuable seedling race.

The tree is erect and resembles that of the *manga* race more than *mango*, having an oval or dome-shaped crown (not flat-topped as in *manga*), with dense foliage. It is small, rarely attaining more than 30 or 35 feet in height. The leaves are frequently very large. The fruit is unique in form—long, slender and sharply pointed at the apex, distinctly flattened laterally, while the color is always greenish-yellow or when fully ripe lemon-yellow. The flesh is meaty, of spicy, piquant flavor, with fiber only along the ventral edge of the seed. The season corresponds to that of *manga*. Anthracnose rarely attacks the fruits to a serious degree, and they are usually clean and attractive in appearance.

The flowers are produced in extremely long, rather loose panicles, 1 to 2 feet in length, the axis being light green, sometimes tinged with red. The proportion of perfect to staminate flowers is

higher than in any other race I have examined, 75 per cent in some instances. The bearing habits of the tree are puzzling, and require much investigation.

The characteristics of the fruit are as follows:

Form rather variable, but in general slender oblong, compressed laterally, somewhat narrowed and oblique at the base and sharply pointed at the apex; length 4 to 6 inches, weight 6 to 12 ounces; left shoulder broad but not high, right shoulder falling abruptly; apex sharply pointed, sometimes curved slightly toward ventral side of fruit; nak scarcely distinguishable; surface smooth, pale greenish-yellow or lemon-yellow, dots numerous, small, inconspicuous; skin very thin, tough; flesh bright yellow-orange, extremely juicy, smooth, almost free from fiber, aroma faint but agreeable; quality good; flavor piquant, delicious; fiber coarse, confined to ventral edge of the seed; seed oblong, 3 to 4 inches long, thin, containing 5 to 6 embryos, the endocarp very thin and easily broken.

There seem to be no types of this race recognized in Cuba. The fruits from various trees are remarkably uniform in character, but in the native home of the race Wester has described three distinct types, Carabao, Pico, and Pahutan. A horticultural variety, Cecil, has been propagated in Florida from one of the trees grown from Cuban seed. The Cambodiana mango of Florida appears to belong to this race. Prof. Rolfs uses the name Cambodiana for the entire group, in which he includes all the types above named, as well as *Moulmein*, a seedling grown near Miami, which I have not seen.

Types of Limited Distribution.

The following types are of very limited distribution, and for this reason have not been included in the general classification. It is difficult in some cases to determine the races in which they should be placed, and it is probably safer, therefore, not to place them definitely until further studies of their characteristics have been made.

Biscochuelo.

SANTIAGO DE CUBA.

This is a very distinct type and undoubtedly the best grown at Santiago de Cuba. Considered from every point of view it would seem to be, in fact, the most desirable type in the Island of Cuba. While it is more fibrous than the Filipino race, and of a less piquant flavor, it has the great advantage of being productive, which more than outweighs the points against it. Its origin is obscure, but it is quite probable that it was introduced from Santo Domingo by the French settlers. It is grown rather commonly in the hills back of Santiago, especially around El Caney, and is abundant in the markets during July, selling for $2.00 per 100. Its affinities do not seem to lie with either the *mango* or *manga* races.

The fruit is broadly oval, weighing 8 to 14 ounces and of a clear orange-yellow color, rarely stained by anthracnose. The flesh is firm and meaty, fibrous around the ventral edge of the seed but elsewhere almost free from fiber, and of a rich, sweet flavor which is very pleasant. It keeps well and is often shipped to Habana. It seems well worth propagating elsewhere in the island.

It may be described as follows:

Form oval to sub-reniform, decidedly oblique, length 3 to 4 inches, weight 8 to 14 ounces; left shoulder rounded to very broad and marked by a deep suture which extends down the ventral surface of the fruit 1-4 or 1-3 of the distance to the apex, right shoulder usually falling abruptly, sometimes marked by a shallow suture; apex somewhat wedge-shaped, broad, with sometimes a tendency toward a beak, the nak prominent; surface smooth, clear, light orange-yellow in color, with very numerous small russet dots; skin thick and tough; flesh bright orange-yellow; very firm and meaty, juicy, the aroma not pronounced but very pleasant; quality good; flavor unusually pleasant, very sweet even when the fruit is rather hard; fiber objectionable around the ventral side of the fruit, slight on the sides; seed reniform, 2½ to 3 inches long, plump, containing 3 to 5 embryos.

CHINO.

CIENFUEGOS.

This is a famous fruit, originally grown in the Quinta Aviles at Cienfuegos and now produced in a few other gardens as well. It is probably the largest seedling mango in Cuba, and is well known in Habana markets, where single specimens sell for 20 to 40 cents. Size is its principal virtue, however, for it is fibrous and rather lacking in flavor.

The people of Cienfuegos class this as *mango*, and the habit of the tree as well as some of the characteristics of the fruit are distinctly those of the *mango* race.

It may be described as follows:

General form broad cordate, very plump, usually somewhat oblique at base; length 3 to 5½ inches; weight 12 to 20 ounces; cavity shallow, broad, somewhat irregular; shoulders sometimes nearly equal, but more often the left one broad and rather high, the right rounded and falling; apex rounded, the nak slightly raised, ¼ inch above longitudinal apex; surface smooth, greenish-yellow to dull cream colored, overspread around the base with light red, the dots numerous, very small and inconspicuous; skin usually thick and tough; flesh deep yellow in color, orange-yellow toward the seed, and of very firm, meaty texture, juicy, with faint aroma; quality fair; flavor sub-acid, spicy; fiber abundant throughout the flesh; seed oval, rather thin, 2½ to 3 inches long, containing 4 to 6 embryos.

The season of ripening corresponds with that of the *mango* race, as do the bearing habits of the tree.

Mamey.

CIENFUEGOS.

Another type grown in the Quinta Aviles at Cienfuegos, and of better quality than Chino, though not so well known in Habana as the latter. It is classed by the natives as *manga,* because of the habit of the tree and the general character of the fruit. It is smaller than Chino, but of somewhat more attractive color, as a rule, and of sweeter, richer flavor.

General form broadly cordate, not as plump laterally as many fruits of the *manga* race, length and breadth nearly equal; length 3 to 3½ inches, weight 8 to 12 ounces; base flattened, very slightly oblique; cavity narrow, flaring, almost regular; right shoulder somewhat broader and higher than the left; apex with a suggestion of a beak, the nak not prominent, ¼ inch above longitudinal apex; smooth surface, greenish orange-yellow to orange-yellow in color, blushed around the base with reddish salmon, dots large, conspicuous, fairly numerous; skin thick and tough; flesh bright orange-yellow, firm and very meaty; moderately juicy, with very little aroma; quality fairly good, flavor sub-acid, rich, pleasant; fiber not very objectionable except around ventral edge of seed; seed oblong, rather thick, 2½ inches long, containing 2 to 5 embryos, the endocarp thick and woody.

The productiveness of this type, while not as good as that of *manga amarilla,* seems to be satisfactory. The season corresponds to that of *manga amarilla.*

While Chino and Mamey are the two best known mangos in the Quinta Aviles, there are a number of other types which are known by name, and some of which may have been propagated. A few trees of the Filipino race are growing in this quinta, and also trees of a long slender fruit erroneously called Filipino. Others which may be mentioned but which are not worth describing, are the following:

Mango de Olor
Garcia
Melocoton
Manga manzana
Caña
Crêma
Morado

Corazon.

SANTIAGO DE CUBA.

This is one of the commonest types in the markets of Santiago, but is not a fruit of great merit. Its relationships are difficult to determine.

It may be described as follows:

General form oblong-cordate to broad-cordate; length 3 to 3½ inches, weight 5 to 8 ounces; base varying from level, flattened, with the shoulders equal, the stem inserted in a shallow cavity, to oblique, the left shoulder high and rounded, the right shoulder falling gradually; apex broadly pointed, sometimes almost beaked, in other instances rounded, nak depressed; surface smooth, greenish-yellow to dull yellow in color, sometimes tinged with salmon near the base, the dots medium large, rather conspicuous; skin rather thin; flesh bright yellow-orange, very juicy, the aroma pronounced and very pleasant; quality poor; flavor piquant, sweet, rich; fiber very objectionable, abundant throughout the flesh; seed oblong reniform, 2½ inches long, plump, containing 3 to 5 embryos.

Mamey.

SANTIAGO DE CUBA.

This name is applied to various types throughout the island; it is, in fact, one of the commonest names given to seedling forms. The Mamey of Santiago de Cuba is an important and well defined type, however, and is therefore deserving of description. It is not a fruit of any great merit, but is very abundant in the markets.

It may be described as follows:

Form oblong-oval, slightly oblique, plump; length 2½ to 3½ inches, weight 4 to 8 ounces; cavity very shallow, left shoulder rather high and broad, right shoulder falling gradually; apex blunt, the nak slightly depressed; surface smooth, greenish-yellow to deep yellow in color, sometimes tinged with salmon near the base, dots rather conspicuous, skin rather thin but tough; flesh bright yellow-orange, very juicy, the aroma pronounced and very pleasant; quality poor; flavor piquant, sweet, rich, very pleasant; fiber abundant, long, throughout the flesh; seed oblong-reniform, about 2½ inches long, containing 3 to 5 embryos.

Toledo.

SANTIAGO DE CUBA.

This is a small fruit, of rather unattractive appearance. It is common in the markets of Santiago de Cuba, however, and is well defined, the name being applied to this one type only.

It is characterized as follows:

Form ovate-oblique to ovate-reniform; length 2½ inches, weight 2 to 4 ounces; base oblique, the left shoulder high and rounded, the right shoulder falling abruptly; apex broadly pointed to rounded, having the suggestion of a beak; surface smooth, greenish-orange in color, dots almost none; skin moderately thick; flesh light yellow, very juicy with a strong aroma; quality poor; flavor

aromatic, sweet, pleasant; fiber very abundant throughout the flesh; seed oblong-reniform, 2 inches long, containing 3 or 4 embryos.

Other Types at Santiago de Cuba: There are quite a number of types cultivated in the vicinity of Santiago de Cuba besides those just described, but none of them seems to be very common, and the names applied to them are used so indefinitely that it is impossible to define the types. The name *Señora* is well known in the markets, and is applied to a number of large fruits, more or less similar in character, and of fine appearance but fibrous. *Obispo* is another name similarly used. *Mameyzon* is applied to several fruits resembling the *manga mamey* of Cienfuegos. *Papelina* is a small, greenish fruit of inferior quality which does not seem to be common and is not worthy of notice. *Rosita* is another very small fruit, something like *Toledo,* with a reddish cheek. We found specimens of it in the markets of Guantánamo.

Cuban Mangos in Florida.

Considering the proximity of Florida and Cuba, and the frequent communication between the two regions in the early days by means of sailing vessels, it is but natural that Florida should have received most of her seedling mangos from Cuba. Mention has already been made of several Cuban types which commonly occur in Florida, but in order to bring them all together a list of the commonest ones is here given:

Mango Race: This has become fairly common in southeastern Florida under the name of No. 11, and is said to have been introduced from Jamaica. Prof. Rolfs describes this race under the name of "No. 11 group," and mentions one named variety which has been propagated.

Manga Race: The majority of seedlings in southeastern Florida are of this race.

Manga amarilla Type: This is the principal one grown in the Miami region, and is usually called "turpentine mango," sometimes "peach mango." The fruits of most of the trees around Miami are remarkably uniform in character. Prof. Rolfs does not define this group separately, but it appears to be included in his "turpentine group."

Manga blanca Type: This includes the seedlings known in the vicinity of Miami as "apple" mango and "Bombay" mango. It is fairly abundant, but less so than the *manga amarilla* type. The "Bombay group" of Prof. Rolfs belongs to this type, and probably the "Eleanor group" also.

Filipino Race: This is fairly well known around Miami under the name of Philippine mango, numerous trees having been grown from Cuban seeds. One named variety, the Cecil, has been propagated by budding. The Cambodiana mango, introduced by the Department of Agriculture, also belongs to this race. It corresponds to the "Cambodiana group" established by Prof. Rolfs.

A thorough study of the Indian mangos cultivated in Florida has not yet been made for the purpose of classifying them, but we are beginning to find that many of them fall naturally into types. Prof. Rolfs has made a beginning at classification by establishing the Sandersha, Mulgoba, and Gola groups. The several Alphonse mangos fall naturally into one group, and exhibit many characteristics in common. A study of these mangos in India would doubtless produce more satisfactory results than an attempt to classify them from the few varieties which we are now cultivating in this country.

THE PILI.

By P. J. Wester, *Philippine Islands.*

The almond, chestnut, walnut and Brazil nut are the most important of the world's dessert nuts, with which, in the United States, may be included the pecan. Among these the almond, chestnut and the walnut, if not actually cultivated, have been used by man since the dawn of civilization. The Brazil nut has been in the trade for rather less than 50 years, while the pecan did not attain commercial importance until about 1880. The pistache is of more or less importance in the Mediterranean countries, particularly in Italy, and has found an increasing sale in the United States during the last ten years. Aside from these there are a number of nuts that are of local importance where they are grown but which do not enter the world's trade or else are of minor importance. Such are for instance, the *sapucaja,* also called the "paradise nut," related to the Brazil nut, and the pili, which have appeared in the market within the last few years. Some indeed, are not nuts at all, for instance the litchi, the edible part of this "nut" being the dried pulp, and not the seed enclosed therein.

Probably used as a food for many centuries by the Filipinos the pili was all but unknown to the outside world until about five years ago. Many Americans had, of course, become acquainted with this nut after the occupation of the Philippines, and the general excellence of the pili finally persuaded a local firm to make a trial shipment to the United States. This shipment brought further orders and a rapidly growing demand was created until in the last half year of 1913 (when statistics of the pili exports were first made) 1,186,173 kilograms of pilis, valued at $94,135.00, were exported from the Philippines, practically the entire amount being imported into the United States.

During that year (1913), with unheard of prices for pilis to the producer, or more properly, the collector, in their wild scramble to "get-rich-quick" as it were, the collectors, in order to get the nuts more quickly and with less effort, did not, as formerly, wait until the nuts ripened for collection, but cut down the limbs of a large number of trees and gathered ripe and immature nuts together; furthermore, in husking large quantities of nuts were steeped in boiling water with the result that a large percentage of the kernels

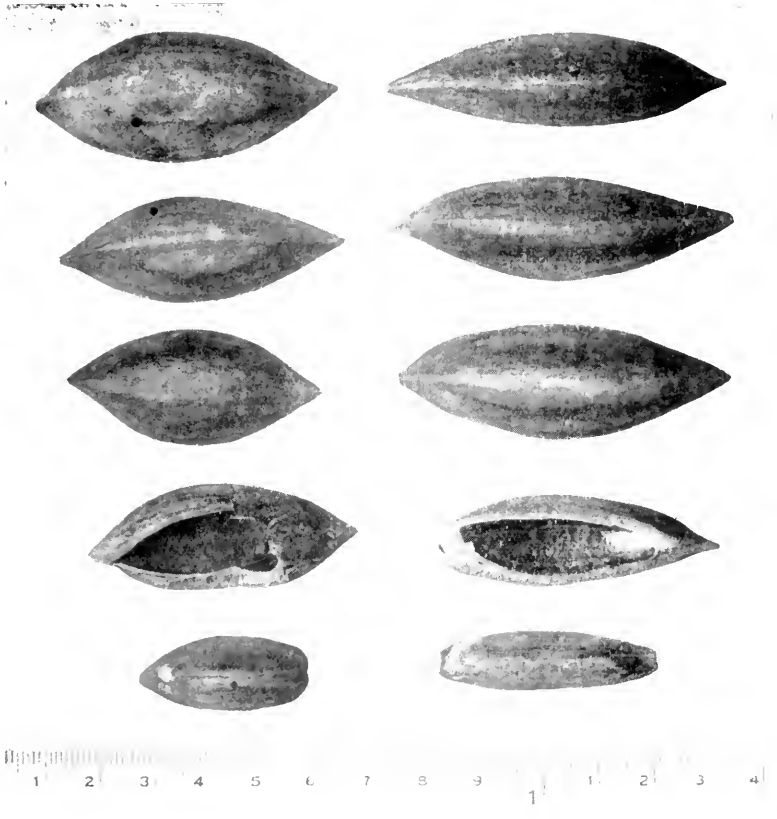

PLATE XI. PILI NUTS—CANARIUM OVATUM, ENGL.

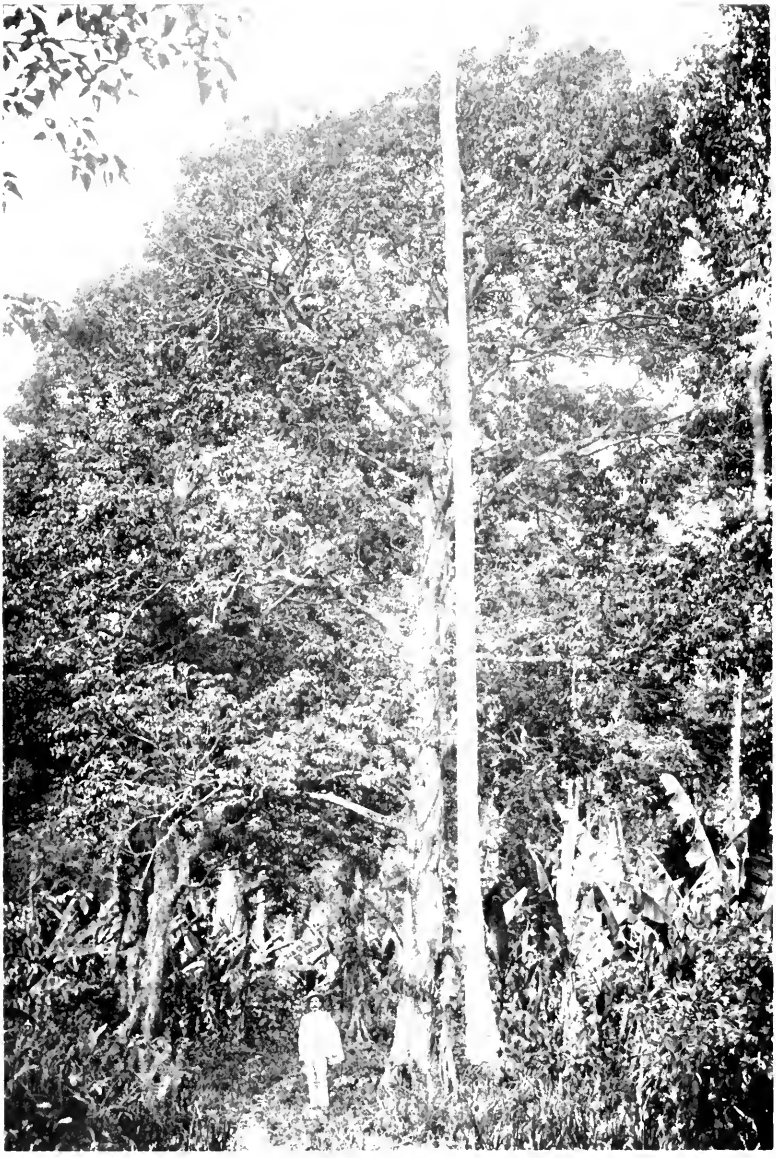

PLATE XII. — A TYPICAL PILI TREE IN A MANILA HEMP PLANTATION IN LIGAO, ALBAY PROVINCE, PHILIPPINE ISLANDS

became rancid. Thus between the green and rancid nuts a great proportion of them were unfit for consumption by the time they reached the consumer with the consequence that in 1914 the export of pilis dropped to 296,231 kilograms, valued at $22,312.00, with the prospect that in 1915 the export figures will be still lower. Considering both the loss of reputation of the pili in the importing countries and the mutilation of the trees, it will probably take four to five years before the export figures will again equal those of 1913.

The pili, *Canarium ovatum* Engl. (*C. pachyphyllum* Perk.) belongs to the family *Burseraceae*, and is a rather large handsome tree, with a straight trunk, attaining a height of fifteen to twenty-five meters, with a spread rarely exceeding fifteen meters, of medium compact growth and rigid branches. The leaves are about forty centimeters long, seven to thirteen pinnate, the pinnae being ten or more centimeters long, dark green, rather thick, and prominently veined. The flowers grow in axillary panicles and are small and inconspicuous, greenish-yellow in color. The fruits are solitary or in small clusters of two to four, and are ovate to oblong, forty-five to 73 millimeters long, more or less triangular in cross-section, black, smooth and shining, each containing a nut enclosed in a fleshy husk three to five millimeters thick.

The nuts occur in two forms, short and long, and are more or less distinctly three-angled, frequently canaliculate, more or less sharply pointed at each end, brown and smooth, the short form being from forty-five to sixty centimeters long, and the slender type fifty-five to sometimes exceeding seventy millimeters in length. The shell is thick and hard, and the kernel oblong, separating readily from the shell, light, brittle in texture, and of excellent flavor and quality raw or roasted. (Plate XI.)

One kilogram contains 130 nuts of which the shell constitutes 81.71 per cent and the kernel 18.29 per cent in the short, and the shell 81.13 per cent and the kernel 18.87 per cent in the long kind. According to Dr. Brill, organic chemist, Bureau of Science, Manila, the kernel in each form analyzes as follows:

Composition of Kernel.	*Long, Per cent.*	*Short, Per cent.*
Moisture	2.79	2.90
Fat	74.37	72.53
Protein (N x 6.25)	12.06	11.88
Sucrose	.88	.66
Reducing sugars	.45	1.35
Starch (by difference)	4.33	5.11
Crude fiber	2.15	2.42
Ash	2.97	3.15

The above analyses show that the two types are identical for all practical purposes. The long nut is superior to the short one, with a greater percentage of edibility and a greater fat, protein and

sucrose content. About five to seven per cent of the bulk marketed constitutes long nuts.

While scattered trees of the pili are found from Laguna province south of Manila through the Islands of Catanduanes, Samar, Masbate and Leyte to Mindanao, the pili district from a commercial point of view is confined to Sorsogon, Albay and Ambos Camarines in southern Luzon, which provinces are important in the production of pilis in the order named, and in which most of the trees grow from sea level to an altitude probably not exceeding 330 meters. Here the annual rainfall varies from 2500 to frequently exceeding 3000 millimeters with practically no dry periods. The soil is rather a light, frequently a sandy loam to gravelly or in places consisting largely of volcanic ash. The tree is always found on well drained land. It makes a very attractive ornamental and is well adapted for shade, or for avenue planting. So far as noted, the pili is singularly exempt from diseases and insect pests.

No statistics are available relative to the age when the trees begin to bear nor of the yield, but the trees are of slow growth and probably do not produce more than eight to ten kilograms of nuts at the age of ten years. Estimates of the yield of full grown trees given to the writer during a visit of investigation in the pili region, ranged from thirty to one thousand kilograms, one man asserting that he had one tree that yielded five thousand kilograms. From the observations made the writer has estimated the average annual yield per full grown tree at one hundred to perhaps one hundred and fifty kilograms, with exceptional trees considerably exceeding this figure. The nuts are collected from trees in the forest or from trees growing spontaneously in the *abacá* (Manila hemp) plantations. (Plate XII.) There are no pili trees planted by man.

As stated in a previous paragraph the nut is encased in a fleshy covering or "husk." This is removed by heaping the nuts into piles and covering them with leaves or straw to prevent drying on the surface. In two to three days the resulting fermentation renders the husks sufficiently soft to be easily washed away from the nuts which are then dried in the sun before bagging. Or, the fruits may be placed in vats and covered with water and allowed to stand until the husk peels away readily. In either case the rinsing should be made in cold water in order to produce a high grade article.

The boiled husk resembles a boiled yellow-fleshed sweet potato in texture and appearance and is a common article of food in the pili regions. In flavor it is tasteless and insipid. An edible oil that is used locally is said to be extracted from the husk by continued boiling and allowing the mass to settle overnight.

With a kernel of excellent quality the pili cannot be placed unshelled on the table like the almond and walnut for the reason that the shell of the pili is so hard that it cannot be broken by the ordinary nut cracker. However, it may be confidently expected that here, as in case of the pecan, systematic search will bring to light trees bearing thin shelled nuts of good quality.

In common with all nuts the pili is not perishable and can be stored away and shipped to distant markets without any preparation save the husking process, and its superior quality is sure to create for it a demand far greater than the supply for many years to come. It is, of course, to be expected that when the mutilated pili trees in the Philippines again come into bearing the lesson of the past will be remembered, and that future exportations will be of the same quality that originally created the demand for the pili and that they will increase somewhat in quantity. Then, with the realization that the pili is profitable and in the market to stay the setting out of pili plantations is probable. However, from the present outlook it seems very unlikely that pili plantations of such size as to affect the price of the nuts will be planted in the Philippines for many years to come. Therefore, considering also the tremendous marketing possibilities of the pili, the insignificant quantity produced at present, and the restricted area in which it is produced, the pili is believed to be worthy of a thorough trial by the fruit growers in the moist regions of Porto Rico and Hawaii without fear of competition by the producers, either in the Philippines, Porto Rico or Hawaii.

PEAR BLIGHT AND RESISTANT VARIETIES AND STOCKS.

F. C. REIMER, *Oregon.*

Pear Blight *(Bacillus amylovorus)* is the greatest enemy of the pear industry in Oregon. This disease first made its appearance in Southern Oregon in 1907. Since then it has gradually spread northward, and in 1914 became established in the Williamette Valley, a region which had previously remained exempt.

In Southern Oregon this disease is exceptionally destructive, and during the past eight years has been a veritable nightmare to our growers. It attacks the branches and fruit spurs as it does in the Eastern States, and in addition often attacks and destroys the trunk and root system even of old trees. This form of blight is often difficult to detect until it is well advanced and much damage has been done. It is also difficult to eradicate from the trunks and roots of large trees. Such trees usually have more or less irregular trunks containing deep crevices in which the disease becomes established and from which it is difficult to extricate all of the diseased tissue. This diseased tissue serves to perpetuate the disease, by housing millions of bacteria which are carried by insects to other parts of the same tree where new infections occur. Such body blight, therefore, has a serious aspect in that it serves as "hold-over" blight, carrying the disease over from one year to another. In other words, it serves as a storage house, housing and protecting the disease during the winter and long hot, dry periods during the summer months. It is therefore the connecting link between one siege of pear blight and a succeeding one. It is well known that most of the blight in the smaller branches eventually

dies, especially during very hot and dry summers, or very dry and cold winters. If pear blight could be confined to such branches we would have much fewer outbreaks than at present, and there would probably be long periods when pear blight would be almost unknown in certain regions. Such dry periods occur almost annually in the leading pear sections of the Pacific Coast. During such periods, however, these bacteria find favorable conditions in the succulent tissue under the thick bark on the trunks, large branches, and roots of the trees. Here the disease often lurks unobserved for many months. Insects and other agencies carry the bacteria from such places to other portions of the tree, and when the conditions are favorable an outbreak of blight occurs in these newly infected portions.

Such hold-over blight is particularly abundant in the succulent tissue of the trunks of the Bartlett, Howell, Bosc, and many other varieties.

The Remedy.

The pear blight problem will be solved ultimately by growing varieties resistant to the disease. Such varieties will be developed by extensive and systematic breeding work. Excellent breeding work of this kind is already being done at some of the Experiment Stations, and also by individuals, notably by Charles Patten, of Iowa.

The Southern Oregon Experiment Station has undertaken extensive work of this kind. We will not be able to do the best breeding work possible until we have determined the most resistant varieties and species now in existence. For this reason we are giving special attention to the subject of resistance to pear blight. For this purpose we have gathered together hundreds of varieties of pears from this country, Europe, and Asia, and practically all the known species of *Pyrus*. During the present summer we have made thousands of inoculations into many of these varieties and species, and some interesting results have already been obtained.

Breeding work requires much time, and many years will elapse before we will be able to supplant the best varieties now grown. Extensive pear orchards are being planted every year in the West, and we should do everything possible to reduce the injury from blight to a minimum in these orchards. We can be of immediate service to the industry by inducing the growers to plant varieties which are practically immune to body blight, and to top-work these at the age of three or four years with the best commercial varieties. This will eliminate the body or trunk blight which is the greatest menace to our pear industry at the present time. For this purpose we should use not only a resistant variety but also one which will make a congenial and vigorous trunk for the varieties grafted upon it.

Many of our Oregon growers have been using the Kieffer as a stock for this purpose. While this variety is not entirely immune

to blight it is more resistant than our commercial varieties. In Oregon trees top-worked upon Kieffer in this way during the past four or five years have done very well. Whether they will be permanently successful on this stock is a question which cannot be answered at the present time. In some of the Eastern States, particularly New York, most of the trees top-worked on Kieffer in this way have not been a permanent success, making a weak union at the graft. This may be due to the fact that the Kieffer is quite distinct from our common commercial varieties in habit of growth. It is a cross between the Chinese Sand Pear and the Bartlett, and begins growth considerably earlier in the spring than our commercial varieties.

At the present time we are attempting to find more desirable varieties than the Kieffer for this purpose, and the following varieties appear very promising: Surprise, Orel 15, Douglas, Warner, and possibly Birkett.

The Surprise is a valuable blight resistant variety. We obtained propagating wood of this from the Horticultural Department of the Missouri Experiment Station. There, two bearing trees of this variety have never shown any blight, while other varieties of pears and apples in the same orchard surrounding these trees have often suffered severely from this disease. We have made many inoculations with blight bacteria into this variety, both on the trunk of two-year-old trees and the tips of young, tender and very vigorous shoots, on one and two-year-old trees. Usually the tips of the young shoots would blight from one to three inches, and in a few cases as much as five inches. It would then stop, die out, and the branch would push out new shoots from below the blighted tip, and grow as vigorously as ever. Although we have made many and repeated inoculations on the trunks of two-year-old trees of this variety we have never been able to get the blight to develop beyond the point of inoculation. Even on the trunks of vigorous one-year-old trees the disease would develop only in a very limited area around the point of inoculation. This variety is a vigorous grower, and as it belongs to *Pyrus communis* it will undoubtedly make a fine blight resistant stock on which to top-work our commercial varieties.

Up to the present time I have not been able to determine the origin of this variety. About thirteen years ago it was sent to the Missouri Experiment Station by the Stark Brothers Nurseries Co., of Louisiana, Missouri, with a note that it appeared to be very free from blight, and that the Experiment Station test it for this purpose. It would be of great value to us to know the parentage of this variety, and we hope to determine this matter, if possible.

Orel 15 is a variety which the late Prof. J. L. Budd, of the Iowa Agricultural College, introduced from Russia about 1880. Trees of this variety have been remarkably free from blight in Iowa. We have been able to make successful inoculations in the tips of the young, tender shoots, but the disease would never extend down the young shoot for more than four or five inches. On the trunks, even

on the one-year-old wood, numerous inoculations have failed to produce the disease up to the present time. The variety belongs to *Pyrus communis,* and apparently is a very valuable one as a stock for top-grafting.

Douglas is a comparatively new variety, originating as an accidental seedling on Mr. O. H. Ayer's farm, in Douglas County, Kansas. The original tree has never been known to blight. In our work we have been able to get some of the tips of the vigorous young shoots to blight from one to six inches. We have never been able to get the disease to develop on the two-year-old trunks of the trees beyond the point of inoculation; apparently showing very marked resistance.

This variety is a seedling of the Kieffer, and the other parent is supposed to be Angouleme. We will top-work this variety for the first time this summer to determine its suitability as a stock for our standard varieties. If it proves a congenial stock for our commercial varieties it will be valuable because of its marked resistance to pear blight.

The Warner originated with Dr. Boor, of Henry County, Indiana, in 1832. It has never become widely known because of its poor quality. One grower in the Middle West states that this variety has never shown blight in his orchard. In our work we have made many inoculations on the trunks of two-year-old trees of this variety, but have been unable to get the disease to develop. We have been able to produce the disease in the very tender, young shoots, but it would not extend into the older wood.

Birkett is another variety which has shown a fair degree of resistance to blight. This variety originated at Peoria, Illinois, about ninety years ago, and appears to be identical with a variety now sold as "Sudduth." On the rich prairie soils, and in the severe climate of Illinois and Iowa, this variety has suffered comparatively little from blight. In our work a large number of trees of this variety were thoroughly inoculated in the trunks and branches. Most of the inoculations in the smaller branches produced the disease, often killing the entire branch, and even extending into the two-year-old wood of the trunk in some cases. Of all the inoculations made on the two-year-old trunks only fifteen per cent produced the disease; in most cases producing only small cankers, while in four cases girdling the tree. Since the largest trees of this variety, and the oldest portions of the trunk, showed almost complete resistance, it is probable that as the trees become older, the trunk and larger branches will be markedly resistant to this disease. The young trees, however, are not nearly as resistant as Orel 15, Surprise, or Douglas.

We now have the Bartlett, Anjou, Bosc, Comice, and Winter Nelis top-worked on Birkett and they are making a very satisfactory growth on this stock.

It should be stated that in all of this work the conditions for the development of blight in these trees have been made as favorable as possible. They were grown on exceptionally fertile soil, and were

repeatedly and abundantly irrigated, and very thoroughly cultivated. The trees have, therefore, been extremely vigorous, a condition conducive to pear blight. The inoculations were made with the greatest care and thoroughness, usually making from twenty to thirty needle pricks at each point of inoculation. This lacerated the bark thoroughly over an area of about one-sixth of an inch in diameter, and hence provided ideal conditions for the pear blight organism.

Check trees of such varieties as Bartlett, Howell, and Forelle were inoculated at the same time and in the same manner and under the same conditions, and with the same lot of bacteria. In every instance these have blighted very vigorously, both in the branches and on the trunks. On the trunks of these varieties the disease would usually completely encircle the trees and most of them have already died.

We have tested a large number of other varieties, some of which were supposed to be resistant to blight, but as most of these suffered more or less from the disease I need not mention them at this time. This work will be extended to our entire collection of varieties and it is hoped that other valuable blight resistant varieties will be found.

At the present time we are recommending the Surprise, and Orel 15, as blight resistant varieties to be used as body stocks on which to top-graft our commercial varieties. These should be grafted or budded on some blight-resistant root system.

Just at present it is impossible to purchase these trees, especially Surprise and Orel 15, in large quantities. I have interested a number of nurserymen in these varieties, and am supplying them with propagating wood, and there should be a goodly supply of trees of these varieties on the market within the next two or three years.

Stocks for Root Systems.

A blight resistant stock or root system is just as important as a blight resistant body or trunk. In many regions on the Pacific Coast pear blight is just as severe on the root system as on the trunk. Most of our older pear orchards are on the French seedling pear roots, *Pyrus communis*. This stock is particularly susceptible to blight and woolly aphis. Under these conditions we should not continue using the French stock for pears. What stock will eventually prove most desirable under such conditions is a difficult question to answer. At the present time the best stock available, considered from the standpoint of blight resistance, is the Chinese Sand Pear, commonly listed as *Pyrus sinensis*. In our work a number of three-year-old seedlings of these two species were inoculated just above the roots. One month later 36 per cent of the trees of the French stock had developed blight. None of these Chinese Sand Pear trees so far have developed the disease either at the crown or on the roots. The Sand Pear is also much freer from woolly aphis which is a valuable characteristic in the prevention of pear blight.

It is unfortunate that only two species of *Pyrus* have been thoroughly tried in this country as stocks for pears. It is well known that there are many other wild species of pears in Europe, Asia, and Northern Africa; and some of these may prove valuable as stock for our cultivated pears. We have made a complete collection of these species. During the present summer numerous inoculations were made on young trees of most of these species. While the work has not progressed far enough to draw conclusions it might be well to present the results obtained up to the present time.

Pyrus ovoidea, Rehder, has proved remarkably resistant to blight. Numerous inoculations in the trunks of young trees have failed to develop the disease. Even in the tips of the young vigorous shoots the disease would never develop more than two or three inches.

Pyrus variolosa has shown marked resistance. All of our inoculations in the trunks of two-year-old trees of this species have failed to develop blight.

Under the specific name *Pyrus sinensis* we have several distinct species which will be classified as soon as they begin to fruit. Two of these so far have not blighted on the trunks of two-year-old trees although they were thoroughly inoculated. The young, tender branches of these species were readily inoculated but the disease would not extend into the older, harder wood.

The following species have blighted readily, although some of them more vigorously than others: *Pyrus communis, Pyrus michauxii, Pyrus elaeagrifolia, Pyrus malifolia, Pyrus canescens, Pyrus fascicularis, Pyrus amygdaliformis, Pyrus pashia, Pyrus balansae, Pyrus nivalis, Pyrus salicifolia, Pyrus cotinifolia, Pyrus cordata, Pyrus longipes, Pyrus siniaca, Pyrus bretschneideri,* and *Pyrus phaeocarpa.*

We have been very much interested in *Pyrus betuliefolia,* which is used extensively in China as a stock. This species is propagated readily from cuttings, and is a very vigorous grower. Inoculations have been made on one and two year old trees, in the branches and also the trunks. Nearly all of the inoculations were successful, and the trees blighted vigorously.

Attention should again be called to the fact that this work has been done with young trees from one to three years old. It is well known that such young and vigorous trees will often blight more readily than older trees of the same variety or species. This has been well demonstrated in our own experiments. In some of the species and varieties the young branches blighted readily, but none of the inoculations on the two and three year old trunks of the same trees were successful. It is quite probable that older trees of some of these species will show greater resistance to pear blight, at least on the trunks, than the young trees with which our work was done.

The work with these species, as well as several others, is being continued, and it is hoped that the degree of resistance or susceptibility to blight of every species of *Pyrus* will be definitely determined.

PLATE XIII. PEAR BLIGHT INVESTIGATIONS. READING LEFT TO RIGHT, FIGURES 1, 2, 3. FOR DATA SEE PAGE 45.

PLATE XIV. PEAR BLIGHT INVESTIGATIONS. READING LEFT TO RIGHT, FIGURES 1, 2, 3, FOR DATA SEE PAGE 16.

THE PRESIDENT: We have with us today the man who discovered and proved that pear blight was due to a bacterium, and I want to say all honor of that discovery is due to Dr. T. J. Burrill, of Illinois Dr. Burrill will say a few words to us at this time.

DR. BURRILL: Mr. President, at the Illinois Horticultural Society, in the early seventies they prohibited the discussion of pear blight, as there were so many confident assertions made with regard to its cause and cure which meant nothing when tried out.

Now, I read a paper under those conditions, under another name, in 1878, and the prohibition is still in force, which proved to be the original data in regard to a statement of the disease being due to a special bacterium. It was not, however, completed until 1880 —that is, the experiments—when a considerable paper some of you may have seen was published in the proceedings of the American Society for the Advancement of Science and also in the proceedings of the Illinois State Horticultural Society, an out and out publication, of fifteen pages, with no prohibition.

Now, then, the peculiar thing about it all was that that has proved to be, after a long examination, the first demonstration of any plant disease being due to any species of bacteria. It was held that plants could not be troubled with bacteria as the sap of plants is always acid, and it was assumed that bacteria could not be developed in an acid media. Hence it was assumed further that no plant disease could be due to bacteria.

Now, we know, and any of you who have seen Irwin S. Smith's three-hundred-page quarto volume, giving an account of "Plant Diseases Due to Bacteria" will know different, and will see the significance of this discovery. (Applause.)

DATA RELATING TO FIGURES OF PLATES XIII AND XIV,

PEAR BLIGHT INVESTIGATIONS.

PLATE XIII.

Fig. 1.—Inoculated in tip of tree. Blight killed shoot for 2½ inches. The disease then died out, and two vigorous secondary shoots grew from buds just below blighted shoot.

Fig 2.—Inoculated in tip of vigorous shoot. Shoot killed for a distance of two inches. The disease then died out, and the two secondary shoots then grew from buds just below blighted tip.

Fig. 3.—Inoculated in the tip of the tree at point indicated by letter "a". Blight developed in shoot for distance of two inches. The three secondary shoots then grew from buds below blighted young tips.

PLATE XIV.

Fig. 1.—Inoculated at tips at points indicated by letter "A." strings. No blight developed.

Fig. 2.—Inoculated on one-year-old trunk at points just below Tree killed by blight—Check tree.

Fig. 3.—Inoculated on trunk at points indicated by circular rings. Killed by blight—Check tree.

THE STANDARDIZATION OF NURSERY CATALOGUES.

FRANK W. POWER, *Oregon.*

At first thought to standardize the nursery catalogues might seem an easy matter—one that could be accomplished merely by the different nurserymen getting together in convention and agreeing to bring their respective catalogues up to a certain standard.

Among the progressive nurserymen this could easily be done, provided some standard could be suggested that would cover the different fruit sections of the United State, and describe the different varieties catalogued with approximate accuracy.

In looking over a general assortment of catalogues, even of the most up-to-date firms, one will be surprised at the different descriptions given to the same variety, often by nurserymen in nearly the same locality. Many of these seeming discrepancies can be accounted for by a careful examination of these catalogues, when one is apt to find that some very attractively printed and illustrated ones are made up largely by the "scissor method," that is by description clipping from eastern catalogues and printing without revision in a western one, or from a northern one to be used by a southern nurseryman. Such methods are sure to give rise to errors, especially as to time of ripening, color, size, etc. As an instance of such methods I might cite a description of the Oregon Champion Gooseberry I ran across a number of years ago in the catalogue of a Williamette Valley, Oregon, nurseryman, who gave the startling information at the close that "this valuable acquisition was introduced into this district *from* Oregon," when, in fact, it had originated in that district. The description had evidently been clipped from some eastern catalogue in which the above quoted clause had been added to the original description, and the nurseryman in Oregon had copied it without revision, making the description absurd.

Careful proof reading will avoid all such errors. You should always carefully proof read all your catalogues and circulars and not leave it to your printer—the copy sent him might have been incorrect and you will notice it, while he could not be expected to do so in all cases. All you can ask of him is to print exactly what you furnished him in your copy and not put in errors of his own.

But using the best and most careful methods available and giving time and study to the work, it is still a difficult matter to so arrange

a description that it will be accurate in all fruit districts, as any nurseryman doing an inter-state business will testify.

It certainly must be a somewhat perplexing matter to an amateur in looking over a number of catalogues and reading the descriptions (most of them using adjectives principally in the superlative degree) to decide just which one of the many "very best that can be grown" he will plant. If, added to this he is interviewed by an oily-tongued salesman with his glowing descriptions, backed up by handsome colored prints of the fruit, is it any wonder that often he plants an orchard that in after years reminds him of the crazy quilt he slept under as a boy, so many and varied are the varieties planted.

Understand that I am not "knocking" the nurseryman, I belong to that class myself and on the whole I am certain you will find them as truthful and honest as an equal number in almost any other line of business.

Nor do I mean to intimate that all catalogues are prepared by such methods. There are many well written ones that have had much careful study and are probably about as accurate for their district as could be expected. But if a small nursery, say, owned by Brown, prepares one that is nearly up to the desired standard, but only does a limited business, and another, Smith, does several times as much, and can afford to print a catalogue that is nearly a work of art, from the mechanical make-up and cuts contained, but very inaccurate as to printed matter, how is the amateur grower going to know that Brown's is correct and that Smith spent all his time and money preparing beautiful cuts and hiring a high-priced printer to do the work? I am merely pointing out some of the errors you are liable to find and giving a partial cause for them.

While a description might not be possible that would be suitable for all districts in the United States, still a much more "standard" one is possible, one that would describe the general size, form, color, the flesh with regard to its color, texture, quality, and use, also the trees, their form, habits and manner of growth.

The season of ripening would be the most difficult to "standardize," for what may be an early variety in one district becomes an autumn or winter variety in another. The size, color and form also change somewhat in the different localities, but a much more uniform description could be given if an effort along that line were made.

The first thing needed in standardizing catalogues would be descriptions worked up by the Division of Pomology of the U. S. Department of Agriculture in co-operation with the Experiment Stations in the different states, the nurserymen and fruit growers so as to have accurate data for the different districts as to color, size, form, time of ripening, quality, use, etc. The Secretary of this Society must realize the difficulty as he has had experience along this line in trying to arrange a new quality rating and key for apples where even districts in the same state have radically differ-

ent ideas as to the quality, rating, etc., of certain varieties and much difficulty has been experienced by the judges and managers of large apple shows on such points.

In discussing this matter with my friend, Secretary Lake, I assured him that I was in favor of such a move, but that if I spent the time and money working up such a description, one that was scientifically accurate (even if I had the ability to do so, which I do not claim to possess) I feared I was so selfish that in place of giving it free to the world, that I would copyright that book and prosecute any nurseryman using it without first obtaining the right to do so and giving full credit to its author.

It could hardly be expected that any one firm could afford to spend the time and money necessary for such an undertaking and then give the information to others free of charge, and for this reason the Division of Pomology in co-operation with the pomologists at the various experiment stations is in a much better position to do this detail work than any one else, as they have the organization, a number of experts, and the machinery capable of doing it.

Nursery catalogues made from such descriptions would be like an abridged work of reference on horticulture for the fruit grower and one on which he could rely and which would be carefully preserved.

The nurserymen should be given the permission of enlarging on the standard descriptions for such new specialties or varieties as they deemed necessary, as a new variety needs a much more complete history than some old one like the Northern Spy, Baldwin, etc., but these descriptions could be so printed as to show which part was the accepted standard one, and which part was supplemental thereto. In this way even old varieties could have supplemental descriptions as to habits, desirability for certain districts, etc.

Sweet cherries, prunes, loganberries, etc., which are so prolific and successful in certain localities, may be total failures in others. By using good judgment many of these characteristics could be explained without making the catalogue over-sized, as the nurseryman must avoid too bulky a book, or it will be merely a work of reference and not an advertisement to secure orders—the prime object of all catalogues, whether for nursery stock or other articles.

A catalogue to be useful must be brief and if accuracy and merit can be secured in about the same size a really standard one has been secured.

Such works as Downing, Thomas, Apples of New York, Plums of New York, while excellent work of reference, would be unusable if supplied to nurserymen free of charge.

This point, size of the booklet, is the only one on which I anticipate much opposition from nurserymen, that if left to the scientists, too much information will be attempted, making it a work of reference, rather than a nursery catalogue, therefore, in order to secure its adoption, accuracy, terseness and brevity are three things that must be the rule.

While this data is being prepared a fairly standard one could be

prepared by nurserymen with the advice and assistance of the Secretary of this Society, and of the Division of Pomology, and I fully believe that all progressive nursery firms would work along such lines if the matter was presented to them.

I might say that I am now revising our own catalogue and trying to prepare a more standard description of varieties, and the rough outline was submitted to Secretary Lake and, with certain suggestions, approved by him. I am sorry that I am unable to be present to explain more in detail than can be done in a paper without becoming tiresome. I find that the greatest difficulty is in securing data for a Northwest catalogue. The most complete description of apples at present is found in "Apples of New York," but unfortunately many varieties change their habits of growth, season of ripening, color, size or some other characteristic when planted in the Northwest, and for the present, at least, it will be necessary to specify for what state or district the description was standardized, with an additional note for the section in which it is desired to sell it or for other districts. This will always be necessary for firms doing a large inter-state business, and I have not yet formulated a plan that is entirely satisfactory to myself, but believe the suggestion above probably might work for the present, as a standard description for any one district or state if so specified in the catalogue, accompanied by a supplemental note, would be much better than the hap-hazard method of description used by many at present without anything to show for what district the description was prepared.

I would suggest that a resolution be adopted by this convention requesting the Secretary of Agriculture to have this work taken up by the Division of Pomology in co-operation with the horticultural division of each experiment station.

That a further resolution be adopted directing the Secretary of this Society to request all nurserymen associations to take this matter up at once, and that the State Horticultural Societies be requested to assist in gathering and preparing the data.

Let us make a start at this meeting, and if it takes ten or twenty years to develop it we are at least headed in the right direction.

THE CONTROL OF APPLE DISEASES OF THE APPALACHIAN REGION.

DR. H. S. REED, *California.*

The practical, as well as the impractical, grower of fruit is fully aware of the variety and severity of the plant diseases to which it is subject. Unless the diseases are controlled, it is impossible to produce marketable apples today.

Fruit growing is largely a question of healthy trees in a suitable location. The location depends upon a suitable soil and exposure subject to subsequent modification by tillage, application of fertilizers and other operations under the control of the farmer. The healthy tree is usually the result of the factors just mentioned com-

bined with such practices as pruning, spraying, and similar forms of caretaking which are needed perennially. Unless the environment of the tree is suited to its development it is exceedingly difficult, if not impossible, to control orchard diseases. It cannot be assumed, however, that proper location and cultivation alone will insure freedom from disease. In fact, certain diseases, such as twig blight, are more destructive to healthy, rapidly growing trees than to trees of retarded growth of the same variety.

The increasing prevalence of many of the plant diseases is not an unmixed evil. It is one of the safeguards against over-production. If all orchards were healthy and producing normal crops of fruit, over-production would be certain. Fortunately, or unfortunately, this is not the case. Many hundreds of acres of orchards are planted every year with the more or less certain fate of being destroyed or stunted by the various plant diseases to which they are subject. Even in fairly well tended orchards, a greater or less percentage of the fruit falls a victim to diseases which destroy its value for market and a certain portion of the fruit is destined to fall to the ground where it decays or is used for by-products of small value.

The epidemics of diseases which appear from time to time have been a perplexing problem to many fruit growers. The question naturally arises, "Whence come these injurious diseases and what part have we in their distribution?" Most of our fruit diseases belong to one of two classes: First, those which have existed in the country as more or less obscure diseases of native vegetation; second, those of other countries which have been introduced through the channels of commerce. Some of the apple diseases of the eastern United States belong to the first class, and were present as diseases of the wild crab or related species before the introduction of improved fruit. Examples of this may be seen in the twig blight and the cedar rust. These diseases existed and may be found today on the wild crab of North America. When improved varieties of apples were propagated and especially when careful methods of cultivation brought about a rapidly growing tree, the organisms causing these diseases found much more suitable host plants and multiplied at a correspondingly greater rate. The communicability of such diseases is also increased where large areas are planted abundantly with a given species or with a given variety of a single species. Here the natural barriers which exist in nature, such as isolation, are removed and the organisms find little if any hindrance in passing from one host plant to another over large areas. The second class includes diseases such as the currant cane blight introduced into this country from Europe, the chestnut bark blight introduced from Asia, or the more recent citrus canker from the Philippines. Doubtless many other fruit diseases which are now firmly established and widely distributed, came from other continents at a time when no attention was paid to such matters and consequently no record made of their introduction. This is undoubt-

edly true of apple scab which is uniformly present both in Europe and North America.

Another observation on the nature of these epidemics may be made in passing, namely, the waves of disease which appear to pass over the country at more or less frequent intervals. The present year probably marks, for example, the crest of the wave of twig blight in the eastern apple orchards. For the last five years the infection and injury from this disease have been on the increase until the past spring witnessed the complete destruction of the fruit over a large district, the injury being pronounced even upon varieties which ordinarily suffer little if at all from this disease. The history of peach yellows shows a similar order of affairs. Several years ago a destructive epidemic of this disease swept through the Middle Atlantic States destroying thousands of acres of valuable orchards. The disease seems to have more or less completely disappeared at the present time and many young orchards are growing thriftily in localities where this disease was at one time severe. It cannot be doubted, however, but that the epidemic of this disease will recur unless better means of control are devised for the future. The reason for this state of affairs offers an inviting field for speculation but it can only be speculation with our present incomplete knowledge of the subject. Many times the disappearance of the epidemic may be due to the death of suitable host plants and consequent isolation of the survivors. In some cases it is hard to get away from the belief that the trees acquire some sort of immunity from the continued presence of the disease organisms in their tissues. This immunity is probably temporary so far as we can judge from results. It goes without saying that many epidemics are dependent entirely upon weather conditions, which favor the growth and dissemination of the disease producing organism. The apparent freedom from infection may in such cases be traced directly to weather conditions. This was observed in the case of the cedar rust in the Shenandoah Valley in 1911, when, on account of a prolonged spring drought there was scanty opportunity for infection of the apple foliage. Many persons concluded that the cedar rust was a vanishing quantity and that the problem of control would take care of itself. They were promptly disillusioned in the season of 1912 when a period of rainfall during the susceptible stage of apple foliage gave abundant opportunity for infection and resulted in an injury of a half-million dollars in the Shenandoah Valley alone and possibly a like condition existed in the neighboring states of West Virginia and Maryland.

Methods of Control.

In the discussion which follows an attempt will be made to point out some of the more practical methods of controlling the orchard diseases and of preventing the injury which follows from their attacks.

Inspection.

Inspection, either State or Federal, is one of the successful means of disease control but one which has been unfortunately too little regarded in the past. The agricultural interests have appeared to be willing for immigrants of every character, both desirable and undesirable, to come to our country. A more determined stand has been taken by several of the states in which horticultural interests are important and they have maintained rigid quarantine against many of these unwelcome invaders. It is only recently, however, that Federal inspection of imported plants has been initiated. Had we had suitable inspection of this kind it might have been possible to avoid the introduction of the San Jose scale, the chestnut bark disease, and white pine blister rust, all of which are definitely known to have been introduced in recent years from countries naturally isolated from us.

Inspection methods are especially useful in the control of diseases of nursery stock. The best example of this type of work is the inspection service of the various states for crown gall and hairy root. It has been definitely proven that these diseases are contracted in the nursery and that there is no means of curing or controlling the disease in a tree which has once been infected.

Various states have laws requiring the inspection of orchards and giving power to the official in charge to destroy or to direct the destruction of infected trees. In most cases known to the writer, the results of this work have not been so productive of good results as the framers of that legislation hoped. Perhaps one of its greatest values, however, has been the education of fruit growers and a recognition of the harm which results from such diseases. There is a type of mind, more or less common, which will be convinced of such facts more readily by legislation than by any amount of scientific experiment or demonstration. At the present time the inspection laws are serving the purpose of a loaded fowling piece standing behind the kitchen door in maintaining law and order. They are seldom called into use but their moral effect is wholesome and restraining.

Pruning.

Pruning and disinfection of diseased trees is the most effieient method of treating certain types of cankers and other diseases which affect the woody portion of the trees. This method is to be regarded as effieient so long as it removes centers of infection and prevents dissemination of disease producing organisms to healthy trees. The need of such kind of treatment is perpetual. The work required can be done to best advantage during the winter when the entire trunk and branch system of the tree may be readily seen. It is only necessary to emphasize the necessity for careful and thorough work. It is not enough to remove the entire canker but a portion of the adjoining healthy tissue should also be taken.

The instruments used for such work should be frequently sponged with a disinfecting solution which will prevent them from carrying organisms to healthy tissue and producing infection. The surfaces of the wounds should also be washed with a disinfecting solution and when dry, covered with a protective coating such as grafting wax or Bordeaux paint. In the case of such diseases as the bitter rot of apples or the brown rot of stone fruits, which produce mummies, it is advisable and in some cases absolutely indispensable that the mummied fruits be knocked off the trees and destroyed.

Eradication.

Eradication of diseased trees is simply carrying further the remedies discussed in the last paragraph. This is required in the case of highly infectious diseases such as the citrus canker or peach yellows. Indeed, it is advisable in such cases to burn the tree in place with the aid of oil rather than to attempt to cut it down and drag it out of the orchard, because in so doing, many growers have communicated the disease to neighboring trees which came in contact with the diseased tree on its way to the brush pile. Strictly speaking, this is not a means of controlling disease because the diseased tree is completely destroyed by the treatment. It must be regarded rather as the removal of centers of infection which are dangerous to neighboring healthy trees.

Only a small part of the benefits of eradication measures will be experienced unless some type of community co-operation can be obtained. Disease producing organisms know nothing of land titles and pass without hindrance from one orchard to another without regard to ownership. A diseased tree in an adjoining orchard is obviously just as dangerous as one on one's own land. If co-operation cannot be had, it may be necessary to secure legislation which would insure the result under the oversight of a suitable official. The twig blight disease previously mentioned is an illustration of this matter. Since this disease is transmitted from one tree to another through the agency of bees, it may travel to wide areas and produce infection. It is, therefore, important to have the hold-over canker removed from adjacent orchards. The case of the cedar rust disease of apples affords a rather unique instance in the history of this type of treatment since the disease is communicated to the apple from the native red cedar. It becomes necessary to eradicate not the apple, but the cedar. In many cases, the owners of the two are not the same person. For many reasons it is often difficult to obtain consent from the owner of the cedar trees for the destruction of the cedars, especially if it happens that he does not grow apple trees. In many cases, it is therefore right that the owner of the cedar trees should be compensated if he can show that he has suffered actual loss from the destruction of his cedars. The new state law in Virginia provides for suitable compensation in cases where it can be shown that valuable property has been destroyed. The damages are paid from the county treasury, the

amount being collected by tax on apple orchards in the district involved. In other states, cedar trees may be cut without compensation. The eradication practice has recently had an interesting application in the case of apple twig blight. Since the disease is very abundant upon pear trees it can be shown in many cases that the bulk of infection in apple orchards has come from neighboring pear trees. The writer has been venturesome enough to advise the destruction of pear trees in the neighborhood of badly blighted apple orchards. In such apple orchards the amount of blight has been reduced to a negligible quantity without resort to other means of control. In such cases, of course, the apple crop was the money crop of the orchard. The pears were planted largely for home use or incidental sales.

Spraying.

The practice of spraying is so well known and so widely used that it needs no detailed discussion to bring it to your attention. In fact, when we speak of disease control the average person regards it as synonymous with spraying. This means of control is the most efficient one which we possess against diseases of foliage and fruit. Some idea of the extent to which spraying is practiced may be gathered from the sale of spraying material by the carload in important districts. Its efficiency depends upon the presence on the foliage of a suitable poison at the time the spores of the disease producing organism germinate. It can be shown by microscopical observation that the weak poison kills the germ tube or young mycelium of the fungus. For many years gardeners have followed the practice of dusting plants with sulphur or other fungicidal agents for the control of mildews and other epiphytic parasites. It was not until the introduction of Bordeaux mixture by Millardet that practice of spraying became practical enough to warrant its use in a large way. Another discovery of almost equal importance, made by Professor Cordley, of the Oregon Agriculture Experiment Station, following his experiments in 1907, is that of dilute lime sulphur as a summer spray.

From time to time the possibilities of dust spraying have been tested in a practical way. This would be exceptionally desirable on steep orchards. It is possible to prepare Bordeaux powder for orchard use and to apply it cheaply to the trees. If it could be made as efficient as the liquid spray it would materially reduce the cost of spraying. Unfortunately the results thus far obtained do not warrant its use in a practical way. The weather conditions under which the dust can be applied are much more limited than in the case of the liquid spray. Absence of winds and the presence of rain or dew in some form on the foliage are quite indispensable. Unfortunately, in the season when spraying must be done these conditions are not always to be had.

The literature of the agricultural papers and bulletins of the state experiment stations are well supplied with thorough studies

upon the question of spraying and its relation to the control of various diseases. It is not advisable to enter into details here, since any adequate discussion would far exceed the limits of a single paper. It may be proper, however, to suggest that orchard men have overlooked the value of winter spraying. This practice is frequently confined to the control of scale insects, but it may be profitably used in many cases where scale insects are not present since it kills the lichens and other types of vegetable growth which frequently cover the branches of old trees. These plants do not cause disease in themselves but they form a harbor for the spores of numerous fungi which may prove very detrimental to the health of the tree. A weak solution of lye or an oil spray, has proven beneficial in many instances in maintaining a healthy bark and promoting the health of the tree.

Tillage.

The various operations, such as cultivation, drainage, irrigation and fertilization assist the growth of the tree and more or less directly influence the disease control. As pointed out above, a vigorous tree is not necessarily free from disease. In fact, the opposite is often the case. Nevertheless, many troubles may be traced directly to improper tillage methods, as for instance, the case of trees in wet soil. Such trees are almost invariably more susceptible to root rot than trees on well drained land. A heavy sod in the orchard unquestionably affords a harbor for fungus and insect enemies. The hope of controlling plant diseases through the application of fertilizers has not met with success in most instances. Nevertheless, the question warrants study, in some cases at least. Price, at the Virginia Experiment Station, has shown that pear blight may be largely controlled by the application of potash and phosphoric acid with the absence of nitrogen and cultivation. The moisture content of the soil so far as it may be influenced by cultivation or irrigation is also important in instances where various fruit troubles such as fruit spot or fruit pit are found. According to our present knowledge, some of these troubles might be avoided by maintaining a fairly constant water supply for the trees. Sterilization of the soil by means of heat or chemicals offers promising possibilities for the control of many root diseases. Future work must show how this may be done economically.

Selection of Healthy Propagating Material.

The value of this practice is too obvious to require extended discussion. It has been shown repeatedly that the use of scions or buds from diseased trees is responsible for the infection of plants and trees with such diseases as crown gall and peach yellows.

Working Varieties on Hardy Roots.

This method borders very closely upon the last one mentioned. It has been found profitable in districts where collar blight is prevalent to work susceptible varieties on hardy roots. In these cases the buds are inserted at least twelve inches above the surface of the ground so that the susceptible wood shall be well above the place likely to be infected. The California citrus growers have found that the gummosis disease may be avoided by budding on stock of the sour orange instead of the sweet orange.

Controlling Insects.

Many instances are known where insects are directly responsible for the dissemination of plant diseases. Stewart of Cornell has recently shown that blight is spread by the tarnished plant bug and by sucking insects which have been in contact with the blight bacteria. Unfortunately the transmission of blight by bees cannot readily be controlled. In this, as in other cases, different means of control will need to be devised.

Selection and Breeding of Resistant or Immune Varieties.

This means of disease control offers abundant opportunity for profitable work. By this means it should be possible to avoid much of the loss now suffered from plant disease. It is perhaps the most permanent and satisfactory solution of the problem. Many of the means of control discussed above, such as spraying, are to be regarded as a make-shift necessitated by our present incomplete knowledge of better means of control. The writer does not believe that spraying will always be necessary. The time will come when such crude methods will be left far behind. Valuable varieties may be obtained by the selection of naturally resistant individuals as is shown by the strain of cabbage resistant to yellows discovered and propagated by L. R. Jones. Plant breeding for resistance is one of the promising means of disease control. The present status of horticultural varieties appears to an outsider to be largely the result of chance crossing and subsequent selection for productiveness, color or flavor. We see that marvelous improvements have been made in the quality and productiveness of fruits as a result. There is reason to believe that we might improve the resistance or immunity of plants to as great an extent as we have improved their quality and flavor. A publication describing the work of Professor Hansen on breeding pears immune to blight has been received in the last few days. The problem is necessarily difficult on account of the long time required from the hybridization of the flower to the productive age of the offispring, but the result will fully warrant the cost in time. Now that we have agricultural institutions established, as we hope, for the benefit of future genera-

tions as well as our own, it is well worth undertaking some problems in this field. We know that we have varieties in hand which are almost immune to certain diseases. With these at one's disposal there would need to be little hesitancy in attempting to make suitable hybrids, due regard being had, of course, to quality and flavor as well as to hardiness. Unfortunately many of the varieties which display resistance to disease are more or less undesirable as a commercial proposition on account of lack of flavor, size, or other characters which commend them to the consumer.

Each year that passes witnesses a more intelligent and, therefore, more successful fight against the diseases of the orchard.

Much of the failure to control plant diseases is due to our imperfect knowledge of the causal organisms. We are trying to fight enemies whose location and modus operandi are unknown, naturally we cannot be entirely successful. A vast amount has been learned in recent years, however. The science of plant pathology in this country is only a quarter of a century old, yet we are regarded by other nations as among the foremost in the art of controlling diseases of plants. (Prolonged applause.)

THE PERSIAN WALNUT INDUSTRY OF THE PACIFIC COAST.

DR. W. W. FITZGERALD, *California.*

Mr. President and members of the Association, it gives me great pleasure to address you on my experience with walnut culture on the Pacific Coast. I am a humble practitioner of medicine, and like your chairman, fourteen years ago, I was taken up with the walnut tree when I was out here. And I conceived the idea of trying a few grafts in my own section at Stockton, ninety-five miles from San Francisco.

I met with success, and conceived the idea of planting a grove of walnut trees. As there was no grove in that section, and no one to go to for advice, the general opinion was that you could not grow walnuts in the interior of California, and as my tentative experiments were a success, I continued them, and I have continued until today.

THE PRESIDENT: How many of them have you?

DR. FITZGERALD: In the last fourteen years I have been grafting every year, until I have nearly every variety known in this state. There are some others that have been bearing eight or ten years, to test out the proper varieties. After I got started I put out seedling trees and top grafted. I have one hundred acres in seedlings, and this year sixty acres were planted with peaches, and grapes, which, until this year paid well with the peaches—those in the peach business this year need no explanation of why they do not pay this year.

The Persian Walnut, often called the English, and sometimes the California Walnut, is obtained mostly from France. Italy and a few inferior nuts from Manchuria. We, the United States, import

about 15,000 tons annually, while California produces from six to twelve thousand tons, mostly in Southern California. Although plantings have been constantly increasing until now, it is only recently accepted that walnut culture in Central California is a commercial success. There are also many groves in the states of Oregon and Washington, which in favorable localities are bearing successfully.

At first only seedling trees were planted and in this way, the different varieties were originated. For a long time it was thought that the seedling trees were superior in thrift, vigor and productiveness, but like many other things, it was seen that when many of the poorer trees were grafted over to better varieties, superior products were harvested, and no well-informed grower would consider planting a seedling tree today.

While this gives groves of universal bearing, the stopping of seedling plantings does not give us the opportunity of producing new varieties. Walnuts have also been grown in a number of states in the Union, but as a rule, not in commercial quantities. The walnut industry is only in its infancy on this coast and far more so in other states, as it is only recently that special attention has been paid to the selection of root-stock and varieties for different localities. Under favorable and normal conditions, walnut growing is one of the most attractive, as well as remunerative horticultural pursuits. The trees requiring comparatively little care in comparison with other deciduous fruits and subject to comparatively few pests and diseases. The prices have always been good and first-class walnuts have always sold at a premium. The walnut not being a perishable crop, and not subject to many diseases, where proper varieties are selected, it requires no special care to conduct a well-established grove.

Climate.

The walnut tree will stand considerable freezing during its period of dormancy, provided the trees do not suffer from excessive moisture which keeps them growing during the late fall and winter; suffering from lack of moisture during the summer also makes them more subject to freezing during their period of dormancy.

The walnut is affected in cases where the heavy frosts come on suddenly in the early fall, where trees are still green and are not yet in a dormant condition. As far as winter temperatures are concerned, the trees are almost as hardy as any deciduous fruit. Thus you see, it is very necessary to select a variety that comes out late in the spring in a locality where you are apt to have late spring frosts, and a variety that goes dormant early in the fall. By so doing, walnut culture can be made a success in many different localities.

At one time, it was thought that walnuts could not be grown successfully in Central and Northern California on account of the frosts, but we now know that it is not injured any more by frosts

than the almond, apricot, peach or grape. Walnuts will stand considerable heat, but sudden hot spells with a rise in temperature of several degrees for two or three days will often cause sunburn. Here again trees on good soil with plenty of moisture, are not affected with these extreme hot spells as are trees on poor soil with lack of moisture. Nuts with heavy hulls and trees with good foliage, are better adapted for hot sections. Varieties that come out late in the spring like the Eureka, Mayette, Franquette and Concord, seem to produce better white-meated nuts and do not burn as easily as the early varieties do in very hot climates.

Hot, dry weather at the time of blooming in the spring, is sometimes very disastrous to the setting of the nuts and long continued rains during the period of pollenation often reduces the yield of nuts. Walnuts can be grown in the mountain districts almost anywhere, except in high altitudes where spring and summer frosts are of regular occurrence, so, generally speaking, in regard to climate, walnut culture may be profitable wherever there is good soil and good water supply, and proper varieties are chosen for the different localities, except in those much exposed to cold and in the high altitudes where frosts are of regular occurrence.

Soil.

The walnut does best on a fairly heavy, deep, well-drained soil with plenty of moisture. One cannot expect to make a success with dry sandy soil or on a shallow soil underlaid with hard-pan, although in many cases, a thin layer of hard-pan underlaid with gravel, may be broken up with dynamite and the land made profitable for walnut culture.

While the walnut tree will stand considerable drought it will grow much more rapidly and supply a greater crop of nuts where there is good moisture conditions. On the other hand, too much moisture in a soil that is not well drained is bad. Much also depends on selecting proper roots for your soil conditions.

Stock.

The stock we use for grafting purposes, in the Northern California black, the Southern California black, the Eastern or American black, the Royal hybrid root which is a cross between the California black and the Eastern black, and the Paradox hybrid, which is a cross between the Persian walnut and the California black. The Southern California black makes a good root for the South, but my experience with it in the northern part of the state, especially on heavy moist soil is that it does not do well; the roots being very susceptible to moisture. The Eastern or American black is a good root, but it is too slow a grower, taking many years to mature. The Northern California black makes a good root and it is on this root that most of the walnuts are grafted. The Royal

hybrid root, and when I speak of the hybrid root, I mean a first generation cross between the Eastern and the California black, not a cross of a Royal hybrid and a California black. These nuts are procured only by hand pollenizing, unless, perhaps, an accidental hybrid occurs once in a great while.

These I obtain by gathering the catkins of the California black just as the pods—anthers—are ready to burst and expel the pollen. I place them on large sheets of paper in the sun in some protected place where the wind will not blow the pollen away. Care must be taken that this pollen does not become damp, or the catkins allowed to lie on the paper too long, as the moisture from them will destroy the pollen. Then, after separating the pollen from the refuse of the catkins and stems, I dry it thoroughly and place it in dry pasteboard boxes and keep it in a dry place until the pistillate blossoms of the Eastern black, which comes out three or four weeks later, are ready to receive the pollen, having previously removed the catkins from the Eastern black. Then I place a quantity of pollen in several folded thicknesses of gauze, tie this to the end of a long bamboo fishing pole, and by this means I can dust the pollen over the surface of the Eastern black walnut trees, so as to pollenize the pistillate blossoms. Then, after these nuts mature in the fall, I gather them, sprout and plant them in the nursery the following spring. These are first generation hybrids. Now, if I allowed one of these nuts to grow up and make a tree, the nuts which that tree produced would be second generation hybrids. Again, the nut from that tree, if allowed to grow and produce a nut, would be third generation, and so on. Of course, a few may be pollenized from trees in the neighborhood, and these will have to be rejected when they come up in the nursery row in the spring.

After they grow a short time in the nursery, it is easy to tell by the character of the leaves and the rapidity of their growth which are hybrids and which are not. The first generation of the Paradox hybrid is procured in the same way, using the pollen from the Persian walnut trees on California black. I have often heard people say that a hybrid tree was not as good as or no better than the straight California black. This is due to their using a second, third or more generation nut. The most skeptical are convinced when they see the first generation hybrids grow in the nursery alongside of the straight or second and third generation trees. These hybrid roots grow at least one-third faster, produce a tree earlier and give larger crops, due to the increased size and vigor of the tree.

The Royal hybrid root is the best all-around root. It does well in heavy soil and stands lots of moisture. The Paradox hybrid is as vigorous a grower, but having the Persian walnut strain in it, will not stand as much moisture as the Royal hybrid root. It is a better root for light and dry soils. Another thing which might affect the Paradox hybrid root is the Oak root fungus which originated in the roots of Oak trees and affects most fruit trees. I have known it to kill walnut trees on Persian walnut roots. It does not

affect the Eastern, California or Royal hybrid roots. I know of no case in which it has affected the Paradox root. I have had Paradox hybrids planted in spots where the Persian was killed to test this, but it is too soon to say whether they will be affected or not. If I should plant a walnut grove on land that had previously been covered with Oak trees, I would hesitate about planting the Paradox hybrid, as it is too serious a matter to take a chance on having them killed in ten or twelve years when you can plant the Royal hybrid root and be positive of having no trouble. Another thing in top-working your Paradox hybrid trees, the grafts and buds do not take well on it. Many times you have to graft two or three times to get them to grow. It is just as important to select your buds as it is to choose the proper roots. The limbs of a tree vary as much as the individual members of a large family. Buds should be selected not only from the most thrifty and heavy bearing trees, but from individual limbs on those trees that are good producers. While the majority of limbs will produce true; there are limbs that will produce inferior and irregular nuts, and they will also vary as the amount and the times they will come into bearing. I know of groves that bore very fair crops the third year after planting and other groves planted eight years, that produced scarcely a nut. I have taken buds from different limbs of a tree and top-grafted them on different limbs of another tree, showing this variance. This is all due to bud selection. You can easily see the difference between success and failure in walnut culture by choosing the best that can be produced, or planting any old kind of a walnut tree. It is unfortunate for the industry that many people, in planting walnut groves first think of how cheap they can get a tree rather than of how good a tree they can get. The first cost of the best tree that can be produced is cheaper in the long run than the lowest priced tree that you can buy, as with a low priced tree, it is a question what you will have if you ever have anything. With the best trees and proper conditions and care, you are positive of success.

The best way to produce a paying orchard of walnuts is to plant nursery grafted trees. A few years ago it was thought the proper way was to plant three or four nuts in the spots which the trees were to occupy in the orchard, pick out the most vigorous tree that started from these nuts and graft to the desired variety of the English walnut later on. Theoretically, this sounds very well. However, I know of no instance in which this method proved satisfactory, as in some places there would be no trees developed and in others each nut would produce a good tree. Another method, which is better, but yet unsatisfactory, is transplanting the black walnut seedlings in orchard form and top-grafting later. The disadvantage of this method is one common with that of planting the nuts in place, namely, that it is impossible to obtain a uniform standard by grafting the first year, and it will probably take three or four years before all the trees have good tops, thus making your orchard uneven. Then, to, in top-grafting on vigorous roots, the grafts grow

very rapidly and thriftily, making them top heavy and easily blown off by the wind, making considerable expense and much work to keep your grafts from blowing out. The best way to top-graft in the field is to let the trees grow a few years until they attain considerable size, then graft about one-third of the tree each year. It will take three years to work your trees over, but you will not have the trouble of their blowing off and will not shock your tree. It is not much of a shock to a one-year-tree to cut it off and graft it, but the older the tree, the more shock it produces to cut off all the top for grafting. When you figure up the time and expense of top-working your trees in the field they are much more expensive than planting nursery grafted trees. Then too, the scientific nurseryman does not graft any but his best trees, and if they do not make a good growth after being grafted in the nursery, they are rejected. I know of several besides myself who have tried top-grafting in the field as well as planting nursery grafted trees, and I have yet to find the man who has tried this on any large scale who would plant anything but nursery grafted trees. Of course, a small percentage of nursery grafted trees that are transplanted, will fail to grow and will have to be replanted, the following season. These failures are so few under proper conditions, that they are not noticeable in the orchard.

Varieties.

One can consider the walnut industry with impunity until he comes to the subject of varieties. Then he will receive opinions galore. Most men with seedling groves have some particular tree which they consider superior to any other variety. Then, too, a man who is growing some particular variety, thinks that that is the only one, either because he has not had experience with other varieties, or because they do not do so well in his particular locality. In considering the different varieties of walnuts, we have to keep in mind several things, as soil, climate and moisture conditions.

It is true that we can regulate moisture conditions, but soil and climate we cannot change: so, in considering the different varieties, we must keep in mind where they are to be grown, and the character of the soil they are to be grown on, as some of our best varieties that produce good white-meated nuts in a cooler climate, will produce inferior nuts in a very hot climate.

The first thing to be considered in judging the different varieties of walnuts is their producing qualities. I do not mean by this a larger producer of an inferior nut, but a heavy bearer of a good quality nut. A tree that produces only a few very fancy nuts is not to be considered commercially. A fancy variety may bring a few cents a pound more, and may make up what it would lack in the number of pounds it would produce, providing it was not too shy a bearer. A fancy variety producing only from fifty to seventy-five pounds on full bearing trees at twenty-five cents per pound, would not compare favorably with a variety which produces two hundred

to three hundred pounds at twelve to fifteen cents per pound. The relation between the quality of nuts and the quantity of nuts produced should be carefully considered in choosing a variety for planting, especially as the demand is increasing for fancy stock.

One should not judge a variety by the fine appearance of a picked sample of nuts without considering the quantity in which they are produced. The best variety is one that will produce annually a large crop of the most desirable type of nuts. Unfortunately, we do not have all the good qualities in any one variety, or we would not be discussing this subject today. We have to choose a heavy producer with a good quality of nut. One important point is that young trees often produce larger nuts than they do after the tree becomes older, so one should judge nuts from a tree that has been bearing for a few years.

We should also consider the age in which the tree comes into bearing, as great differences exist in different varieties as to what age they begin bearing. Some varieties begin to produce nuts even in the nursery and give a commercial crop within three years from planting in the orchard, while other varieties are several years later in coming into bearing.

The next important consideration is that of the size and weight of the nut. The size for commercial number one grade walnuts are those which will not pass through a one-inch square opening, while those above one and three-sixteenths inches, which are generally considered as budded nuts, bring considerably more per pound, and the demand is growing for this size of nut.

The weight of the nut is equally important since this varies widely in nuts of the same size. Some of the largest varieties are considerably lighter in weight than others in which the nuts are smaller. A desirable nut should be well filled with plump white meat without too much air space between the shell and the meat. A comparatively heavy shell is more desirable than a very light one, since the nut is better protected from being mashed in handling and less susceptible to perforation disease, which is one of the most serious troubles of the walnut grower in recent years. It consists of a non-development of the outer hard layer of shell. The hard shell is not actually perforated, but rather fails to develop. This disease has become more prevalent in the last few years and affects principally the one with very thin, soft shells; the ones with harder shells not being affected. Nuts that are prone to crack easily, and have a fine light shell, are more or less injured in handling, thus contaminating the nut.

It is also to be considered that since walnuts are sold by the pound, the heavier the shell, the greater the weight, and the more the returns for a given number of nuts. The leading walnut on the world's market is known as the Grenoble. Strictly speaking, the Grenoble means a Mayette variety. It is not a very long nut, somewhat broader at the base than at the apex. This is not very important, however, since the smoothness, symmetry and uniformity of

the nuts affect their appearances more than their shape. An ideal nut should be quite smooth, free from outside ridges and other irregularities of surface, and all nuts should be of the same general shape and appearance, thus giving them uniformity and individuality. A variety in which the nuts are decidedly uniform so that the variety is easily distinguished and recognized even to the consumer, has a marked advantage over one in which the nuts are of all sorts of shapes, so that only an expert could distinguished the variety from others.

The color of the shell is not important, as the trade demands bleached nuts even though they may have an attractive appearance without bleaching. By being bleached, they are all brought to about the same color. The quality of the meat is also of considerable importance, as nuts with the lightest colored meat are considerably more desirable, while those that are dark, even though plump and of good color are discriminated against. There is no doubt but that the dark-meated varieties will become more objectionable as more of the lighter colored ones are produced. The flavor of the meat varies considerably in the different varieties and is of much importance in a high class fancy trade. Although commercially there is not much importance placed on their flavor except when they are bitter, and this is the most undesirable quality and should be guarded against in choosing the variety and in formulating an idea of what constitutes an ideal walnut.

The most important qualifications in a variety from a strictly commercial standpoint is that it should be a uniformly large producer of nuts. The majority of which will not pass through a one and three-sixteenths inch square mesh, well sealed even though hard shelled, and should be uniformly well filled with meat of light, yellowish-brown color or not darker than light brown or amber. For a fancy trade, the nut should be of an attractive uniform shape and color, with a fairly smooth surface and particularly high quality, with agreeable flavored meat, and with no bitterness.

The next important consideration is the choosing of a variety that is resistent to blight. This being a bacterial disease which affects the young growth when it first puts out and requires for its development, moist weather conditions.

It is not as yet very prevalent in Northern and Central California on account of the drier atmosphere and also because the groves are young and they have not as yet been infected with the blight. For many years, they did not have blight in Southern California, but it is sure to come in any locality in time.

While, as I said, it is not very prevalent in Northern and Centrol California, as yet, still, in localities where the infection has been introduced, the seedling trees have considerable blight so that it behooves a planter to give due and timely consideration to walnut blight in selecting a variety.

As a rule, the late blossoming varieties are free from blight as they come into blossom when the weather is drier and the blight can

make little headway, while the earlier varieties blossom during a moist season on account of rain and fogs, which is a favorable period for its development. Certain varieties are spoken of as being immune to blight, but while there is not such a thing among walnuts as absolute immunity, when conditions are favorable for the development of blight, yet some trees do show quite a marked resistance and should be given precedence on this account. Their marked resistance is on account of their great vigor and because they start out late in the spring, avoiding the moisture which is necessary to develop the bacteria which attack on the young nuts and new growth.

There are many seedlings of promise scattered throughout the state, both of the Santa Barbara soft shelled type and the French varieties which are being carefully watched. The University of California has for a number of years done much in this line through Professor Ralph E. Smith, and now Professor Batchelor is following in that line of work. Besides, there are a number of individual growers who for years have been trying out promising seedlings, but up to date the leading varieties for Southern California are the following:

Placentia, Eureka, Neff, El Monte, Prolific, and Chase. In Northern and Central California, Oregon and Washington, the varieties that come out later in the spring are the best, such as the Eureka, Franquette, Mayette and Concord. The Payne is also a variety which is coming into prominence in localities which are not subject to blight.

These varieties all have their good and bad points and, as I have said, there are many who are constantly on the watch for new varieties, and some besides myself, I presume, who are developing new varieties by crossing some of our best walnuts. I have some very promising new varieties, but as the trees have to be under observation for a number of years before it can be proved, I do not wish to be too sanguine.

Planting.

After you have selected your varieties, on the proper root, then, when you obtain your trees, heel them in moist soil until you are ready to plant. Trees should not be left lying around with the roots exposed. It is useless to plant during the cold months of the winter, as the roots will not start to grow and are liable to become sour from the cold, damp earth, but in the spring when the ground begins to get warm, it is natural for plant growth to put forth. Roots should be about eighteen to twenty inches long. If too long, they rot due to soil being too cold and wet. Make a fresh cut on the under side of each root and spread them out in their natural position in the hole where they are to be planted. The hole should be dug large and deep if it has not been dynamited. Put in top earth at first and see that it is filled in well around the roots. The earth should be tramped thoroughly, being careful not to bruise

the roots with your boots. The top six inches that is filled should not be tramped. Previous to planting, the tops should be cut off, and waxed, about twelve inches above the ground, according to the number of buds on the lowest part of the trunk of the tree. After these buds make a growth of four to six inches, I select the most thrifty one to make the butt of the future tree, and pinch off the tops of each of the other limbs. This will stop their growth and leave them with a few leaves to shade the butt of the tree. The tree will probably make a growth of four to twelve feet the first season.

Pruning.

As a rule, the next year they will not make so much growth in height, but will throw out side branches. When they fail to throw out side branches, it is well to top them about seven or eight feet above the ground. This will force out the side branches. The only other pruning that is necessary is to cut off the limbs that are too low and any limbs that would cross and chafe against each other. Of course, after the tree gets older and is in bearing, the limbs should be pruned to open up the center, allowing the sun and air to go through the tree, the same as with other fruit trees. The amount of pruning required by the walnut, however, is very little compared with other deciduous fruits.

Distance of Planting.

As the walnut tree continues growing for many years and eventually makes a large spreading top, the trees should not be planted too close together. Most of the old groves in Southern California are planted entirely too close. In most instances, groves have produced more nuts after every other row has been taken out. Fifty to sixty feet looks a great distance with small trees, but as the years go by and the trees get their growth, this is none too much. With vigorous growing varieties on heavy soil, sixty feet apart is none too far, although fifty feet with less vigorous varieties and on lighter soil is all right. It is generally desirable in planting walnuts to inter-plant with something in order to receive some remuneration while the walnuts are coming into bearing. With the principal trees planted sixty feet apart, some variety of walnut that comes into bearing early and does not make a large growth may be inter-planted one way, thus making your trees sixty by thirty. Walnuts being deep rooting trees, do not interfere with each other at that distance until the tops of the trees get large enough to touch, and being sixty feet apart one way, gives plenty of air, so you can plant them this way for a number of years and receive a few crops of nuts until the trees are large enough to interfere with each other, when the inter-planting can be taken out. Peaches, grapes and berries are often used for inter-plantings. Beans also are an admirable crop to inter-plant with as they are a benefit to the soil and quite

remunerative. Sugar beets are sometimes used, the tops being left on the ground to be plowed under. This is an advantage. Alfalfa is good to inter-plant, but one must leave a strip to be plowed six or eight feet on each side of the trees, otherwise the alfalfa would rob the walnut trees of moisture. Of course, proper irrigation must be had under these conditions, especially with alfalfa.

Cultivation.

The soil should be plowed and cultivated to conserve the moisture, different characters of soil requiring different methods of cultivation. Fertilizing and the growing of cover crops, suitable to the soil and location, between the trees to be plowed under, is a benefit to the soil and a help in conserving the moisture.

The walnut tree, while not dependent on constant irrigation, like most deciduous trees which are more shallow rooted, is at the same time a large consumer of water and needs plenty of moisture for its successful development. While it may be grown without irrigation where there is a good rainfall and the moisture is covered, by proper cultivation, yet it is necessary in dry years to irrigate it, and while it grows quite well and produces good crops without irrigation, it grows better and produces better crops where it has proper irrigation and drainage. As I have said before, trees with sufficient moisture conditions are not so apt to be affected by frosts and die back, and naturally the nuts are better filled and the trees produce more fruit buds for another season. Then too, the hulls will crack open, letting the nuts fall more readily if an irrigation is given at the proper time, especially in the warm, dry climates. On the coast where they have fogs at this time, it is not necessary to irrigate.

Harvesting.

Under proper conditions, the hulls crack and the nuts fall on the ground. In case there are a few that do not drop, they are easily shaken off by using a long pole with a hook in it to shake the limbs, after which they are easily picked up and put in sacks. They are then hauled to the shed and washed to remove the dirt and hulls that may adhere to them. This is generally done in large drums that are made of wire netting which revolve slowly in a stream of water. Then they are placed on trays in the shade to dry. In moist localities, they are usually dried with artificial driers. Then, in Southern California, they are taken to the packing houses where they are graded and marketed. The California Walnut Growers Association of California handles at least seventy-five per cent of the output of this state. (Prolonged applause.)

[A series of twenty-nine very interesting lantern slides, illustrating in particular the character of growth and behavior of the various stocks, was presented, together with brief explanations of the merits of Royal, Paradox and California black stocks; the appearance of inter-planted orchards, young and old bearing trees, top-worked trees, blight affected trees, and types of nuts.]—*Secretary.*

THE OLIVE INDUSTRY OF THE PACIFIC COAST.

A Brief History.

B. B. MEEK, *California.*

It is interesting to note that it was during the stirring days immediately preceding the American Revolution that the olive, the historical emblem of peace, was first introduced into California by the early Spanish Fathers. Many of the olive trees planted by these sturdy missionaries in their mission gardens are still alive and producing bountiful crops. From these trees was propagated the most popular variety of pickling olive we have today—that known as the "Mission" variety. Surely to these Mission Fathers we owe a deep debt of gratitude.

But it was not until about a generation ago that there occurred an awakening as to the commercial possibilities of the olive culture, and then, in many parts of the State, stimulated by nurserymen and promoters, a large acreage was planted. However, little or no care was given to the selection of varieties, with the result that when these orchards reached a bearing age many of them were found to contain almost all known varieties of olives, pickling varieties, oil varieties and varieties good for neither purpose.

Again, soil and climatic conditions were not given due consideration. Many groves were planted in the coast regions, where the moist atmosphere encouraged scale, and where the yield was found to be irregular.

But oil was made and green olives were pickled and the commercial history of olive culture in California was begun. However, it is doubtful if the oil and the green pickled olive could ever have placed the olive industry on the horticultural map of California. It remained for the pickled ripe olive to revolutionize the industry, and to give to California a climatic corner on a new and delicious form of a food famed for centuries in the Old World for its nourishing and healing value.

Long years of tedious experimenting for a pickling process that would retain in the ripe olive its rich, oily flavor, preserve it indefinitely for Eastern shipment and not destroy its beautiful, deep purple color, were followed by long, trying years of discouraging and costly attempts to educate the people to its exceptional food value and to introduce the delicious product to the markets through the country; but so well done was the work of these pioneers in the building of this industry, and so meritorious their cause, that today the gospel of the California ripe olive is being spread by enthusiastic food experts, by physicians and by magazine writers throughout the entire civilized world.

And thus, while the introduction of the ripe olive began only a few years ago, the expansion of the market has been phenomenal.

The early promiscuous planting served the purpose of disclosing the best commercial varieties, and of determining the ideal soil and climatic conditions.

More recently a great improvement has been made in the cultural methods. It is now an established fact that the olive tree responds well and continuously to good cultivation, to regular irrigation, to consistent pruning, and to the application of suitable fertilizers in adequate quantities and in proper season; and that if it be cultivated negligently or not at all, it will not bear remunerative crops. It is known that the olive in a state of nature is not exacting in respect to soil; it establishes itself on the sides of mountains among clefts of rocks and amid loose stones scarcely less well than in the richest and best watered of garden soils. But when it comes to the cultivation of the olive for profit, conditions of climate, soil, irrigation, tillage and fertilization have to be carefully studied.

Soil.

It has been demonstrated that the olive will thrive best in a light, friable, well aerated, warm and well, but not necessarily deeply drained soil, rich in lime and potash contents and that it will yield scanty crops of fruit of poor quality in heavy, clayey or ill-drained soils. The olive requires less water than many other trees on account of its sparse foliage and strong root system. It will not, however, produce heavy yields in a soil lacking in moisture. Excepting in rare cases, monthly irrigation during the dry season is necessary for big fruit and a regular yield. This must not, however, be excessive and the water level must be kept low, otherwise the quality of the crop will be inferior, the yield irregular and the tree subject to disease. In many rich, loamy soils, a good tree growth can be obtained without irrigation, but inequalities and intermittency of yield to which the olive is subject under certain conditions, make the growing of the product unprofitable in these localities.

Climate.

In the coast regions of California, subject to the fog and cool sea breezes, the tree is generally diseased, the yield irregular and the fruit of poor quality. A dry, warm atmosphere is absolutely essential.

It is unwise to plant olive trees in any region where the temperature often falls below twenty degrees. The olive tree has survived a temperature of ten degrees in California, but the fruit may be injured by a fall in temperature to twenty-eight degrees. This tends to render unprofitable the growing of the olive in localities where the ripening season extends into the later winter months.

Thus, the climate restricts the district available for olive culture.

Varieties.

Of the numerous pickling varieties of olives, the Mission is generally considered the best all-around variety. The tree is of great longevity, the fruit is large and of uniform size, and contains a

large percentage of oil. The meat is firm, both before and after pickling, and hence does not bruise easily in handling. The Mission is a regular and prolific bearer under conditions adapted to it.

The Manzanillo is the variety next in popularity. Its tendency to soften as it approaches maturity is not in its favor; while its early ripening and heavy yield commend it.

The larger varieties, principally the Sevillano and the Ascalano, are favorably considered in some localities.

In soil, climate and varieties then, the experimental stage has been passed, and the olive industry occupies a peculiarly secure position.

Territory.

There are approximately 25,000 acres of olives (bearing and non-bearing) in California. This is only a small fraction of the acreage in peaches, prunes, apricots, apples or oranges, for instance, in California, and these products are grown in other states, and in other countries throughout the world, while California alone produces practically the entire world crop of pickled ripe olives; and on account of the combination of climatic and soil conditions, the future production of the pickled ripe olive commercially, will practically be confined to California.

There are thousands of acres of land in the foot-hill sections of Northern and Central California, where climatic and soil conditions are ideal for olive culture, that would not grow any other product profitably.

Special Features of the Industry.

Olive growing is especially attractive for many reasons. The olive is the only fruit-bearing tree whose producing qualities do not deteriorate with age. In fact, they appear to increase as far as we have any record. Many olive trees in California, which are known to have been planted more than one hundred years ago, are today producing a larger quantity of better olives than when they were younger. And in Europe and Asia the trees are still producing at the remarkable age of several hundred years.

Besides its wonderful longevity, the olive is remarkably free from pests, in fact, entirely so in portions of the Sacramento Valley.

With consistent care, it is a regular and prolific bearer.

Another important feature is that the entire crop can be utilized. Fruit too small for pickles, and frozen or otherwise damaged fruit, can be used for oil and other by-products.

As a delightfully healthful, nourishing food, the ripe olive cannot be surpassed, and the number of uses to which it can be successfully put is constantly increasing—as a substitute for indigestible mushrooms, for instance.

The development of the market has hardly been begun. To illustrate this: If New York City ate as many olives per capita as the little town of Oroville does, California, with its present acreage, could not supply this large center alone.

And, lastly, but of prime importance, an olive grove is a sure, consistent, everlasting revenue producer, and is indeed, as the old Spanish proverb has it, "A gold mine on top of the ground."

Care of Orchard.

The orchard should be plowed and cross-plowed early in the spring of each year, thereby permitting the warm air to quickly reach the roots of the trees; this induces an early growth of the trees. Any cover crop can be turned under at this time.

The spring application of commercial fertilizer should be broadcasted or drilled in just ahead of the plow.

After the ground has been plowed it should be thoroughly pulverized by the use of a harrow or other device.

Bearing trees should be irrigated once a month and young trees oftener. The irrigating season usually begins in May and lasts five months.

The most critical time in respect to the crop is the period during and immediately following the flowering time; care should be taken during this period that the ground is sufficiently moist.

Olive orchards require nothing exceptional in the way of cultivation. During the summer months the orchard should be kept free from weeds, which sap the soil of its moisture, and the surface of the ground should be kept well pulverized. Cultivation both ways should follow each irrigation as soon as the land is dry enough to permit of it. Cultivation should cease about September first.

In some sections of California it is a general practice to put on artificial fertilizer in two applications; one in the spring and one in the fall. The fall planting of a cover crop is also recommended. Manure can be applied to the best advantage after summer cultivation ceases.

Pruning is a very important factor. When set out in the orchard the nursery tree should be topped back to about eighteen inches from the ground, leaving four to six laterals near the top cut back to about four inches, and stripped of all leaves. Probably twice a year for the next three years, the young tree should be pruned—during this period the shape of the tree is determined and the pruning is done with this idea only in mind. To prevent the tree from getting too thick and to encourage the growth of fruit wood, light annual pruning thereafter is important.

Cost of Planting and Care per Acre.

Based on a unit of forty acres of average land (cleared).

FIRST YEAR COST.

Preparing ground	$15.00	
Trees, 55 per acre, at fifty cents	27.50	
Planting trees	7.50	
Water	5.00	
Irrigating, cultivating, pruning	15.00	
Superintendence	5.00	
Total		$75.00

SECOND YEAR.

Care	$15.00	
Water	5.00	
Superintendence	5.00	
Total		$25.00

THIRD YEAR.

Care	$15.00	
Water	5.00	
Superintendence	5.00	
Total		$25.00

FOURTH YEAR.

Care	$20.00	
Water	5.00	
Superintendence	5.00	
Total		$30.00
Total		$155.00

Probable Yield.

A yield of five pounds per tree can be expected the fourth year, and from ten to fifteen pounds per tree the fifth year, increasing annually thereafter. Sixty to seventy pounds per tree can be expected the tenth year.

In respect to yield, the following is interesting data from Butte County groves:

Mr. Onyett's grove of 155 trees yielded: Seventh year (1907), 3½ tons; eighth year (1908), 4 tons; ninth year (1909), 4½ tons; tenth year (1910) 5½ tons; eleventh year (1911), 5¾ tons; twelfth year (1912), 6 tons; thirteenth year (1913), 4½ tons; fourteenth year (1914), 7 tons.

Mr. Lang's grove of 180 trees was planted in May, 1904. It shows a record of nearly twenty pounds per tree the fourth year after planting, forty pounds the fifth, thirty pounds the sixth, sixty-five pounds the seventh, eight pounds the eighth, thirty pounds the ninth, and one hundred and twenty pounds per tree the tenth year.

Mr. Fogg on forty acres had a yield of one hundred and seventy tons in 1911, twenty-five tons in 1912, seventy tons in 1913, one hundred and sixty tons in 1914. Mr. Reardon on his four and a half acres grew fourteen tons in 1911, eight and a half tons in 1912, sixteen and a half tons in 1913, and seventeen and a half tons in 1914.

The twenty acres of Old Orchard on the Meek and Gray Ranch bore a crop of thirty tons in 1911, forty-five tons in 1912, fifty tons in 1913, and one hundred and thirteen tons (5.6 tons per acre) in 1914.

There are records of many twenty-year-old trees and older in Butte County yielding from 250 to 650 pounds of olives per tree. Such tremendous yields show the unusual possibilities for individual effort in increasing the yield.

Harvesting and Handling Fruit.

Harvesting of the pickling varieties usually begins early in October and lasts about two months. The olive makes the best pickle if pickled when it is red to purple in color. Olives for oil purposes are permitted to remain on the trees until black in color and are harvested during the later winter months.

Pickling olives are handled very carefully to prevent bruising. They are hand-picked and if carried any great distance to the packing house, are transported in huge vats of water or in the pickling solution of lye.

At the packing house they are graded for size—the larger sizes are placed in the pickling vats and the small sizes sent to the oil room. It takes three to four weeks for the processing of a pickled olive. The essential in turning out a first-class product is care. Mrs. Ehmann, frequently spoken of as the Mother of the Pickled Ripe Olive has achieved her remarkable success principally by the exercise of this homely virtue.

By-Products.

The largest by-product at present is the oil made for table use from the oil varieties and from the undersized pickling varieties. Next in importance is the oil extracted from the pulp by means of

gasoline—this oil is used in the manufacture of soaps. The refuse from the plant is used as a fertilizer.

The most promising by-product is olive paste. This is still in the experimental stage but is meeting with great favor.

SUMMARY.

However, if the olive industry in California is to gain the important place it logically deserves:

First, the state must do for the olive what it has done for other fruits—establish an experimental station, and experiment in pruning, fertilization, cross-pollination, etc., and for larger sized and earlier ripening fruit.

Second, oil must be considered as a by-product only.

Third, the growers must give their orchards better and more consistent care, thereby increasing the proportion of good quality pickling fruit; and the prospective growers must plant proven varieties in proven districts, according to proven methods.

Fourth, the market now so undeveloped must be enlarged to keep pace with the increase of production, by standardizing the pack, by a co-operative and consistent campaign of advertising, and by a systematic campaign of education as to the diversified uses of the olive and its by-products.

Fifth, for the past three years, perhaps, we have been trying to strangle the goose that lays the golden eggs by cramming tasteless green olives down its throat. This year's carry-over stock is largely the result of this short-sighted and unfortunate policy. And, therefore, above all the growers and packers must combine to the end that ripe olives, and ripe olives only, are pickled, and the pickling of green olives sold under a ripe olive label forever stopped.

Upon the ripe olive, how it is grown, how cured, and how marketed, depends the future of the olive industry in California; and the olive industry can become one of the biggest and most important fruit industries in the state. (Prolonged applause.)

DISCUSSION.

THE PRESIDENT: I want to commend you on the completeness of the paper, Mr. Meek. I think anyone who wanted to undertake the cultivation of the olive could not do better than secure a copy of your paper which would give him all the information he needed.

MR. HUTT: What is the comparison in fruit value?

MR. MEEK: The green olive is six to ten per cent of oil, and the ripe olive gives twenty-five to forty per cent of oil. After the green stage, the olive turns a light yellow, and the oil content develops very quickly during the last ten days of its ripening.

MR. HUTT: The principal food value coming through ripening, as I understand, is the additional oil derived.

MR. MEEK: Yes.

MR. POMEROY: How does the food value of the olive compare with the Avocada?

MR. MEEK: I do not know. The Avocada is very rich, but I do not know exactly the percentages.

MR. POMEROY: What do the growers consider a satisfactory price for the olive?

MR. MEEK: There is no limit. We want all we can get. We consider that our small sizes this year will not bring as much as before. We expect a lower price, but if it drops under one hundred dollars, then we will feel badly.

MR. CONDON: The Avocada fat contains twenty-nine and one-tenth per cent oil, ranging upward to thirty-three to thirty-five per cent. The olive runs higher than that in some varieties.

THE PRESIDENT: Would you consider them nearly equal?

MR. CONDON: I would, yes.

DR. STEWART: Does the Olive Association recommend that they pickle only ripened olives?

MR. MEEK: I am quite sure they recognize the necessity of stopping the pickling of any but ripe olives. The green olive has been pickled to sell as a ripe olive, and we are not able to compete with Southern Europe on the pickling of the green olive; so, to make money, we must confine ourselves to the ripe olive. In Southern Europe they have not been able to produce a pickling ripe olive. They soften too much, and they are obliged to pickle them while green.

MR. CONDON: Has the speaker noticed the different variations in Mission olives. There is some evidence that the first olives raised in California were raised from seed.

MR. MEEK: There is a difference in the fruit and in the character of the tree; there are many similarities between the different kinds of Missions. The leaves are longer in some cases, and the fruit is more nearly spherical, something like Manzanillo in many cases.

I think the same care will bring about the same general products. That is open to question. I have noticed that trees of Mission olives that were considered to bear small fruit always, have come out wonderfully under a proper sort of care.

MR. DUMAS: What does it cost to pick olives?

MR. MEEK: Fifteen to twenty dollars per ton: the average is seventeen and a half; that is for the pickling varieties. The oil varieties average ten dollars per ton. (Extended applause.)

THE STATUS OF THE ALMOND INDUSTRY OF THE PACIFIC COAST.

GEORGE W. PIERCE, *California.*

As far back as authentic history takes us we read of the almond. It is frequently referred to in Scripture and has played no small part in ministering to the needs and pleasures of mankind. Its food value is important and its bloom, following closely on the heels of winter, has probably appealed to the esthetic side of man more strongly than has the bloom of any other orchard tree.

The almond is supposed to be a native of Asia, but it has been under cultivation so long, over an area so extensive in Europe, Asia and Africa, the cradle of mankind, that its origin is a matter of conjecture. Certain it is, however, that around the shores of the Mediterranean Sea, where a mild and temperate climate prevails, the almond both in its wild and cultivated states has flourished for many centuries. It is referred to in the Bible we are told under the name "shaked," meaning to hasten. One might easily imagine that its extreme haste in blossoming before winter is wholly over may have suggested its name. The famous rod of Aaron, mentioned in Numbers, was taken from an almond tree. So, too, the rod cut by Moses, that afterwards became a serpent when cast down, was an almond branch. There are also many Biblical references to the beautiful pink bloom of the almond. It has been long a favorite of the Jewish people, being used extensively by them in the decoration of their synagogues.

Many sections of California have established beyond question their ability to produce almonds in commercial quantities. Experiments have made known the necessary requirements of soil and climate. That certain freedom from frosts, so essential during the early growing period has been found. The general outlines of the area possessing these requirements are definitely known. The pests that infest the orchards may be said to be under a reasonable degree of control. As to varieties, a wide range of these is possible. With these facts established, there seems to exist no physical reason why California should not materially increase her output of almonds.

From reliable data we learn that the annual almond crop of California, for the last ten years, has averaged about three thousand tons. That the amount produced in the near future will be much greater is well known. During the planting seasons of the last five years, a large acreage has been set to almonds. In fact, so great has been the demand for nursery stock that but little, if any, of the almond material has remained in the hands of the nurseryman at the close of the several seasons.

Accepting then, as an established fact, the ability of California to produce almonds, the future of the industry in the state depends upon the ability of the orchardist to market the product at a sufficiently remunerative price. If the crop cannot be sold at a reasonable profit its decline is certain. There is but little satisfaction save to "the gentleman farmer," in knowing that one can produce any given crop unless he is assured that he can dispose of it at a price that will leave him a fair profit.

There are two great varieties of almonds, viz: Those having sweet meats and those having bitter meats. The bitter almond is not grown commercially, in extensive quantities outside of the Mediterranean regions. Those almonds are chiefly used in the manufacture of Prussic acid, bitter almond oil and in perfumery. In California the bitter almond output is chiefly consumed by the nurseryman. It is claimed that nursery stock on bitter almond root is of superior quality.

The almond of commerce having sweet meats is divided into hard shelled, soft shelled and paper shelled varieties. These are again sub-divided many times to meet the requirements of the trade and to gratify the fancy of supposed originators of varieties. Many of these are well known and are standard. Others have names known only locally.

The leading varieties grown in California are the Nonpareil, I. X. L., Ne Plus Ultra, Peerless, Drake (Seedling), Texas (Prolific) and Languedoc.

The almond is supposed to have found its way into California from Europe about 1853. It came to us after long centuries of existence with many of the imperfections that characterized its early career. To a Californian, Mr. A. T. Hatch, of Suisun, Solano County, is given the credit of first having undertaken the improvement of the almond along scientific lines. So great was the improvement, and so marked the results obtained by Mr. Hatch, that the leading commercial varieties of almonds grown in California today are designated as the Hatch varieties. Chief among these are the Nonpareil, the I. X. L., and the Ne Plus Ultra. The first two are the leading and the highest priced almonds produced in California at this time.

While Mr. Hatch greatly improved the quality of the almond, the varieties originated by him, when planted in the orchard in solid blocks, of a single variety, rarely give a satisfactory yield. The quality of the product was improved at the expense of the output. To obtain cross-polination and increased yield it has been found to be good practice to alternate the Hatch varieties with some hardier almond. Years ago hard shelled seedling almonds were used for this purpose, but now the Texas (Prolific), Drake (Seedling) or other soft shelled varieties are generally grown because of their higher market value. Usually two rows of the soft shelled varieties alternate with four rows of the Hatch varieties. The rows should run, as far as may be, at right angles to the line of the prevailing winds at the time of blossoming.

The almond is a long-lived and very hardy tree. It is moderately free from insect pests. Its early blossoming period, which, in California, begins in the latter part of February, makes it very susceptible to the killing effects of late frosts. So it is that many sections that can successfully grow an almond tree, so far as the tree only is concerned, may not be able to ever produce a crop or ever mature a single almond.

The almond is a deep-rooted tree and seeks water at considerable depths. It will not flourish where the water plane is near the surface. These well known requirements of the almond limit, with unerring certainty, the area adapted to its culture.

California is the only state in the Union that produces almonds in commercial quantities. About 35,000 acres are here devoted to almond culture. Less than one-half of this is in full bearing at this time. The trees are usually twenty-five feet apart in the orchard.

From 700 to 1,000 pounds per acre is an average crop of the Hatch or paper shelled varieties, with exceptional yields of double that amount. The soft shelled varieties are heavier bearers, one ton per acre being frequently realized.

The market for California almonds, up to the present time, has been confined to the demand from the United States. The annual consumption of almonds in America amounts to about 5,000 tons of shelled goods and 6,000 tons in the shell. Or, expressing the shelled in terms of the unshelled, we find the consumption to be annually about 16,000 tons.

There are two sources of supply to meet this demand for almonds. These are California and Southern Europe. The two are in direct competition. There is but one market and each is seeking it. It goes without saying that the section that can acceptably supply that market at the lowest cost to the consumer, will ultimately get the trade. Heretofore the imported product has enjoyed the bulk of the trade in shelled almonds. There is a market the year round from the baker and the confectioner for the shelled goods. For the nuts in the shell, there is but a limited market, limited as to the amount consumed and limited as to the time of selling. Almonds in the shell find their readiest market at and immediately before the holidays. Many of the wholesale dealers in almonds in the shell are practically out of the market by the first of February.

Eighty per cent of the almonds imported are shelled, while but five per cent of the California crop is shelled. It will thus be seen, that, under existing conditions, the California almond industry is sadly handicapped. The California Almonds Growers' Exchange, a co-operative organization, of nine hundred members, representing about eighty per cent of the California output, has taken up the matter of shelling almonds and will, this season, enter the markets of America and endeavor to secure what we deem a fair share of our home trade. The importers have long enjoyed this trade and today hold the great market centers. The contest between the home and the imported products will be keen. In both Europe and America the acreage devoted to almond raising is being increased. The imports from Europe are increasing. In 1900, 5,140,232 pounds were imported to America. In 1914, 4,753,525 pounds of unshelled, and 10,114,901 pounds of shelled goods came here. In 1914 the importations were ten thousand tons greater than they were in 1900.

As to quality, California can meet the demands of the market and duplicate anything her competitors may offer. The question as to whether or not the Pacific Coast can supply the United States with almonds is not a horticultural one. It is a commercial proposition.

In the final statement of the cost of production of almonds will be found the following items: Taxes, interest on investment, supplies, labor and marketing. Chief of these is labor. When one compares the wages paid in California with those paid in Spain, France and Italy, he finds that the European grower has a most decided ad-

vantage. The labor put into a pound of almonds in Spain is less than one-third as much as the California producer is compelled to put into a pound of his product. In the matter of interest and supplies, the Spanish grower again has the lesser expense.

When one considers transportation rates, he finds that it costs the American grower more to deliver his almonds to the home market than it does the Spanish grower to ship across the ocean to the same market. The overland freight rate from the Pacific Coast to the chief eastern points is $1.40 per cwt. By steamer from San Francisco to New York, via Panama it is 75 cents per cwt. From Malaga, Spain, to New York, it is 27 cents per cwt.

The Federal Government, long ago recognized the disadvantages under which the American almond grower labors. For a considerable time a handicap was placed on the European grower in form of an import duty, equal to six cents per pound on the shelled and four cents per pound on the unshelled goods. This, it was thought, would equalize the cost of production and delivery to the common American market. It meant, in the judgment of those responsible for the law, that it costs about five cents a pound more to produce almonds in America than it does in Southern Europe. Recent legislation has reduced this differential to a duty of four cents on the shelled goods and three cents on the almond in the shell. The wisdom of this change is yet to be demonstrated. The American grower, however, realizes that he is pulling against the tide, while his European competitor is simply drifting. He knows that to insure a profitable sale for a greatly increased output he must extend the markets and induce a more general consumption of almonds. He sees foreigners appropriating our markets and anticipating the needs of our people. He sees cause for alarm and is organizing his forces. He must popularize his products, advertise their desirability and cheapen their production.

About 1898 local associations of growers began to be formed. These were a benefit from an educational point at least, for they emphasized the need of co-operation. They generally combined for selling purposes, the greater part of the almonds produced in the immediate vicinity of the location of the association. Their sphere, however, had narrow limitations. They had no selling agencies, depending upon what seemed to be competition among the commission houses and speculators. They were not in a position to even obtain data on which to place a fair valuation of their crops. They were surely and safely in the hands of the enemy.

Previous to the year 1910, little had been done by California almond growers either to develop or protect the market for almonds. Each individual isolated grower was a complete selling agency within himself. He was supposed to be a walking encyclopedia of almond lore and commercial shrewdness. He was eagerly sought for by the agents of the commission houses and was legitimate game for the speculator. Under these conditions ridiculously low prices ruled for the grower, while the consumer was taxed to

the limit. Actual entries in the books of growers of this time show that Nonpareil almonds were sold at prices ranging from seven to ten cents per pound. The buyer interested only in the goods he had acquired at a low figure, had no thought for the future of the almond industry. He took all the profit the traffic would bear. The markets were demoralized and the business languished. The demand for almonds was confined to the few. The speculator usually bought early and on an eminently safe margin. He imposed on both producer and consumer and made of the almond a luxury supreme.

It is only within the last five years that the California almond situation had been studied along commercial lines in the interest of the growers. Beginning in 1910 with eleven local associations and 230 members, a start was made by the California Almond Growers' Exchange. It was purely a pioneer effort based on a determination to secure to the growers the profits of the business. At once, those who had reaped rich harvests at the expense of the growers, saw in this movement, the killing of the goose that was laying the golden egg.

Through various vicissitudes, organization has progressed, until today there are eighteen associations and nearly nine hundred members. These are located, in the almond growing sections of the state from Tehama on the north, to San Bernardino on the south. In this co-operative work, the year 1915 is no laggard. One new association has been formed and is affiliating with the Exchange. One old, strong, well equipped independent association, representing ten or more carloads of almond, annually, has joined the Almond Exchange. A careful investigation convinced these people that they were on the wrong track, and that if they were to accomplish anything in the upbuilding of the almond industry, they must train with those who were doing that certain line of work. Tired of competition they turned to co-operation.

During the month of June of the present year, 300 tons of almonds were added to the output of the Exchange for the season of 1915. The Exchange has never lost an association by withdrawal or otherwise. The Associations have lost but few members. About eighty per cent of the California crop is now handled by the Exchange. The remaining twenty per cent is sold independently, and generally, for less money than is realized by Exchange members for the same class of almonds. These sales furnish ammunition for the brokers who are doing their utmost to discredit and discourage co-operation among the growers. The independent seller unwittingly pays a commission for his own undoing. That the speculator makes a profit goes without saying. That profit belonged to the grower. It is his money, and he would have gotten it had he been a member of the Exchange. Were it not for the almonds sold by non-members, the speculators and demoralizers of the markets would have nothing on which to operate and would be forced out of the field. It is no less to the interest of the consumer than it is

to the producer to eliminate the speculator. The time has come when the producer, through organization, must protect the consumer. The history of speculative marketing is full of instances where crops have been purchased at low figures, cornered and sold to the consumer at exorbitant prices. The principle involved in these transactions is recognized and utilized to the detriment of legitimate almond production.

The Almond Growers' Exchange has had a healthy growth from its inception. It is placing the almond business of California on as firm a foundation as existing economic conditions will permit. It has done much to eliminate speculation and to steady prices. It markets the almonds of its members at cost. Its equipment for handling the business, while efficient is neither elaborate nor expensive. The aim in view at all times, is to return to the grower every dollar possible from every sale made. It adopted and maintains a high business standard. Starting without capital and without credit, it has advanced financially, until it is now in a position to handle the entire output of the State with ease. It advances to growers fifty per cent of the value of the almonds immediately upon receiving warehouse receipts, properly endorsed showing quality of the nuts. It has already begun that development which will ultimately enable the California grower to make a strong fight for the almond trade of America. This growers' organization is but an infant now. When it reaches maturity it will be a giant capable of commanding attention and respect. Already it has developed a satisfactory selling scheme. It has reliable agents in all the large Eastern markets. It has gone into territory and developed trade in sections hitherto neglected. It has taken care of all the old markets and has developed many new ones. By its methods of distribution it encourages increased consumption. It has studied the needs of various sections and has learned how best to place the several varieties at its disposal.

Officials of the Exchange have studied foreign methods and conditions. With all available data they have mapped out a campaign for the contest in what we believe to be our share of the almond trade of America. Noting that eighty per cent of the imported product is shelled while but five per cent of the California crop is shelled, and seeing a better market for these goods, the Exchange decided to make that market available to the California grower. It took up this work a year ago, and now has, at 19th and C streets in Sacramento, a large fireproof building devoted exclusively to almond shelling. The plant is equipped with modern machinery. It is now being enlarged to bring its output up to one car of shelled almonds daily. This will enable the Exchange to compete on a commercial scale with the imported product. It will also tend to relieve at times, congestion in certain varieties. The cost of the shelling plant has been about $14,000, and best of all, it is paid for.

This plant is the property of the loyal members of the several Associations. It is one of their investments made to insure the

permanency of the almond business in California. It represents money saved through co-operation. It equips to make and save more money. It was built out of the surplus from several funds remaining, after the growers had been returned annually, the highest market price for their almonds. No special assessment was ever levied for the building fund. No grower was ever approached for a subscription. As they would say on the street, "It is all velvet." The construction of the building and the financing of the undertaking was all accomplished so quietly and so easily that but few of the actual contributors knew that advanced co-operative methods were erecting here in California, a monument to their loyalty and business forethought. Comparatively few, even today realize that they have been important factors in the solution of one of the knottiest problems ever presented to the producing classes. They are making history of a lasting sort. They are overcoming the producers' prejudice against organized effort. Yes, more, they are making an earnest appeal to the American people to give fair consideration to American products.

The future of the almond in California depends largely upon the degree of co-operation practiced among the growers. Co-operation in selling, is a modern idea, and in this line the grower needs education. The situation is full of hope. That eighty per cent of the growers of the State should have co-operated and built up a successful selling agency within and during the first five years of the experiment, is cause for congratulation. The remaining twenty per cent of the growers have been benefitted, through the existence and influence of the Exchange, from fifty to one hundred dollars per ton annually on their output. This is their dividend on the business ability displayed by their fellow growers. The outside producer needs the Exchange much more than the Exchange needs him. A campaign of education is now on, and these two forces will ultimately get together for their mutual benefit.

California alone, can supply our nation's demand for almonds. Whether or not she ever becomes a dominating factor in that supply, depends largely upon the support her growers give to co-operative marketing and the attitude of the Federal Government toward the encouragement of home industries. (Prolonged applause.)

THE STATUS OF THE PEACH INDUSTRY IN CALIFORNIA.

LEONARD COATES, *California.*

In considering the peach industry in California it may be well to devote a few minutes to a pomological study of this most popular fruit.

Perhaps no species bearing fruit of such economic and commercial importance as *Prunus persica* has so many widly divergent types or varieties. Some of them differ, in fact, so greatly, that they become very near to being candidates for distinct species. The

specific name, *Persica*, is misleading, as it assumes Persia to be the land of its birth, while it is more likely that the peach is indigenous to China and Northern India. The peach may be said to be adaptive, if not ubiquitous. Early in the Nineteenth Century it was found growing wild in this country as far west as Arkansas, and if only "Johnny Apple-seed" had had a brother who believed in this fruit as faithfully as he did in the apple, more new and acclimated peaches would doubtless have originated in many states.

There are what may be called distinct "types" of the peach, differing very much in their fruit, with considerable variation in leaf, and a very marked difference in their climatic requirements or preferences. In the north and well into the western states the "Persian Group" thrives, comprising such varieties as Crawford and Salway; to the southwest a class of peaches known as "Indian" is grown successfully, probably so named because found while still the Indians were in the ascendancy, and thought to have been brought to this country from Spain. Among them are Cabler, Columbia and Lulu. We have also the "North China" group, to which belongs Elberta, Chinese Cling, and Thurber, and the "Peento" type, also from China, which approaches the semi-tropic in some of its characteristics, such as a love of warmth and moisture, and a large, luxuriant foliage, which remains upon the trees long after other varieties are bare.

While these groups or types of peach have fairly distinct climatic boundary lines, from Canada to Florida, and west to Missouri and Texas, all will thrive in some portions of California, and some of all of these groups were brought here either as seed or budded trees, by our pioneer settlers.

The Sacramento-San Joaquin Valley, or Great Central Plain, is the home of the peach, in its broadest and most comprehensive sense, showing that it thrives best with abundant summer heat and sunshine, a dry atmosphere, plenty of root moisture, and yet with very cool nights. These conditions are anomalous, and just as puzzling to the horticulturist today, as to the early pioneer nurserymen and fruit growers, who would have thought it madness to plant trees anywhere except where the water table did not lower more than eight or ten feet during the rainless summers. An instance may be cited in the old Soscol Rancho a few miles south of Napa, and forty-five miles north of San Francisco, where extensive orchards of almost all fruits were planted sixty-five years ago. This tract was largely in or adjacent to the marsh or tule lands, as well as within the influence of the fog drifting in from the Bay. Old seedling peach orchards could occasionally be found in Napa and Sonoma counties, bearing fruit of every conceivable quality, shape and color, all of which formed a most interesting study to the pomologist, but, in those days there were but few who gave much attention to fruits, little dreaming that thousands of trees would, in a few years, be carried across the mountains to distant markets.

During the eighties it began to be realized that a very large market—the "world's market"—was open to receive our fruits, but for many years the French prune was the fruit most largely planted, mainly in Santa Clara Valley, because the care and handling of the dried product appealed most strongly to those who were hitherto producers of wheat. The fruit grower, however, is a born gambler, and, in California at any rate, a creature of impulse. So he soon launched into all sorts of fruit-planting speculations, the market being as unprepared to receive the product as the railroad was to transport it; do not the chronicles of the old State Horticultural Society and of the State Board of Horticulture tell the story?

As the market opened for our canned peaches, the demand increased faster than the supply, with the natural result of very high prices, for several seasons, even running as high as four cents a pound, and the obvious stimulus to planting. Only culls and inferior fruit were dried.

These conditions continued, with some fluctuation, for several years, but the inevitable happened. In the interior central valley, peach orchards were being planted by the thousands of acres, and to a proportionate extent in the smaller valleys. Prices steadily declined, but still, in the San Joaquin Valley five to ten tons to the acre at four years old, even at $20 per ton "looked good" to the farmer—and the planting continued. Shipping fresh peaches to markets east of the mountains is not, and cannot ever be a reliable and continuously profitable enterprise. For this purpose, the fruit must be picked too green, which, however, does not apply with equal force to any other of the large fruits. When it ripens, it has not the sweetness and flavor of the peach picked from the tree nearly ripe. After the early shipments, most of our California fresh peaches come into competition with riper fruit grown nearer home. The development and betterment of the peach industry in California must be mainly with the local fresh fruit markets, and with the cured and otherwise preserved product. By this time, during the early years of this twentieth century, stocks of dried peaches were accumulating, there being an annual heavy "holdover" of both the canned and dried product. In 1912 the output of dried peaches alone reached the enormous total of 30,000 tons, and, at the present time the highest obtainable price would not pay the cost of production, and there are many thousands of tons of fine peaches now on the trees in excess of the canners' requirements. The San Francisco and other local markets, consume a large amount of fresh peaches, but it is but a drop in the bucket compared with the supply. The canned fruit industry shows an output of over 2,000,000 cases of peaches, mostly clingstones.

I have thus very briefly sketched the history of the peach up to date, there not being any good prospect of the 1915 crop bringing in much profit to the grower, as a whole, and it becomes imperative to suggest wherein mistakes have been made, and how conditions may be permanently improved.

As the keynote to the solution of this problem, I would say that

Quality Has Been Sacrificed to Quantity.

From the earliest agricultural days of California, the phrase, "feast or famine" has been axiomatic. The spirit of gambling was rife in 1849 and it is not dead in 1915. Wheat farmers made a fortune because of one year's ample rainfall, and the next year they did not get enough to pay for the seed. Gambling on the weather, before the days of irrigation, was as exciting as prospecting for gold in a new field. If a farmer made a lot of money out of a potato crop, all of his neighbors planted tubers, each thinking he was a little shrewder than the other. Later on, it was so with French prunes, with Muir peaches, with Elbertas, and so on all along the line with large fruits or berries, potatoes or onions. The nurserymen, of course, had to follow suit, but, propagating of necessity in advance, and on a rising market, the result was that when prunes were offered the grower wanted pears, and when he raised peaches in largest quantity, the demand was for apricots. And we find, in consequence, great blocks, thousands of acres, of one variety all maturing at once, a slump threatening, and growers grubbing out whole orchards, while others will graft over orchards to some other variety which seems to be likely to become popular.

As a business investment, and because one "should buy when the market is low" nothing would promise better than good peach orchard property, contradictory as it may seem. All may admit the soundness of the proposition, but few have the grit to act on it.

California canned peaches are unsurpassed, if not unequalled. The leading varieties used are Elberta and Lovell, for freestones, and *(Tuscan)* Tuskena and Phillips for clings. White-fleshed peaches do not seem to be in demand, though the quality of Heath Cling, and some of its seedlings, and Illinois for a white freestone, are very far ahead of any of the yellow-fleshed varieties.

But the price of canned fruits is too high. Canners have had to pay as high as four cents a pound for peaches, and now, when they can get all they want at one cent, there is little if any difference in the price the consumer has to stand. Furthermore, the canner should acquaint himself with other varieties, and instruct his travelling men to introduce them to their customers.

The dried peach market has slumped badly for several reasons, but mainly because of poor quality. It has been, and is still, very largely the practise to dry the culls, and I read in our leading horticultural journal of July 24th how a grower, in boasting of his pack, and the money he makes refers incidentally to the "culls" being dried. This is all wrong.

The manager of one of the largest fruit houses in California writes me that the dried peach output has reached anywhere from 35,000 to 45,000 tons; and he says, "when we come to figure each year on the total production of the peach crop of the state, and the tonnage of peaches which have been shipped, it is rather startling to realize that the majority of the crop had been cleaned up, and the

carry-over is not tremendous. I rather take it that after the peach once got started down the road, that they have become underdogged, and everyone has given it a kick; even the producer himself has lost faith, and when there is not faith or confidence in business or in a commodity that commodity has not much of a future until the confidence is restored."

Peaches like the Muir, Lovell, Salway, all have very fuzzy and thick skins; if the fruit is large and carefully handled, the dried product is nothing to boast of, either to the eye, or to the sense of smell; but when small culls are used, no amount of stewing can render palatable a thick, fuzzy, leathery skin, with a minimum of peach flavor. Fruit buyers in England have told me that they do not want our dried peaches because they "stink" and the flavor is far removed from what in Europe generally is considered the standard of quality, found in green and white-fleshed varieties.

Instead of 40,000 tons of dried peaches, good, bad and indifferent, if we put on the market 10,000 tons of first-class fruit, and organize a campaign of advertising the same, the demand would grow, and prices would be much better. The "fuzz" should always be rubbed off, or peaches should be peeled, if we are to create a demand for the cured product. If we never eat the skin of a fresh peach, why should we be expected to eat it when it has been dried?

The trade, however, has yet to explain why it is that dried peaches are now selling at from ten cents to sixteen cents a pound in the East, while the grower in California receives but two and a half or three cents; or why it is that fresh peaches retailing at three for ten cents bring the grower forty cents a box?

As refuting the statements made that the European War will decrease our export trade in fruits, it is a significant fact that while in March, 1914, our export to Europe of dried fruits amounted to $400,000, in March, 1915, these commodities exceeded $1,000,000 in value.

The market for fresh peaches is still in a more chaotic state, and mainly, again, because of over-stock of poor goods.

A well-known commission firm in San Francisco, Wetmore Bros., writes me that Late Crawfords from Oregon are selling at seventy-five cents for a 23-pound box, while the market is quoted at thirty and forty cents. Also another pack, in Porter carriers, similar to egg crates, is selling at sixty to seventy-five cents. Answering a question, he writes me that the only way to improve the market is to eliminate the trash, but he could not suggest how it could be done. If some of the commission men were eliminated, and many of the dealers, who charge exorbitant prices and who know nothing whatever of varieties of fruit, it would tend to help the situation. It would seem that the only way to stop some growers from shipping poor fruit to market is for the commission men to refuse to receive it.

Lack of distribution is another and important factor combining to injure the peach industry. Let any one visit the well-known

hotels and holiday resorts or any of the Coast towns, and the peach is a rarity. The large markets are catered to, while the smaller markets all over the state are hungry for good fruit. Even in the country, amongst the orchards, the tourist or visitor is unable to purchase the fruits which California raises in such abundance.

The peach is a popular fruit; it is synonymous with all that is luscious in fruits. The list of varieties is so great that I can, in our own orchard, pick a ripe peach any day from June to November, and yet, on the farms of California, there may be a few peach trees, generally of one variety, such as an Early Crawford or a Muir, but none other. We need more real horticulturists, lovers of fruit and flowers, who, by their influence and example, will teach their neighbors how they may live where nature does so much for them, and, to that end, the very presence with us in California of the American Pomological Society, with all its traditions, ambitions, and successes, must be an abiding help and inspiration to all.

SOME SUB-TROPICAL FRUITS FOR COMMERCIAL AND DOMESTIC USES.

D. W. COOLIDGE, *California.*

I think we will all agree that, up to this time, none or any of the tropical or sub-tropical fruits have equalled in importance our temperate zone fruits; however, it is my firm belief and honest conviction that another quarter of a century will witness the introduction to all of the markets of the Western Hemisphere and, possibly, Europe, of a real food fruit that will rival in commercial importance any fruit grown today.

THE AVOCADO.

In calling your attention to the Avocado, *Ahuacate,* or *Alligator* Pear, I am willing to go on record as predicting that, in Southern California, the time is coming when the acreage of this fruit will equal that of the citrus product. And why should it not? The orange at best is but a confection that is eaten, not as a real food, but because it pleases the palate. The Avocado is today being sold in the Los Angeles markets at from seventy-five cents to a dollar and twenty-five cents each. Now, the average wealthy man, for it is only he who will pay such prices, I am sure would not buy Avocados simply as a food. It is my contention that no product of tree or vine takes a greater hold on the palate than this fruit and couple it with the fact that it has been proven by careful analyses to be a real food, nourishing and healthful, it seems to me that beyond cavil this fruit is destined to be one of our staple food products when it is raised in sufficient quantities that it can be sold at a price within the reach of the masses. Competent authorities state that the Avocado is of equal value, as a food, to eggs. It has been

proven that the Avocado can be successfully grown in California and thus far the local markets are confronted with a greater demand than supply.

If I were to make the statement—which can be verified—that, from a single tree in the last six years, more than $2,000 worth of fruit has been sold, you would set me down as a typical California liar.

About ten years ago, when I first became interested in the Avocado, there were but three or four producing trees that supplied fruit for our local markets. At that time they sold for thirty-five to fifty cents each. Last year to my certain knowledge there were more than one hundred trees contributing to the local supply and the fruits brought the highest prices known.

I maintain that when fruits weighing from three-fourths of a pound can be retailed at ten cents each there will be an unlimited demand and at such a price the grower will get returns beyond any tree product known today.

Feijoa Sellowiana.

A real fruity fruit that was brought to California about 1900 is *Feijoa sellowiana*. I have always believed that this fruit possess so much merit that it will ultimately receive consideration at the hands of commercial growers. Up to this time we have nothing but seedlings which are erratic in their bearing habits and in the size of their fruit. Individual bushes—for the *Feijoa* is not a tree, but a large shrub—are producing regularly heavy crops of fruits averaging almost as large as hens' eggs. From these we are attempting to propagate, but the plant is a very difficult one to work, budding or grafting not being successful. However, we have had some success in propagation by cuttings.

For the benefit of those of you who are not familiar with the *Feijoa*, permit me to say that it is a fruit the flavor of which has been described as a mingling of pineapple, banana and raspberry. The seeds are not much larger than those of the fig and the fruit can be used for every purpose that apple is used. It is delicious when fresh, or when stewed, or when made into pies, jellies, or jams.

The plant is very hardy, having withstood a temperature of four degrees above zero without injury. The fruit can be kept three or four weeks after ripening and can be shipped to any of our markets. I am sure that it will become one of our commercial fruits.

Loquat.

A really good fruit that has not yet received the attention it merits is the loquat. Up to about fifteen years ago only inferior seedlings were planted, but by selection a strain of greatly improved fruits has been secured. Mr. C. P. Taft, of Orange, has probably done more with the fruit than any local person, and his "Pine-

apple," "Advance," and others are marked improvements over those planted earlier in the history of this fruit. There is still room for improvement, not so much in the flavor of the fruit, perhaps, as in the elimination of the too large a proportion of seeds.

Japanese Persimmon *(Diospyros kaki).*

A growing demand is found for some of the finer and larger Japanese and Chinese Persimmons. Hachiya, Hyakume, Tanenashi and other varieties grow very large and are really superb in quality. Growers of this fruit find a ready market wholesale at six to eight cents per pound.

Guava *(Psidium cattleyanum and Psidium guajava).*

While they have not reached any great commercial status, some of the guavas are fruits of much excellence and there is no reason why they should not be planted more largely. Of the two types, *Psidium cattleyanum* and *Psidium guajava,* the Cattley type is the one best adapted to California culture. Besides being a hardier plant, its fruits are of much finer flavor and for eating fresh there is no comparison. The red or brown fruiting, one known as the strawberry guava, is most commonly seen, but *Psidium lucidum* in reality a yellow fruited variety of *Cattleyanum,* is much the finer flavor, particularly as a fresh fruit. The red one, or *Cattley guava,* is a little more acid and for this reason might be preferred for jelly making. The *araca guava* is a very large, yellow fruit, quite acid, and if it were obtainable, I am sure would supplant the red fruit. Of the *Guajava* type there are many varieties, but all impress me as valueless. One called the lemon guava is used to some extent for jelly making, but others of this type are insipidly sweet.

The two types are so distinct in their foliage and habits of growth as to make them unrecognizable as belonging to the same family. The Cattley type has thick, glossy leaves and the plant is but a large shrub at best, while plants of the *Guajava* type have rough, dull green leaves and grow into large trees. The fruits of the latter type also grow very large, some of them being as large as a good sized pear.

The Lime.

In speaking of sub-tropical fruits, it would hardly be expected that I omit all mention of the orange and other citrus fruits, but I assume that all of you gentlemen, although you may not live where the orange and lemon grow, are so familiar with our Bahia (Navel) and Valencia oranges, Eureka and Lisbon lemons, Marsh Pomelo, Dancy and other tangerines that nothing I could say would be especially illuminating, so that I will now mention but one or two comparatively rare citrus fruits that you may not know. Two

years ago as I know your impartial eastern press informed you, we had a "slight" frost, the mercury going as low as twelve degrees above in some localities. Naturally sub-tropical fruits suffered One of the tenderest was the lime. Out of half a dozen varieties, but one passed through almost untouched at our gardens—the Rangpur lime coming from well up the slopes of the Himalayas. This fruit is, in appearance, like the tangerine, but it is a real lime, intensely acid and of good flavor. It has not been planted to any extent but I cannot see why it should not be a good commercial fruit.

The little Japanese orange, known as the Kumquat has not reached any commercial importance. I think most of you know it, a real orange about the size of a gooseberry that is eaten skin and all. It makes good preserves and people usually like it fresh. The principal market thus far has been as a novelty and it is not grown to any extent for eastern shipment.

Custard Apple *(Annona cherimola)*.

The Cherimoya—which, though so called locally, is not the real Custard apple of the tropics which, I believe, is *Annona squamosa* —but is really quite a delicious fruit and, while it is not grown to any extent for the market, has yet proven its adaptability to many sections of California and is not unfrequently seen on our fruit stands. It would not be a good shipper and I would not advise planting it except in a small way for home consumption and, perhaps, the local market.

The White Sapote *(Casimiroa edulis)*.

A fruit from Mexico and Central America that is frequently seen in our gardens is the Sapote. It grows into a pretty evergreen tree and produces fruits usually about the size and shape of a medium sized tomato. dull yellow or greenish in color. The flavor is generally liked, but the consistency of the flesh—being somewhat salvy —does not strike every palate. Like the Cherimoya, I cannot conceive that it will ever be commercially planted.

The Queensland Nut *(Macadamia ternifolia)*.

Here we have a subject that has commercial potentialities and that surely is a most desirable tree for the home. It is one of the prettiest evergreen trees and the nuts it bears are simply delicious. However, it is not strictly hardy and the sections of the state where it can be grown are somewhat limited. In any section where the temperature does not go below twenty-eight degrees (28°), it is safe to plant it. In the young stage it is more tender than the Avocado, but a tree some fifteen or twenty years old in one of the Los Angeles parks, passed through the severe winter two years

ago with no apparent injury. The nuts have been likened in flavor to the Brazil nut *(Bertholletia)*, but aside from the fine grained flesh there is not much similarity. The flavor is very delicate and were it not for the hard shell—one almost has to use a sledge hammer to break it—it would surely be a winner in the markets. A statement in an English trade journal chronicled a sale at ten shillings per pound.

Natal Plum *(Carissa grandiflora)*.

A charming ornamental evergreen shrub is the *Carissa*, both in foliage and in flower. The latter is like a large single Jasmine, very fragrant. The fruits which are about the size of a medium-sized plum are of a brilliant crimson color and of a very pleasant acid flavor. The *Carissa*, however, is erratic in its bearing habits and few of the plants in California have fruited heavily. In Florida and the Hawaiian Islands is produces fairly heavily and is esteemed quite highly.

Kai Apple *(Aberia caffra)*.

This is a large thorny shrub that produces fruits similar in size and appearance to Transcendent Crab-apples. The flavor is quite acid but of pleasant character which makes it a superior fruit for jellies. The plants are dioecious and it would be necessary to have more than one plant to insure a fruitage.

Mango *(Mangifera indica)*.

I am sure that no really good Mangos have ever been produced in California. There are a number of large seedling trees that bear regularly, but the fruits are so strongly impregnated with turpentine as to make them uneatable. I believe there are a few sections of Southern California where good Mangos might be grown and it is possible that within another year a favorable report on this fruit could be made.

The writer has experimented with a great number of tropical and sub-tropical fruits, few of which not heretofore mentioned have any particular value even if they could be successfully grown. There are some, however, that we grow principally as ornamentals—notably the *Eugenias*. The Rose Apple *(Eugenia jambos)*, the Surinam Cherry *(Eugenia uniflora)* and some others of this group really produce interesting, if not fruits of commercial value.

In closing this rambling talk, permit me to say that I have always been an enthusiast in the field of new fruits and a fifteen-years' experience in California, whose wonderful climatic possibilities are not yet half known, leads me to say that the commercial horticulture of a quarter of a century later will witness the introduction of many fruits scarcely heard of today and much improved varieties of existing sorts.

NUT GROWING IN THE NORTHEASTERN UNITED STATES.

DR. W. C. DEMING, *Connecticut.*

I feel like apologizing for the title for there is almost no nut growing in the northeastern United States, except as you might speak of huckleberry growing, or growing any other wild thing. There is no nut growing in the sense that you grow walnuts and almonds in California, or as the southerners are beginning to grow pecans in Georgia.

Nut tree planting, however, is beginning with us in an experimental way, and, of course, we have our native nuts. But even these we have to speak of with somewhat bated breath. The chestnut is nearly extinct over a large area from the ravages of the chestnut blight, and this area appears to be growing greater every year. Our shagbark hickory is growing scarcer because of tree destruction by the axe and the hickory bark borer, and from deficiency in bearing due to unexplained causes. The black walnut especially is falling prey to the axe, but this nut is little in demand owing to its thick shell and strong flavor—a neglected source of cheap food. The butternut is abundant and of high quality but little used on account of its thick shell. The abundant native hazel is too small to be of commercial value.

Our one bright shining star in the nut growers' firmament is the Indiana pecan, but the native habitat of this nut is restricted to parts of the states of Indiana, Illinois, Kentucky, Missouri, Kansas and Iowa.

This is a sorry present showing for an industry that is destined some day to put the growing of the soft fruits in second place. To put nut growing in its rightful place in the northeastern United States is the purpose of the Northern Nut Growers' Association. This Association was organized in 1910 with the stated object of "The promotion of interest in nut-producing plants, their products and their culture." It now has about 200 members distributed through twenty-six states, Canada and the District of Columbia. Pennsylvania leads with forty-five members and New York is second with thirty-six. Connecticut, Illinois, Indiana, Maryland, Massachusetts, New Jersey, Ohio, Virginia and the District of Columbia are well represented.

One of the first objects of the Association has been to locate and preserve by propagation the best examples of our native and introduced nut trees. Before the organization of the Association this object had already been pursued by Dr. Robert T. Morris, of New York City, who had for several years offered prizes for different varieties of nuts and succeeded in locating a number of valuable ones. Last year the Association offered prizes for the best shagbark hickory, black walnut and hazel. This year the Association offers $50 for a hazel nut of pure American origin that can compete with the imported filbert; $25 for a shagbark hickory nut, under conditions not yet announced; $10 for a northern pecan bet-

ter than those already being propagated; and $20 as prizes for other nuts. I do not know that a list of prizes for nuts has ever been offered equal to this.

The pecan of the Middle West, grouped under the title of the "Indiana" pecan, has been assiduously studied and propagated by a group of Indiana men composed of M. J. Niblack, T. P. Littlepage, W. C. Reed, R. L. McCoy, J. F. Wilkinson and others, and some very fine pecans have been selected for dissemination.

The Persian walnut is found in bearing throughout most of the eastern states from Ontario to Georgia. These are mostly single trees though there are a few groups of larger numbers. Adelbert Thompson, of East Avon, N. Y., has 225 trees in bearing. E. C. Pomeroy has an orchard at Lockport, N. Y., and Mrs. J. L. Lovett another at Emilie, Pa. The greatest number of trees is reported from the region south of the Great Lakes from Long Island and from Pennsylvania, Maryland and Virginia. The State of Pennsylvania has been carrying on this summer a survey of the Persian walnut trees of the state.

All the larger bearing Persian walnut trees are seedlings, so far as I know, with the exception of eight trees at Hainesport, N. J., said to have been grafted in 1896-1897, variety not stated, but said to have been bearing well for some years; and the Garrettson trees in Adams County, Pa., one of them a Franquette with a good bearing record, grafted in 1898; another believed to be a Mayette, grafted in 1900, bearing two bushels in 1914. The scions for these trees were obtained from Felix Gillette, of California. Pictures of these trees are shown in the American Nut Journal, the official organ of the Northern Nut Growers' Association, in the issue for April, 1915.

No final determination of the value of our eastern walnuts has been made, but a number of them are being propagated by J. G. Rush, a pioneer propagator of the walnut; J. F. Jones, T. P. Littlepage, W. N. Roper, W. C. Reed, R. L. McCoy and others.

With the shagbark hickory less has been done than with either the pecan or the walnut, in the way of the selection and propagation of improved varieties. We have some pretty good varieties but none as yet that combine in a high degree the qualities that we seek. Possibly this combination does not exist. If it does not we hope that it may be produced by man's efforts in hybridizing among the fifteen or sixteen varieties of the hickory. Some very good and remarkable natural hybrids have already been brought to notice.

The chestnut had begun a most promising commercial career in the East when the imported chestnut blight appeared and put an end to further planting. What is to be the fate of the chestnut in its native habitat no one yet can tell, but the appearance of this destructive plague has certainly given rise to an excellent opportunity for the commercial planting of the chestnut outside the area where native chestnut forests and trees keep up a supply of the infective agent.

Some very excellent varieties of the chestnut have been produced by the experimenters of the East, notably H. W. Endicott and E. A. Riehl, of Illinois; and Dr. Van Fleet, of the U. S. Department of Agriculture, is now engaged in experiments for producing a blight immune, or blight resistant, hybrid chestnut, with results so far that are very promising.

No variety of our native eastern hazel of commercial value has yet been brought to notice, and the large filbert of the Old World which, I believe, is being made something of a success on the Pacific Coast, cannot be grown commercially with us on account of a blight to which it seems inevitably to fall a victim.

Of the black walnut no variety of marked excellence has yet been introduced, though several are on trial. Of the butternut there are no varieties even on trial.

No review of the status of nut culture in the Northeast would be complete without references to two factors. The first is an honorable one to the disinterested, scientific work of Dr. Robert T. Morris, who for some years has been collecting nut trees from all parts of the world, at his place in Stamford, Connecticut, carrying on systematic experiments in hybridizing nut trees, and by his geniality and enthusiasm encouraging others in the pursuit of nut culture. His collection of the edible nuts of the world at Cornell University is perhaps the largest in the world.

The other reference is to the practises, without honor, of certain nurserymen who, from motives of self-interest, make totally unwarranted claims for the nut trees which they have to sell, and even, I am sorry to say, in some instanees knowingly and willfully misrepresent the trees which they deliver to their customers. Their ability to reach the public through their persistent advertising has done much to counteract the educational purposes of the Northern Nut Growers' Association, to diseredit nut growing, and to injure the future interests of the advertisers themselves.

Thus the status of nut culture in the Northeast, not too enthusiastically stated, may be described as one of belief and hope. Belief in the great possibilities for nut culture in the Northeastern United States, as well as in other parts of the world; and hope that we of the present generation may do something toward the development of these great possibilities and live to see the realization of some of them.

THE PRESENT STATUS OF POMOLOGY IN GREAT BRITAIN.

E. A. Bunyard, *England.*

The large amount of fruit imported into Great Britain has often led Americans to think that fruit culture must be undeveloped in the United Kingdom. Many transatlantic visitors whom I have had the pleasure of introducing to Kentish fruit farms have been greatly surprised at their extent and up-to-date organization. I am glad,

therefore, to take the opportunity offered to me by your Secretary to place before you briefly the present status of fruit growing in my country.

First, however, I must emphasize how much we owe to American example. The routine spraying of orchards, for example, has been generally adopted only within the last twenty years, and our first machines and formulas for washes were all borrowed from American sources. In the same period the knell of the old home orchard with its varied collection of sorts has been sounded and the fruit farmer is now a specialist and no longer deals with fruit as a side line. The most striking change within the past twenty years is the plantation of bush trees or dwarfing stocks, especially apples. The term orchard in England is used where trees are planted in sod, and where the land is cultivated it is termed a "plantation." The tendency of recent years has been from orchard to plantation. The ease with which trees may be sprayed and pruned and the fruit gathered is a great recommendation. One striking exception must, however, be noted, and that is in the culture of cherries. These do not thirve under cultivation and are always planted on grassed land and sheep are grazed beneath the trees. Under suitable conditions the trees crop enormously and as much as 25s worth of fruit is frequently gathered from one tree. Such trees are generally thirty to thirty-five feet apart. No department has shown more advance than the marketing of fruit, and the non-returnable box is now firmly established for such fruits as apples and a considerable export trade is done in this way.

The great staple of culture is, of course, the apple, followed in order of importance by the plum, cherry and pear, and in small fruits, strawberries, raspberries, currants and gooseberries. Our proximity to France, the home of the pear, makes our culture of this fruit of little importance in comparison with that of the apple.

Nut culture is rather restricted, and comprises only cob-nuts, filberts and walnuts. The first are almost entirely limited to the County of Kent, and the trees are always severely pruned, so that a tree of a hundred years old will not be over six feet high. By this method large fruits are produced and the trees are always within hand reach.

The culture of fruit under glass has been carried on commercially for many years and grapes and peaches are extensively grown, especially in the neighborhood of London. In this department no great changes can be recorded during recent years, but a steady fall of prices indicates a greatly increased production.

The competition of American apples with the home-grown product is not really very serious. The English dessert apple season is from September to Christmas, while cooking varieties go on till March. As the best American apples do not come on the English market till after Christmas they have a free field. For cooking purposes English fruits are generally preferred, and in their culture much of the recent development has tended. The English

housewife prefers a green apple for cooking, and the dryer flesh of such fruits as Baldwin will never hold the market as against such native varieties as Bramley *(Seedling)*, Lane *(Prince Albert)* and Newton *(Wonder)*. In the choicer fruits, such as Cox (Orange), an export trade has sprung up, principally to the English Colonies and to the Argentine.

The surprising general development of fruit culture has been mainly the result of individual enterprise, and it was not until quite recently that the Government discovered that there were problems that could only be solved by state aid. In response to this feeling, and from the spoils of the famous Lloyd George budget, a start has been made in the establishment of experimental stations. The Government wisely gave their grants to established agricultural colleges to enable them to extend their work, and it is to these that fruit growers are now looking for advice upon problems which are rather beyond the reach of the resources of the private individual. From the fruit-growing point of view the principal experimental stations are those of Wye College, Kent, Woburn Fruit Farm and that of the University of Bristol, at Long Ashton. The first named has been for some years the principal, if not the only, establishment in the country where commercial fruit culture has been scientifically taught. Thanks to a Government grant and to private assistance an experimental station has been started at Malling, Kent, where several questions are now being studied. The most important of these is that of the various stocks used in the propagation of fruit trees. The so-called "Paradise" stocks for apples have been collected and studied, and it is hoped to classify them and settle their nomenclature, and after that to test their dwarfing power and effect on the fruitfulness and vigor of the tree. In view of the great number of dwarf trees now being planted this is of special interest. It is well known that the original French paradise has a great dwarfing power, and it is now little used if at all on the Continent or in England. Other varieties such as the Doucin are used largely and have a moderate dwarfing power, whilst those preferred in England, the "Broad leaf" and "Nonsuch" give trees of some considerable vigor. The grouping of all these stocks under the generic name of "Paradise" has thus led to much confusion, and these experiments will be of the greatest value in bringing exact knowledge into this question.

A problem of similar character is the use of the "free" or seedling apple stocks for standard trees. These stocks are raised from mixed seeds and give plants of very varying degrees of vigor and rooting habit. This question is being dealt with at Long Ashton. This station is mainly concerned with the cider industry which is chiefly located in the west of England, and here the chemistry of cider-making is being investigated with great thoroughness.

The cultural problems of fruit culture have been dealt with for many years at Woburn Experimental Station. This was established and has been sustained entirely by a private benefactor, and the

HOME OF THE FRESNO COUNTRY CLUB, A VERITABLE OASIS, GASTRONOMICALLY SPEAKING, FOR POMOLOGISTS.

ON THE LAWN, SOUTHERN CALIFORNIA BUILDING, SAN DIEGO.

DR. HOWARD SPECULATING ON THE MERITS OF CALIFORNIA MANGOS AS COMPARED WITH MISSOURI APPLES.

AT THE RIMROCK, GRAND CANYON.

THE FIRST "HORNED TOAD," RIVERSIDE, CALIFORNIA.

"THROUGH" THE BIG TREES, NEAR YOSEMITE PARK.

results have been published in a series of reports dating from 1897. Such questions as that of pruning after planting, the effect of grass on fruit trees, shortening roots and manurial experiments, to mention but a few, have been treated in an exhaustive manner, and though the conservative tendencies of the fruit grower have not always accepted their conclusions there is no doubt that they have had a remarkable effect upon many established practices.

The systematic branch of Pomology has always been strangely neglected in England and it is remarkable that at the present time no such work is being done by any state institution. All the authorities in past years, with but a few exceptions, have been nurserymen and we have no experts who devote their time to this necessary work as in the United States.

We can, however, pride ourselves upon a large number of real amateurs who grow fruit in the fancier's spirit and in their gardens collections of all the best fruits are grown to perfection. We do not, however, possess a society devoted to Pomology, standing almost alone among the great nations in this respect. The Royal Horticultural Society, through its Fruit Committee, gives awards to new fruits and makes occasional trials of fruits in its gardens, but there is much work which could be done by a special society. Notwithstanding our numerous gardening papers, none exists which deals exclusively or even mainly in fruits.

Such, briefly stated, is the position of Pomology in this country. Much remains to be done in experiment and organization, and we hope that in a few years we shall be able to throw a new light on certain problems and repay in a small measure our great debt to the energy and enterprise of the American States and their investigators.

THE GANTER AVOCADO.

MILO HUNT, *California.*

The Ganter Avocado tree at Whittier, California, is perhaps the most valuable single tree commercially in the United States, being insured in Lloyds for thirty thousand dollars, and having paid to its owner more than three thousand dollars per year for two successive years, this income being about equally divided between fruit and budwood.

This avocado tree is one of a half-dozen seedlings planted by Mr. A. R. Rideout, a Whittier nurseryman, eleven years ago. At the age of three years it began to bear fruit of an excellent quality, and in large quantities. Successive years showed the tree to be a phenomenal bearer, and that the fruit was large, of unusually good quality, and sufficiently solid to make a rather good shipper. The big freeze of 1912 also showed that the tree was hardy. These qualities, together with the rapid growth of the avocado in general public favor caused a remarkable demand for both the fruits and the budwood. Thousands of seedling avocado trees are now budded to this variety in Southern California.

Mr. Rideout, who planted the tree, does not now know where the seeds came from, neither does the party from whom he secured the seedlings when they were very small. Just as this tree was coming into bearing Mr. Rideout sold his home place to A. M. Ganter, and as the tree in the next two years showed its phenomenal qualities the tree became known for its new owner as the "Ganter" avocado. A little later the property was sold to H. A. Woodworth, and more recently it is called locally the "Woodworth." However, Government publications state and national, recognize the name "Ganter." So valuable did the tree become a couple of years ago that Mr. Woodworth not only had it insured, but he also had a fence twenty-five feet high built around it, both as a protection from wind, and from possible pilferers of fruit and budwood.

The tree is now about thirty-five feet high, and has a spread of perhaps thirty feet. This season, autumn, 1915, the tree is heavily loaded with fruit. These ripen in October and November.

This avocado tree seems to show the adaptability of the fruit to sheltered locations in Southern California and appears to indicate that the avocado will soon take its place as one of the standard fruits of the state.

A SYMPOSIUM OF CALIFORNIA POMOLOGY.

DR. E. J. WICKSON, Leader.

In talking this matter over with my associates and successors in the Pomological Department of this institution, we all agreed that the best way to present California fruit growing was to get contributions from a number of our men who had made special study of the different branches of it. Anyone, of course, could rattle around in this great subject and not communicate anything of particular value. The best way to get the points which we are most desirous to present to the Pomologists of this country; the best way to serve their interests in getting accurate information, would be to break it up. And that is the entertainment and instruction which we offer to you today.

We offer you a somewhat more extended list than appears on the official program, for the purposes stated. Now, in leading in this discussion, obviously it would be improper for me to attempt any general discussion for fear I should say something which would not agree with the following features and might muss up their situation somewhat. I would like, however, to call attention to the fact, that the very presentation in this program indicates that we have been developing in this state not only fruits and great industries in fruits, but we have been developing men also.

Yesterday afternoon your President called attention to the fact that the greatest thing in the Pomological industry and industry in general was not so much the material which was developed, as the development of men. We have been fortunate in California in

developing men devoted to the fruit industry, not only those who have developed land and industry in that direct way, but fortunately also in the development of those who have given their lives to the studies of the question. We have not only developed men from the soil in California, but we have borrowed men from the whole country; and it is a very fortunate thing for us that good people like to come to California to engage in these undertakings.

The work of this institution began many years ago with one or two men, serving a good purpose, but it soon reached a point where specialization was necessary and hence the organization of the Pomological staff which has sub-divided the subject with very commendable results. We are calling this morning upon men, all of whom are connected with the pomological branches of work in this institution.

Our industry is great. Of course one has to steel himself against the temptations to talk about it. One of the speakers yesterday gave us great credit by saying that we led the United States in the total of value produced by fruit. It is also a fact that we led the United States in the production of every fruit except two that are grown. According to the census of 1900 we stand ninth in production of apples. In the census of ten years ago, or rather ten years before, we led in all except two, the apple and the cherry. So that, of the larger fruits only the apple stands as a fruit today in which we are not first, and we have only attained the ninth place there. The other fruit, or group of fruits in which our standing is lower than first, is the berries.

The census of 1910 gave us a farm value of those fruits amounting to fifty million dollars, and on the basis of fifty million dollars we took first place in farm production. That was the fruit: But man touched it, as you might say, and the added value by handling would be so much that we count the commercial value of the agricultural products of 1909 at one hundred million dollars. That seems to be a large amount until you see how easy it would be to spend that. I suppose the annual fruit product of California would maintain the European War about thirty hours. So great and satisfactory as this seems to us, it is not the greatest thing in the world, although, probably, as compared to war, it should be.

Naturally, the development of an industry of such dimensions has brought out a great many original points. Those in the beginning began to develop this fruit industry of California by imitation. Nearly all who went into it in the early days, with capital enough, either went to Europe themselves or sent representatives to find out how this business was done in the place where it had been longest pursued. It was the universal conclusion, I think, even in early times that the growth and handling of fruit in California must not be by imitation. Conditions were so different that original processes had to be discovered and developed. And it was thirty or forty years ago that the conclusion was reached that if California wanted to go ahead in this business, it must work its own way out. So we

are growing fruits in California differently, and handling them differently, and it is largely because of this that we have something to tell you this morning that may be interesting.

The first address on this collective subject will be:

Apples and Pears.

Dr. W. L. Howard.

Mr. Chairman, to my mind it is a striking co-incidence that just about the time George Washington was oiling up his old flint lock gun and getting ready to shoot holes through divers and sundry red-coats, that another man, Father Junipero Serra was planting apple and pear trees in Southern California. About the time of the opening of America, the fruit industry of California had its beginning in these old Mission orchards which started at San Diego.

Perhaps the Franciscan Padre Junipero may have smiled at the grim joke he was playing on the native Indians as they saw him planting those first trees, when he knew that hereafter the said red man would have to cultivate them. In fact, they perhaps began then to do their first real work, and for sixty or seventy years thereafter they cultivated these Mission orchards. These Missions, as you know, were scattered from San Diego to the vicinity of San Francisco, and all of them established rather wonderful orchards.

It is my place to speak only of the development of the apple and pear in California. With this beginning the industry began to thrive and it was only after the fall and decline of the Missions, in about 1834, that the industry of fruit-growing declined. But before I take up the next step I had better make brief mention of the fact that about the year 1812 small apple orchards were planted on the upper coast of California in Mendocino county by the Russians and I am told there are still remnants of those old seedling apple trees to be found in that part of the state.

However, the Russian influence on the apple industry of the state was comparatively insignificant; following the decline of the missions in 1834 came eventually American settlers, these venturesome spirits who braved the wilds and the dangers of the mountains and the deserts, in some instances revived these mission orchards.

This continued until 1849, when there occurred the great influx of settlers from the eastern states and other parts of the country, and they re-built the fruit industry. About this time there were many introductions of budded and grafted varieties brought from the eastern states. But soon nurseries were established in Oregon (this was in the early fifties) which resulted in the extensive planting of apples and owing to lack of markets the industry suffered great depression beginning about 1857. About ten or fifteen years later shipments of fresh fruits were sent to the eastern market, and with the opening of the railroads across the Sierras and the Rockies until in 1886 the fruit was sent eastward in solid trainloads. In

1901 the state of California produced seventy carloads of apples. In 1905 over seven hundred carloads of apples. In 1910, 3,800 carloads. In 1914, 2,500 carloads. In 1912 California had 3,800,000 apple trees—think of it—3,800,000 apple trees. This represented 51,600 acres.

In point of acreage the apple was fifth in importance among the fruits of the state, being surpassed by grapes, oranges, peaches and prunes in the order named.

In 1909 the last available figures I could get in point of total money value received for the crop, the apple ranked sixth, in the state, being surpassed by oranges, grapes, peaches, plums, prunes and lemons in the order named.

Now, the apple orchards of California are chiefly located in the counties of Santa Cruz, Sonoma, Monterey, Nevada, Los Angeles, San Diego, Humboldt, San Bernardino and Inyo, in the order of importance.

The largest recent plantings have been made in San Bernardino, Riverside, Sonoma and Kern (a new county appearing), Santa Cruz, Siskiyou and Humboldt counties.

The industry is, for the most part now, confined to twelve counties. In a general way these are located along the coast or in the mountain section or the foothill section. The cultural conditions do not differ materially from the highly developed districts in other states. I may say that California is the original home of the open-headed tree, and otherwise severely pruned fruit trees. Likewise, California is the original home of the boxed apple. To me, with my limited observation of half a year, it appears that apples are grown in California more than they are in the middle and eastern states.

Possibly they have not lived up to their possibilities, but at any rate it does not seem necessary for them to do the work that they do in the east. It appears to me that while the pruning requires a good deal of work and the cultivation here, more perhaps than eastward, that less spraying is done, and with results that are better than to be hoped for further eastward.

Outside of the state, California is famous for two varieties of apples, the Newtown and the Yellow Bellflower. But inside of the state the Gravenstein has great fame, likewise the Alexander, Red Astrachan, White Astrachan, which are quite well known. Other varieties most generally met with in the state are Esopus, Baldwin, Rome, Wagener, White Pearmain, Yellow Transparent, Delicious, Jonathan, Black Ben and Gano.

All the varieties, practically—of the eastern and middle states—may be found growing in a small way in the farm orchards of California. It may be said that only the summer varieties can be successfully grown in the San Joaquin and Sonora Valleys. Winter varieties require the cooler locations to be found near the coast, or at altitudes from two thousand to four thousand feet. The trees will do well at altitudes above four thousand feet, but the danger from spring frosts becomes very great. Aside from the fresh apples,

California does a big business in evaporated apples. About twenty-five hundred tons of apples, chiefly Newtowns, are canned every years, and they bring from ten dollars to twelve dollars per ton. That is, the canners pay that.

California in 1913 exported over thirty-three and one-half million pounds of evaporated apples. These brought nearly two and three-quarter million dollars. The time is too short to go into the details of apple growing.

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The history of the pear parallels that of the apple. It is grown in the river bottoms and the delta districts and in the foothills and the semi-desert locations. It is even found in the hot locations if water is abundant.

The chief variety is the Bartlett. While the pear reaches its best development in the better types of soil, it is less exacting than the prune, apricot or cherry. The blight has hit the pear-growing industry pretty hard, but we have it under control now. The profits from pear-growing are sufficient to make it a large industry. I will give some of the figures: In the state in 1910 there were 1,500,000 pear trees of bearing age which produced approximately 2,000,000 bushels of fruit, the exact figures being 1,928,097 bushels. In 1914, 8,000,000 pounds of evaporated pears were exported, and one and a half million dollars worth were sold as fresh fruit to the export trade. In addition to the foregoing, about 25,000 tons of pears are canned annually. For these the canners pay thirty dollars to forty dollars per ton to the growers.

Plums and Prunes.

A. H. Hendrickson.

According to the California definition, a prune is simply a plum which will dry without fermenting at the pit; all others are regarded as plums, pomological classifications to the contrary, notwithstanding.

Plums and prunes have been grown in California ever since the establishment of the old Spanish Missions throughout the state in the latter part of the Eighteenth Century. They did not, however, gain rapidly in popularity nor were they grown on a commercial scale until after the introduction of the (Prune d'Agen), Agen, commonly known as the French or Petite prune, in 1856. It was then found that California could grow a plum which could be dried, and the first commercial plantings were begun about 1870. At the present time plum growing is the foremost deciduous fruit industry in the state in point of acreage and value of the product, having displaced the peach within the last few years.

The plum in California is an exceedingly healthy, vigorous and long-lived tree over the greater part of the state, excepting some of the higher elevations and some of the dry areas. It is adapted to

regions along the coast, to the hot interior valleys and to the lower foothills of the Sierra Nevada Mountains wherever the rainfall is sufficient or water for irrigation is available. Probably three-fifths of the plum acreage is located in the Santa Clara Valley just south of San Francisco Bay, the rest of the plantings being found principally in the region just north of the Bay, in various localities in the Sacramento and San Joaquin Valleys, and in the low foothills just east of Sacramento.

There are now being grown but three varieties of prunes which are of any great importance. They are the Agen, or French prune, the Imperial, and the Sugar. The other branch of the industry—the growing of shipping plums—shows a much greater number of varieties. Because of the ease with which the plum can be top-worked in California, these varieties are being constantly changed in an effort to find something, having exceptional qualities with regard to early ripening, quality, color, regular bearing and shipping; new varieties are being constantly added to the list, and the older ones, as soon as the demand falls, are either pulled out or top-worked. At present, the most popular shipping varieties are the Climax, Wickson, Burbank, Kelsey, of the Japanese sorts; Tragedy, Grand Duke, Diamond, Pond and Giant, of the *domesticas* also.

Shipping plums are picked in a hard, green condition practically as soon as they have reached a saleable size; packed in the four-basket crate, with which you are familiar, and shipped to market under refrigeration. Unfortunately in the effort to reach the early markets, growers often pick the fruit before it even shows any color, relying on the fruit coloring and ripening en route. Under such treatment, the quality of the fruit exposed for sale on the eastern markets cannot be regarded as a criterion of the quality of the tree-ripe California plums. Comparatively few plums are canned, except those of the Yellow Egg and Green Gage types.

The prunes are handled in an entirely different manner. Instead of being picked, they are allowed to remain on the tree until thoroughly ripe, when they fall to the ground. They then have a high sugar content which permits them to be dried and kept for an almost indefinite period. After being picked from the ground, they are immersed for about a half-minute in a boiling solution of concentrated lye, to crack the skin to insure quick and even drying. They are then thoroughly rinsed in fresh, cold water, placed on trays, and put out in the sun to dry, the latter process requiring from one week to ten days. The shrinkage is ordinarily about two and one-half to one, requiring two and one-half pounds of the fresh fruit to produce one pound of dried prunes. They are then stored in bins and packed as needed. The dried product is sold according to size, the larger prunes selling for a considerably higher price than the smaller ones. The size containing eighty prunes to the pound is taken as the standard or basis upon which the price is computed and proportioned for the other sizes. For all prunes larger than eighty to the pound, the grower receives a higher price or premium and vice versa.

The utilization of the secondary fruits has not as yet been given much attention and usually plums which cannot be packed and shipped are thrown away. Prunes which grade below the smallest commercial size are sold to the distilleries.

The revenue derived from the growing of plums and prunes in the past decade has, on the whole, been very satisfactory. The yield of prunes varies from an average of 2,500 pounds up to three tons of dried fruit per acre, and the selling price averages between two and a half and six cents per pound. For the state, the prune crop in 1914 was 56,000 tons, roughly valued at $5,000,000. For shipping plums, the yields run from two hundred and fifty to six hundred crates per acre, which brings the grower from forty-five cents to a dollar and twenty-five cents per crate. For the last season, the total shipments of plums, exclusive of the plums used locally, was 1,906 carloads. The foregoing yields and prices may, in part, account for the value of plum orchards which are valued, and command a ready sale, at from four hundred to one thousand dollars per acre.

Plum growing has at nearly all times shown a greater stability as regards growth, production and returns, than nearly any other deciduous fruit in California. The present rapid extension of plum orchards is probably being done at the expense of the peach. The prune has far out-stripped the plum in acreage, probably because of the limited demand for the latter and the more restricted areas over which it can successfully be produced. The plum is further restricted by its ripening season—it must ripen at a time when the demand on the eastern markets is greatest. The greater ease in handling and marketing the prune crop give it a decided preference over the plum which is marketed fresh. The plum itself has been given more attention than the lowly prune, and along the line of selection for securing new, early, attractive, good quality shipping plums, a marvelous development has taken place. Our growers have been very successful in producing plums which seemed peculiarly adapted to some special needs; on the other hand, the prunes which are being planted today are the same kind as were planted in 1856, when the first prune trees were set out.

No doubt the special feature we have in California is the great prune industry with its attendant drying, packing and marketing problems. In the Santa Clara Valley alone there will be harvested this year over 80,000,000 pounds of dried prunes. The task of picking, drying, packing and selling this great crop presents a problem entirely different than those usually found in commercial fruit growing.

Another feature is that of being able to use several stocks for the plum, thereby adapting it to a greatly increased number of different soil conditions. Prunes are being grown upon Myrobalan, almond, peach, and apricot roots. When the great range of conditions, to which these different stocks are adapted, is considered, some of the reasons for the success of the prune become apparent. In connec-

tion with the matter of stocks can be mentioned the great ease with which plums can be top-worked under California conditions. It is not unusual to top-work a plum tree to change the variety, once, twice or even three times. If one variety becomes unprofitable, it is simply grafted to another. In the same way peaches at the present time are being successfully top-worked to plums.

Another peculiar feature of it is the difference of the time of ripening of one variety in different regions which may be separated by only a few miles. North and south mean very little as far as the time of ripening is concerned. Plums are picked and shipped from Vacaville three weeks earlier than are the same varieties from Santa Clara, although the latter place is nearly one hundred miles farther south. The difference of a few hundred feet in elevation may mean a difference in season of a week or ten days, although the orchards may be within a few miles of each other.

Of our problems, probably, the most serious one is that concerned with the *Armillaria mellea,* commonly known as the Oak Root fungus. The other insects and diseases can be controlled by ordinary methods, but as yet no satisfactory method has been discovered of dealing with this fungus. Once it has a foothold, it works upon the roots of the trees, and spreading underground, it rapidly kills off the trees in a constantly widening circle. It cannot be controlled satisfactorily. All the common rootstocks are susceptible to it. Then it is not uncommon to find that a great many fruit growers often have several of these ever-increasing areas, sometimes a half acre in extent, on land which pays eight per cent on an investment of a thousand dollars an acre, the seriousness of the problem how to control this disease is no doubt quite apparent. (Applause.)

Cherries, Peaches and Apricots.

A. V. Stubenrauch.

We have to go to the early Missions for our earliest plantings of the peach, and as Dr. Howard indicated to you, those Missions were established in the latter part of the Eighteenth Century. We have not found that there was any great extension of the peach planting until after the discovery of gold in this state. Soon after that there were established a number of seedling orchards or gardens surrounding the different mining camps. The first record we have of grafted or budded trees is in the year 1850 or 1851, and after the introduction of these grafted types of known varieties, we have accounts of early plantings which flourished and which indicated the precocity of the trees in California under those conditions.

There have been many examples of trees coming into bearing and yielding considerable crops the third year after planting, and many fruits the second year after planting.

For many years the peach was the most widely grown fruit in the state, and during the last few years of low prices, many of the

trees have been top-worked to plums and prunes, and as there has been heavy planting of these plums and prunes they have overtaken the area in plantings of the peach.

In 1914 the number of peach trees in the state was nearly eleven and a half million which we find is equivalent to about 127,000 acres.

The production during that year was 330,000 tons green weight. We find the shipments in the fresh state, out of California during this season were 2,144¼ carloads, which, at 13 tons per car, equalled 27,876 tons of green fruit, leaving 302,000 tons for drying and canning. Of this 203,000 tons were dried to yield the 37,000 tons of dried products. The remainder, 98,624 tons, went to the canneries, which do not appear in a record of carload shipment.

There are peach trees in every county of California. The principal district is the great San Joaquin Valley. Eight counties produced ten thousand tons or over in 1914. They are: Fresno, 122,980; Tulare, 31,280; Kings, 39,400; Placer, 20,700; San Bernardino, 16,576; Santa Clara, 14,688; Stanislaus, 13,544; Solano, 10,080. Notice the range of these counties; they are distributed over Northern and over Southern California.

The character of the principal area is valley lands and foothills, and deep, light, sandy soils. The peach thrives in sheltered valleys, north of San Francisco Bay, and in the Coast Range. But when sheltered from coastal influences it succeeds one thousand to two thousand feet higher up in the Sierra foothills than apricots, or about three thousand to four thousand feet elevation. The handling of the orchards during the season is about as follows: Clean culture is practiced in summer for the purpose of conserving moisture. Cover crops or green manure crops are being used in some sections. In the foothill sections they are irrigated throughout the summer season. In handling the question of pruning the peach, the best form with the low head is the standard, and the strenuous pruning each winter is used to shorten the growth and maintain healthy, vigorous new wood on which the crop is borne. With good care, in the state of California, the peach tree is long-lived. Where it is neglected, the heart wood soon decays and the trees break down. We find this true in many trees which have been top-worked, where proper care has not been taken to exclude the fungi of decay; in such cases we find a variety of troubles which can be avoided with the exercise of proper care.

A variety of peaches, different varieties of peaches, are shipped, fresh, dried and canned, in California. Some of the principal shipping, drying and canning fruit sections, are as indicated by the statistics given above. We have these three outlets for peaches in our state. The greater portion of the crop is dried and canned. Less than one-tenth of the crop is shipped in fresh condition and about two-thirds of the production is dried. Special varieties are grown for these special purposes, so that the peach grower is not dependent upon simply shipping his fresh fruit.

The leading shipping varieties are Alexander, Tuskena, Crawford, Elberta, Foster, and the Muir.

The leading canning varieties are: Of Clingstones—Phillips, Tuskena, Golden, Orange; of the Freestones—Lovell, Muir, Crawford, Foster.

The leading drying varieties are the Lovell, Muir, Crawford and Foster.

The shipments are made in twenty-pound peach boxes, practically all of the fruit being shipped in wrapped condition. The fruit is picked in hard, green condition, to obtain the early markets, and to avoid ripening during transit.

I might stop a few moments to say a few words about the desirability of a method of using and handling which will allow our peaches to remain on the trees longer, in order to acquire better qualities. We are, in the East, met with the statement that while our peaches have a fine appearance the quality is low. Some of us who have attempted to investigate and improve shipping conditions, have tried to determine whether it is possible to have the fruit remain on the tree long enough to acquire higher qualities. And a system of promptly cooling the fruit before shipment has been suggested. I regret to say that this system has not come into as wide practice from the standpoint of improving the quality of our shipping peaches, as much as it might be. Prompt pre-cooling would materially assist in improving shipping qualities.

The Apricot.

This is one of the principal stone fruits of California. It was introduced early with the American settlers. California has largely a monopoly of this fruit. For a long time practically an absolute monopoly of it, but now some orchards are to be found in some of the districts of the North Pacific where they produce fine fruit. It is my privilege to see some of the apricots sent to the Exposition from the state of Washington and from British Columbia, where fine apricots have been grown, but not on a large commercial scale. I think we can safely state that at the present time California has a monopoly of the canned and dried apricots. The apricot has a very wide range in the state. It is more tolerant of the Coastal conditions than the peach. It withstands winter temperature just as well. The limiting factor in its cultivation is the early spring frosts. It blossoms early, following closely after the almond, and for that reason is frequently cut with frost in lowlands. The more elevated lands are freer from this frost and are better adapted to this fruit. Then there is serious damage from cold winds and rains in exposed places during the blossoming season. They throw the blossoms off, especially if they come before the calyx protects the fruit. I am told by the pathologists that this may be due to a species of the monilia fungus.

Now, some figures: Using the figures of 1914, the number of apricot trees in California was 3,157,718, which is equivalent to

about 45,000 acres. The production of the fruit was 115,000 tons, green weight. The shipments of fresh fruit was 382 carloads, of 13 tons each, making a total of 4,966 tons green.

Approximately 110 tons of this went for drying and canning.

About one hundred tons were dried in order to yield twenty thousand tons of dried products in 1914. The remainder, ten tons, were canned.

Nine counties in the state produced 4,500 tons, or more, green fruit in 1914—they are as follows: Santa Clara, 22,804; Alameda, 20,000; Fresno, 12,375; Kings, 8,250; Santa Cruz, 6,500; San Bonita, 6,000; San Bernardino, 4,789; Riverside, 4,788; Los Angeles, 4,500.

The apricot can be worked on a number of stocks, and is suited to a variety of soils. On the peach root it is adapted to a low, warm, well-drained soil, and the peach is largely used in the state, owing to the fact that the gophers, which are at times a serious pest, do not attack this root readily.

On the apricot root, deep, rich, well-drained soil is best.

On moist, heavy lands, or where lighter soil is underlaid with heavy retentive sub-soil recourse must be had to plums, preferably the Myrobalan root. Some of the growers complain of the dwarfing effects. A few are using the almond, and they claim larger fruit is obtained as a result of that. Many of them claim that the union does not hold on almonds, and where desirable it must be double-worked with peach or plums on almonds. The apricot thrives better in a heavy soil, a little heavier soil than that which is best for the peach. The climatic conditions I have already mentioned; and clean culture is the rule.

Pruning, is the vase form, and in later years a considerable amount of fall pruning is done. I am not certain that this is desirable, but it seems to me it is more from a desire to have the work done before the rainy season is at hand. In the Vacaville or Winter district, they have a peculiar type of tree, with the open head and which is adapted to expose a larger surface to the sun in order to get early ripening fruits.

I will just run over the list of varieties for shipment. They are: The Royal, Hemskirke, Moorpark, Blenheim and Montgamet.

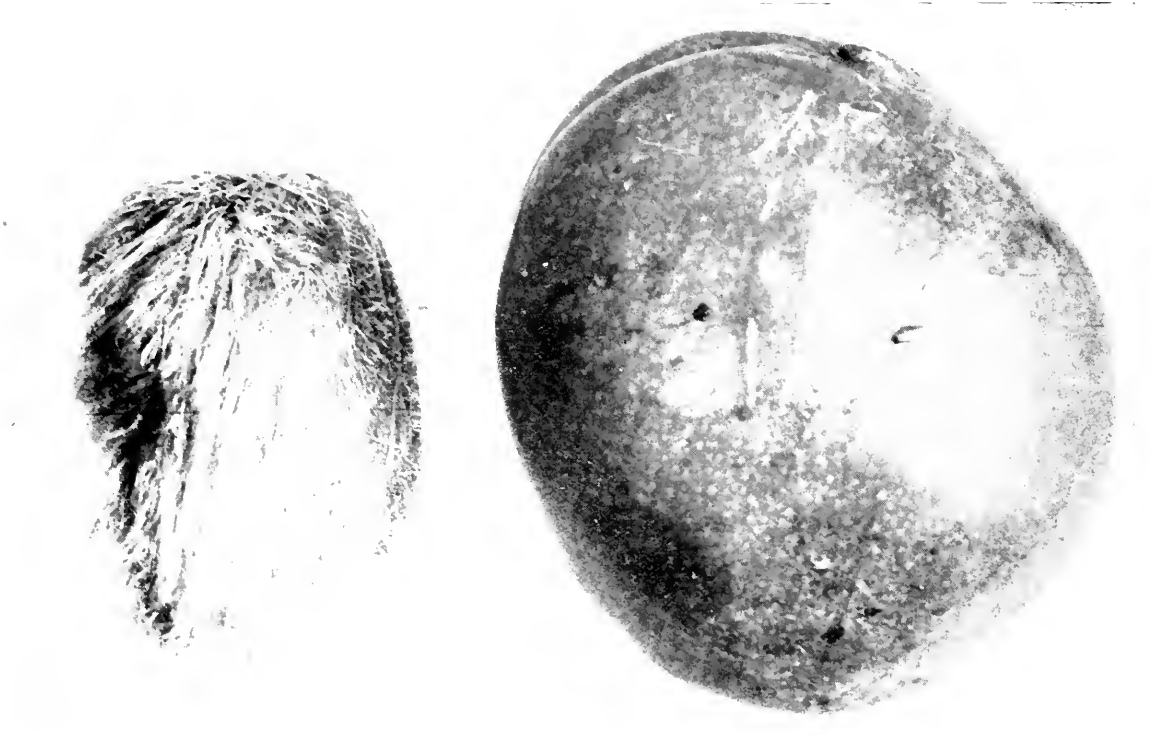
For canning: The Moorpark, Hemskirke, Blenheim and Royal.

For drying: The Royal and Blenheim.

The shipments are made in crates containing from four to five baskets and this fruit is, like the peach, picked in hard, green condition.

Here is an opportunity for the use of pre-cooling to enable shipment of fruit of higher qualities. Both the peach and the apricot are dried first by pitting, and then subjecting the fruit to the fumes of sulphur in order to bleach the product and destroy the insects, and then it is dried in the sun. Practically all of our fruit crops are sun-dried. There has been considerable discussion as to the use of this bleaching agent. The sulphur apparently does two things.

TYPICAL FRUIT OF THE FILIPINO RACE. JOVELLANOS MATANZAS PROVINCE.



FRUIT AND SEED OF THE BISCOCHUELO MANGO, SANTIAGO DE CUBA. THIS IS ONE OF THE BEST SEEDLING TYPES IN THE ISLAND.

It prevents the darkening of the fruit in drying, and it does more; it is necessary to use an agent which will kill the insects and enable the fruit to give up water more readily.

Experiments where this is not used, indicates that the process required such a long time that the fruit deteriorates considerably.

Personally I would welcome a change in this process, as I think, all systems to the contrary notwithstanding, that there is undoubtedly deterioration of the flavor of our fruits due to this process. So I hope eventually we will find a substitute which will enable us to put all these on the market with their full fruit flavor and properties.

The Cherry.

The cherry was planted in California by our earliest settlers. There are some famous old trees planted in the early fifties. These trees remained productive for many years. There are some old trees still in excellent condition, but in later years many of the old trees have been affected by a sort of die-back.

The earliest introduction of the cherry was from Oregon. There were some valuable varieties which came to California by this Oregon route.

The cherry, while one of the minor deciduous fruits, is one of great unit value. California cherries are all early cherries and they are all of the sweet varieties. It is often the earliest fruit to leave the State; sometimes being ready to ship during April. This year the shipments got off about April 15th. That is of the ripe fruit. There were some earlier shipments, about March 31st, from Vaca Valley. Of course, reaching the market early and in good condition, high prices are obtained. From $1500 to $2500 per carload.

The cherry in California is not as widely planted as the peach and the apricot. Many of our counties have crops of commercial proportions. The bulk of them come from Northern California. There are some districts in Southern California which are proving adaptable to cherry growing.

The number of cherry trees in California in 1914, according to our figures was 952,118 trees. or about 13,600 acres.

The crop in 1914 was 10,646 tons. The shipments, 156 cars, equal to 2,150 tons.

Of the balance, between five thousand and six thousand tons of them were canned. From two thousand to twenty-five hundred tons of local shipments were used for Maraschino cherries.

The Coast Valleys adjacents to San Francisco Bay, and the alluvial bottoms in the interior valleys and their tributaries, and in Southern California, in the elevated valleys where moisture is adequate and the temperature not too high, these are the various localities in California for the successful growing of cherries.

The soil for the cherry is a deep alluvial or sediment, where water does not stand near the surface.

A sandy sub-soil if not too dry in summer is satisfactory but heavy clay soil is wholly unfit for the purpose.

A very deep loam, well drained, is the best, but it must be well-drained; for standing water for any considerable period is especially fatal, even in winter.

The locations must be elevated and protected from late frosts and cold winds. Early blossoming trees, but they are not as early as the apricots.

There were eight counties in California producing cherries in 1914. Their names and the quantities produced are as follows: Santa Clara, 2,751; Alameda, 2,250; San Joaquin, 2,250; Solano, 1,000; Sacramento, 841; Placer, 700; Sonoma, 654; Contra Costa, 200.

STOCK.

In California, the stock is almost exclusively the Black Mazzard. It makes the better tree on the whole under California conditions than the Mahaleb, although the latter is more hardy and less liable to injury from soil saturation during the winter.

The varieties are: Black Tartarian, Napoleon *(Royal Ann)*, Lambert, Bing and Black Republican. The Napoleon is used for canning, and pickling for Maraschino. They are shipped in ten-pound crates faced; some are sent in one and two pound cartons. Of course, refrigerating and pre-cooling are used to give the best effect. (Prolonged applause.)

The Citrus Fruits.

Dr. J. E. Coit.

The first orange orchard in California was planted at the San Gabriel Mission about 1804. The first commercial orchard was planted by William Wolfskill in 1841 in what is now the city of Los Angeles. Commercial development was most rapid between 1875 and 1885, due to the introduction of the *(Washington navel)* Bahia variety and the completion of the transcontinental railroads.

There are now about 200,000 acres planted to citrus fruits in California and about $200,000,000 are invested in the industry. A considerable proportion of the lemon acreage is not yet in bearing and a large increase in production will come in the next three years. Fifty thousand cars may be considered a normal crop at the present time for which about twenty-seven to thirty million dollars is returned to California. California is now producing about one-sixth of the world's supply.

Citrus fruits are grown in favorable localities from San Diego County to Shasta County. The localities are in the order of present importance: (1) The area enclosed in and adjacent to a triangle drawn through Pasadena, Redlands and Santa Anna; (2) the eastern foothills of Tulare County; (3) Ventura and Santa Barbara

Counties; (4) San Diego County; (5) Butte County. There are a great many smaller areas scattered through the state which are well suited to citrus fruits.

The industry is older in Southern California and there the lands and water have been further developed and prices of land and water are much higher than in the central and northern parts of the state. The cost of land varies from $150 to $700 an acre and water rights from $75 to $300, or more. It costs to establish an orchard and care for it through the first five years from $800 to $1200 per acre in Southern California, and from $500 to $900 per acre in other parts of the state.

The labor in California citrus groves is done principally by Americans, although a good many Mexicans, Italians and Orientals are employed. In the packing-houses, most of the packing is done by women while the heavy work is performed by men.

In none of the citrus areas in California is the rainfall sufficient for commercial citrus culture. Irrigation is universal. In the early days the water was diverted from streams. Recently there has been an enormous development of underground water by pumping. Many wells interfere with each other and there is a growing demand for state control and apportionment of underground waters. The methods of applying water have been very highly developed, yet there is much room for improvement along the line of greater efficiency and conservation.

The usual method is to irrigate through four deep furrows in each middle (except in very sandy soil), about once a month, soaking the ground about four feet deep. There are one or two cultivations between each irrigation. Recently considerable interest has been shown in the mulching system. The ground is entirely covered from six to ten inches deep with hay, bean vines, shavings or other material, water is applied through permanent furrows under the mulch and all soil stirring discontinued. This system appears to be better for the trees but is objected to on account of the great cost of the mulching material and the high fire hazard during the dry season.

Clean cultivation is the rule in most orchards. A good many growers plant vetch, bur clover or sweet clover in the fall as a winter cover crop and turn this under at the spring plowing, applying fertilizer and manure at the same time.

Recently orchard tractors have come into quite general use and on large ranches where they are kept busy, seem to be giving satisfaction particularly in the interior valleys where the high summer heat is so distressing to work stock.

During the last few years a great advance has been made in methods of protecting citrus orchards from excessive cold. The problem of heating a lemon orchard is very different from that of smudging a peach or pear orchard. For almost five months, lemon growers must be prepared to fire on a few hours notice for blossoms and young fruit may be found on the trees all winter. Smoke or

smudge is injurious as it makes expensive washing and brushing of fruit necessary. The ideal citrus orchard heater, therefore, is a sheet iron receptacle with a capacity of three to five or more gallons of cheap fuel oil. It must have a draught capable of easy regulation, and a stack which gives complete combustion of the gases and provides the maximum proportion of heat in the form of radiant energy. Such heaters have been found very efficient and have come into quite general use in Southern California, particularly in lemon orchards.

The elimination of the less profitable varieties has taken place rather rapidly and now five varieties may be said to dominate the field. These are: *(Washington Navel)*, Bahia and Valencia oranges; Eureka and Lisbon lemons; and Marsh pomelo. The ratio of oranges to lemons is about five or six to one. Very few pomelos are raised in California.

The bulk of California citrus fruits is shipped eastward and distributed throughout the United States and Canada. Very little is exported to Europe. In the autumn a few early oranges are sent to Australia and New Zealand while there is a small but growing export of lemons to Manila, Hong Kong, Japan and Korea.

About sixty-two per cent of the fruit is sold through a very well organized co-operative selling agency known as the California Fruit Growers' Exchange. The grower buys stock in a local packing-house usually in proportion to his acreage. Such houses are owned and operated by an association of growers. Several associations together form a district exchange which orders cars, ships the fruit, and distributes the returns. All of the district exchanges belong to the central exchange which furnishes facilities for marketing the fruit in the shape of bonded agents working under salary in the principal markets. The central exchange also furnishes daily market reports and other information. Grower-members are prohibited from selling and delivering fruit outside of the association. Growers may withdraw from an association at the end of any year. There are about forty co-operative marketing associations outside of the exchange and a number of independent grower shippers. Very little fruit is shipped on consignment.

A recent investigation by the Exchange shows that the dollar the consumer pays for oranges is distributed as follows: Picking and hauling, .024; packing, .074; freight and refrigeration, .205; selling (Exchange), .015; jobber, .082; retailer, .333; grower, .267.

The associations belonging to the Exchange have the privilege of buying ranch and packing-house supplies through the Fruit Growers' Supply Company. This is a non-profit co-operative organization through which the growers pool their orders at low cost. This company has an authorized capital of one million dollars and last year did a business of $3,319,062.04 at an operating expense to the members of three-fourths of a cent on each dollar of business transacted.

Up to the present time there has been no citrus by-product industry to take care of cull fruit and as a result too much poor fruit is

forced on to the market where it depresses the sales of good fruit. There is now a concerted effort being made to develop a citrus by-product industry to relieve this situation. Both the University of California and the U. S. Department of Agriculture are operating laboratories for experiments along this line, while a large number of individuals and private companies are taking an active interest in the matter. Citric acid is the chief citrus by-product and our problem is to devise machinery which will enable us to compete with the cheap hand labor of Southern Europe. But citric acid is made from lemons and the great bulk of California culls are oranges. Of course, some of these are made into jellies, jams and marmalades, but the citrus growers equity in these products is small compared with that of the sugar beet grower. Orange marmalade, therefore, comes nearer being a by-product of the sugar beet industry than it does of the citrus industry and it offers but a small outlet for the thousands of tons of orange culls available.

In conclusion, I may say that our production is now somewhat ahead of consumption and low prices and very conservative planting will probably be the rule for the next few years. Ordinarily we might hope to overcome this trouble by increasing consumption through an advertising campaign and this is being tried with some success. It is very costly, however, to increase consumption in the face of the very wide-spread economy which the people of this country are beginning to put into practice as a result of the unrest and uncertainty brought on by the world war. (Prolonged applause.)

The Semi-Tropical Fruits.

Ira J. Condit, California.

The term semi-tropical as applied to fruits grown in California, includes in a general way those fruit plants which are either temporarily or permanently injured by temperatures much below 20 or 22 degrees F. For convenience sake a few tropical plants are included, such as the banana and pineapple which can be grown here successfully in many localities although not commercially. Citrus fruits are usually classed by themselves. The fruits described in this paper will include the fig, date, avocado, loquat and persimmon, the olive being treated in another paper. Time or space will not permit more than a mere mention of the guava, several species of which are found in our gardens; the Feijoa, which was introduced in 1900, and is now a widely disseminated and promising fruit plant; the cherimoya, which has produced fruit in a small way for many years; the mango, seedlings of which have fruited in several localities and which can undoubtedly be grown here successfully if the proper varieties are planted; the pomegranate, which produces very profitable crops in the Imperial Valley and in Tulare County where it is commonly planted as a border tree; the white sapote, which is a common tree in southern gardens; and the

jujube, which is not grown commercially but is promising, especially with the newer varieties recently introduced from China.

The Fig.

Fig trees were introduced into California by the Franciscan Fathers early in the Eighteenth Century and large Mission fig trees are common in all the older settlements of the state. The Mission or California Black fig was the only variety grown previous to 1850, when a number of European varieties were introduced. In 1880 the Bulletin, a newspaper of San Francisco, imported a large number of cuttings of the Smyrna fig offering these cuttings as premiums to subscribers. The resulting trees grew thriftily, but without exception failed to mature any figs until the introduction of the Blastophaga in 1898. Since that time Smyrna fig culture has been a decided commercial success and there has been a slow but steady increase in the number of acres planted. The Adriatic fig which has long been grown for drying purposes, is still far in the lead in the number of tons of dried figs produced. In the San Joaquin Valley the Adriatic trees are planted around the borders of vineyards and are known as "mortgage lifters," the crop being contracted for from one to five years in advance, the buyers doing all the work of gathering, drying and packing. The production of the three leading varieties is about as follows: White Adriatic, 5,000 tons; Smyrna, 600 tons; Mission, 300 tons.

Fig trees may be and are grown in nearly every county of the state. The industry in dried figs, however, is limited to the hotter and dryer valleys where the temperature during the drying season ranges from 90 degrees to 110 degrees Fahrenheit in the shade. The center of this industry at present is at Fresno, although other equally good sections for the production of dried figs may be found along the foothills from Bakersfield north to Merced and in the Sacramento Valley along the eastern border. The marketing of fresh figs forms only a very small percentage of the entire business; some early figs are shipped to eastern markets from the Imperial Valley in pony refrigerators and from the San Joaquin Valley in cars of other fruits. Fresh figs are found in the local markets from July to October at prices ranging from five to fifteen cents a pound. The White San Pedro, Brunswick, Brown Turkey, Calimyrna (a trade name for one type of the Smyrna), Mission, and Adriatic are commonly grown in gardens for home use or local markets.

Since the production of mature Smyrna figs is entirely dependent upon caprification of the small figs by means of the female Blastophaga or fig wasp, the growing of good capri figs is an important matter. Capri fig trees ordinarily bear three crops of fruit a year, the mammoni or summer crop, the mamme or winter crop, and the profichi or spring crop. The profichi figs contain not only large numbers of galls in which the insects live but also an abundance of pollen from the male flowers. The process of caprification consists in

placing profichi figs in the Smyrna trees so that the fig wasps after emerging dusted with pollen, may enter the figs of the Smyrna tree and pollinate the female flowers contained therein. In practice this is accomplished by placing the capri figs every three or four days in wire baskets suspended in the Smyrna trees. It is this necessity of growing capri figs of the proper kinds and of understanding something regarding the life history of the Blastophaga which has deterred many a grower from setting out Smyrna figs and induced him to plant the Adriatic instead. Dried Smyrna figs bring from one and one-half to two tons; of Adriatics, two to two and a half tons. Much larger yields, however, are often obtained.

Figs partially dry on the tree, then drop to the ground, after which they are picked up and hauled to the yards where they are spread out on trays, placed in the sun or in stacks open to the light and air. After being dried the Adriatic figs are exposed to the bleaching effects of sulphur fumes for a short time; neither the Mission nor the Smyrna figs are sulphured since the black color of the former could not be removed by any amount of bleaching and the latter is naturally of the desired light color. The best grades of Smyrnas and Adriatics are packed in small squares or bricks of four, six, eight, twelve, or sixteen ounces as the trade may require, the remainder being marketed in larger packages. The bird-pecked and split figs are not a total loss but are sold at a reduced price to bakers and confectioners.

The number of pests which attack the fig is exceptionally small. In sandy soil Adriatic trees are often seriously infested with root nematodes which stunt the growth of the trees and reduce the crop. On poorly drained soil or on land which has been too heavily watered the fruit of some varieties sours badly on the tree. Considerable loss is occasional in the interior valleys from sunburn which causes the fruit to grow irregularly and woody; also from splitting of the figs, due probably to climatic conditions as well as injudicious irrigation. Birds cause considerable damage at times; some growers have found it profitable to furnish boys with guns and ammunition and pay so much a head for each bird killed.

The Date.

Date seeds were brought into Southern California by the Mission Fathers along with the fig, olive, and grape about 1795. Unlike the other three plants mentioned, however, the date palm was of no value for other than ornamental purposes around the Mission Gardena since it rarely if ever sets or matures fruit along the coast. Although quite hardy in most of the California valleys the true date palm is not so ornamental as its near relative, *Phoenix canariensis,* the latter being the most widely planted of all palms in the state. Seedlings of *Phoenix dactylifera,* the true date palm, are growing in widely separated localities and many in the interior valleys have produced edible fruit.

The possibilities of growing dates commercially in the hotter valleys of the state have long been recognized. It was not until 1890, however, that the first offshoots of named varieties were imported from North Africa by the U. S. Department of Agriculture and were distributed in Arizona and in various parts of California. Later importations were made in 1900 and in succeeding years until by 1906, the number of varieties totaled 213. Date gardens where these varieties are being tested out, were established at Tempe and Phoenix, Arizona, and at Mecca and Indio, California. A station at Tulare in the San Joaquin Valley has been discontinued. Recently thousands of offshoots have been imported by private parties and by the Coachella Valley Date Growers' Association, 13,000 offshoots having been received in one shipment. The first commercial date orchard was planted in 1903 near Heber in the Imperial Valley and consisted of about four acres of imported Deglet Nur offshoots. This orchard is now producing abundantly, the fruit being largely sold in one-pound fancy cartons.

The high prices received for the fruit and the prospects for large profits from orchards of date palms, have induced many owners of land in the Imperial and Coachella Valleys to start planting on a more or less extensive scale. Since the palm can be propogated asexually only by the offshoots which are produced somewhat sparingly around the base of the trunk, the greatest problem has been and still is to secure stock for planting. The Date Growers' Association succeeded in importing offshoots of desirable varieties for about $2.85; offshoots handled by other concerns ranged considerably higher in price.

The scarcity and high cost of the offshoots has encouraged the planting of seedlings, thousands of which have been set out in the last few years. Owing to the fact that the date palm is dioecious, at least half of the seedlings turn out to be males. Of the females the proportion which produces fruit of good marketing qualities is variable, depending upon the source of the seedlings, those from specially selected seed of the Deglet Nur being preferred. The growers can usually expect to secure ten or fifteen per cent of the seedlings which will bear good fruit and there is always the chance that one or two of these will be a little better than other varieties grown in the locality. They would then have to be propagated by offshoots. The growing of seedling dates in the hotter parts of the San Joaquin and Sacramento Valleys is being encouraged as it is believed that varieties can be developed which will mature fruit in the fall months before cool weather starts in and that this fruit will be most excellent for home use if not for extensive markets.

Unfortunately the early importations included two very serious insect pests, the Parlatoria scale *Parlatoria blanchardi*, which infests the leaves and green stems, and the Marlatt scale *Phoenicoccus marlattii*, which attacks only the bases of the leaves and flower stalks away from the light. The Parlatoria can be controlled by spraying but the second species has been difficult to control; one

method used is to pour kerosene over the trunks and around the bases of the leaves of the palm and set them afire. The heat proves fatal to most of the insects and naturally interferes with the fruiting of the palm for one season but the terminal bud remains alive and soon sends out new growth.

The Federal law now requires that all imported offshoots be dipped for two periods of fifteen minutes, separated by twenty-four hours, and then be planted in nursery form for one year in specially designated quarantine areas where the plants can be examined by inspectors from time to time. They can not be shipped outside the quarantine area unless free from scale.

The date palm is able to stand more severe conditions of soil and climate than any other fruit tree grown here commercially. With its roots in soil containing as much as 0.6 per cent total salts, and sometimes in standing water, and its trunk and foliage in an atmosphere, the day temperature of which ranges around 110 degrees Fahrenheit for several months in the year, the date palm flourishes. The palms do not require an alkaline soil, but they will endure it if need be. They will moreover stand considerable cold, experience having shownw that old palms if nearly dormant are not seriously injured by a temperature of 15 degrees Fahrenheit. A few more degrees of frost will kill the foliage but not the terminal bud, which pushes out new leaves and fruit stalks, bearing an abundant crop the same season. The succeeding crop is much smaller on account of the setback received by the palms.

The flowers of the date palm are produced in large brush-like clusters appearing usually in March and April. The female clusters are pollinated artifically with sprigs of male flowers of the same season's growth or with pollen preserved from the previous year. Pollen of *Phoenix canariensis,* or of many other species of palms can be used if date pollen is scarce. Unpollinated flowers do not drop off but mature into three-parted seedless fruits which contain some sugar but are worthless except for advertising purposes in real estate windows.

The season for dates in California extends from the last of August until November or until cooler weather prevents proper maturity of the fruit. Many of the varieties of dates now being grown belong to the class known as soft dates and the fruit is largely marketed as fresh fruit. These fresh dates of such varieties as the Birket al Hajji, Makantishi, and Maktum were rather common in the Los Angeles market last season but only a few were shipped farther north. Small berry baskets holding almost a pound of fruit sold at from twenty-five to thirty-five cents each.

The standard variety which is most largely favored for planting is the Deglet Nur. The fruits of this variety are picked by hand from the clusters when the individual berries begin to show translucent brown spots, and are then artifically ripened in an incubator or closed room heated for the purpose. Slow ripening, or a temperature of eighty to eighty-four degrees F. for three or four days is

preferred to more rapid incubation when the temperature is maintained at one hundred and ten degrees F. for only twenty-four hours. The fruits of most varieties of dates when allowed to ripen on the tree become soft and sticky and attract bees, ants, and other insects to such an extent that it has been found necessary to protect the berries by enclosing the entire cluster in a bag of thin muslin or netting. Only a few varieties of the dry or bread dates are grown and practically none of the fruit of this class has been placed on the market.

The Avocado.

One of the newer fruits to attract the attention of planters is the avocado. It was not introduced into California until a comparatively recent date and is not, therefore, so well known as the fruits introduced by the padres. During the last ten or fifteen years several large seedling avocado trees have come into bearing in the southern part of the state; these have produced such bountiful crops and the fruit has sold at such attractive prices that growers all over the state are considering the possibilities of the avocado as a reliable source of income. Plantings from a few trees up to several acres in extent are being made from San Diego to Butte County, although the most extensive plantings are being made in the southern coast counties.

The seedling trees which have borne fruit in the state represent two distinct types of tree and fruit. The first, generally known here as the Mexican type produces foliage with a characteristic anise-like odor and taste, and fruit with a thin, tender skin; the second, commonly known as the Guatemalan type produces foliage in which the anise is not pronounced and fruit which has a thick granular rind or shell. Both types are being planted commercially, although it is generally conceded that the thin-skinned fruits will be good for home use and local markets, while the hard-shelled fruits will be better for distant markets on account of their greater shipping qualities.

The avocado tree has proven itself to be as hardy as the lemon and the behavior of trees under various climatic conditions indicates that some varieties may be expected to thrive wherever lemon, orange, or pomelo production is successful, with the exception of the Imperial Valley where the extreme heat has so far proved fatal to the foliage of the avocado. Many parts of the state are too windy to admit of the successful culture of the trees and undoubtedly scores which have been set out in such localities will never come into bearing.

Avocado trees are propagated in this state by budding on seedlings of the thin-skinned type of fruit since such seedlings have proved hardier than those of the hard-shelled type. Budding may be done any time during the season when the bark of the stock is slipping. The usual procedure is about as follows: Seeds are planted either in pots or in seed beds during the winter months and

when the seedlings are from six to eight inches high, they are transplanted to nursery rows in the open ground. Pot-grown plants are looked upon with disfavor since the roots become so confined in the pots that it is difficult to get the plants to start into healthy growth when set out in their permanent location. Seedlings planted in the nursery in the spring should be ready for budding in October, the buds remaining dormant until early spring. Budded trees are allowed to grow in the nursery for one year and then transplanted, by balling, the month of March being favored.

Varieties differ as to the age of bearing after the bud starts to grow. Some varieties, notably the Walker and Lyon, are very precocious, often blossoming and fruiting in the nursery row. The most experienced planters are favoring the planting of varieties which develop primarily into good orchard trees believing that they can be easily top-worked to more profitable varieties if not productive of good, marketable fruit. This top-working is accomplished with only the loss of about eighteen months in fruiting period, by cutting back the larger branches in the spring and budding into the base of the new sprouts which appear. Some varieties are easy to bud and nursery trees are relatively cheap; budders have found it difficult to propagate any large percentage of some varieties and the trees are more expensive. Seeds of the avocado sell at present for four to five cents apiece; buds bring from two to ten cents each; while one-year-old field-grown trees sell at from two to five dollars, depending upon the variety.

The number of named varieties of the avocado of local origin is at least twenty-five and a great many more are being heralded by enthusiastic owners or nurserymen as worthy of propagation. A score or more varieties have been introduced from Central and South America, Florida, Hawaii, and elsewhere and are being propagated by the thousand. It is the opinion of many persons who have traveled in other countries and eaten avocados in various climates that the commercial avocado of the future has not yet appeared in California; others maintain that we already have varieties which can not be excelled anywhere. Growers and prospective planters are, therefore, having a very difficult and perplexing time in deciding what variety or varieties to plant.

The Harmon is very largely planted because nurserymen find it easy to propagate and its merits have been widely advertised. The Harmon tree grows vigorously, is prolific, and bears a thin-skinned fruit of medium size, of light purplish-green color and of good quality but with a large seed, loose in the cavity; the fruit has a tendency to crack in ripening and to soften rather quickly. Other thin-skinned varieties which are being planted are the Northup, which bears two crops in a season, Carton, Ganter, Chappelow, and White. For commercial planting, however, varieties bearing the larger hard-shelled type of fruit are preferred. Among these the Taft is probably the favorite so far. Budded Taft trees have so far not shown a tendency to come into bearing as early as some growers

desire although this may not be such a bad feature after all if the young tree is enabled to bear larger crops in later years on the strong framework which it formed during the first four or five years of its life. The Lyon, Blakeman, Challenge, Sharpless, Meserve, and Miller are some of the California varieties which are being planted out more or less extensively.

The Loquat.

The loquat is comparatively speaking, a neglected fruit in California. With few exceptions the trees now growing in this state are seedlings, bearing as a rule small and inferior fruits. Good varieties that are well suited to our climatic and soil conditions have, however, been developed here and introduced from abroad. There are commercial orchards in Santa Barbara, Ventura, San Diego, and Orange Counties. At Orange where the largest orchards are to be found, enough fruit is produced to warrant co-operation of the growers in marketing. In the northern and central parts of the state there are no commercial loquat orchards, but one or more trees are to be found in almost every good home garden collection of fruits. The lack of good varieties, the occasional failure of the crop on account of frost injury, and the greater interest in better known fruits, are the main reasons for the lack of attention given the loquat by commercial growers in California.

Loquats do well wherever the production of lemons is successful. They blossom and set fruit from October to February and, while the blossoms are fairly resistant to cold, the developing fruit is liable to be injured by temperatures much below thirty degrees F. The tree is not particular as to soil requirements. Although poor soils and a scanty supply of water will produce an abundant crop, and the individual fruits may be of good flavor and quality, they are almost invariably small. Since size is an important factor in a commercial fruit, the fertilization and irrigation are regulated so as to produce fruit equal to the market demand.

The loquat tree is very prolific and liable to over-bear. A common practice in some sections is to crowd the trees into rows twenty-four feet apart, with the trees twelve feet apart in the row. This helps to dwarf the tree and to produce more uniform and regular crops.

Some excellent varieties have been developed in California. The best variety for an early market is the Early Red which often ripens in February. The best mid-season varieties are the Champagne, Thales, Advance, and Victor.

The average price received for the fruit during the past few years has been about five cents per pound. Budded trees are usually precocious and begin to bear profitably at the age of four or five years. Trees ten years old should produce from one hundred and fifty to two hundred pounds of marketable fruit.

The loquat tree is remarkably free from serious insect or fungous pests. The pear blight often attacks the flower clusters and twigs

in the spring of the year but it is only occasionally fatal to the tree. Birds often destroy quantities of the fruit during the harvesting season. Their depredations may be prevented in small orchards by bagging the clusters of fruit before the color develops.

The Persimmon.

The kaki or Japanese persimmon was introduced into California about 1870 and is to be found to a greater or less extent in nearly every county in the state. The tree is easily grown, is free from serious diseases and insect pests and is in most cases exceedingly prolific. The following reasons may be given why it is not more of a commercial fruit in this state: The general lack of knowledge among consumers as to the value of the fruit and the proper condition for eating; the failure of the growers and marketing agencies to advertise the fruit and educate the public as to its use; the growers' lack of attention to the subjects of varieties, pollination, natural and artificial ripening; the failure of growers to develop the industry in by-products such as dried persimmons.

The persimmon tree thrives in nearly all sections of the state, commercial orchards being found in Orange, Los Angeles, and Placer Counties, while small plantings of a few trees are very common both along the coast and in the interior valleys. Although some nurseries propagate the trees by budding or grafting on seedlings of the American persimmon tree, others import the grafted plants from reputable firms in Japan.

A common practice is to plant the trees along ditches and streams where they seem to thrive with little care. When planted in orchard form the trees are set about twenty feet apart, although the spacing depends upon the variety.

The fruit is marketed either on the coast or in some of the eastern cities. New York has proven one of the best markets, Pittsburg, Philadelphia and Boston being good, while the demand is light in the Middle West. Eastern shipments proved unprofitable during the season of 1914 and large quantities of the fruit were sent to San Francisco, flooding that market which resulted in reducing the price to such an extent that very little profit was received by the growers. A better distributing system is therefore necessary if the persimmon is to become a staple commercial fruit. The usual price to the grower is about six cents a pound.

The leading commercial varieties are the Hachiya, Tanenashi, Hyakume, Tsuru, Yemon and Zengi. The Tamoan has been fruited here but is yet in the experimental stage.

THE ALMOND.

R. H. Taylor, *California.*

The California almond industry for a number of years previous to 1910 remained about stationary. Old orchards were constantly being taken out in poorly chosen situations and new orchards being planted in newer and more promising localities, so that the bearing

acreage remained about the same. About 1910 a new interest began to be aroused. The growers waked up and organized themselves into the California Almond Growers' Exchange, a co-operative, non-profit-bearing organization, and proceeded to market their crops themselves rather than allowing all the profits to go into the hands of the middleman as they had done before. Prices to the producer went up and new acreages were planted in increasingly larger blocks from year to year until the result is that all the orchards now planted come into bearing at the usual time it has been estimated that production will increase several hundred per cent in the next five years over what it was last year.

The estimates reported to the office of Commissioner of Horticulture by the county commissioners at the close of 1914 show that there were then 15,747 acres of bearing almonds in the State, and 13,371 acres of non-bearing trees.

Many of these trees figured as bearing have just born a few nuts for the first time, so that in reality the non-bearing trees are greatly in excess of those in full bearing. On the commissioners' basis of 740,188 acres of all fruit trees of all kinds in the State, the almonds constitute 3.93% of the whole.

The largest acreage in any one county is in Yolo, 2,250 acres of bearing and 2,750 acres of non-bearing trees, a total of 5,000 acres in almonds. Next in order are Butte with 1,800 bearing, and 1,000 acres non-bearing; Contra Costa with 1,737 acres bearing and 850 acres non-bearing; Riverside with 818 acres bearing and 1,328 acres non-bearing; San Joaquin with 1,500 acres bearing and 500 acres non-bearing trees, etc. Trees average seventy-five per acre.

In general, the successful plantings are on slightly elevated lands, where the soil is deep and well drained without being too loose and open. These conditions are generally found along the lower foothills on both sides of our great valleys and on the slightly higher lands adjacent to the streams flowing from the mountains. In southern California, the Banning district in Riverside County at an elevation of about 1,900 feet, is the only one of any importance. The absence of real cold weather in the winter, such as is found at lower elevations, fails to force the trees into a sufficiently dormant condition to prevent them from blossoming too early in the spring. Even when the frost does not kill the blossoms, the weather conditions seem to cause an excessive drop of blossoms and young fruit. The result is that over eighty per cent of all the almonds grown in the State are in the great interior valleys of northern California where the trees are subjected to cold winter temperatures for some time.

The average yield of almonds in this State is approximately 800 pounds per acre. With good care, this could and should be raised to 1,000 pounds for trees in full bearing. Not infrequently yields of one ton per acre are obtained.

Prices range from eight cents to twenty cents per pound, depending on variety and season. The average price would probably be somewhere around thirteen cents per pound. At these figures, gross returns would rang from sixty-five dollars to one hundred and sixty

dollars per acre for average orchards. A man should be able to figure one hundred and thirty dollars per acre. Cost of production ranges from twenty dollars to fifty dollars per acre, exclusive of interest and taxes, so that net returns can easily be figured where land valuations and taxes are known.

The domestic crop is at present protected by an import duty of four cents on shelled and three cents on unshelled almonds. These figures are from the recent Underwood Tariff, which reduced the former rate two cents on shelled and one cent on unshelled almonds.

The almond is particular in its requirements in most ways, yet at the same time will live through considerable neglect. It requires a deep rich medium loam soil with good drainage. It is especially averse to standing water around its roots. The loss of many crops, and also a great deal of sour sap, and consequent death of the trees in many cases, has been directly traceable to this one difficulty.

The tree is the first to commence growth in the spring and the last to go dormant in the fall and consequently requires a reasonable amount of moisture for a long season. Variation in the moisture supply is undesirable.

Frost is an important factor because of early blossoming and locations must be chosen with special reference to this point.

Cultivation, thoroughly and continuously done, will well repay the owner of any orchard. Cover crops or some means of restoring humus to the soil are equally important.

Pruning consists in shaping the young tree and thereafter limiting cutting to removal of watersprouts, dead and interfering branches.

Harvesting is done by knocking the nuts and hulls from the trees by long poles on to sheets spread under the trees. This is done as soon as the hull splits open sufficiently to allow of easy hulling by machinery. If the nuts are allowed to hang on the trees long after the hulls open the nuts turn so dark that only very heavy bleaching will bring them back to a desirable color for market. It also makes hulling harder.

After hulling, the nuts are thoroughly dried until the meats will break without bending, after which they are bleached. This is done by first lightly spraying the nuts with water or better, by steaming them for a few moments and then exposing them to the fumes of burning sulphur for from ten to thirty minutes. If the meats are not thoroughly dried, the sulphur fumes will penetrate them and hasten the development of rancidity. Unbleached nuts will keep much better than bleached nuts.

Marketing facilities are excellent, largely because over 75 per cent of the crop this year is being marketed by the California Almond Growers' Exchange for its members. The number of members has been gradually increasing until there are now nearly 900 members. As is usual with most co-operative organizations, the Almond Growers' Exchange has encountered serious opposition from outside interests and even after five years, the opposition is still strong. The unusual market conditions throughout the world the past year have been hard on all fruit lines and this condition has furnished

opportunity for renewed attacks. The growers are commencing to learn, however, that they can do no better than to stay together, and handle their problems as a unit. The Exchange finished last season in much better condition than it expected, and now things look better for it than ever. Without such an organization, the growers would be losing money fast, especially with the supply increasing so rapidly, and the markets still undeveloped.

The standardization of product that is being brought about by this co-operation is having a good effect on the wholesale market. Buyers are less afraid to purchase in larger quantities because they are sure that what they get will be what they ordered. The large organization has a greater sense of responsibility than the average individual grower, and realizes its need for building up a reputation for uniformity of product and honesty in all dealings.

The almond, as other fruit trees is subject to its quota of insect pests and diseases. The Red Spider is one of the most important insect pests, of which there are two kinds, the Brown Mite, *Bryobia pratensis*, and the Yellow Mite, *Tetranychus bimaculatus*. Both cause injury to the tree by sucking the plant juices from the leaves and bark, and both are controlled by the use of sulphur in one form or another.

The brown mite, or clover mite, as it is commonly called, is the first one to commence active operations and fortunately it is the most easily controlled. Its entire life history is lived on the tree. The fall eggs are laid on the under side of the large and small branches, where they pass the winter. In the spring they commence to hatch with the first warm weather, and thereafter a number of generations are born successively through the summer.

This mite may be easily and effectively controlled by spraying with winter strength lime-sulphur solution under at least 180 pounds pressure just before the buds open in the spring. This will control it effectively throughout the year. If winter spraying is not done, the only other thing to do is to use some sulphur spray in the summer as soon as the mite appears. Lime-sulphur, one---thirty, atomic-sulphur or milled-sulphur will be effective though not nearly as much so as the winter spray. If facilities are not at hand for a thorough liquid spraying, dry sulphur may be dusted on the trees using the very lightest grade of flowers of sulphur obtainable. It is difficult to get good results with one application of this so that it may be necesary to make as many as four or five applications.

The yellow mite, or six-spotted red spider, passes the winter in the ground, in rubbish, etc., and generally commences crawling up into the trees about the middle of May or first of June, depending on the time the warm weather comes. Its later summer generations are then produced on the tree. This mite, unlike the *Bryobia*, spins a very fine web on the upper surfaces of the leaves and on the smaller branches and then works underneath. This makes it much more difficult to control by means of dust sprays. Liquid sprays, if thoroughly applied under high pressure, will control the pest if applied soon enough. Spraying should be done as soon as the mite

first appears. Waiting until the leaves commence to turn yellow is too late. It is not long then until the leaves drop from the trees. This is the same mite which is so destructive in defoliating the plum and prune before the crop is harvested in many cases. Winter spraying is ineffective in most cases.

The stored almond is sometimes infested with a moth, the larva of which eats into the meats pretty badly. The infestation is worse in poorly sealed varieties like the Nonpareil. Prompt handling and elimination of unnecessary exposure will largely do away with the trouble. Storage bins should be thoroughly cleaned every year.

Of the fungous disease, the shot-hole fungus is the worst on the leaves and fruit. It is only bad in years of late spring rains and continued damp weather after the fruit has set. In the past it has never been serious enough to warrant spraying regularly, and the growers seem satisfied to risk an occasional severe infestation.

The *Armillaria*, or oak fungus, is bad in some sections, and is gradually making holes in the orchards. There is no remedy known except to dig out the trees and isolate the infested area from healthy trees by digging trenches outside of the first row of healthy trees, and cutting off all root connection with the outside trees, or simply pulling out a row of healthy trees with as much of the root as possible to prevent its spreading through them.

Root Knot, or crown gall, caused by *Bacterium tumefaciens,* is very troublesome, causing the death of many trees, both young and old. Care must be exercised in planting to see that clean, healthy trees are planted with no infestation on them. After the knots have developed the only method of control is to dig away the dirt and cut out the knots cleanly and paint over the wounds with Bordeaux paste. This is expensive and not always satisfactory.

"Sour-Sap" and "Fruit Drop" are the result of unfavorable weather and moisture conditions. Wet weather in the spring, followed quickly by warm, sunny weather, seems to be the reason for the worst cases. Sudden variations in moisture or temperature conditions omitted in the soil as nearly uniform throughout the entire growing season as possible.

The question of varieties to plant is still an unsettled one. Probably the Nonpareil, I. X. L., Ne Plus Ultra and Drake are the most popular varieties. These are all of California origin. The first three, known collectively as the Hatch varieties, are by far the most popular and bring the highest prices, though they are not heavy bearers. The Drake is consistently a heavy bearer. The Texas, Languedoc and Peerless are also being planted considerably. The Languedoc is an old French variety and one of the first to be grown in the State.

In planting orchards, three or four varieties are generally interplanted in order to secure the benefit of cross-pollination. This is desirable because it also extends the harvesting season considerably and lightens the work in that busy season. It is generally considered that the early blooming varieties like the I. X. L., Ne Plus Ultra and Nonpareil are most in need of such inter-planting,

either with each other or late blooming varieties. Commercial plantings at the present are largely composed of but seven or eight varieties, so it is not difficult to choose varieties for planting.

While prospects for the future are somewhat doubtful in some ways, there is every chance that the industry will maintain its profitable standing provided all the growers will work together for its sane development.

THE WALNUT.

DR. L. D. BATCHELOR, *California.*

Persian, so-called English, walnuts may have been planted first in California by the Mission Fathers. However, it was not until after the coming of the first Americans that this industry attained any commercial importance. The present walnut industry is of comparatively recent origin and owes its establishment to the early efforts of Joseph Sexton of Santa Barbara and the late Felix Gillet of Nevada City. The Santa Barbara soft shell seedlings and the several grafted varieties of this type all trace back more or less directly to the efforts of Mr. Sexton. The French varieties, such as the Mayette, Franquette, etc., owe their popularity to the tireless work of the late Mr. Gillet in promoting the production of this type of walnut. The extent of the present walnut industry will fall somewhere between 45,000 and 50,000 acres or about one and one-quarter million trees.

An average crop for the past few years is about twelve thousand tons, valued at three and one-half million dollars. The investment in the walnut industry of California represents about forty-five million dollars.

The walnut industry is centralized in the following counties mentioned in their order of importance: Orange, Los Angeles, Ventura, Santa Barbara, San Joaquin and Contra Costa.

This industry is almost universally a specialized crop. It is seldom one encounters the growing of walnuts as one of two or more general farm crops, but on the contrary, nuts are the one and only crop produced by most of the orchardists engaged in this industry. Success with this crop depends on the soil and climatic conditions and the availability of irrigation water. A deep, rich loam is desirable and although good drainage is imperative to a depth of six or eight feet, irrigation water is necessary practically throughout California for the best production of walnuts.

Groves planted on the light, sandy loams or soils underlaid with a fluctuating water table or a hardpan close to the surface, say within three or four feet, are bound to be short-lived and unsatisfactory in the end.

Clean culture with the use of a winter cover crop is the most prevalent type of soil management practiced by the progressive growers. Such cover crops as *Melilotus* or sweet clover, vetch and rye are often seen. These crops are usually planted immediately after

harvest, the latter part of September, and should be nearly waist-high at the time they are plowed under, during the latter part of March or April. Irrigation water is applied by the furrow system in the majority of cases, although occasionally a grove is watered by the basin method, where the land is level or where possibly a sod is grown in the grove throughout the year. Companion crops in the bearing groves are seldom seen, and in fact, the young groves, before they reach a bearing age, are sometimes handled with clean cultivation. As the industry has grown older this has seemed to be a mistake and the most progressive planters are now inter-planting the young walnut groves with hoed vegetable crops, small fruits, alfalfa, and occasionally apricots and peaches. If these inter-crops are properly handled the land will commence making returns immediately after the trees are planted without any detriment to the future walnut grove.

It is clearly noticeable on every hand that the older plantings of walnuts were set too close together. Although fifty feet apart seemed ample room for development, it is very evident now that a distance of sixty feet is none too much for the larger growing varieties on the rich loam soils which are best adapted for this crop. It is a matter of common observation to see the outside trees in a grove produce considerably more than the trees in the center. This leads one to believe that perhaps some of the older plantations might produce as many walnuts today with half as many trees to the acre, inter-planted with some vegetable or small fruit crop.

The older groves are composed entirely of seedlings, most of which are of the Santa Barbara soft shell type and trace directly or indirectly to the original trees grown by Mr. Sexton at Santa Barbara. It is only within a comparatively recent time, during the last ten to fifteen years, that the walnut has been propagated by budding and grafting in commercial quantities. During this time, a comparatively large number of varieties have been introduced and many of these have been dropped by the wayside even thus early in the development of the industry. At the present time the following five varieties are being propagated to a greater extent than all other sorts combined: Placentia, Eureka, Franquette, El Monte, and Prolific.

In a general way the two first-mentioned varieties will compose nearly seventy per cent of the trees propagated at the present time in California nurseries.

The grading and sale of the California walnuts has developed rapidly during the last decade, from the sale of seedling nuts, ungraded and unbleached, as just plain walnuts; the grading has gradually reached a stage where a portion of the nuts are sold under their variety name and another larger portion is disposed of after being strictly graded according to size, shape, color of the meat and quality of same. Recently the California Co-operative Nut-Growers' Association have introduced a one and two-pound carton and will attempt to standardize the product handled in this package as strictly as are breakfast foods and canned goods at the present time.

Although the walnut industry has not an established reputation for profitableness which is comparable with the citrus fruits of California, it has nevertheless, maintained its position as a stable, conservative, permanent crop within this state. The income per acre for this product will vary widely according to variety, soil and climatic conditions as well as the personal element of the management. Such net incomes will fluctuate from $100 to $200 per acre.

The future development of this industry seems to be drifting gradually inland. Especially is this true where the walnuts have been planted on soil which might have been used for citrus culture. Whereas the inland valleys were formerly thought to be poorly adapted to walnut production because of the darkening of the meats by the intense sunshine, there are several sections which give promise for development along these lines with the proper choice of varieties adapted to their particular environments.

The walnut industry enjoys one of the most unique features of any fruit industry of the country, inasmuch as its product may be successfully stored awaiting disposal for a period of at least twelve months if necessary. This has given the industry a very stable character and has freed this product from the speculative manipulations which are frequently found in connection with the perishable fruit products. It is interesting to note that the importations of walnuts into the United States have gradually increased during the last ten years and during this same period the prices to the growers of California have also gradually increased. This may be taken as only one of many indications that the walnut is being looked upon more and more as a stable food necessity by the people of this country.

From present indications this industry is farther from the dangers of over-production than almost any other agricultural or horticultural crop within the borders of the state.

THE GRAPE.

FREDERIC T. BIOLETTI, *California.*

The vineyard area of California, comprising about 1,000 acres in 1857, has grown to about 375,000 acres in 1915. It may be roughly estimated to consist at present of 175,000 acres of wine-grapes, 130,000 acres of raisin-grapes and 70,000 acres of shipping-grapes. At a valuation of $250 per acre this represents an investment of nearly $100,000,000. To this must be added the value of wineries and packing houses, with their equipment for handling, grading, seeding, packing and shipping, which is difficult to estimate.

Grapes are produced in commercial quantities in forty-five of the fifty-eight counties of California. In most of the remaining thirteen they are grown as garden fruit or arbor vines in limited quantities for home use. All the counties of the great interior valleys from Shasta to Kern have large vineyards; the centers of densest planting being in Fresno, Tulare and Kings, and in San Joaquin and

Sacramento counties. All the coast counties from Mendocino to San Diego also have commercial vineyards, the densest planting being in Napa, Sonoma, Santa Clara and Contra Costa. All the counties of southern California have considerable vineyard interests, the largest being in San Bernardino county in the San Gabriel Valley.

Of the grape-growing counties, ninety-three per cent produce wine-grapes, eighty-two per cent shipping-grapes and fifty-three per cent raisin-grapes.

The raisins are produced principally in the upper San Joaquin Valley in Fresno, Tulare and Kings counties. Other considerable centers of production are San Diego, Los Angeles, Madera, Colusa, and Sutter counties. California produces about sixty per cent of all the raisins of the world, excluding Zante currants. Nearly half the world's crop of raisins is produced within fifty miles of the city of Fresno.

The shipping grapes are grown principally in the interior valleys in the counties of San Joaquin and Sacramento and of Tulare and Fresno. Other considerable centers of production are Los Angeles, Contra Costa, Colusa, Stanislaus, Placer and Imperial. Several minor but important centers exist.

The wine-grapes are more evenly distributed than either of the others. The areas of largest production are San Joaquin and Sacramento, Napa, Sonoma and Solano, Fresno and Tulare, Santa Clara, Alameda and Contra Costa, San Bernardino and Riverside, with important areas also in Madera, Stanislaus and Merced, in Placer, in Tehama, and in Santa Cruz.

In a general way it may be said that grapes for dry wine are grown in the coast counties where the summer temperature is moderate and the vintage late. Grapes for sweet wine are grown in the great interior valley where the hot summer insures high sugar contents and low acidity. Raisin-grapes are grown in the same region where they mature at a time when several weeks of dry weather are still available for drying. Table-grapes can be grown in almost all the viticultural regions, but most of them are produced near certain centers. These centers owe their pre-eminence partly to natural advantages, such as extreme earliness as in Imperial, extreme lateness as in Contra Costa and Santa Cruz counties; and partly to the accidents of proximity to railroads or the first establishment of packing houses.

The methods of grape-growing in California are practically those of southern France and Algeria modified slightly by the more general use of large implements and the high price and unskilled nature of most of the labor. They differ markedly from those of the eastern and southern parts of the United States, owing to the dry summers which make it possible to grow vinifera grapes, to omit much of the warfare against fungous diseases which necessitate modifications of practice in pruning and cultivation.

Practically all our grapes are varieties of the so-called European grape, *Vitis vinifera*. A few American species, *Riparia*, *Rupestris* and *Berlandieri* supply a number of varieties and hybrids which are

extensively used in some sections as grafting stock resistant to the *Phylloxera*. *Labrusca* varieties, principally Pierce and Concord, constitute not more than a few hundred acres. *Rotundifolia* is not grown at all.

Each of the great classes of viticulture depends partly on the use of varieties with special characteristics, and partly on special climatic conditions.

The great bulk of the raisins is made from the (*Muscat of*) Alexandria, the Sultanina (*Thompson's Seedless*) and the Sultana. The first produces large raisins of the Spanish type, the last two, the seedless raisins known to commerce as "Sultanas." No other known varieties can be substituted for these, though fair raisins are made occasionally from a few large grapes such as Malaga or Feher Szagos. Currants or seedless raisins of the Zante or Greek type are made in small quantities from the Black and White Corinth grapes.

The business of shipping-grapes deals with a large number of varieties, though three constitute by far the greater part of the eastern or distant shipments. These are, in order of importance, Flame Tokay, Malaga and Emperor. A few others, notably Cornichon, Verdal and Black Morocco, are shipped in fairly large quantities. For Pacific Coast markets the raisin Muscat and the Sultanina are used extensively and also, in smaller quantities, Black Prince (Rose of Peru), Black Malvoisie, Black Ferrara, Ferrara, Mission, Luglienga, Golden Chasselas, Pizzuetello and Pierce, the last our only variety of *Labrusca* type, while a score or more of varieties are shipped occasionally, locally and in small quantities.

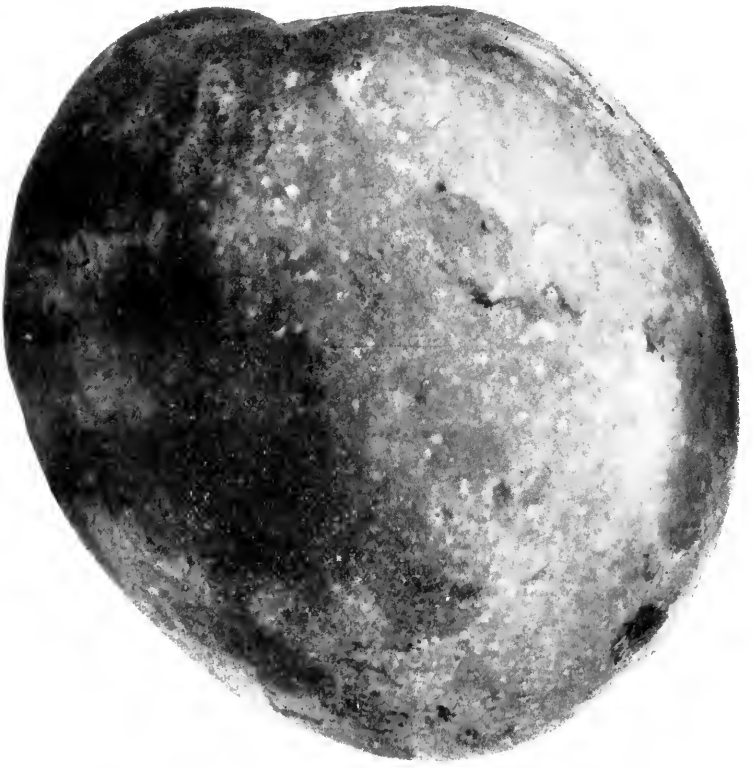
For wine, the list of varieties used extensively would be too long to give. Zinfandel is still the chief, out of a list of even the important names would contain fifty or more. The total number grown commercially would probably exceed a hundred.

Among the better varieties which have been planted largely during recent years, the principal is the Petite Syrah, Alicante Bouschet and Palomino have also been extensively planted, but these are little better than the Carignane, Mataro and Burger which they tend to replace. Many small vineyards of fine varieties, such as Cabernet Sauvignon, Colombar and Riesling, exist which in the aggregate constitute a considerable area.

Few new grapes have been introduced within recent years. Most of the European varieties were introduced and tested during the last two decades of the Nineteenth Century. Those which we now grow have proved their worth in actual practice. There has been little careful testing of varieties with the exception of wine-grapes, which in part accounts for the much larger number of this group of varieties which are actually grown.

For raisin-grapes it seems hopeless to look for anything better than our Muscat of Alexandria and our Sultanina. Perhaps by selection the setting of the former might be improved. The Huasco is a strain showing this improvement. Attempts are being made to increase the size of the Sultanina by selection, but so far without very definite results.

TYPICAL FRUIT OF THE MANGO RACE, SHOWING THE CHARACTERISTIC FORM. COMMON THROUGHOUT THE ISLANDS



A FRUIT OF MANGO CHINO WEIGHING 16 OZ. FROM THE QUINTA AVILES, CIENFUEGOS. ONE OF THE LARGEST CUBAN TYPES.

The introduction of new varieties of table and shipping-grapes is more promising. Persian 23 is an earlier and more highly colored grapes than the Malaga and may be useful in the Imperial region. A red grape for the hotter regions, where the Tokay fails to color, may be found in the Flame Muscat or the *Maraville de Malaga.* The *Dattier de Beiruth* is earlier, larger and of better quality than the Malga and gives promise of being useful in the Malaga sections of the San Joaquin Valley. It appears, however, to be too much subject to coulure* and abortive berries.

The crop of raisins for 1914 was about 182,000,000 pounds, valued at about $10,000,000. The wine produced about 44,000,000 gallons, consisting of 26,000,000 gallons of dry wine and 18,000,000 gallons of sweet. The value, together with that of the 7,000,000 gallons of brandy made, totalled about $15,000,000. The table-grapes shipped amounted to 8,773 carloads, bringing about $4,000,000 to the growers. The total value of the grape crop to the growers of wine, table and raisin-grapes, including the manufacturers of wine, but excluding all packing or transportation values, was roughly $29,000,000. The great bulk of the crop of all kinds is consumed in the United States.

The manufacture of by-products is on a very small scale. The production of grape-juice, vinegar and cream of tartar utilize but an infinitesimal portion of the crop.

On the whole the production of grapes has been perhaps a little more profitable than that of most other fruits. The best vineyards in the most favorable years return profits as high as any orchards. Poor vineyards are unprofitable. That the vineyards as a whole have been profitable is proved by their steady and rapid increase during the last fifteen years. The average profit from a vineyard may be estimated to be from thirty dollars to forty dollars per acre, though the variations are very great, especially in the case of table-grapes.

This profit is calculated aside from the labor of the owner, which makes it possible to support a family on fifteen or twenty acres of vineyard.

The further development of the industry is hard to foresee. The extension of Prohibition discourages the planting of all kinds of grapes, as the discontinuance of wine-making would automatically much increase the output of table and raisin-grapes without new plantings. At present the most extensive plantings are of Sultanina.

The most notable facts regarding the industry during the last year are the continued success of the Raisin Growers' Association; the changes in the Internal Revenue laws due to higher tax rates, which have introduced much uncertainty into the operations of the producers of sweet wines; and the attempts being made to standardize the quality of shipping-grapes and to prevent the shipping of unripe or otherwise inferior fruit.

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*Dropping of fruit.

A SYMPOSIUM ON OREGON POMOLOGY.

PROFESSOR C. I. LEWIS, LEADER.

As far as statistics are concerned I will refer you to the census figures, which you can get from the United States Census Bureau at Washington. For a general history, I refer you to the State Department of Horticulture, where they have a lot of literature for free distribution. For our booster literature, I refer you to our commercial clubs, which will be glad to furnish you with some excellent booklets.

We have thought that the best way to treat this subject is to confine ourselves to certain problems. I have picked out those having national interest, rather than those with only Pacific Coast interest.

Professor Gardner will discuss the subject of pruning, having thirty-five hundred trees under observation. Professor Allen will talk to you on cover crops and shadow crops, and so forth, while Professor Reimer will devote himself to pears. My own subject is that of

ORCHARD ECONOMICS.*

Four or five years ago we were getting bonanza prices, three, four and even five dollars for apples in boxes and in carload lots. At the time we were growing apples at five dollars a box, we got extravagant, and we are trying to use the same methods now while our returns are one dollar a box. They will not work together. A summary of the results of our study is herewith offered:

For the past four years the Division of Horticulture has been conducting investigations dealing with the cost of fruit production in the Pacific Northwest. The investigations have been conducted on a broad scale, including the states of Oregon, Washington, Idaho and the Province of British Columbia, and have entailed the study of a thousand orchards.

All figures are taken from farms which have at least two-thirds of their entire acreage devoted to orchards and at least two-thirds of this orchard devoted to apples.

The aim of the bulletin is to give average costs of production which will serve as an aid to those orchardists attempting to lower their production costs and which will indicate what expenses may be included under the various heads of Growing, Handling, Overhead and Selling.

The average cost of clearing land and planting to apples in the northwest amounts to about $112.82 an acre.

The average cost of maintenance and development of the young orchard is as follows:

Ochards two to three years of age $62.72 an acre.

Orchards four to five years of age $60.36 an acre.

Orchards six to seven years of age—less receipts—$52.87 an acre.

*Very full details of the investigations summarized here are reported in bulletin 132 of the Oregon Experiment Station.

A study of costs of production according to horse units reveals the fact that the average fruit ranch maintains too many horses for economical management.

The figures found on Costs of Production of Apples show conclusively that it is much cheaper to produce apples on the larger units than on the smaller units, and that those growers who are depending upon five or ten acres of apples should either enlarge their orchards or combine with apple production some other agricultural activities.

Our figures seem to indicate that, given a large number of orchards, it would be possible to plot a curve which would show strong regular fluctuations of higher and lower costs according to the approximation to the local economical unit, and a progressive lower cost according to increase in acreage. There would be, then, certain combinations of acreage which would mean low production costs, and certain combinations which would mean high production costs.

The average costs of production of apples in orchards six to nine years old with an average yield of 120 bushels, on an acreage basis, were: Maintenance, $30.71; Overhead, $57.03; Handling, $53.18; a total of $140.92.

The average cost of each box under the same conditions were: Maintenance, $0.2564; Overhead, $0.4776; Handling, $0.4463; a total of $1.1803.

The average costs of production of apples in orchards ten to eighteen years old with an average yield of 233 boxes to the acre, on an acreage basis, were: Maintenance, $40.75; Overhead, $110.76; Handling, $68.99; a total of $220.50.

The average cost for each box under these conditions were: Maintenance, $0.1782; Overhead, $0.4737; Handling, $0.3030; a total of $0.9549.

To make a success of apples, the orchardist must choose varieties with which he can excel.

It is doubtful if the Northwest as a whole should be producing more than a dozen varieties of apples, and each locality should only be producing the particular few varieties that are best suited to the local conditions, probably not more than three or four at the most.

The average orchardist studies his problems from the point of view of the whole orchard or large blocks of trees in the orchard, whereas he should study the problems more as they are related to each individual tree and small blocks of orchards.

The problem is to find out what trees are unprofitable and to determine why this condition is true.

We believe that the best opportunities to diversify the apple farm—especially where lands are high priced and where there is an overhead cost, taxes and interest on investment, of from $30 to $50 an acre—is by the growing of more than one kind of fruit. We doubt if there are many types of farming other than fruit growing that will pay as good a dividend on an investment of over $500 an acre.

Regardless of location, soil or climatic conditions, where fruit is

raised there is no doubt that the fruit-grower should under all circumstances have a good garden; should raise enough pork for his own use; should keep a family flock of chickens and a good cow. He should also endeavor to raise all feed necessary to maintain all stock on the ranch.

Under proper conditions a number of growers are handling forage crops to advantage, where the crop is fed to live stock on the place. When grown strictly as a hay crop in the orchard, it is very difficult to make much profit from the crop, as the increased cost of producing hay under such conditions leaves the margin of profit extremely narrow.

If it becomes necessary to hire labor for all the work in raising truck and garden crops in the orchard, it will be only in exceptional cases that profits can be realized.

Where irrigation is practiced, probably one of the most successful crops grown among trees in the Northwest is the strawberry.

Potatoes as an inter-crop have been tried by a number of orchardists with varying success.

Where climatic and soil conditions favor cheap and abundant pasturage and where most of the concentrates necessary may be raised on the farm or obtained at a reasonable price, hogs have proved a profitable investment with orcharding.

The only opportunity for the orchardist in the Northwest to make a profit from dairying in conjunction with his orchard, is by having a superior herd—better than the average—and by producing on the ranch the major portion of the feed consumed.

There is perhaps no one orchard operation which will probably allow more economy than that of tillage.

The greatest loss from the use of fertilizers and manures comes from the tendency of many growers to buy mixed fertilizers.

Perhaps the greatest loss in pruning comes from a lack of knowledge of fundamental principles of pruning, and of the application of these principles to the orchard and to individual trees.

Large sums of money are lost in improper spraying.

Lack of facilities for scientific handling of the crop often causes a loss.

Unskillful organization and handling of labor is responsible for the loss of much money.

One of the greatest drawbacks in the past has been the absolute independence of the selling agencies.

Not enough attention has been given to the relation of the size of crop, the general market conditions of any one period, and the proportion and amount of fruit that is held in storage.

We strongly urge the establishment of a Bureau of Statistics and a Protective Fruit League.

The causes of a large percentage of low-grade and cull apples are choice of wrong varieties, too many unprofitable trees, poor management, and unfavorable climatic conditions.

We have three possibilities in handling low-grade apples: (1) reduce the amount of this fruit to the minimum; (2) handle this class

of fruit in a cheaper package; (3) manufacture these apples into fruit by-products.

The general apple situation would indicate that to make a profit from the industry at present prices an economical unit must be chosen and the investment kept down to a reasonable figure so that the overhead charges are not excessive; soil and climatic conditions must be favorable; proper varieties must be grown and skillful management given.

A CONSIDERATION OF THE QUESTION OF "BULK" PRUNING.

V. R. GARDNER.

INTRODUCTION.

Any one who has had occasion to make a somewhat careful survey of the literature pertaining to pruning fruit trees realizes the improbability, if not almost the impossibility, of advancing an entirely new idea on the subject. It has been discussed so often that something has been said on almost every phase of the question. Furthermore, the literature on pruning shows that there is hardly any practice followed, or any theory held, about which there are not opposite views. It may almost be said that the literature of pruning is very largely a record of opinions formed, of views held, rather than a record of facts ascertained and principles established. What is needed in a difficult field, like that of pruning, is first the collection of a large body of facts—facts that are presented just as they are found, uncolored by any opinions or theories regarding their explanation. Once in possession of such a large body of facts it should be possible carefully to analyze and interpret them. Perhaps it is too much to expect that we may learn all that they have to teach, but certainly there should be a few lessons that we can draw from them. Fortunately we are not entirely without data regarding certain pruning operations. The difficulty has been that in too many cases the amount available has been too small to warrant the conclusions that have been reached. Sometimes, too, a large amount of evidence has led to erroneous conclusions because considered from unfortunate points of view, or because closely related facts have not been taken into consideration. Viewpoint is often as important to a correct interpretation of evidence as is the accumulation of additional data that bear on the question.

It is not the intention in this paper to present a large body of new data. Time is not available for a detailed presentation of all the evidence, nor is it necessary in this instance. The illustrations cited are simply representative of examples that without doubt the reader has seen duplicated in many orchards in many parts of the country. In other words, the full body of facts here called in evidence includes the observations and experience of many fruit-growers and investigators. The object of the paper is rather to suggest a point of view for a consideration of this evidence. It is not claimed that

it is a new point of view, but it is one that without doubt is given too little consideration by those directing, or engaged in, pruning our orchard trees.

Pruning Considered as an Operation Affecting the Tree as a Whole.

In pruning practice and in the consideration of pruning problems, outside of those dealing with the healing of wounds, most people look upon pruning as something directly affecting the tree as a whole. We speak of pruning this tree heavily and that one lightly; of heading-back one and thinning-out another; of winter-pruning in one instance, and summer-pruning in another. We say that a certain tree that has been neglected for a number of years requires a heavy pruning to bring it back to a vigorous productive condition. Such a statement is made, regardless of the fact that, while possibly *certain parts* of the tree should be pruned heavily, certain other parts should be pruned lightly, if at all. Taking it for granted that heavy pruning is synonomous with large cuts and much brush left on the ground, we proceed to do rather heroic work. If a tree thus pruned fails to attain quickly the vigorous productive condition we have in mind as an ideal, we wonder why the result has not been satisfactory, especially when general opinion seemed to be that heavy pruning was required. On the other hand, when it is decided that another tree requires only a light pruning, we proceed to take out only a very few branches, and consider it fortunate that so little work is required. If such a pruning is attended by some of the results usually accompanying a heavy pruning again we wonder *why*. These statements, which will be recognized as based upon very general experience, serve to illustrate the fact that pruning is looked upon as a kind of *bulk* problem—as something which is decided upon for the tree as a whole, done to the tree as a whole, and to which the tree as a whole responds. It is some of the negative evidence on this question with which this paper is mainly concerned.

Evidence That Pruning Does Not Directly Affect the Tree as a Whole, But Rather Parts of the Tree.

Evidence from the Results Following "Dehorning" — Everyone who has had much experience in pruning fruit trees, and many who have been simply casual observers, have seen trees that have been more or less severely cut back or "dehorned," as it is called when the cutting back has been very heavy. In fact, this is the kind of pruning with which some people are best acquainted. The type of growth that almost invariably follows such pruning is well known. If the dehorning has been done in winter or early spring, numerous comparatively upright shoots will be produced during the following summer. The usual practice is to thin out these shoots and head-back those that are left, the idea being to develop as quick-

ly as possible new fruiting branches. Thus is the tree reinvigorated—"rejuvenated." So well is this procedure understood that we regard as practically settled the questions as to when and how to rejuvenate our trees. We assume that the tree *as a whole* responds to the treatment given and there the matter rests. But does the tree *as a whole* respond? And is the whole matter to be thus summarily dismissed? Even a cursory examination of a tree that has been recently dehorned shows that only *a part* of the tree has responded. Because it happens to be the part upon which we have, through habit, come to focus our attention, makes it none the less *a part,* and *not the whole tree.* Undisturbed branches in the lower part of the dehorned tree usually continue to grow in the ordinary way. As a rule their spurs bear flowers and fruit no more regularly and yield a product of no better grade than before. Their older spurs and smaller fruiting branches are nearly as prone as ever to become gradually weaker and die. Apparently neither as whole branches nor in their separate parts have these branches in the lower part of the tree been accelerated or retarded in growth. The chances are that they have not even produced watersprouts, such as have developed so abundantly on the dehorned branches above them. In other words, there is an important portion of the tree, often its most important portion, that has apparently not been affected by the dehorning, either for better or for worse. Though the tree as a whole has been pruned heavily, a large part of the tree has not felt the influence of the pruning. Dehorning has not rejuvenated the whole tree; it has resulted merely in the production of new wood to replace a portion of the old top.

Evidence from Results Following Partial "Dehorning" — Even more striking evidence on this question of the distance to which the influence of pruning extends is furnished by trees that have been partially dehorned, i. e., have had a portion of their branches cut back very severely and other branches of equal size and that reached to an equal height left untouched. In such instances what we have come to regard as the characteristic results of dehorning usually are limited almost entirely to the branches that have been cut back. These branches give rise to watersprouts in abundance, but the unpruned branch continues to grow and function as though nothing had been done to upset the normal course of events in the tree. The case presented is that of a single branch, or several branches, immediately surrounded by the effects of a particular type of pruning and yet neither having received a stimulus from the pruning itself or an influence from the new vegetative growth resulting from it. So far as results are concerned, they may be compared with those following the occurrence of a frost in some region. Because of elevation or location killing temperatures are not reached and vegetation is not injured in a particular orchard, even though neighboring orchards possessing the same kind of soil, containing the same varieties, swept by the same prevailing winds, and falling within the same general storm areas, may have their new growth entirely destroyed. Another particular orchard receives no benefit from a

rain coming at a critical time, if just before reaching the orchard the path of the storm is turned in another direction by a momentary shift in the air currents. Similarly a particular limb is apparently little benefited or injured by the pruning shears or saw that greatly injures or benefits, or even entirely removes, the surrounding or neighboring limbs. All have seen examples of the point that is made here in old trees of one species or another that were being top-worked, where the top-working was being distributed over a period of several years. The heavy pruning that such trees receive, incident to the top-working process, usually is not reflected to any appreciable extent in a changed manner of growth on the part of the ungrafted limbs. On the contrary the influence of the heavy pruning is apparently mainly limited to an area close to the point of insertion of the cions. This seems to be true not only for the first season, but for as long as the tree remains in a partially top-worked condition.

Evidence from the Type of Pruning That Entirely Removes a Few Large Limbs — If there is a type of pruning that lies at the opposite extreme from the cutting-back to stubs of a number of large limbs for purposes of grafting and at the same time leaving one or more large limbs uninjured to help temporarily to maintain a balance between top and root, it probably consists in the entire removal of one or more comparatively large limbs, the majority of the limbs being left unpruned. This may be considered a kind of *bulk* thinning. In a way it is the converse of the *bulk* heading-back practiced in dehorning. Few will fail to recognize it as a type of pruning commonly employed by many fruit-growers. It at least possesses the advantage of requiring little labor. At first thought one might imagine that if *bulk* heading-back influences only certain parts of the tree and not the tree as a whole, certainly *bulk* thinning-out should operate in an opposite manner. However, let us see whether or not it does. When a single large limb is removed from almost any part of a tree, watersprouts develop to take its place, and the rest of the tree top continues to grow much as though no pruning had been given. Attention is again called to the point of origin of these watersprouts. They spring, in the main, not from limbs far removed from the pruning wound, but close to where the cut was made. There is an unmistakable response to the *bulk* thinning, but that response is evident within a very limited area. The tree as a whole does not show it.

Those who have intentionally or unintentionally permitted a leader to develop for a number of years and form close-centered trees and have then tried to train them as open-centered or vase-shaped trees can furnish abundant evidence on the question under discussion. The removal of the central leader from trees of this kind (bulk heading-back or bulk thinning-out, depending upon the form of the tree and where the cut is made), is almost always followed by the production of a number of watersprouts that attempt to take its place. The subsequent removal of these watersprouts is followed by the production of still other watersprouts, nearly al-

ways springing from points near the wound left by the removal of the leader. On the other hand, the unpruned branches of the tree seem to be little influenced by the cutting out of the leader.

What has just been said regarding the bulk pruning of old trees apparently holds true for younger trees, though perhaps to not quite the same degree. When trees that have not yet reached bearing age, or that are just coming into bearing, have one of their larger limbs entirely removed in order to train them to a desired shape, new shoots usually start to take the places of the limbs that have been cut out. Those who have had any considerable experience in attempting to develop open-centered Yellow Newtown apples or Bartlett or Anjou pears, or close-centered McIntosh apples or Winter Nelis pears, know how difficult it is to keep shoots and limbs from growing up in the center in the first instance, and from spreading out and even growing down in the second by simply cutting them out or off; and what is of equal or greater importance, make the other shoots and limbs of these same trees spread out or grow upright, as the case may be, and thus profit by the food materials that it is desired to divert from the closely pruned parts. In fact, so persistent are the watersprouts in attempting to replace removed limbs, that many careful growers are coming to realize that the easiest way to develop an open-centered tree is not to cut out all of the growth in the center, but rather to simply suppress it by pruning it a little more severely than the surrounding branches that are desired to form the main framework of the tree. Even then it is to be doubted if the normal growth of the remaining branches is materially changed. Similarly, when young trees are lightly, or even heavily, headed-back new shoots are sent out, but mainly from points where some of them can easily replace the portion removed. It is not usual for distant portions of the tree to show a clear cut response to the pruning.

It may be argued that when the thinning-out and heading-back that are usually afforded very young trees is practiced, the *tree as a whole* responds to the treatment—sometimes nearly every bud starting to vegetate. Without doubt such trees are influenced *as a whole* by the pruning given them, but it must be remembered that every part of such trees is pruned; and that probably the tree is influenced *as a whole* only because *each part* is separately and distinctly influenced.

Evidence from Spur Pruning — Also bearing on this same question are the results that are obtained from what might be termed "spur pruning." As they become older, some varieties of apple and pear trees are very prone to develop large numbers of fruit spurs, spurs that often branch and rebranch until they become fruit spur clusters rather than individual spurs. If more or less neglected, such trees finally reach the state where they make hardly any new shoot growth, practically their entire energies being absorbed by their fruit spur systems. Usually when there are such large numbers of fruit spurs but a comparatively small percentage can flower and fruit in any single season and the record of any single spur, or

even spur cluster, especially in an older part of the tree, would show very irregular fruiting. Such trees present a condition in which, though there is little of what we commonly speak of as vegetative growth, neary all of the energies of the tree are really being absorbed in a slow vegetative growth of the spurs. The engineer would say that the fruiting machine is so large and complicated that nearly all the power is required to overcome friction; consequently but a small portion of a full load can be carried. The economist would say that it is an instance of the trees using up most of their income in their own overhead charges. Such, of course, is recognized as the condition that many seek to remedy by dehorning or by some other type of bulk pruning. That bulk pruning is only a partial remedy has already been pointed out. Some have seen the experiment tried of removing a part of the spurs from such trees—a half, or two-thirds, or even three-fourths of them. As the spurs possess a very large percentage of the normal growing points and bear practically all the leaf system of a tree in such a condition, it will readily be seen that such a thinning of spurs is really the equivalent of a heavy pruning, except perhaps in the total weight of wood tissue removed. Treated in this way trees do not produce watersprouts as they do when dehorning or the removal of a few large branches takes away an equivalent number of growing points. In fact, they produce very few watersprouts. However, the remaining spurs show a much more vigorous growth and the new shoot growth that develops from normal lateral and terminal buds is much longer and more virgorous. The net results is that the tree is changed little, if at all, in general form; but the rate of growth of nearly all of its individual parts is accelerated, and the ways in which they function are materially changed, for strengthened and enlarged spurs bear fruit more regularly. Here, then, is a type of pruning that has apparently affected the *tree as a whole*, affected the tree as a whole because affecting *nearly all* of its individual parts. However, it is a type of pruning that must be regarded as the opposite of *bulk* pruning. Of course, it is an extreme case, but nevertheless it serves to illustrate the point that it is desired to emphasize.

The Interpretation of the Facts Presented.

A consideration of the facts that have been cited leads unmistakably to at least one conclusion, viz.: that the radius of influence within the tree of any pruning (i. e., the cutting out or cutting back of any particular shoot or branch) is comparatively narrow. Parts close to the pruning wound, or perhaps close to space left by the removal of a branch, show a response to the pruning treatment. Roughly speaking, other parts of the tree do not. In other words, pruning does not *directly* affect the tree *as a whole*, but it affects it only indirectly through its effect upon individual parts. *Why* such is the case is, of course, another question. No attempt is made to suggest an answer here. Probably much careful work will have to

be done before a satisfactory answer will be forthcoming. Meanwhile the principle established may be of use, even though we are not able fully to explain it.

APPLICATION OF THE PRINCIPLE ESTABLISHED TO PRUNING PRACTICE.

In order that a few of the applications of the principle that has just been stated to pruning practice may be better understood it may be well to make a brief statement regarding some of the main objects that the grower should have in mind when pruning. In other words, why do we prune? There are, of course, many ends sought in pruning, the relative importance of which vary with soil, elevation, temperature, humidity, disease, variety and many other factors, factors both environmental and those artificially imposed by market demands or the whims of the grower. It is not the intention to attempt even to mention these here. It will be generally agreed, however, that primarily, pruning must seek to bring trees into bearing at a reasonably early age and then keep them bearing large quantities of high-grade fruit, and this must be done with due regard for keeping down the cost of production. Limiting the discussion now to apples and pears, it may be stated that at least in the case of older trees by far the most of the fruit is borne upon fruit spurs. Pruning should consequently aim to lead to the production of large numbers of fruit spurs and to the regular bearing of those already possessed by the tree, together with the maintenance of a reasonable amount of vegetative growth. It has just been pointed out that *bulk* pruning is mainly influential in the stimulation of watersprouts and not the main fruit spur system or *normal* vegetative growth of the tree. There is certainly very little reason to believe that watersprouts can, or at least do, take the place of the normal vegetative (shoot) growth in contributing to the welfare of nearby fruit spurs and to the welfare of the tree as a whole. Furthermore, they are comparatively slow in developing a fruit spur system of their own; so it may be questioned whether or not they are really very useful in the economy of the average tree (except, of course, for special purposes, such as rebuilding a new top in cases of renovation, etc.). To stimulate the formation of fruit spurs and to increase the efficiency of those already in our possession requires that pruning must be afforded close to the point where we wish them formed or where they already are, for we have seen that the radius of the influence of pruning is comparatively narrow. This in turn means light, or rather fine as opposed to coarse pruning. In other words, it means pruning that is distributed throughout the tree top, for the spurs and normal vegetative shoots are thus distributed. Our tendency must be in the direction of the removal or cutting back of a larger number of smaller branches. It will be necessary more and more to get away from the idea of what has been called *bulk* pruning and to give greater attention to detail. Theoretically pruning should concern itself mainly with shoots and spurs rather than with older or larger wood. Practically it should be limited to

the shoots, spurs and smaller branches. Of course, in the case of trees that have been neglected for several years some exceptions must be made. Just because the removal of a larger number of smaller branches necessitates the exercise of better judgment and perhaps takes a little more time and requires greater skill than the removal of a smaller number of larger ones, this should not deter us from the best method of procedure.

Carrying the line of reasoning a step further it becomes evident that pruning should be a regular, rather than an irregular orchard operation. This is a statement that most growers know to be true from observation and experience, though the reasons therefor may not have been clearly understood. However, the points that have been brought out furnish an explanation of some of the characteristic results following irregular pruning. Trees left unpruned for several years usually seem to demand the removal of some of the larger branches or limbs. This approaches the *bulk* type of pruning that has been described, and as such stimulates new vegetative growth, rather than invigorating the older fruiting wood; and new vegetative growth in trees of this sort is as apt to increase as to diminish difficulties. If the pruning that is to be afforded our orchard trees is to be such as will help establish and maintain rather than disturb a proper balance between vegetative and fruiting wood it must be attended to every year.

What has been stated should not be regarded as an argument against occasional heavy pruning, i. e., the removal of a considerable amount of growth. Though heavy pruning as commonly done is bulk pruning, this is not necessarily the case. It may consist in the removal of a large amount of shoot growth and small branches and thus not give rise to watersprouts, but on the contrary stimulate the normal vegetative growth and fruit spur system of the tree. The instance of spur pruning cited in this article is evidence on this point.

Some Questions Raised by the Facts Presented.

That the radius of influence of a particular pruning cut is comparatively narrow seems to be established beyond all question. Just how far that influence extends is only one of a great many unanswered questions. Is the radius of influence of a pruning cut the same when a limb is cut back as it is when it is cut off entirely? Does it depend more upon the size of the wound or the age of the limb? Is it felt to as great a degree by fruiting wood in the neighborhood of a cut as by more strictly vegetative tissue? Does it depend to any extent upon the season when the pruning is done? For instance, is the radius of influence from a cut made July 1st greater or less than it would be from a similar cut made March 1st? To what extent are the fruit spurs of a tree virtually independent of the tree as a whole, and to what extent are the fruit spur and vegetative systems interdependent? If interdependent to a certain degree, how close to a particular shoot must a particular spur be in

order to be benefited or injured by it? Is the radius of influence of a particular pruning cut greater or less than that of the part removed? Finally, to what extent are parts of tree tops independent and to what extent are they interdependent? These and other questions are at present unanswered. They are not easy problems to solve, yet they must be solved if we are to have a more perfect understanding of the principles underlying pruning practice.

MAINTENANCE OF FERTILITY AND IRRIGATION OF ORCHARD SOILS IN THE PACIFIC NORTHWEST.

R. W. Allen.

During the past three years a very radical change has taken place in the manner of treating orchard soils throughout the Pacific Northwest. Systematic summer tillage without the use of fertilizers has been temporarily abandoned and the use of green manure crops, stable manure or other fertilizers adopted. The long continued practice of clean culture, which dates from the beginning of commercial orchard planting has resulted in the impoverishment of irrigated—as well as nonirrigated land. The necessity for this change in soil treatment, which has but recently taken place, has long been apparent.

That the average soil in mature orchards is seriously depleted is plainly indicated by: (1) The yellow appearance and slow growth of trees; (2) Weak character and heavy falling of blossoms; (3) Small size and early maturing of fruit; (4) Very poor physical condition and low water holding capacity of the soil; (5) Extremely dry condition of the land late in summer, and (6) A consequent cessation of activity of a large proportion of the feeding roots of the tree, as a result of drouth.

Although the conditions enumerated above have existed in many of the old nonirrigated orchards and upon some irrigated tracts for a number of years, it has only been of recent date that full recognition of this critical condition of the trees has prevailed. It is difficult for growers who have had confidence in the fertility of their land, to realize the extent to which the store of fertility has been reduced. It is also difficult for them to realize the extent to which the demand of trees for moisture grows as they increase in size. The influence of lack of fertility upon the amount of moisture required by the trees, and the loss of power of the soil to retain moisture as its supply of organic matter is diminished, are little understood at the present time. The influence of organic matter upon the water-holding capacity of the soil, and that of fertility upon the quantity of water required for a tree to mature its crop is very marked, therefore an adequate quantity of fertility and organic matter in soils having a limited supply of water, is of greater importance than where moisture is plentiful. Where injury from drouth results to crops on poor soil—well managed land frequently yields satisfactory returns owing to the higher duty of the water they contain.

To correct the factors which have greatly diminished the yield, and not infrequently caused permanent injury to the trees in the old orchards, it is necesary to apply nitrogen and organic matter.

Trees can be stimulated by the application of nitrogen, but the effect is probably temporary and of no benefit to the soil. Some very striking results have been obtained by applying Nitrate of Soda to land occupied by eighteen-year-old Spitzenberg apple trees, which were in a seriously devitalized condition. The soil in the orchard where this determination was made has been kept under continuous clean culture since the trees were planted.

One hundred thirty-five pounds of nitrate of soda, containing sixteen per cent nitrogen, was applied to each of several plats containing twenty trees. This gave to every tree approximately 1.08 pounds of nitrogen. As a result of this application, which is twice the amount used by mature trees, according to Roberts in Cornell Bulletin, the crop, vigor and growth of the trees were greatly increased. The leaves were larger and darker in color, and the fruit was much larger than that produced by untreated trees. On account of the marked results derived from the use of nitrogen on these trees the same treatment was given them again in 1915. From the second application very pronounced results were also derived. By the first fertilization the trees were restored to an apparently normal state of vigor, but upon receiving two treatments in succession some have been over-stimulated as extensive terminal growth has occurred on many fruiting branches during the current season. The results of this experiment are briefly summarized in the following table, which shows the striking difference in (1) set of fruit, and (2) vigor of growth of trees on treated and untreated plats:

	Set of fruit,	Average terminal growth in inches.			Size of leaves, 1915.		% of Moisture
Plat.	1915.	1913.	1914.	1915.	Length.	Width.	in foliage.
Nitrate,	71%	5.05	7.85	14.85	2.8	1.65	176.5
Check,	36%	6.7	5.35	8.05	2.25	1.35	129.5

These results, which are closely paralleled by a number of similar experiments, under similar conditions in the Hood River Valley, demonstrate the great need of nitrogen where attention has not been paid to fertilizing the land. In this same set of experiments no appreciable benefit has so far been gained from the use of potash or phosphates.

As there is no appreciable benefit to the soil from applying nitrogen in the form of Nitrate of Soda, sulphate of ammonia, or other forms not containing organic matter, their wholesale use should be discouraged, notwithstanding the fact that very marked and beneficial results to the trees follows the application of nitrogen in a readily available form.

Orchards that have become seriously devitalized can, and should be stimulated by the use of commercial nitrogen, until green manure crops are grown and incorporated into the soil.

Where it is at all possible to grow green manure crops, the use of commercial nitrogen is unnecessary for trees of moderate vigor, as it does not take the place of nitrogenous manures by supplying organic matter needed in the soil.

The cost of nitrogen in nitrate of soda applied at the above rate is approximately $16.00 per acre. An average crop of vetch, which can be grown for $10.00 or less, accumulates about seventy-four pounds of nitrogen, approximately nine-tenths as much as was applied to these trees. In addition to the benefit derived from incorporating the vegetable matter into the soil a saving of at least $1.50 to $2.00 per acre is realized. If the above application of nitrogen is excessive, as it appears to be, that derived from one leguminous crop should be sufficient or more than sufficient for the growth of one fruit crop. By the use of live stock a large portion (possibly 80%) of the fertilizer value of forage consumed should be returned to the land and a moderate profit derived from feeding it.

The shortage of stable manure and the high cost of organic fertilizers containing nitrogen renders them both impracticable for use by the average orchardist, therefore, he is obliged to resort to the growth of fertilizing materials with which to improve his land.

What system of cropping should be used depends largely upon conditions of climate, and the available supply of moisture. The practice of growing winter cover crops and plowing them under in the spring, followed by clean culture throughout the summer, is a most effective method of soil treatment where irrigation is not applicable, and where there is a shortage of irrigation water. Owing to the necessity of purchasing seed annually, and to the cost of frequent summer tillage this practice is quite expensive.

Where sufficient moisture is available the soil can be rapidly and effectively improved by maintaining crops during the entire year in the orchard. As an additional amount of water is necessary for this purpose, irrigation must be applied in many instances where it has not previously been needed. Its adoption, however, causes only a slight change in cultural practice where a system of clean culture is in vogue.

By making a close study of the effect of clover and alfalfa upon mature trees and soil in many orchards in the Pacific Northwest, no detrimental results have been observed where sufficient water is used for both crops. It is important, however, not to permit such crops to remain on the land for too long a period without cultivation. Crops grown in the orchard are of little fertilizing value until plowed in and partially decayed. The frequency at which cultivation is necessary for proper aeration, depends a great deal upon the porousness of the soil. Alfalfa, clover and similar plants can be allowed to stand longer on light than on heavy soils without damaging them.

For the reason that clover lasts only two or three years, it is preferable to alfalfa for general use. It grows better than alfalfa under mature trees, owing to its greater tolerance of shade. When alfalfa is used the land should be plowed and worked frequently, as it

can be done without injuring the stand, provided the soil is not permitted to dry out. The extent to which crops of this nature should be grown upon, and incorporated into the land will be influenced by the state of neglect the land is in, the success of crops grown for the purpose, and upon the character of the soil. One crop should greatly benefit any soil, and two or three should restore most soils to a desirable condition. It is possible that sufficient nitrogen can be supplied before a desirable physical character of the soil is obtained. In such an instance crops low in nitrogen should be grown for a period. When the proper state of soil improvement is reached systematic summer culture should be resumed until additional fertilizer becomes necessary.

As a matter of economy in the management of the orchard all forage grown between the trees should be fed to live stock, instead of being worked directly into the ground. For this purpose dairying, hog-raising and sheep raising can be practiced with a fair degree of profit. As it is expensive to harvest hay necessary for cattle, much of the forage should be pastured by hogs or sheep. Although but few orchardists are experienced in the handling of live stock, many of them have up to the present time, kept a few animals very successfully on their orchard tracts. In selecting stock to use, one should be influenced by the amount of hay he can produce, and by his personal preference of kinds of stock.

Although sheep have not been extensively tried, they offer a very promising possibility for utilizing clover and grass crops grown in the orchard. The principal interest in sheep is due to the fact that they do not require grain. Grain is expensive in most fruit districts, and must be had to get maximum returns from dairy cows and from hogs. Where it is obtainable at a moderate price, hogs will doubtless yield greater returns than sheep or dairy cattle. Hogs pastured on alfalfa in a young apple orchard, on the Umatilla Experiment Farm in 1914, yielded a net return of $47.48 per acre.

The introduction of forage crops into the orchard necessitates the growth of two widely distinct kinds of vegetation upon the same land, therefore, plants should be chosen for this purpose that differ materially in their fertilizer requirements from fruit trees. By so doing there is less danger of failure on the part of the introduced crop or of the orchard. Since there is a close relation between the amount of water consumed by plants and the amount of vegetation produced upon a given area of land, the growth of two crops on the same soil calls for approximately a double amount of moisture provided both produce normally.

As many mature orchards have been more or less injured by drouth, notwithstanding the fact that systematic clean culture has been given them, it is very evident that irrigation is necessary for the growth of crops for green manure. That a liberal supply of moisture is necessary for the proper growth and productiveness of trees there can be no doubt.

Moisture determinations made during the early part of August, in orchard soils receiving different cultural treatment show that in

some instances the trees are surrounded by very uncongenial conditions. The samples were taken from that area of soil in which the greater part of the feeding roots of the trees are located. Where continuous clean culture has been practiced the moisture contained is 7.4%, where a crop of alfalfa has been inadequately irrigated the soil contained but 4.28% of moisture, and where the soil has been effectively improved by the use of green manure crops and irrigation 15.9% of moisture was found.

The wilting coefficienct of soils very similar in physical character to this has been found to be 7.7%, which is the Hood Silt Loam of the Hood River Valley, and the moisture equivalent 14%. From this it can be seen that the trees receiving clean cultivation and those among which improperly managed alfalfa is grown, are decidedly in distress. Both show visible signs of distress and the foliage of those accompanied by alfalfa is badly wilted.

The soil in these orchards, which was originally very similar in texture, differs widely now, owing to the manner in which it has been treated. In 1907 it was found by a number of tests, to contain the extremely low amount of 1.08% of organic matter, which has evidently been much reduced as clean culture has been continued.

The amount of irrigation, water, frequency and method of application required under the old system of summer tillage have been worked out for respective soils and crops. Although similar methods in general are advisable for use with clover or alfalfa in the orchard, a large number of details require special care.

When crops are placed in young orchards a strip of land should be left along the rows for cultivation during the summer, as immature trees do not appear to be as successful in competing with such crops as do old trees. In mature orchards crops may be planted over the entire area.

To start these crops by irrigation shallow furrows are necessary so as to permit the surface soil being uniformly moistened to germinate the seed.

Upon lands that are quite nearly level, ridges should be placed in line with the rows of trees in order that large quantities of water can be held in a small area, and forced through the thick stand of forage. This is also necessary as a safe-guard against mushroom root rot, to which apple and pear trees in this district are more or less susceptible.

Irrigation should be applied to mature alfalfa by the above method, or by two or three deep furrows to a space between tree rows.

Crops can be started on steep land by taking advantage of periods of damp weather to avoid the use of irrigation water. If irrigation is attempted when the ground is soft and the plants are small, much washing is liable to result. When the crops are well established, large quantities of water can be run on steeply sloping land without injury to soil or by washing.

It has been the general practice in a number of our fruit-growing districts to irrigate bare soils by means of numerous shallow fur-

rows. This method is necessary and effective on coarse sandy soil where the movement of soil water under the influence of capilliary attraction is very limited. The finer types of soil should be irrigated by a small number of deep furrows to prevent the surface becoming moistened, which results in heavy loss of water by evaporation. It is also important to prevent the very harmful result of baking and puddling of wet soils that results from exposure to the sun. The use of deep furrows permits of better distribution of the water in the soil, a saving of labor and a minimum of loss of moisture.

The decided change in systems of orchard culture cited above has now become quite general throughout the Pacific Northwest. It is one of great value to the horticultural industries. Not only is it less expensive than the old elaborate systems of clean culture, but it is well suited to the needs of orchards and orchard lands. By growing fertilizers on the land a great saving is effected in the cost of production. Although more water is required, returns more than sufficient to justify its cost can be gained. Successful and economical methods of handling water are rapidly being established and a higher duty derived from its use than resulted when it was applied to impoverished soils.

By keeping orchard soils in a high state of fertility by the growth and utilization of nitrogenous and other crops in the orchard, the yield and period of usefulness of the trees will be greatly increased, whereas, without such care many excellent orchards have become unfruitful at the extremely low age of from twelve to eighteen years.

WASHINGTON POMOLOGICAL INTERESTS.

PROFESSOR R. T. BARNETT.

Among the states that border on the Pacific Coast you will no doubt remember that Washington is the most northern of them. We have heard from the representatives of California and Oregon, and although I will have no chance to compete with the very able boosting and the scientific addresses which have been presented from these other states, still I wish to leave with you some idea of the distribution and the extent and the type of pomology that is going to make the State of Washington still more famous as a fruit-growing region than it is at the present time.

You will all realize that Washington is a new state. It has come into any pomological notice it may have within the last twenty years. We have made many errors and mistakes, but we have made considerable progress considering the conditions under which we have worked. I trust to make this a comparatively brief and friendly talk, rather than address, feeling sure that our President will stop me if I trespass beyond the time limit which has been assigned to me.

We have in Washington another region where we have the possibilities of apple growing, that is in the Lake Chelan region, and the Walla Walla region. The Lake Chelan region is here (indicating on

blackboard sketch of the State of Washington), and the Walla Walla region is here (indicating). The original Lake Chelan orchard is here, planted by the Indians and grown from seed. The Walla Walla region has a large majority of budded or grafted trees. Insects and diseases prevailed, and these practically, almost entirely, eliminated the first generation plantings, and it was only after spraying came in that we had high grade fruit in this state.

The state, in a pomological way, is divided as you may remember into three parts. The first part I will mention is Western Washington; and by Western Washington I mean that part between the Pacific Ocean and the Cascade Mountains, which traverse the state from north to south. The others are the irrigated valleys, and the dry uplands, both of which have importance in a pomological way.

I will speak a few moments of that part lying west of the Cascade Mountains in what is known as the humid section of the state. The rainfall there runs from twenty inches up to one hundred inches. Here (indicating on map) would be a dry part of Western Washington, where the Olympic Mountains intercept the water-carrying clouds that come from the Pacific. The greater part of this is well watered. That being the case fruits, such as the apple, are not cultivated there to any extent. The scab is bad there where it rains eight to nine and sometimes ten months of the year, as it washes off the spray materials. In spite of that, there are several sections in Western Washington where a good many fine apples are being grown. They have not the smooth appearance of the Eastern Washington apples, but we have in Western Washington some regions which produce good apples.

I collected apples from Western Washington and from Eastern Washington and from seven Middle and Western States. I peeled those apples and presented them to a class in pomology, and in that class of twenty, studying pomology there was no knowledge as to where those apples were grown. Nor could anyone distinguish any difference between them. I believe if they are well grown there is no one can tell the difference.

Western Washington is noted for its pears, in a small way, and it would be more noted in that way, as well as with the growing of small fruits and berries especially, if greater attention was paid to that branch of the industry. Puyallup Valley here is eight or nine miles long, and it is practically planted solid with berry crops, gooseberries, red raspberries, the Logan berry and finally the evergreen blackberry. I cannot stop to dwell on their efforts and accomplishments in that valley. In 1902 they started a cannery to take care of their overplus of fruit. They appropriated $1,200, and assessed the members at one dollar per member for that cannery. They have put no more money in that, but last year they put up a pre-cooling plant in that valley, quite after the Government's suggestion. They are able to ship the red raspberries to Cincinnati and Chicago, and they say they could ship them entirely to New York City. I have seen as many as twelve carloads going out of Puyallup Valley in one day. They stopped the Twentieth Century

Limited and put as many as six cars of berries on that fast train going East. It is a wonderful business for them to have built up there. That could be developed even further. They have moist weather right up to the day the picking of the red raspberries begins. That spoils their strawberries, but the dry season begins when the picking season of the red raspberries starts. I have seen seven hundred and twenty crates per acre of Snyder blackberries grown in that particular valley.

Sumner is the next station in the valley, but there is a region here (indicating on chart) just above where we find considerable prune growing. They grow there also the English walnut and other crops of that sort. They have been slack in doing their work, such as fertilizing and spraying and so forth. There are some regions around the mouth of the Columbia River where cranberries can be grown, and in the early future we will be producing the cranberries for the Pacific Coast. Our cranberries are poor in keeping qualities, but they are excellent otherwise. I have compared them with the ones shipped from Wisconsin. The Wisconsin ones will not hold up in quality.

The only solid carload of currants that ever was shipped in the world, was shipped out of Puyallup to Vancouver and British Columbia. Those two places will take a considerable quantity of black currants. I cannot leave Western Washington without mentioning the pear industry.

I have talked with a number of men who have been in Belgium and Southern England, and they assure me that the climatic conditions and the soil of the regions over there can be duplicated in Puget Sound regions; and many men are making considerable plantings in Western Washington.

If any of you have ever the opportunity it would be of great pomological interest to you to visit Mr. Stephen Hahnly on Vashon Island. He says the water falling on that island varies between one degree in summer and winter. So you can see the influence on that small island of that rain. Pears will become important in that part of Washington.

Mr. Paulhamus told me he would contract in five-year periods for all that could be contracted for canning purposes.

The Eastern section of Washington is divided into two pomological districts. These cannot be sub-divided on the map as they intermingle with each other. The first is the valley sections. This region is scattered all over Eastern Washington, practically in the valleys along the streams which I have shown here (indicating on blackboard). This branch system here (indicating) is accurately shown.

We have here the Spokane River; here is the Snake River (indicating), and here is the mountain streams flowing in the Columbia River. Now, those mountain streams have valleys of varying width, and because there are varying rainfalls on the eastern slope of the Cascade Mountains, it is practicable for us to store water and to irrigate a considerable acreage of land in these valleys. Much of

these lands have been given over to the growing of fruit. In this section (indicating) the apple is so much in advance of any of the other fruits that we might dispense with a discussion of other fruits than the apple. It is grown in all of these valleys, and to a high degree of perfection. I might designate what I mean by this—this is the longest river and the largest valley in this section—Columbia (indicating). The next is Chelan Lake and the short river connecting that with the Columbia River. Now all of these are to some degree developed in fruit growing. Last spring I was in the upper Columbia River Valley, and they expected in that neighborhood, in that valley, to have one hundred and fifty carloads of extra fine fruit. Our grade terms here as Extra Fancy, Best, Fancy, and Choice.

It will cost these people from ten to fifty cents to haul to the railroad. There the development of the region has gone ahead of the means of transportation, and unless a railroad comes up and down the valley, those fruit trees will have to be cropped out to alfalfa. This (pointing) little valley up here is in much the same situation. There is a man there with eighty acres of apple-bearing land. This (indicating) land here is up near British Columbia, and it now has a railroad built down where it connects with the Great Northern. The development of this valley is more fortunate, although it has not developed in fruit growing as much as the other valleys on each side of it. This, of course, is one of the great, great difficulties. The promotors get ahead of the transportation people, but the transportation people will catch them after considerable time.

They say our handicap up there is in the neighborhood of fifty cents a box on fruit to the Eastern market. That must be taken into consideration in figuring what the profits from Western grown apples might be. This Snake River Valley is comparatively wide, and if you get opportunity you might find it interesting to study. I can not help thinking of the meteorological conditions there. It is some two thousand feet deep, and you find a place to dive nearly to the bowels of the earth from that top. I have seen the land drop 1700 or 1800 feet in a distance of 3,000.

Now, the cold air does not dip into that valley (indicating). I might say that of this section around Lewiston. Pullman is 2,600 feet higher than the valley floor a few miles away.

Some of these sections raise apples of a very high quality, and the consumers, at least it looks as if the consumers are beginning to recognize quality. Those California pears must have been picked while green, and they could not develop the quality which bears shipping from here if they did not do that. And, of course, that makes a great difference in the quality of the fruit.

The strawberry growers in this section are very prosperous at the present time. They have splendid crops there. This region also grows large quantities of peaches, some apples and some other fruits.

Our problem is what to do with the apples not fit to be shipped away.

The growers have this year organized a growers' council, with which is affiliated all of the large and small associations of the state; and this council has certain powers over the marking and marketing of fresh fruits and of fruit products which we hope will assist in solving the problem. (Applause.)

IDAHO — POMOLOGICALLY CONSIDERED.

PROFESSOR C. C. VINCENT.

INTRODUCTION.

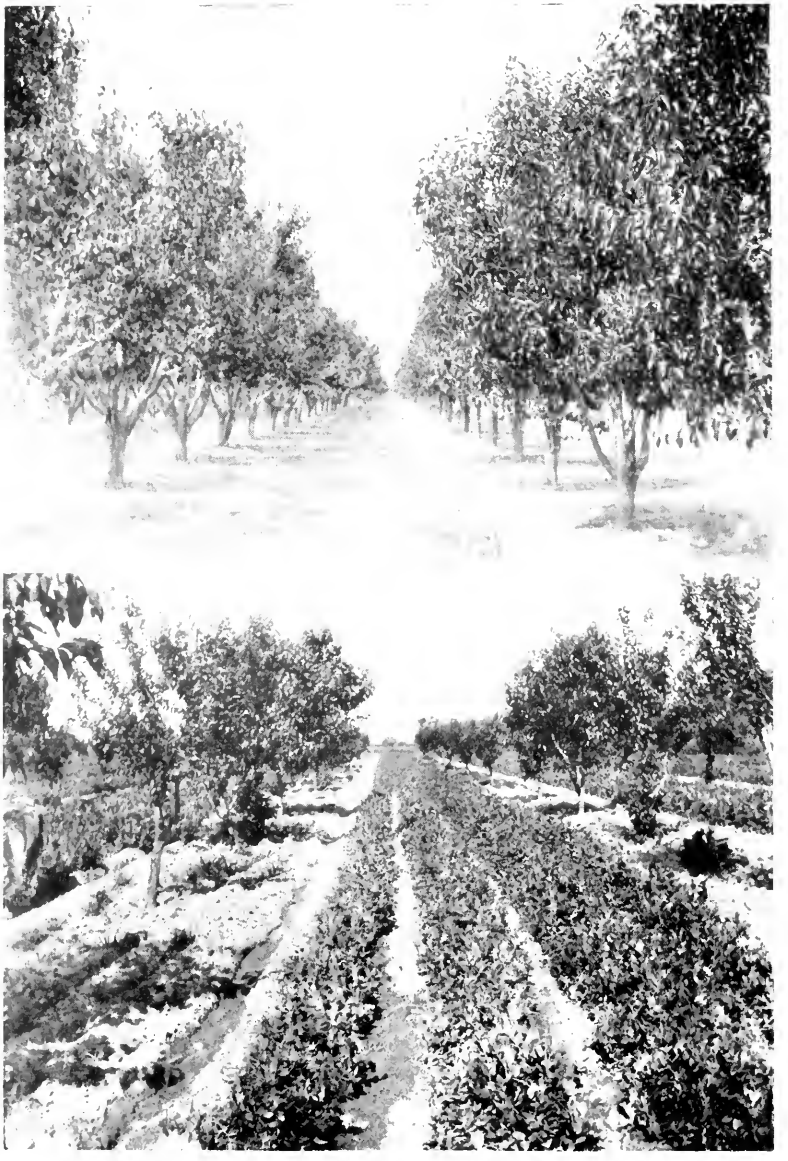
The State of Idaho, lying west of the Rocky Mountains, is of vast extent and wide diversity of topography. It has a range north and south of approximately seven hundred miles, extending from the forty-second to the forty-ninth parallel of latitude. Its breadth east and west, at its widest point is about two hundred miles. Taking the state as a whole, the altitude ranges from that of central and northern Indiana to more than five thousand feet above the highest peaks of the Appalachian system.

Some of the salient features of Idaho are its sage brush plains, high snow capped mountains and timbered plateaus. Along the eastern border of the state lie the Coeur d'Alene, Bitter Root, Cabinet and many other ranges of mountains. The Owyhee mountains lie in the southwest corner and their lateral spurs extend almost to the Snake River. The native vegetation of the whole of the southern part of the state, as far north as the middle of Washington county, is sage brush. This entire area is a vast agricultural region, having at the present time 1,843,039 acres of irrigated lands. South Idaho is an arid region, the rainfall being from eight to fifteen inches. The timbered plateau extends over most of the northern and central parts of the state. The principal trees found in this area are Yellow Pine, Red Fir, and White Pine. The northern part of the state is humid, the anuual precipitation varying from twenty-twenty-five inches. The agricultural lands lie mostly near the western border. The state is entirely drained by the Snake River and other tributaries of the Columbia.

DEVELOPMENT OF FRUIT INDUSTRY.

Never in the history of our state has so much interest, so much intelligent thought been given to land, to the soil, to the possibilities that may be realized in its improvement, as at the present. Hardly half a century has elapsed since the pioneers laid the foundation of the empire in the "Gem of the Mountains" and yet progress is noted on every hand. The development of the fruit industry of the state is an interesting story. When H. H. Spaulding, a missionary in this country, started the first orchard in the state, little did he dream that within the next quarter of a century, the value of the annual fruit crop would be more than two millions of dollars. In

A TYPICAL IDAHO ORCHARD OF TODAY



WITH CLEAN TILLAGE IN IDAHO.

WITH INTERCROPS AND "WATER," IDAHO.

the year 1836 Mr. Spaulding started an orchard on the Clearwater River, a few miles above Lewiston, at a place now known as Joseph. In the southern part of the state, two small orchards were set out on the Snake River near the Brown Lee country in 1862. Small plantings were also made on the Payette River in 1863 and near Boise in 1865. From these small plantings, the fruit industry has developed until now there are over 140,000 acres planted to orchards, having a valuation of $6,021,109.00. This acreage is distributed as follows: Apples, 110,000 acres; prunes, 12,000 acres; pears, 3,000 acres; peaches, 5,000 acres; mixed fruit, 10,000 acres. The plantings have been wisely and carefully done. The lands selected are ideally adapted for producing tree fruits and the varieties have been wisely chosen. It appears that there will be a very small acreage planted the next few years, as the general sentiment is that we should wait until we have developed markets for our present acreage before making any further plantings.

Fruit Districts.

Owing to differences in altitude and climatic conditions, the state may be divided horticulturally into several distinct districts:

THE NORTH IDAHO OR PANHANDLE DISTRICT.

This section includes the timbered territory of North Idaho and especially the country around Coeur d' Alene, Hayden Lake, Pend Oreille Lake, Sandpoint, Bonners Ferry, Clarks Fork, Rathdrum, and Post Falls. It includes all of Bonner county and parts of Kootenai, Shoshone, Latah, Clearwater and Idaho counties. This is a large district and there is considerable variation in the conditions in different parts of it. The section around Coeur d' Alene and Post Falls is really one end of the Spokane Valley and here the soil and precipitation are quite different from the soil and precipitation around Bonners Ferry or Sandpoint. Conditions around Rathdrum are also quite similar to those around Post Falls.

The soils of the northern part of the state vary in texture from silt loams to sandy loams and in color from red to black. Around Bonners Ferry, the red sandy loams predominate while around Pend Oreille Lake and Sandpoint, the soil consists of red silt loams. The typical Spokane Valley soil is a gravelly black, silt loam. The timber soil around Coeur d' Alene consists largely of a reddish silt loam. The bottom land around Clarks Fork is a gravelly, gray, silt loam.

The climate is mild in summer and not severe in winter. The elevation varies from 1500 to 2500 feet. The annual precipitation is from twenty-twenty-five inches and is sufficient to mature horticultural crops although irrigation is practiced in several localities.

The local conditions such as soil, air drainage, elevation and slope are important considerations in the establishment of an orchard in this district.

The varieties in large type are recommended for commercial planting.

LIST OF VARIETIES FOR NORTH IDAHO DISTRICT.

Apples:—WAGENER, ROME BEAUTY, TOMPKINS KING, JONATHAN, BANANA, Wealthy, Grimes, Oldenburg, Gravenstein, Yellow Transparent, Baldwin, Northern Spy, Wolf River, Yellow Bellflower, Bellflower, Transcendent (Crab), Hyslop (Crab).

Pears:—BARTLETT, FLEMISH, Kieffer, Howell, Anjou.

Peaches:—Early Hale.

Cherries:—Napoleon *(Royal Ann)*, Bing, Lambert, Republican, Wood, Morello, May Duke, Late Duke, Montmorency.

Prunes:—Italian, Pond *(Hungarian)*, SILVER, Golden, AGEN *(Petite)*.

Plums:—Peach, Burbank, DAMSON, Green Gage, Columbia, Golden Drop, Yellow Egg.

Strawberries:—PARSON, Gandy, William Belt, Dunlap, Clark, Glen Mary.

Dewberries:—Lucretia.

Blackberries:—Snyder, Early Harvest, Eldorado, Taylor.

Red Raspberries:—Cuthbert, Loudon, Turner, RANERE *(St. Regis)*.

Blackcap Raspberries:—Cumberland, Gregg, Kansas.

Loganberries:—Do well in parts of the district.

Gooseberries:—Downing, Pearl, Houghton, OREGON CHAMPION.

Currants:—Cherry, Fay, Perfection, White Grape.

Grapes:—None.

THE PALOUSE DISTRICT.

This district includes all of the typical, rolling, wheat-growing region, known as the "Palouse Country." The commercial orchards are mostly located around the towns of Viola, Moscow, Potlatch, Genesee and Princeton. As conditions are quite similar on the "Camas Prairie" which lies in Idaho, Lewis, Clearwater, and Nez Perce counties, it is also included in this district. The larger plantings of fruits on "Camas Prairie" are found in the vicinity of the towns of Grangeville, Cottonwood, and Nez Perce.

Irrigation is not necessary in this district. The rainfall being from twenty-twenty-five inches, is sufficient to grow crops successfully, although a good dust mulch is essential in order to obtain size to the fruit. The deep, friable soils are of basaltic formation, very fine in texture, and hold moisture remarkably well. The elevation varies from 2000 to 3500 feet.

Pear growing is rapidly gaining prominence, in certain parts of this district. The growers have had very little trouble with blight and where systematic patrolling of orchards is practiced, it has been practically eradicated.

All sweet cherries do exceptionally well. The Bing is the leader, although the Napoleon *(Royal Ann)* and Lambert are excellent. The sour cherries also find here soil and climate congenial to their growth.

LIST OF VARIETIES FOR THE PALOUSE DISTRICT.

Apples:—WAGENER, GRIMES, ROME BEAUTY, JONATHAN, Early Harvest, Yellow Transparent, Red Astrachan, Tompkins King, Gravenstein, Banana, Rhode Island Greening, Blue Pearmain, Transcendent (Crab), Whitney (Crab).

Pears:—BARTLETT, FLEMISH, Clapp Favorite.

Peaches:—None do well.

Cherries:—BING, Napoleon *(Royal Ann)*, LAMBERT, Morello, May Duke, Late Duke, Richmond.

Prunes:—Italian, Agen, Pond (*Hungarian*).

Plums:—DAMSON, Bradshaw, Washington, Wickson, Burbank, Abundance.

Strawberries:—CLARK, PARSON, Marshall, William Belt, Dunlap.

Dewberries:—LUCRETIA.

Blackberries:—Snyder, Early Harvest, Lawton.

Red Raspberries:—Cuthbert, Ranere, Marlboro.

Blackcap Raspberries:—Gregg.

Loganberries:—Do well.

Gooseberries:—Downing, Oregon Champion.

Currants:—Victoria, Cherry, Fay.

Grapes:—None do well.

Apricots:—Moorpark, Blenheim.

THE LEWISTON DISTRICT.

This district includes the territory around the town of Lewiston in the Lewiston Valley. It extends up the Clearwater Valley to Stites; up the Potlatch Creek Valley to Kendrick; and south from Lewiston along the Snake River.

The average elevation of this district is low. It varies from 700 feet, which is the elevation of the business streets of Lewiston, to about 2000 feet at the upper end of the Potlatch Creek Valley. The annual precipitation ranges from twelve-twenty inches. Irrigation is practiced in the Lewiston orchards as well as in parts of the Clearwater and Snake River Valleys. Practically all kinds of fruits of excellent quality are raised here. In a few favored localities, the European grape, such as Flame Tokay, Muscat, etc., are grown successfully.

A large percentage of the fruit in this district is grown on a bench, about three miles southeast of Lewiston at an approximate elevation of 1500 feet, known as the "Lewiston Orchards." In these tracts there are about 6000 acres. A few varieties of fruits are grown in this locality that do not do well in other parts of the state, among them being the Esopus *(Spitzenburg)* and Yellow Newtown varieties of apples.

LIST OF VARIETIES FOR THE LEWISTON DISTRICT.

Apples:—ROME BEAUTY, ESOPUS *(Spitzenburg)*, JONATHAN, WINESAP, YELLOW NEWTOWN, DELICIOUS, Banana, McIntosh, Yellow Transparent, Oldenburg, Wealthy, Bellflower, Gravenstein, Martha (Crab), Whitney (Crab).
Pears:—BARTLETT, Flemish, Anjou, Winter Nelis, Kieffer.
Peaches:—ELBERTA, EARLY CRAWFORD, LATE CRAWFORD, Muir, Lemon Cling, Indian Cling, Triumph, Alexander, Early Hale.
Cherries:—Bing, Napoleon *(Royal Ann)*, Lambert, Richmond, May Duke, Late Duke, Montmorency.
Prunes:—Italian, SILVER, German.
Plums:—Yellow Egg, Green Gage, Burbank, Wickson, Lombard.
Strawberries:—GOLD DOLLAR, CLARK, Warfield, Glen Mary, William Belt, World *(World's Wonder)*.
Dewberries:—Lucretia.
Blackberries:—Snyder, Himalaya, Taylor, Lawton, Kittatinny, Early Cluster.
Red Raspberries:—Cuthbert, Red Antwerp, Ranere.
Blackcap Raspberries:—Gregg, Cumberland, Kansas.
Loganberries:—Do well.
Gooseberries:—Oregon Champion, Downing.
Currants:—Perfection, Victoria, Fay, White Grape.
Grapes:—CONCORD, Moore, Niagara, Brighton.
Apricots:—Royal, Blenheim, Moorpark.

THE PAYETTE DISTRICT.

This district includes the territory along the Payette River from its mouth to the Horseshoe Bend and Brown Lee country; along the Snake River from Weiser to Payette; and along the Weiser River from Weiser to the Council Valley. A large percentage of the fruit is planted around the towns of Payette, Fruitland, New Plymouth, Emmett, Woods Spur, Jonathan and Weiser. This is the largest fruit district of Idaho, calculated on the basis of the acreage planted to fruit. The soils are volcanic ash and vary in texture from light sandy loams on the uplands, to heavy dark loams in the valleys. The annual precipitation ranges from ten-fifteen inches. Irrigation is necessary.

The Council Valley section is located along the upper Weiser and Council Rivers. Its elevation varies from 3000 to 4000 feet. The protection is very good and fruit of fine quality is grown. Approximately 3000 acres are in fruit at the present time.

Almost all kinds of fruit of excellent quality are grown in the Payette District. However, at the present time, apples and Italian prunes are the leaders in importance from a commercial standpoint. Blackcap raspberries are also of some importance commercially. Almost all kinds of apples row well, although the six varieties

named are the leaders. The Arkansas Black is one of the best money makers with the Rome Beauty a close second. The acreage in Jonathans is large.

LIST OF VARIETIES FOR THE PAYETTE DISTRICT.

Apples:—ARKANSAS BLACK, ROME BEAUTY, WINESAP, JONATHAN, BEN DAVIS, GANO, Delicious, Winter Banana, Stayman Winesap, Grimes, Wealthy, Yellow Transparent, Gravenstein, Hyslop (Crab), Martha (Crab).
Pears:—Bartlett, Anjou, Flemish, Winter Nelis, Clairgeau.
Peaches:—ELBERTA, LATE CRAWFORD, EARLY CRAWFORD, Orange Cling, Early Hale, Triumph, Alexander.
Cherries:—BING, NAPOLEON *(Royal Ann)*, LAMBERT, Late Duke, May Duke, Richmond, Morello, REPUBLICAN.
Prunes:—ITALIAN, Pond *(Hungarian)*, SILVER, Agen, German.
Plums:—Peach, Bradshaw, Golden Drop, Yellow Egg, Abundance, Damson.
Strawberries:—DUNLAP, WARFIELD, GLEN MARY, WILLIAM BELT, Aroma, Parker Earle, Jumbo, Superb, Progressive.
Dewberries:—Lucretia.
Blackberries:—Snyder, Lawton, Himalaya.
Red Raspberries:—Cuthbert, Columbian.
Blackcap Raspberries:—GREGG, Kansas.
Loganberries:—Do well.
Gooseberries:—Downing JOSSELYN.
Currants:—Cherry, Fay, White Imperial.
Grapes:—CONCORD, Niagara, Moore, Delaware, Worden.
Apricots:—Blenheim, Moorpark.

THE BOISE VALLEY DISTRICT.

This district includes the entire Boise Valley with Boise at one end and Parma at the other. It is about thirty-five miles long and varies in width from two to ten miles. While fruit is raised in the entire valley, most of the commercial orchards are found in the country around the towns of Boise, Eagle, Star, Parma, Collister and Middleton on the north side of the river, and Meridian, Nampa, Caldwell, and Roswell on the south side. There are approximately 25,000 acres and it is the second largest fruit district in Idaho.

While many varieties of apples do excellently in this district, the Rome Beauty, according to many of the growers, is the most profitable. However, the growers are almost unanimous in agreeing that the Italian prune is the leading money maker in the Boise Valley at the present time.

The soils of the Boise Valley are very rich, being volcanic ash of a decomposed basalt. The elevation varies from 2000 to 3000 feet.

The annual precipitation is from ten-fifteen inches. Irrigation is depended upon to mature crops grown in the valley.

LIST OF VARIETIES FOR THE BOISE VALLEY DISTRICT.

Apples:—ROME BEAUTY, JONATHAN, WINESAP, ARKANSAS BLACK, DELICIOUS, BEN DAVIS, GANO, Yellow Transparent, Red June, Oldenburg, Gravenstein, Grimes, White Pearmain, Banana, Baldwin, King David.
Pears:—Bartlett, Winter Nelis, Anjou, Flemish, Kieffer, Howell, Clairgeau.
Peaches:—Elberta, Early Crawford, Late Crawford, Champion, Crosby, Alexander, Early Hale.
Cherries:—RICHMOND, MORELLO, MONTMORENCY, MAY DUKE, LATE DUKE, DYEHOUSE, Bing, Napoleon *(Royal Ann)*, Lambert, Republican.
Prunes:—ITALIAN, Agen, Pond, Silver.
Plums:—Peach, Damson, Yellow Egg, Bradshaw, Green Gage.
Strawberries:—UNCLE JIM, MICHIGAN PRIDE, WILLIAM BELT, GLEN MARY, JUMBO, Climax, Magoon, Parson.
Dewberries:—Lucretia.
Blackberries:—Snyder, Lawton, Taylor, Early Cluster.
Red Raspberries:—Cuthbert, Ranere.
Blackcap Raspberries:—Gregg, Cumberland.
Loganberries:—Do well in some locations.
Gooseberries:—Downing, Josselyn, Industry.
Currants:—Fay, Cherry, Red Cross, Red Dutch, Perfection, White Grape.
Grapes:—Niagara, Moore, Concord, Worden.

THE SNAKE RIVER CANYON DISTRICT.

This district consists of:

(a) The Homedale section which includes Indian Cove, Central Cove, Sunnyside, Fargo and Peaceful Valleys. All of these are coves along the Snake River. This section is well adapted to fruit as the climate is excellent for fruit growing purposes. However, trees should not be planted on the adobe land on the floor of the river valley. There are about 2000 acres in this section which is distributed along the Snake River for thirty miles.

(b) The Upper Snake River Canyon section consists of Grand View, Medbury Valley, Glenn's Ferry, King Hill, Swiss Valley, Hagerman Valley, Crystal Springs, Niagara Springs and Blue Lakes. This is approximately one hundred miles long and is a narrow canyon varying in width from one to four miles. The fruit is planted in spots.

The entire district is located directly along the Snake River. The hills or canyon walls on each side of the river afford an excellent protection although there is a wide variation. At Blue Lakes, the

canyon walls of the river are very steep and about eight hundred feet high, while in the Homedale section, the valley is much wider and the hills not nearly so abrupt nor high.

This entire area has a mild climate and long growing season, well adapted to the growing of fruits and there are localities where even tender fruits such as European grapes are grown successfully. Apples do well and are grown commercially.

Peaches, sweet cherries, grapes, etc., have the advantage of a good local market, due largely to the fact that they ripen earlier than those grown outside of the canyon district. Sour cherries are excellent and sweet varieties do well. Prunes, plums, strawberries and all of the small fruits grow well and produce abundantly.

LIST OF VARIETIES FOR THE SNAKE RIVER CANYON DISTRICT.

Apples:—JONATHAN, ROME BEAUTY, WINESAP, DELICIOUS, GANO, Wagener, Yellow Transparent, Gravenstein, Hyslop (Crab), Red Astrachan, Ben Davis, Arkansas Black, White Pearmain.
Pears:—Bartlett, Kieffer.
Peaches:—ELBERTA, EARLY CRAWFORD, EARLY HALE, Late Crawford, Alexander, Carman.
Cherries:—Bing, Napoleon *(Royal Ann)*, Lambert, Richmond, Morello, Montmorency, Wood.
Prunes:—ITALIAN, Agen, Silver, Pond.
Plums:—Damson, Bradshaw, Abundance, Red June.
Strawberries:—Dunlap, Gandy, Jucundo, Chesapeake.
Dewberries:—Lucretia.
Blackberries:—Eldorado, Snyder.
Red Raspberries:—Cuthbert, Ranere, Columbian.
Blackcap Raspberries:—Cumberland, Kansas, Gregg.
Loganberries:—Do well.
Gooseberries:—Downing, Josselyn.
Currants:—Fay, Cherry, White Imperial.
Grapes:—Concord, Moore, Niagara, Muscat, Tokay, Cornichon, Sweetwater.
Apricots:—Blenheim, Royal.

THE TWIN FALLS DISTRICT

This district includes:

(a) The territory known as the North Side Twin Falls section and the country surrounding where the conditions are similar, especially the vicinity around the towns of Ticeska, Bliss, Jerome, Gooding, Wendell, Shoshone and Richfield. The conditions in the Richfield project are somewhat different from those on the North Side Twin Falls as the elevation is greater. In this entire section, there are approximately six thousand acres in fruit.

(b) The South Side Twin Falls section, especially the area surrounding the towns of Hansen, Kimberly, Twin Falls, Filer, Buhl,

Minidoka and Burley. Minidoka and Burley are located on the Minidoka project and at the present time very little fruit is grown in this vicinity. In this section there are about 19,000 acres in fruit.

(c) The Salmon Tract. This is a flat, irrigated country located to the east of Salmon River and watered by the Salmon River and Deep Creek. There are approximately three thousand acres in fruit.

The average elevation of this district is quite high, varying from 3500 to 4500 feet. The soil is a clay loam and is excellent for the production of fruit. Throughout the district, irrigation must be practiced in order to produce crops.

LIST OF VARIETIES FOR THE TWIN FALLS DISTRICT.

Apples:—JONATHAN, ROME BEAUTY, DELICIOUS, WAGENER, STAYMAN WINESAP, GRIMES, Gano, McIntosh, Yellow Bellflower, Rhode Island Greening, Banana, Yellow Transparent, Wealthy, Gravenstein, Oldenburg, Hyslop (Crab).
Pears:—Bartlett, Flemish, Winter Nelis.
Peaches:—Early Crawford, Elberta, Alexander, Mamie Ross, Early Hale, Triumph.
Cherries:—Richmond, Montmorency, Napoleon *(Royal Ann)*, Dyehouse, Morello.
Prunes:—Italian, German, Silver.
Plums:—Green Gage, Lombard, Damson, Abundance, Bradshaw.
Strawberries:—Glen Mary, Clark, Dunlap, Clyde.
Dewberries:—Lucretia.
Blackberries:—Snyder, Eldorado, Erie, Early Harvest.
Red Raspberries:—Cuthbert, Turner, Loudon.
Blackcap Raspberries:—Cumberland, Gregg, Kansas.
Loganberries:—Do well.
Gooseberries:—Downing, Oregon, Champion, Josselyn.
Currants:—Fay, White Grape, Cherry, Red Dutch.
Grapes:—Moore, Campbell, Diamond, Niagara.
Apricots:—Blenheim, Royal.

THE BLACKFOOT AND IDAHO FALLS DISTRICT.

This district consists of a strip of land running from Blackfoot through Idaho Falls and on to St. Anthony, being approximately eighty miles long and thirty miles wide. The average elevation is about 4700 feet. There is a gradual rise in elevation from Blackfoot to St. Anthony of about thirteen feet to the mile. In general, the soil is excellent.

Owing to a greater elevation, the area planted to fruit in this district is small compared with some of the other fruit districts of Idaho. There are some favored localities where commercial plantings have been made. Sour cherries, dewberries, blackberries and blackcap raspberries are grown on a small scale. Prunes and plums

do well, while strawberries, red raspberries, gooseberries and currants grow to perfection.

LIST OF VARIETIES FOR THE BLACKFOOT AND IDAHO FALLS DISTRICT.

Apples:—WEALTHY, GRAVENSTEIN, McINTOSH, Wagener, Rome Beauty, Oldenburg, Rhode Island Greening, Jonathan, Pewaukee, Yellow Transparent, Hyslop (Crab), Transcendent (Crab), Martha (Crab).
Pears:—Bartlett, Clapp Favorite, Flemish.
Peaches:—None.
Cherries:—Morello, May Duke, Late Duke.
Prunes:—Italian, German.
Plums:—Lombard, Yellow Egg, Green Gage.
Strawberries:—DUNLAP, JUMBO, GANDY, MARSHALL.
Dewberries:—Lucretia.
Blackberries:—Snyder, Briton, Eldorado.
Red Raspberries:—Cuthbert, Columbian, Ranere.
Blackcap Raspberries:—Gregg, Cumberland.
Gooseberries:—Downing, Houghton, Industry.
Currants:—Cherry, White Grape, Fay.
Grapes:—None.

MISCELLANEOUS NOTES.

THE PRESIDENT: We might at this time use a few moments in hearing reports from different sections of the country. I will call for a report on Western New York.

MR. GILLETT: I have not been there since last April, and all the reports I hear show that we are one-fourth of a crop short. We had a big freeze on the 26th of May which struck the big apple section; so I get reports of a short apple crop. Twenty-five to thirty per cent shortage.

THE PRESIDENT: Washington now.

MR. BARNETT: My impression is that it will not be in excess of forty to fifty per cent of last year's crop.

THE PRESIDENT: Now let us hear from Oregon.

MR. ROBERTS: Mr. Chairman, the prospects for a crop in Oregon this year are bad. We have a very light crop. Some sections were hit by heavy frost on the night of the 30th of April, and other sections have been hit by drought. In some sections which depended on irrigation the water has failed. Their crop will be small. I doubt if we will have more than forty per cent of a full crop. I think I am safe in saying we will not have more than forty per cent. It is a hard question to definitely answer.

THE PRESIDENT: That is why I asked it. We will now hear from Mr. Taft and Michigan.

PROF. TAFT: Of winter apples, we will have only one-half a crop. We had in some sections cold rain or frost, at the time of blossoming, which cut down the crop. We have a good crop of summer and fall apples.

THE PRESIDENT: From Illinois. Mr. Lloyd will report on Illinois.

MR. LLOYD: They are better than any year for the last three years. A poor crop of some varieties, but a moderate crop of Ben Davis.

THE PRESIDENT: About one-half of all the apple trees in Illinois are dead?

MR. LLOYD: Yes. We have a great many more apples, however, than we had last year.

THE PRESIDENT: We will now hear from Missouri.

MR. WAYMAN: As far as I can learn it is about forty per cent. The apples are of good quality, but the quantity cannot be kept up. The Jonathan and Grimes are especially fine this year, but owing to excessive rains there is some shrinking in the quantity.

THE PRESIDENT: What varieties are short?

MR. WAYMAN: The Ben Davis, that is our principal variety. The reports which I get, although these reports are not general, are to the effect that the best we can get is about forty per cent this year.

THE PRESIDENT: Now let us hear from Idaho.

MR. BLUNCK: (Idaho.) I have not been in Idaho for six months, but I get weekly reports. The frost was not so bad in certain parts of Idaho, but blight is bad up there this year owing to the weather we had in the month of May. They will have about sixty-five per cent of the regular crop this year.

MR. HUTT: (North Carolina.) The North Carolina apple crop, I should say will be sixty per cent of the regular crop. We had excellent prospects this spring, and we looked for a bumper crop, but the blight has been the worst ever known, and it has been with us twenty-five or thirty years. This year it swept down like a cyclone, and some heavy bearing orchards did not have enough left on them for an apple pie. But summing up, I should say we have about sixty per cent of the regular crop.

THE PRESIDENT: Mr. Lord will tell us about California.

MR. LORD: I visited the Watsonville district, and took a thirty-five-mile ride with men well informed there, and they tell me it was about a sixty per cent crop. The apples are too large, but the trees look to me like carrying a light load; but they said there was sixty per cent of the regular crop.

DR. COOK: That district embraces one-half of our California crop.

MR. REAM: San Diego County, there is no crop at all. The second of May cleaned them up.

When I left there we had just commenced to gather the crop. It was very short owing to the drought, and also to the frost which had visited us.

THE PRESIDENT: Let us have a few words from Australia.

MR. L. M. SHOOBRIDGE, of Tasmania: I have been asked to say a little about Australia, but I should like to preface my remarks with an expression of the great pleasure it gives me to meet such a body

as the American Pomological Society. When it was known to your Secretary that I was about to visit this country he extended to me a hearty invitation to be present at this the 34th Biennial Meeting of your Society.

I have listened with great interest and profit to the papers read and discussions on the various aspects of the fruit industry, realizing that we in Australia have much in common with you. Australia is a great country with a wide range of climate and soil, but with a territory as large as the United States we have only a population of a little over five million as against about a hundred million in the States. We sadly need more people for the fuller development of our resources. Australia is eminently a pastoral country, as it is never necessary to house stock even in the severest winter. A large part of Australia is still unsettled, but the value of pastoral products for 1913 (the latest figure I have was over 360,000,000 dollars). Very large areas are suitable for grain growing and the wheat crop for the same year amounted to nearly thirty million bushels, with other grains in proportion. Australia is rich in mineral deposits, but other than gold, silver and copper, have not been worked to any great extent, as we have large deposits of coal with an increase of population other metals will be worked and an impetus given to manufactures.

The railways, post and telegraph systems are owned and worked by the state. Education is free, compulsory and unsectarian. Our form of government is very liberal, every adult, male and female, having the right to vote. Each state has its own Governor and Parliament. There is also a Governor-General and Federal Parliament in which each state has its fair representation. Hitherto the most of the settlement has been near the coast, but with the construction of railways into the interior settlement is rapidly pushing ahead.

As Australia possesses such a wide range of climate and soil every known fruit can be grown to perfection. In the northern parts bananas, pineapples, sugar cane, etc., are extensively cultivated, over two and a quarter million tons of sugar being produced last year. All sub-tropical fruits, as grapes, figs and citrus fruits, thirve to perfection, and the output of dried fruits and wine is considerable and only limited by market conditions. In the southern part all the fruits, as apples, pears, etc., that prefer a cooler climate are found in profusion, and as these can be carried to all parts of the world in refrigerated chambers a big future is in prospect for these. Already a considerable trade is established with England and other parts, and as the area of land suitable is almost unlimited, there is ample room for the development of a pleasant and profitable occupation. For fuller information I would refer you to the Australian Court at the Exposition now held in San Francisco, where you may obtain some of the literature that is distributed there.

The construction of the Panama Canal has been watched with keen interest in Australia, as the completion of this great work should result in the expansion of our trade, especially with your

Eastern States, for as we are in the opposite hemisphere, our fruits ripen in your off season, which should result in an exchange of these products to our mutual advantage.

In conclusion I should like to express how much pleasure it has given me to travel through your great country and view the many natural wonders you possess. Nature has been very liberal to you, providing extensive areas of fertile lands with an abundant water supply, of which you are making good use, as evidenced by the wonderful collection of primary and manufactured products displayed in the Panama Exposition.

A Day in June.

"I could write such a beautiful poem
About this summer day
If my pen could catch the beauty
Of every leaf and spray,
And the music all about us
Of brooks and breeze and birds,
But the greatest poet living
Cannot put them into words.

"If I only could write the color
Of the lilacs tossing plumes
And make you feel in a sentence
The smell of its sweet perfume;
If my pen could paint the glory
Of the blue and tender sky
And the peace that crowns the mountains
My poem would never die!"

—*Ceres Flora Pomona.*

CHARACTERISTICS OF SOME OF THE PRINCIPAL VARIETIES OF AVOCADOS BEING GROWN IN CALIFORNIA.

IRA J. CONDIT.

The number of named varieties of avocados originating in California is at least thirty. New varieties are rapidly appearing as local seedlings and as budded trees from other countries. It is, therefore, very difficult for growers to decide what varieties or variety to plant, either for home use or for market. The accompanying table is presented as a guide to the important characters of varieties as far as we have been able to obtain them. Any additions or corrections will be gratefully received by the writer.

The requirements of a good commercial variety of avocado may be briefly outlined as follows:

1. The bud of such a variety should be able to grow into a vigorous, upright, orchard tree.
2. It should be sufficiently hardy to withstand ordinary frosts.
3. It should be precocious, prolific, and a regular bearer.
4. It should blossom late enough for the flowers to escape heavy spring frosts.
5. The fruit should be of good flavor and quality.
6. The size and shape of the fruit should be uniform and not too large, approaching oval or round, rather than "bottle-necked," and averaging about one pound in weight.
7. The fruit should be well adapted to shipping.
8. The seed should be small and tight in the cavity.

COMPARISON OF AVOCADO VARIETIES.

TREE. Variety	Blake	Chappelow	Topa Topa	White
Locality	Pasadena	Monrovia	Nordhoff	24 W. Arellaga St., Santa Barbara
Owner	Henry A. Stearns	William Chappelow	E. S. Thacher	Mrs. G. A. White
Date of Planting	1903	1893	Seed plantd in 1907; tree in March, 1909	1897
Origin of Seed		Monterey, Mexico	Probably Mexican	Mexican
Diameter of Trunk 3′ from Ground, 1914		22.5″	5.5″	9.4″
Height, 1914		40′	17′	20′
Spread, 1914		65′	Medium spread	21′
Age of Bearing		5 years from seed	3 years	Few fruit third year
Yield	Moderately Prolific	Average of 11 years, 518 fruit		Prolific, 400 fruit
Time of Blossoming		Nov.-March	January	February
Season	Sept.-Oct.	July-Nov.	Sept.-Oct.	Sept.-Jan.
FRUIT. Size	Length 4″ Diameter 2¼″	Length 4¼″ Diameter 3½″	Length 3¾″ Diameter 2⅛″	Length 4¼″ Diameter 2¼″
Shape	Oblique - Pyriform. Neck 1¼″ long	Elongated pyriform; distinct neck 1½″ long	Oblique-pryriform; distinct neck ½ to ¾″ long	Oblique-pyriform; distinct neck 1″ long
Average Weight	154 gr.	142 gr.	123 gr.	170 gr.

Color	Bright green, thickly spotted with greenish-yellow dots	Deep purplish-black; reddish to russet dots	Dark purple	Dark purple
Surface	Smooth; blemish at apex	Smooth; very glossy	Smooth; very glossy	Smooth
Skin	Thin	Thin	Thin	Thin
Fiber	Slight	Slight	Slight	Present; stringy
Quality	Very rich; good	Good	Good	Fair
Size of seed	2″ x 1¾″	1⅞″ x 1⅜″	2⅜″ x 1⅜″	1¼″ x 2⅜″
Average weight of seed	31.0 gr.	27 gr.	21.0 gr.	42 gr.
Condition in cavity	Loose	Tight	Tight	Tight
Shape	Conical	Oblong oval	Slender conical	Elongated conical
ANALYSIS.				
Water	65.76%	60.94%	75.00%	77.06%
Protein	1.88	1.40	2.30	1.74
Fat	25.50	29.10	15.48	14.64
Carbohydrates	5.52	6.55	6.14	5.49
Ash	1.34	1.71	1.08	1.07
Edible portion	67.4	77%	72.3	63.9
Refuse	32.6	23%	27.7	36.1

COMPARISON OF AVOCADO VARIETIES—*Continued.*

TREE. Variety	Fowler	Northrop	Hathaway	Harman
Locality	353 Grove St., Pasadena	Near Tustin, Orange County	1659 Miller Ave., Hollywood	Sherman, near Hollywood
Owner	Mrs. E. M. Fowler	E. Bartley	Hathaway	E. Harman
Date of Planting	1902	About 1899	1904	1899
Origin of Seed	Honolulu	From C. P. Taft, Orange	Mexico	S. America
Diameter of trunk 3′ from ground, 1914	8″		12″	15″
Height, 1914	25′	30′	20′	30′
Spread, 1914		Wide	15′	30′
Age of bearing	4 years			6 years
Yield	Rather shy bearer	2 crops per year	Prolific	Prolific
Time of blossoming		April and early May	January	Jan.-Apr.
Season	July-Oct.	Long season in spring; larger crops and better in Sept.-Nov.	Sept.-Oct.	Oct.-Dec.
FRUIT. Size	Length 3⅛″ Diameter 2¼″	Length 3¾″ Diameter 2½″	Length 3-4″	Length 3½-4″ Diameter 2½-3″
Shape	Slightly oblique, egg-shaped	Pyriform with distinct neck	Oval to obovate	Oblique-pyriform

Average weight	124.3 gr.	120 gr.		283.5 gr.
Color	Green to russet	Very dark purple	Purplish green	Greenish-purple with light dots
Surface	Smooth	Smooth		Smooth
Skin	Thin	Thin	Thin	Thin
Fiber	Slight amt., tough; brown in color	Slight	Present	Slight
Quality	Good	Good	Good	Very good
Size of seed	2″ x 1⅜″	1⅝″ x 1¼″		2″ x 1¾″
Average weight of seed	34.5 gr.	36.4 gr.		56.0
Condition in cavity	Usually tight	Usually tight	Loose	Loose
Surface	Smooth			
Shape	Conical to egg-shape	Conical		Roundish-conical
ANALYSIS.				
Water	70.33	61.20		74.70
Protein	1.60	3.40		1.60
Fat	21.20	25.3		18.30
Carbohydrates	5.61	7.52		4.60
Ash	1.26	1.05		0.80
Edible	64.1	59.3		67.2
Refuse	35.9	40.7		32.8

COMPARISON OF AVOCADO VARIETIES—*Continued.*

TREE. Variety	Azusa	Mattern	Carton	Ganter
Locality	Azusa	Pasadena	San Fernando	Whittier
Owner		Mattern	P. H. Carton	H. A. Woodworth
Date of planting			1907	1905
Origin of seed	Mexico		Guadalajara, Mex.	
Diameter of trunk 3′ from ground, 1914	6″		8″	
Height, 1914	20′		30′	
Spread, 1914			13′ 8″	
Age of bearing	3 years		3 years	4th year
Yield			Prolific	Very prolific
Time of blossoming	January		January	January
Season	Oct.-Nov.		Oct.-Dec.	Oct.-Dec.
FRUIT. Size	Length 4½″ Diameter 2¾″	3¼″ x 2″	Circumference 7¾″ 3½″ to 4″ length	Length 3½″ Diameter 2½″
Shape	Elongated pyriform; neck short	Oblique-pyriform; neck not pronounced	Pyriform, slightly oblique	Oblique-conical
Average weight	198 gr.	84.40 gr.	179 gr.	180 gr.
Color	Black	Bronze purple	Purplish black	Deep green, thickly studded with light green dots

Surface	Glossy, roughened by depressions; russet lines along neck	Slightly rough; russet scars	Smooth, glossy	Smooth, somewhat glossy; slight bloom
Skin	Thin	Thin	Thin	Thin
Fiber		Slight	Slight	Stringy; fairly abundant
Quality	Good		Texture Buttery: Good	Very good
Size of seed		1⅞″ x 1⅜″	Large, 2″ x 1¾″	Large
Average weight of seed	36.1 gr.	28 gr.	38 gr.	34 gr.
Condition in cavity		Loose	Tight	25% of seed loose
Surface			Slightly roughened	
Shape		Conical	Conical, slightly oblique	Oblique-conical
ANALYSIS.				
Water	67.05	61.55	66.98	63.8
Protein	1.94	2.20	1.97	2.2
Fat	21.06	25.70	19.50	25.6
Carbohydrates	8.59	8.94	6.29	6.58
Ash	1.36	1.61	1.24	1.71
Edible portion	71.7	55.9	61.5	83.4
Refuse	28.3	44.1	38.4	16.6

COMPARISON OF AVOCADO VARIETIES—*Continued.*

TREE. Variety	Knowles	Cardinal	Pollock	Trapp
Locality	Santa Barbara	Florida	Miami, Florida	Cocoanut Grove, Fla.
Owner	W. A. Knowles		S. H. Pollock	
Date of planting	1898		1896	1894
Origin of seed	Mexico		Cuba	Key West, probably
Diameter of trunk 3′ from ground, 1914				
Height, 1914				
Spread, 1914				
Age of bearing	8 years			
Average yield	Prolific			Prolific
Time of blossoming	April-May			
Season	Nov.-Jan.	Oct.-Nov.	Aug.-Oct.	Oct.-Jan.
FRUIT. Size	Length 3½″ Diameter 2½″	Length 6¼″ Diameter 3⅞″	Very large	Length 4¼″ Diameter 4″
Shape	Pyriform	Oblique pyriform	Pyriform	Almost spherical
Average weight	4-12 oz.	705 gr.; spec. anal. 578 gr.	Up to 3 lbs.	637.8
Color	Purplish-black	Purplish--b r o w n, with light brown spots	Greenish, with yellow markings and indistinct purplish stripes	Yellowish-green

Surface	Smooth, glossy	Smooth	Smooth	Smooth to slightly roughened
Skin	Thin	Thin	Thick	Skin separates readily from flesh; thick
Fiber	Slight	Slight		Hardly a trace
Quality	Good	Good	Very good	Nutty, very pleasant
Size of seed		2″ x 2¾″	Medium	2¾″ x 2″
Average weight of seed	30 gr.	79.5 gr.		125 gr.
Condition in cavity		Very loose	Nearly fills cavity	Loose in some; in others tight
Surface		Smooth to rough at apex		Rough
Shape		Conical	Obconic	Rather oblate; base broad and flattened
ANALYSIS.				
Water	60.5	79.66		78.66
Protein	2.20	2.56		1.61
Fat	27.11	10.70		9.80
Carbohydrates	Undetermined. 8.76	6.48		9.08
Ash	1.43	0.60		0.85
Edible portion	66.5	81.0		71.5
Refuse	33.4	19.0		28.5

COMPARISON OF AVOCADO VARIETIES—*Continued.*

TREE. Variety	Miller	Meserve	Wagner	Lambert
Locality	Nicholls Canyon Road, Hollywood	Cherry & Hill Sts., Long Beach	Fairfax & Fountain Sts., Hollywood	Fairfax & Fountain Sts., Hollywood
Owner	Jacob Miller	Ralf Goddard	C. F. Wagner	C. F. Wagner
Date of planting	1886	1901	1907	1907
Origin of seed	Tree from Guatemala	Hawaii	Seedling from Royal	L. A. Market
Diameter of trunk 3′ from ground, 1914	12″	8″	7″	
Height, 1914	35′	25′	20′	
Spread, 1914	18′	15′	8′	
Age of bearing			5th year	8th year
Yield	Moderately prolific	Fairly prolific	Prolific	
Time of blossoming	April		Feb.-March	April-May
Season	Feb.-April	April to June	Apr.-Aug.	April-May
FRUIT. Size	4″ x 3″	4½″ x 4½″	3¼″ x 3″	4¼″ x 3½″
Shape	Conic oblique	Roundish, obovate to round-oval	Spherical	Oblique egg-shaped
Average weight	242 gr.	14 to 20 oz.	295 gr.	417 gr.
Color	Purplish-green	Dark green, with small, rounded greenish-yellow dots	Green	Green with brownish tinge

Surface	Rough, warty, dots russet	Undulating	Somewhat roughened	Rough; russet spots numerous, enlarging on ripening
Skin	Thick and coarse	Thick, granular, separating readily from flesh	Thick	Medium thick
Fiber	Very little	Trace at base and apex	Slight	Slight, dark colored
Quality	Good	Nutty and rich, very good	Good	
Size of seed	1⅝″ x 1½″	Medium to small	1⅝″ x 1⅞″	2⅛″ x 2⅛″
Average weight of seed	36 gr.		62 gr.	93 gr.
Condition in cavity	Tight	Tight	Tight	Tight
Surface				
Shape	Slightly oval; roundish	Oblate	Oblate-spherical	Oval to roundish
ANALYSIS.				
Water	66.6		74.84	76.52
Protein	3.70		2.77	2.86
Fat	23.7		16.03	14.31
Carbohydrates	4.51		Undetermined 5.06	5.40
Ash	1.49		1.30	1.91
Edible portion	64.2		53	66.4
Refuse	35.8		47	33.6

COMPARISON OF AVOCADO VARIETIES—*Continued.*

TREE. Variety	Challenge	Royal	Sharpless	Solano
Locality	1547 Las Palmas Ave., Hollywood	1547 Las Palmas Ave., Hollywood	Near Santa Ana	Hollywood
Owner	J. H. Walker	J. H. Walker	B. H. Sharpless	J. W. Wolters, care of Solano Est.
Date of planting	1897	1897	1901	1907
Origin of seed				Unknown
Diameter of trunk 3′ from ground, 1914	16″	25″		8″
Height, 1914	37′	37′		17′
Spread, 1914	30′	36′		11′
Age of bearing	8 years	8 years		5 years
Yield	Very prolific	Moderately prolific	Prolific	Prolific
Time of blossoming	March and April	March and April	April-May	June
Season	Feb.-May	Jan.-Apr.	June-Aug.	April-May
FRUIT. Size	4″ x 3⅞″	4″ diameter 5½″ long	6½″ x 3½″	5″ x 3½″
Shape	Oblique-spherical, flattened at stem and apex	Oblique-pyriform	Elongated-pyriform	Pyriform, slightly oblique
Average weight	568 gr.	636 gr.	507 gr.	517 gr.
Color	Dark purple with brown spots	Very dark purplish-black, with reddish-purple dots	Jet or purplish-black	Green, dots light yellowish-green

Surface	Coarsely roughened with numerous roundish or elongated dots; glossy	Distinctly corrugated or ridged	Roughened by russet dots; ribbed at stem end	Smooth, glossy; light dots numerous. Russeted around apex
Skin	Thick	Medium, coarse, granular	Thick, coarse	Medium, granular
Fiber	Slight	Slight	Slight, scattered	Slight
Quality	Fair	Fair	Rich, nutty	Fair, watery
Size of seed	2¾″ x 2½″	2½″ x 2¼″	2″ x 2¼″	1½″ x 2″
Average weight of seed	126 gr.	113 gr.	60 gr.	52½ gr.
Condition in cavity	Tight	Tight	Tight	Tight
Surface	Somewhat roughened or undulate	Roughened or undulate		Smooth
Shape	Oblate	Conical	Oblique, apex pointed	Short, oblong
ANALYSIS.				
Water	85.95	76.34	76.73	90.62
Protein	0.80	1.39	2.15	1.27
Fat	9.48	15.61	15.73	3.85
Carbohydrates	Undetermined 3.14	Undetermined 5.97	3.69	Undetermined 3.64
Ash	0.63	0.69	1.70	0.62
Edible portion	65.4	73.6	78.88	84.5
Refuse	34.5	26.3	21.2	15.4

COMPARISON OF AVOCADO VARIETIES—*Continued.*

TREE. Variety	Taft	Walker	Spinks	Dickey
Locality	Orange	1547 Las Palmas Ave., Hollywood	Duarte, Cal.	La Brea Ave., Hollywood
Owner	C. P. Taft	J. H. Walker	W. F. Spinks	E. W. Dickey
Date of planting	1900	1897	1911	1904
Origin of seed	S. Mexico	Probably Mexican		Atlixco, Mexico
Diameter of trunk 3′ from ground, 1914	15″	21″		
Height, 1914	30′	40′		
Spread, 1914	36′	36′		
Age of bearing	9 years	6 years		
Yield	Moderately prolific	Very prolific	Prolific	Prolific
Time of blossoming	Apr. & May	March and April		Mar.-May
Season	Apr. & May to Aug.	May to Aug.	May to Oct.	Apr.-July
FRUIT. Size	5″ x 3½″	4″ x 2½″	5″ long	5″ x 3½″
Shape	Broad pyriform, apex rounded	Broad pyriform	Broad pyriform	Oblique-pyriform; rounded base
Average weight	14-22 oz.		20-24 oz.	430 gr.
Color	Dark green, numerous yellowish dots	Green	Dark purple	Light grass green; small brown dots

Surface	Irregularly roughened	Prominently roughened, warty	Slightly roughened	Characteristic longitudinal ridges
Skin	Thick, readily separating from the flesh	Thick, separates easily from flesh	Thick	Thick
Fiber	Practically none	Fair amount		Slight
Quality	Excellent	Fair		Fine, rich, nutty
Size of seed	2¼″ x 2½″	Large, 2″ x 1¾″	Rather large	2″ x 1⅞″
Average weight of seed	110 gr.	47 gr.		17% of total, 73½ gr.
Condition in cavity	Tight	Tight	Tight	Tight
Surface				Smooth
Shape	Roundish	Conical		Oval; slightly conical
ANALYSIS.				
Water	72.53	68.66		
Protein	2.66	3.15		
Fat	18.54	18.71		
Carbohydrates	Undetermined 5.16	7.55		
Ash	1.11	1.93		
Edible portion	71.8	62.9		74.6
Refuse	28.2	37.1		25.4

COMPARISON OF AVOCADO VARIETIES—*Continued.*

TREE Variety	Blakeman	Murrieta	Colorado	Lyon
Locality	La Brea Ave., Hollywood		(Purple Murietta) Los Angeles	7276 Sunset Blvd., Hollywood
Owner	E. W. Dickey		Mr. Doheny	R. B. Lyon
Date of planting	1907		1901	1908
Origin of seed	Atlixco, Mexico		Atlixco, Mexico	L. A. Market
Diameter of trunk 3′ from ground, 1914				6″
Height, 1914				20′
Spread, 1914				5′
Age of bearing	6 years			
Yield	Prolific			Very prolific
Time of blossoming		April & May		April-May
Season		Sept. & Oct.	Apr. & May	Feb.-June
FRUIT. Size	4″ x 3½″	3¾″ x 3¾″	5″ x 3½″	5½″ x 3½″
Shape	Oval, oblique	Oblique, roundish	Oval to obovate	Broad pyriform
Average weight	449 gr.	16-20 oz.	14-18 oz.	16-18 oz.
Color	Deep green, numerous light dots	Yellowish-green with numerous light dots	Purplish-black; numerous dark spots	Dark green, numerous light dots

Surface	Glossy; dots slightly raised		Slightly rough; reticulate	Rough
Skin	Thick	Medium thick	Medium thick	Thick and woody
Fiber	Small amount	Very slight	Very slight	
Quality	Fine; smooth, buttery	Very good	Very good	Very good
Size of seed	1¾" diameter	Large	Medium	Large
Average weight of seed	59 gr.			
Condition in cavity	Tight	Tight	Tight	Tight
Surface	Smooth			
Shape	Spherical	Spherical	Oblong conical	Broadly conical
ANALYSIS.				
Water	76.02			75.78
Protein	2.88			2.48
Fat	16.35			16.31
Carbohydrates	Undetermined 3.76			Undetermined 4.38
Ash	0.98			1.05
Edible portion	74.3			65.8
Refuse	25.6			34.1

COMPARISON OF AVOCADO VARIETIES—*Continued.*

TREE. Variety	Dickinson	El Presidente	Rhoad	Rita
Locality	679 W. 35th St., Los Angeles	College St., Los Angeles	Orange	Orange
Owner	H. Brown		C. P. Taft	C. P. Taft
Date of planting	1900		1901	1903
Origin of seed	Honduras			Guatemala
Diameter of trunk 3′ from ground, 1914	11″		9″	6″
Height, 1914	35′		35′	15′
Spread, 1914	10′		8′	8′
Age of bearing	9 years		5 years	
Yield	Fairly prolific			
Time of blossoming	April and May		April-May	
Season	April and May	June	April and May	April and May
FRUIT. Size	3½″ x 2¾″	5″ x 3⅛″	4¼″ x 3¼″	Medium
Shape	Oval to obovate	Oblong-pyriform	Slender to broad-pyriform	Broad pyriform
Average weight	7 to 12 oz.	14 to 18 oz.	12 oz.	8 to 12 oz.
Color	Dark purple, large maroon dots	Olive-green, numerous yellowish dots	Yellowish-green, with numerous light dots	Green

Surface	Very rough	Undulating	Roughly undulating	Smooth
Skin	Thick	Medium thick	Very thick	Thick and tough
Fiber	Almost none	Slight	Slight	Slight
Quality	Very good	Very good	Fair	Good
Size of seed	Medium	Medium	2″ x 2⅛″	Medium
Average weight of seed				
Condition in cavity	Tight		Tight	Tight
Surface				
Shape	Oblate-roundish		Roundish-conical	
ANALYSIS.				
Water			82.46	71.05
Protein			1.19	1.57
Fat			9.78	14.13
Carbohydrates			Undetermined 6.03	Undetermined 12.25
Ash			0.54	1.00
Edible portion			63.0	57.3
Refuse			36.9	42.6

COMPARISON OF AVOCADO VARIETIES—*Continued.*

TREE. Variety	Senor	Beauty	Ultimate	Champion
Locality	Orange	Orange	Orange	Orange
Owner	C. P. Taft	C. P. Taft	C. P. Taft	C. P. Taft
Date of Planting	1902	1902	1902	1902
Origin of seed				
Diameter of trunk 3′ from ground, 1914	7″	8″	12″	8″
Height, 1914	30′	18′	20′	20′
Spread, 1914	10′	15′	18′	12′
Age of bearing				
Yield				
Time of blossoming	April-May			
Season	May and June	April-June		June to August
FRUIT. Size	5″ long; 3⅞″ diameter	4½″ long; 3½″ diameter	4″ long; 3″ diameter	4½″ x 3¾″
Shape	Broadly pyriform	Egg-shaped	Pyriform, slightly oblique	Oblong-oblique
Average weight	14-16 oz.	439 gr.	290 gr.	524 gr.
Color	Green	Dark green; dots scattered, yellow-green	Bright grass green	Green with russet yellow dots

Surface	Almost smooth	Broadly undulate; dull	Almost smooth; glossy	Smooth
Skin	Thick and tough	Thick; granular	Medium thick	Thick
Fiber	Very slight	Slight	Considerable	Slight
Quality	Fair	Good	Excellent	Good
Size of seed	Moderately large	2¼″ x 2⅛″	1¾″ x 1¾″	Medium
Average weight of seed				94.5 gr.
Condition in cavity	Tight	Tight	Tight	Tight
Surface		Smooth		Somewhat roughened
Shape		Oblique-spherical	Spherical	Obliquely conical
ANALYSIS.				
Water	74.70	72.68	78.01	74.32
Protein	1.69	2.48	1.57	2.59
Fat	17.03	15.26	14.51	16.54
Carbohydrates	Undetermined 5.45	Undetermined 8.22	Undetermined 4.88	Undetermined 5.31
Ash	1.13	1.36	1.03	1.24
Edible portion	77.8	66.1	65.5	70.1
Refuse	22.1	33.9	34.5	29.9

COMPARISON OF AVOCADO VARIETIES—*Continued.*

TREE. Variety	Nutmeg	Brodia		
Locality	Hawaii	Orange		
Owner		C. P. Taft		
Date of planting	1907			
Origin of seed	Guatemala			
Diameter of trunk 3′ from ground, 1914				
Height, 1914	15′			
Spread, 1914	8′			
Age of bearing	4 years			
Yield				
Time of blossoming		April-May		
Season		April-May		
FRUIT. Size		4½″ x 3¾″		
Shape	Roundish to spherical	Pyriform, slightly oblique		
Average weight		432 gr.		
Color	Greenish purple to black; yellowish dots	Deep green dots, yellowish or russet		

Surface	Undulating	Somewhat roughened		
Skin	Very thick, woody	Very thick, granular		
Fiber		Slight		
Quality	Rich, nutty	Good		
Size of seed	Large	Medium		
Average weight of seed		75 gr.		
Condition in cavity	Tight	Tight		
Surface		Smooth		
Shape	Roundish, flattened at base	Conical to spherical		
ANALYSIS.				
Water		80.8		
Protein		1.26		
Fat		10.88		
Carbohydrates		Undetermined 6.30		
Ash		0.76		
Edible portion	68.0	63.2		
Refuse		36.7		

COMMITTEE REPORTS.

The committee reports of this society have long been recognized as a feature of particular value in its proceedings. During recent years a number of our older members have been constrained to withdraw their services from this important part of the work of the society to its great loss: But this volume will be notable as the first one in many years in which COLONEL BRACKETT has not been an active factor in making one or more of the important committee reports.—*Secretary.*

REPORT OF THE TROPICAL FRUIT COMMITTEE.

WILSON POPENOE, *Chairman.*

In recent years there has been a remarkable awakening of interest in tropical fruits, not only in the mildest sections of the United States, where such fruits can be grown, but in Hawaii, the Philippines, Cuba and Porto Rico, not to mention those foreign countries with whose conditions we are not so familiar, such as India, Queensland, and Algeria. Considering the matter solely from the American viewpoint, it appears that several of the tropical fruits which have been unknown, horticulturally speaking, until very recent years, are rapidly becoming commercial and are demanding the attention of pomologists. We see this with the avocado, of which more than eighty varieties have already been named and propagated in California, and a smaller but considerable number in Florida. Here, then, is a new field for pomologists, and one which should be given attention at the very beginning if the science of pomology is to keep pace with commercial development. In other lines, too, we see notable progress, together with unusual promise for future development. The mango has been given attention in Florida and the West Indies for the past fifteen years, and seems almost certain to become of considerable commercial importance. The annonaceous fruits are also attracting attention as commercial possibilities, while the fruiting of the litchi at Santa Barbara, California, two years ago gave a new stimulus to the culture of this fruit and it is now being pushed as a promising thing for south Florida.

The field of tropical pomology is as yet practically untouched. What the future holds in store we can only conjecture, but it will be surprising if the next quarter of a century does not witness a much greater development of tropical horticulture than has any previous period of similar length. Horticulturists are just getting to the point where they can propagate most of the lesser-known tropical fruits by budding or grafting, thus paving the way for the establishment of named horticultural varieties, and making possible commercial culture of these fruits on a modern basis.

MANGA MAMEY, FROM THE QUINTA AVILES, CIENFUEGOS. A HANDSOME FRUIT OF GOOD QUALITY.

(*Left*) MANGA AMARILLA, FROM HABANA, SHOWING CHARACTERISTIC FORM OF THIS TYPE.

(*Right*) MANGA BLANCA, FROM HABANA. ALLIED TO M. AMARILLA, BUT LIGHTER YELLOW IN COLOR AND DISTINCT IN FORM.

It seems doubtful, however, whether the greatest development in tropical pomology will take place within the tropics themselves or in the slightly cooler regions to the north of the torrid zone, such as Florida and California, where the culture of many tropical fruits is possible. Not only are the living conditions better in these regions, but it has been seen with citrus fruits, as well as with some others, that they frequently attain their highest perfection when pushed right up against the frost line, and grown at the extreme northern limit of their zone.

It is with the object of reviewing the present status of tropical fruit culture in Florida, California and the territory of Hawaii, as well as to point out some present-day needs in tropical pomology, that the Tropical Fruit Committee submits the following report:

Some Systematic Needs of Tropical Pomology.

Numerous varieties of both the avocado and mango are now being propagated in tropical and sub-tropical regions, while named varieties of several other tropical fruits are commencing to appear. In glancing over varietal descriptions published in the catalogs of nurserymen or by tropical pomologists, a discrepancy which immediately strikes the attention is the lack of definite terms in regard to size; while it is correct enough to use the terms "small," "medium," and "large," when describing avocados and mangos, unless they have a definitely understood meaning they can very easily be misconstrued. Especially is this true when descriptions prepared in one region are used in another; for example, the avocados of Florida are on the average considerably larger than those of California, hence a variety which would be termed small in the former state would be at least medium-sized in the latter. To obviate this misunderstanding, some such schedule of sizes as the following should be adopted for use in all regions where these fruits are grown:

Avocados.

Very small	Below 5 ozs.
Small	5 to 8 ozs.
Below medium	8 to 10 ozs.
Medium	10 to 14 ozs.
Above medium	14 to 16 ozs.
Large	16 to 19 ozs.
Very large	19 to 24 ozs.
Extremely large	Above 24 ozs.

Mangos.

Very small	Below 4 ozs.
Small	4 to 7 ozs.
Below medium	7 to 9 ozs.
Medium	9 to 13 ozs.
Above medium	13 to 15 ozs.
Large	15 to 20 ozs.
Very large	20 to 24 ozs.
Extremely large	Above 24 ozs.

In regard to describing avocado varieties, there has been as yet very little uniformity among pomologists, and the nurserymen's descriptions are usually lacking in several important points. The amount of detail necessary in a description will vary with different workers, depending upon the purpose for which the description is made. A brief, practical description should certainly contain all of the following characteristics:

Form. Commonly spherical, oval, oblong, obovate or pyriform.

Size. Comparative, according to some such schedule of sizes as that given above, and actual, including weight in ounces and length and greatest breadth in inches.

Base. The form should be stated, whether rounded, attenuate, flattened, etc., and the insertion of the stem, whether squarely or obliquely inserted. The cavity is very frequently wanting in avocados; when present it should be described as to size, depth, breadth and form.

Stem. The length and character of the stem should be given. It is also important to note whether the fruits are borne singly or in clusters.

Apex. Should be described as to form—rounded, obliquely flattened, etc.

Surface. This should be described first as to texture (smooth, undulating, rough), next as to glossiness, then as to color, and finally the number, size, form and color of the dots should be noted.

Skin. In describing the thickness of the skin the use of relative terms is not sufficient. It is desirable to note the actual thickness in fractions of an inch, when dealing with the thick-skinned varieties. With the thin-skinned Mexican fruits, this is impracticable, and relative terms must be depended upon. The texture of the skin (brittle, tough, leathery, etc.) should be given, and its adhesion to the flesh.

Flesh. This should be described as to texture (firm, meaty, soft, buttery), the color, and the amount of fiber present. Sometimes there is no actual fiber but it is represented by discolorations in the flesh.

Flavor. This can only be described by the use of such terms as rich, nutty, watery, etc., which are oftentimes rather indefinite and unsatisfactory.

Quality. This point represents the personal opinion of the describer, and should be listed as poor, medium, good, very good, or extra good. None of these terms should be applied to flavor.

Seed. The form should first be given (conical, spherical, oblate, etc.), followed by the relative size (large or small and the actual size (weight in ounces); the character and adhesion of both seed coats should then be mentioned, and the size of the seed cavity, if larger than the seed. When the outer seed coat adheres to the wall of the seed cavity, it should be noted.

Season. This should be stated fairly, not considering the fruit in season until it is fully mature.

Tree. The vigor and character of the growth should be carefully noted, together with any peculiarities of habit which the tree may exhibit. Its hardiness should be stated, followed by the character of the foliage. Productiveness and precocity of bearing are two points of great importance, and should be described as fully as possible.

In regard to classification of tropical fruits, we have not progressed far enough to have worked out any natural systems for either the avocado or the mango which can be considered as complete and definite. In Florida only one type of avocado has been commonly grown, and of this only one or two varieties are prominent. In California, however, avocados of several distinct types have been planted, making a classification almost necessary. Nurserymen have frequently divided the varieties grown in California into two arbitrary groups, accordingly as they are thin- or thick-skinned. As this latter group contains both the Florida varieties (which do not flourish in California, as far as past experience goes), and the hardier Guatemalan varieties, which include the leading commercial sorts, the classification was rather unsatisfactory. Recently a natural classification has been proposed, consisting of three types, the Mexican, which includes the small, thin-skinned, hardy varieties; the South American or West Indian, which includes the varieties from Florida; and the Guatemalan, which includes those varieties from southern Mexico and Guatemala which have very thick, woody skins, which are hardier than the Florida varieties, and which ripen from the latter part of winter until mid-summer. This classification would also apply in Florida, and as it tends to bring out the important features of a variety, such as hardiness, size, thickness of skin, and season of ripening, it seems likely to prove very useful.

Present Status of Tropical Fruits in Florida.

A keen interest in tropical fruit-growing has been developed in south Florida, principally in the Miami limestone belt, which comprises a narrow strip of land along the east coast from Fort Lauderdale to below Homestead. On the west coast there has been a good deal of planting done, notably at Fort Myers, Sarasota, and in the vicinity of Tampa Bay, which is almost the northern limit of tropical fruit culture.

At the present moment the avocado is receiving more attention than any other of the tropical fruits. It is estimated that there are approximately two hundred acres of budded trees now in bearing, with an area of nearly equal size recently planted. Trapp is the only variety which has been planted extensively up to the present, but interest is now centering in the winter-fruiting Guatemalan varieties which have been introduced from Guatemala and California. Several of these have already fruited at Miami, and have matured from January to April, the precise season when avocados are in greatest demand and highest prices are realized. The variety Pollock, which ripens in August and September, is practically the only one beside Trapp which has been planted commercially, and the acreage is insignificant.

The mango promises well for the future, but is not yet upon as substantial a basis as the avocado. Many of the Indian varieties, which are of excellent quality and in most ways quite satisfactory, do not fruit abundantly, and the problem now is to obtain varieties of good quality which will be productive. Some of the most promising are Haden, a seedling of Mulgoba which originated at Cocoanut Grove, and is more productive than its parent but of somewhat poorer quality; Amini, a small fruit from India, of attractive appearance, excellent quality, and seemingly more productive than most of the Indian varieties; Paheri, another Indian variety, which strongly resembles Mulgoba but seems to be slightly more productive; Bennett, from Bombay, a good fruiter and a mango of excellent keeping qualities, but not quite so attractive in appearance as some of the others, though of good quality; Sandersha, a large Indian mango which is more properly a culinary than a dessert fruit, being rather acid and well suited for cooking or canning; and Cambodiana, from Indo-China, a very productive fruit of good quality. There are several small mango groves in the vicinity of Miami, and in good seasons many crates of fruit are shipped to northern markets. A large number of the plantings made in the earlier days were of Mulgoba, but this variety is proving so unproductive that it seems almost certain to be superseded by some other.

The sapodilla, *Achras zapota*, is a common tree on the keys, on the mainland around Miami and as far north as Palm Beach, and on the west coast around Fort Myers. The fruits are abundant in the markets during summer. While no named varieties have yet been established, it has been shown by Simmonds at Miami that the tree can be budded in the same way as the mango, and some of the choice seedling trees will probably be propagated in the near future. There are several trees on the lower east coast which have something of a reputation for large, fine fruits; one of these, at Lemon City, produces conical fruits up to four inches in diameter. It should certainly be propagated.

The cashew, *Anacardium occidentale*, has fruited successfully at Miami and Cocoanut Grove, and should be more widely planted, both for its aromatic fruits, which can be used in a variety of ways, and its edible seed, known as cashew-nut. It is a variable plant, but so far as known selected varieties have not yet been propagated vegetatively.

The annonaceous fruits are very promising. The true cherimoya, *Annona cherimola*, does not seem to be at home in south Florida, and has so far produced fruit of indifferent value, but the sugar-apple, *A. squamosa*, flourishes and should in time become a favorite, as it has in Cuba. It can readily be budded. The sour-sop, *A. muricata*, is somewhat tender except in extreme south Florida, but has been successfully grown at Miami. The custard-apple, *A. reticulata*, also succeeds at Miami, but seems less desirable than the sugar- apple. All of these species are readily budded, and choice seedlings can be propagated without difficulty. Edward Simmonds, of the Plant Introduction Garden at Miami, has recently produced

a hybrid between the cherimoya and the sugar-apple which indicates that the annonas may be made to yield, by proper manipulation, a whole range of new fruits which should be of value in tropical countries. They seem to hybridize readily.

The Jak, *Artocarpus integrifolia*, has fruited at Cocoanut Grove and seems to do well in this section, but the fruit is not esteemed. The bread-fruit, *A. incisa*, has not yet fruited in Florida, so far as known.

Averrhoa carambola, an interesting fruit from south China, has proved to be hardy in Mr. Reasoner's tropical fruit shed at Oneco, and is fruiting well. It does not appear to be of especial value, however, as the fruit is rather acid and deficient in flavor. The bilimbi, *A. bilimbi*, is growing well at the Plant Introduction Garden in Miami, and has fruited abundantly. The fruits are cylindrical, about three inches long, very acid, and useful only for pickling. The tree seems very susceptible to frost.

The papaya, *Carica papaya*, has been grown commercially in the Miami region for the production of papain, and the fruits are marketed in considerable quantities. This tree is of such easy culture, and yields so abundantly of its rich fruit, that it seems almost certain to become popular. A large number of seedling types have been grown at Miami in an attempt to obtain choice ones. Through grafting, which was first applied to the papaya about three years ago, by Simmonds at Miami, the perpetuation of named varieties has been made possible. One has already been established; it is a small, round fruit of attractive appearance, known as *Simmonds*.

Carissa grandiflora, the Natal plum, seems likely to become more popular as a hedge and ornamental plant than as a fruit, but its bright red, plum-like berries are excellent for sauces and jellies. It is becoming common around Miami and is hardy enough to be grown some distance north. There is a great deal of variation among different plants in size and character of fruit, as well as in productiveness, and the best ones should be propagated by budding, which has been shown by Simmonds to be comparatively simple.

The white sapote, *Casimiroa edulis*, has fruited at Cocoanut Grove and Miami, and seems to do well in this region. The star-apple, *Chrysophyllum cainito*, has fruited near Miami and seems to be at home, but has not yet become common. The akee, *Blighia* or *Cupania sapida*, is also fruiting at Miami, and seems to be a promising thing. *Diospyros ebenaster*, the sapote negro or sapote prieto of Mexico, is growing well at Buena Vista, near Miami, but is not yet large enough to fruit. The kei-apple, *Dovyalis caffra* is fruiting abundantly at Cocoanut Grove, and grows readily in this section. Its fruit, however, is not sufficiently valuable to warrant extensive planting.

The loquat, *Eriobotrya japonica*, has been grown commercially in a small way at Miami and in other parts of Florida. It does well in this state but the fruits do not attain to such large size as in California. Practically all of the varieties which have been planted are of California origin, and include Advance, Premier, Victor and Champagne.

The Surinam-cherry, *Eugenia uniflora*, is one of the lesser-known fruits which seems to be winning its way into favor. It has recently made its appearance in the Miami markets, selling at fifteen cents a quart basket. The plant is quite at home in south Florida, fruits most prolifically, often bearing two crops a year, and requires very little attention. It has not as yet been successfully propagated by budding or grafting, so far as known, and no named varieties are grown. It seems to come fairly true from seed.

The feijoa, *Feijoa sellowiana*, which is doing well in California, has not been a complete success in Florida. It grows well, and is hardy throughout the state, but the fruits seem to be lacking in flavor. Probably it requires a cooler climate and different soil. Some of the plants have proved to be self-sterile, and do not bear unless hand-pollinated, while others are self-fertile and fruit fairly well.

The litchi, *Litchi chinensis*, has blossomed at both Tampa and Oneco, and set fruits at Oneco the past season but did not carry them to maturity. It is growing well at Miami, and looks very promising. Named varieties have been introduced from south China and India by the Department of Agriculture, but have not yet come into bearing in this country.

On the Florida keys the egg-fruit or ti-es, *Lucuma nervosa*, is well known, and it is fairly common around Miami. It is popular among those who are accustomed to it, but its disagreeable odor and cloying sweetness seem to stand in the way of its becoming a commercial fruit. *Lucuma mammosa*, the mammee sapote, which is so common in Cuba, does not seem to do well on the limestone of south Florida, and no bearing trees are known.

The Queensland nut, *Macadamia ternifolia*, seems very promising. There is a large specimen on the grounds of the Hotel Royal Poinciana at Palm Beach which fruits heavily, and young trees in the Plant Introduction Garden at Miami have recently come into bearing. The young plants seem rather difficult to start, but when they have become established, they grow well.

Malpighia glabra, the Barbados cherry, is grown in a few gardens around Miami and Cocoanut Grove, but is a fruit of very minor importance.

The mammee-apple, *Mammea americana*, seems quite at home in the Miami region, and there are a number of large fruiting specimens. The fruit is not esteemed as it is in Cuba, however, the cultivation of this species is not being extended.

The Spanish-lime, *Melicocca bijuga*, is grown at Key West, but does not seem to fruit at Miami.

The guavas have assumed considerable importance as jelly fruits, and several small groves have been planted near Miami. The species grown for this purpose is *Psidium guajava*. It occurs in numerous varieties, a few of which have been propagated at Miami by budding. Mr. Simmonds has shown that budding is successful, when performed as with the avocado. The strawberry guava, *P. cattleianum*, is not so common in south Florida, but is grown in

other parts of the state, especially to the north of the zone in which the tropical guava can be cultivated.

Two species of *Spondias* have been grown in south Florida, the Otaheite-apple, *S. dulcis* or *S. cytherea,* and the Spanish-plum, *S. purpurea.* Both of these are easily propagated by cuttings, and the last named exists in a considerable number of varieties, some of which are superior and ought to be introduced. Neither species is at all common.

California.

Among the tropical fruits which experience has shown to be successful in California, the avocado is just now attracting the most attention and seems to be of greatest promise. During the past five or six years the nurserymen have taken up the propagation of this tree, and are now producing thousands of budded plants yearly. More than four-score varieties have been propagated, many bearing originated locally as seedlings, a few having been introduced from Hawaii, quite a number from Florida, and at least twenty-five from Mexico and Guatemala. The question of varieties is at present a pressing one, and it will require some little time for the large number now on trial to be tested out. Eventually the orchardists will doubtless settle down to a handful of the best ones, and eliminate all the others, many of which are already being found worthless. Of the Guatemalan type, which seems to be by far the most promising commercially, the leading varieties of the present day are Taft, Blakeman, Meserve, Sharpless, and one or two others; of the thin-skinned Mexican type the two most prominent varieties are Ganter and Harman. The Florida type has not done well in California up to the present, and none of the varieties is being planted extensively.

The mango is still in the experimental stage, though several trees have been fruiting in southern California for years, demonstrating the possibility, at least, of growing mangos in this state. Before the disastrous freeze of January, 1913, quite a collection of Indian varieties had been placed on trial by the Department of Agriculture in several locations, but most of these trees were killed. Some of them have been replaced, and are now making good progress. It seems likely that the warmest locations in Southern California may be able to grow good mangos; near the sea coast, as at Santa Barbara and San Diego, the summers are so cool that the fruit does not ripen, but in the foothill sections, as at Sierra Madre and Monrovia, where the summer heat is more intense, some good fruits have been produced. Two or three seedlings of local origin have been named, but no choice varieties have fruited in California.

Achras zapota, the sapodilla, has never been a success in California. Its growth is very slow, and it is susceptible to frost. It may reach fruiting size in favored locations, but has not been given a thorough trial as yet.

Of the annonaceous fruits, the only one which succeeds and seems of value for California is the cherimoya. This is much more suc-

cessful in the foot-hill regions of Southern California than it is in Florida, the climate being, apparently, more to its liking. Excellent cherimoyas have been grown at Hollywood, where there are several small groves, but this fruit is not now receiving much attention. It awaits the introduction of choice varieties, propagated by budding. C. P. Taft, of Orange, has budded a variety called Golden Russet, but this, like most of the others, is rather unfruitful. The problem of the cherimoya in California is one of productiveness, which may possibly depend upon pollination by insects. It deserves investigation. Undoubtedly, the cherimoya is one of the fruits which will become of importance in the future.

The papaya, *Carica papaya*, has never been a complete success in California. It has fruited at Hollywood and in a few other sections, but due to the cool nights the fruit never becomes properly ripened, and is of an insipid, squash-like flavor. The plant is very tender in most locations.

Carissa grandiflora grows well throughout the southern part of the state, seeming to be fairly hardy. It does not bear abundantly, as a rule, and for this reason has never become well known as a fruit, though as an ornamental shrub it is much liked. The reason for its failure to bear is not known, but the evidence seems to indicate that it may be faulty pollination.

The white sapote, *Casimiroa edulis*, is believed by Franceschi to have been the first tropical fruit tree planted in California. An old specimen, planted by one of the Mexican settlers about 1810, is still to be seen on De la Guerra street in Santa Barbara, and forms one of the horticultural landmarks of the state. This species has proved to be quite hardy in Southern California, and is readily propagated by budding. Three named varieties have been established, one of which, Harvey, has been propagated to a limited extent. While this tree fruits well and seems quite at home in California, it has not yet become very popular.

The loquat, *Eriobotrya japonica*, has become a commercial fruit of some importance, due mainly to the efforts of C. P. Taft, of Orange, who has originated most of the varieties now grown in California, and who has the largest commercial orchard. The principal varieties now being grown are Advance, Premier, and Victor; among the newer ones are Champagne and Tanaka, the latter having been introduced from Algeria, though of Japanese origin.

The Surinam cherry, *Eugenia uniflora*, grows well in Southern California, and is fairly hardy, but does not fruit so prolifically as it does in Florida. It is not widely planted and is not receiving much attention.

The feijoa, *Feijoa sellowiana*, has been propagated more extensively in the past five years than almost any of the other new fruits except the avocado. Thousands of plants have been set out, and many are now coming into bearing. This fruit is one which seems to be of commercial promise, but it will be necessary to establish selected varieties of known productiveness and propagate them vegetatively, since seedlings do not always fruit abundantly.

Practically the only variety which has thus far been offered by the trade is André, an excellent form which was introduced from the Riviera.

Litchi chinensis, the true litchi, is too tender for any except the most protected locations in California, but it is doing well at Monrovia and at Santa Barbara, where it first came into fruit two years ago.

The Queensland nut, *Macadamia ternifolia*, has proved to be fairly hardy and drought-resistant; it is being propagated in considerable numbers, and seems likely to become common. It is of slow growth but fruits well. No attention has been given to the matter of varieties as yet, the plants being grown from seed.

Of the guavas, *Psidium cattleianum*, the strawberry guava, is by far the most common, and is found in almost every garden. It is propagated from seed and no named varieties are known as yet. The tropical guava, *P. guajava*, is seen occasionally, and will probably become more common in the future. Only seedlings are raised, but these are offered under different varietal names; those of a deep yellow, oval fruited form are called lemon guava; those from long, pear-shaped fruits with white flesh, grown at Hollywood, are called pear-guava; and those from a round, yellow fruit with salmon-colored flesh, grown at Elysian Park, Los Angeles, are offered by the trade under the name of Hawaiian guava.

The Passion-fruit or Granadilla, *Passiflora edulis*, is fairly hardy in Southern California, but is not so highly esteemed as it is in Australia, perhaps because it is not well known as yet. No varieties have been offered.

Hawaii.

The following notes regarding varieties of tropical fruits cultivated in the Hawaiian Islands will be of interest. The more important varieties of each are italicized:

Pineapple: *Cayenne*. This variety is the basis of the Hawaiian pineapple industry. About 15,000 acres are planted to this and another sort, the two being mixed and all passing under the above name. The other variety, the indentity of which is uncertain, is known as the "Queensland." No other varieties are grown on a commercial scale.

Banana: Cultivated commercially for export: Cavendish, about 17,000 bunches per month. In gardens and for home market: *Apple, Brazilian,* Borabora, *Cuban,* Eleele, Haa, Hai, Hamakua, Hilahila, Hua, Moa, Iholena, Ihou, *Jamaica,* Kaio, Kapua, Kaualau, Koal, Kusaie, Largo, Lele, Mahoe, Malai, *Maoli,* Pahi, *Popoulu,* Puapuanui, Oa.

Avocado: Cultivated chiefly in yards and gardens, but always in the market during the season. Varieties: Chapellow, *Eskbank, Farnsworth,* Harman, Hulumanu, *Inezholt,* Kailua, *Lycett,* Lyman, *MacDonald, Magoon, Moanalua,* Preston, Taft, *Trapp,* Walker.

Mango: Not cultivated commercially, but much grown in yards and gardens. Very few of the choice varieties ever reach even the

local markets. Varieties: Alphonse, Ameeri, Arbuthnot, Bennett, Brindabani, Bombay yellow, *Cambodiana*, Crescent, Divine, D'or, Fijri, French, Gay, Hawaiian, Herbert, Jamshedi, Java, Julie, Kawasji-Patel, Lemon, Totapari, Mangosteen, Manila, Mulgoba, Mullgoa, Nectarine, Number Nine, Number Eleven, Oahu, Pahutan, Peach, Peters, Philips, *Pirie*, Samoa, Smiths, Strawberry, Wooten.

ORANGE: No commercial culture. In gardens and at experiment station may be found. *Bahia*, Golden Nugget, Mediterranean Sweet, *Navelencia*, Ruby, St. Michael, *Thompson*, *Valencia*.

LEMON: No commercial culture. Eureka, Genoa, Lisbon, Villa Franca.

LIME: Kusaie, Mexican, Tahiti.

POMELO *(Grapefruit)*: Not cultivated commercially. Varieties: Dunean, *Imperial*, Marsh, Royal, Triumph.

COCOANUT: Hawaiian, Madagascar, Samoan—a few commercial plantings.

LITCHI: No commercial culture. The fruit of the few trees now in bearing is much in demand, selling at about fifty cents per pound. Varieties: Chiefly unnamed and of local origin. Hak Ip and Kwai-mi have been introduced recently.

DATES: No commercial culture—only seedlings in cultivation.

CACAO: No commercial culture.

GRAPES: Isabella grown commercially for local market. Grapes in market throughout the year.

VANILA: A few acres in commercial culture.

REPORT OF GENERAL FRUIT COMMITTEE.

BY C. P. CLOSE, *Chairman*.

In order to assemble the units which make up the general report of this committee, the Chairman sent out a circular letter early in July to each member asking for his state report. Some of the members, for various reasons, could not make their reports and substitutes were appointed, but not all of these responded. In this report, therefore, it will be noticed that not all of the states are represented.

The special subjects upon which information was asked are as follows:

Items of special pomological interest.
New methods of grading, packing, etc.
Legislation needed on standard grades and packages.
New markets.
New varieties.
New plantings.
New orchard implements and machinery.
Cold storage and pre-cooling.
Orchard heating.
By-products—cider, vinegar, evaporated products.
Co-operative buying and selling.
Best varieties for your section.
Unusual outbreak of diseases or insects—how handled.

ALABAMA.

The Satsuma orange industry is assuming great commercial importance in Southern Alabama where there are 150,000 bearing trees and 432,000 young trees, mostly in Mobile and Baldwin counties. There is an eighty-acre planting of figs three years old known as the Cudahay Orchard near Robertsdale.

The Southern Alabama Orchard Company, of Atmore, in Southern Alabama, has young and bearing peach orchards embracing 225,000 trees. New plantings are being made each year in that locality. Mr. D. C. Turnipseed, of Union Springs, in Southeastern Alabama has 1100 acres of bearing peach trees. Mr. E. J. Bryan, of Blount Springs, in Northern Alabama, has 50,000 peach trees. Fugazzi Brothers, in the northeastern part of the state, at Fort Payne, have 100 acres of apples, mostly winter varieties, and 300 acres of other fruits. Summer apples are giving good results in Northern Alabama.

Mr. Frank Holman, at York, in the west central part of the state, is perhaps the most extensive strawberry grower, having one hundred and sixty acres. The Southern Alabama Orchard Company, mentioned before, has one hundred acres of strawberries. Klondyke is the leading variety.

There is increased interest in the planting of improved varieties of pecans, of which Schley is the best.

The Duncan and McCarty grapefruit are grown to some extent for home use in Southern Alabama. Such oranges as Bahia *(Washington Navel), (Double)* Imperial Navel, Pineapple and others are tried there in an experimental way. The Ponderosa lemon bears bountifully there.

In May, 1914, a Citrus Growers' Association was organized in Baldwin County, Alabama, and incorporated under the laws of the state. This organization was established on the plan of the Florida Citrus Exchange, and during the year 1914 all the citrus fruit in the said county was sold advantageously through this Association. The Association also buys fertilizers, spraying materials, implements, etc., for its members.

At present there is in process of organization a Citrus Exchange to cover the entire southern part of South Alabama and Mississippi. The Baldwin County, and other similar associations, will become affiliated with the Citrus Exchange. Its object will be co-operative selling, buying of materials, packing, storage, etc., along the lines of the Florida Citrus Exchange. It will be an incorporated body.

The producers at Thorsby operate a Fruit and Truck Growers' Association for co-operative marketing.

The Gulf Coast Horticultural Society organized in 1914, includes Southern Alabama, Western Florida, and Southern Mississippi. It is principally interested in citrus fruit culture and with the aid of the State Horticultural Society raised $3000.00 to add to a like amount from the Federal Department of Agriculture for use in fighting the destructive citrus canker. This work has been pushed

with vigor under the supervision of the State Department of Horticulture.

December 8th, 1914, was set apart as "Satsuma Day" in Mobile and will now be celebrated annually.

The fire blight of apples was not so serious in 1915 as in 1914.

ERNEST WALKER.

CONNECTICUT.

The San Jose Scale appears to have lost its vitality in this state and does not seem to flourish even in unsprayed orchards as it did previously. There has been such thorough work in the eradication of the brown tail and gypsy moths that these pests are almost entirely eradicated, so far as orchards are concerned.

Uniform standards of color, size, form, etc., of fruits have been adopted and are proving a benefit to fruit growing.

Some of the best apples for Connecticut are Northern Spy, Tompkins King, Wagener, Rhode Island Greening, Baldwin and Fall Pippin. Delicious is considered worthy of trial.

NORMAN S. PLATT,
C. L. GOLD,
E. E. BROWN.

DELAWARE.

The strawberry plantings of the state are increasing rapidly and the peach industry is going through an era of revival. Thousands of acres of peaches and hundreds of acres of apples have been planted during the past two years largely as a result of the work of the Experiment Station. The Georgia carrier is being extensively used in the marketing of peaches. Several mechanical sizers are being used with success with peaches as well as with apples. The majority of the fancy apples are now being packed in bushel boxes, and the early apple market has been extended to Canadian points.

Orchard methods are being improved. Sussex County has broken all records in the shipment of strawberries this year, Selbyville having shipped seventy-five cars in a single day. The thirty-two-quart crate is taking the place of the cumbersome forty-eight-quart crate.

A uniform apple grading law, similar to the New York law, was passed by the last General Assembly.

Orchard heating has been practised to some extent in peach orchards, but whether or not this will prove a good investment has not been established.

There are a few produce exchanges operating with rather indifferent success, although there is much need of co-operation among growers who produce fruit in less than car-load lots.

The best varieties of fruits are the following: Yellow Transparent, Williams, Stayman Winesap, Winesap, Nero and Paragon apples; Champion, Carman, Elberta, Belle and Francis peaches; Kieffer pear; Early Richmond and Montmorency cherries; Niagara, Moore and Concord grapes; Klondyke, Chesapeake, Gandy and Parsons strawberries. Plums are not considered profitable.

There was an unusually virulent attack of fire blight in the apple orchards this season.

C. A. McCUE.

GEORGIA.

The peculiar conditions in the South, incident upon the European War, have created a great demand for knowledge along horticultural lines. Some of the items of special and general horticultural interest are the increase in the planting and production of apples in the mountain sections, and the planting of Satsuma orange groves in South Georgia. The peach industry is increasing in some sections and diminishing in others. The growth of the pecan industry is also worthy of note. From the Albany section last year there were shipped 300,000 pounds of pecans. A great increase over this amount is expected this year.

The methods of growing and packing of all fruits in this state are yet open for improvement, though advances are being made along these lines. At the present time the problem of grades of pecans is of great interest to the growers of this nut. There is a tendency in some sections to substitute the bushel and half-bushel baskets for the six-basket Georgia carriers for peaches. Some growers report good results from this substitution and the saving of considerable money from the use of the basket. The tendency to pack fancy apples in boxes is becoming more general.

The markets for Georgia peaches are being extended to Toronto and Montreal. More attention is being paid to the smaller cities and towns as markets. The question of getting the railroads to facilitate in this matter by allowing individual car lots to be distributed through several small places on the same line is being agitated.

No new varieties have come to light during the past two years from this state. The J. H. Hale peach has not proven as successful with us as has been hoped. The Early Wheeler, syn. *Red Bird*, peach has ripened in central Georgia and is a promising variety, it is about a week later than Victor. The Niagara peach also promises well. The Brilliant apple, origin middle Georgia, adapted to north and middle Georgia, is medium in size, oblong, ground color, yellow, partly covered with brilliant red, sub-acid, of good flavor and quality, and is a promising new fruit. The Delicious, Yellow Newtown, and other high quality apples are being successfully grown in northern Georgia. The Georgia Experiment Station has a new seedling of the scuppernong grape which is yet unnamed but is worthy of being disseminated within the next few years.

Spraying is recognized as absolutely necessary in the production of good fruit. Power sprayers are the rule in all of the better or-

chards. Compressed air sprayers are being used by some and the use of dusting outfits is being tested at the present time. The introduction of the picking strap in some of the up-to-date orchards has demonstrated that its use is a money and time saver.

Cold storage is not of importance in this state as yet. Some of the apple growers have built ventilation storage houses. Pre-cooling has passed through its experimental stage and there are a few private and public plants in operation. There is need and room for more.

Orchard heating has not proven successful. A great deal of our trouble comes from cold winds and freezes rather than frosts, and our orchards are so large that individuals find the expense of proper orchard heating almost prohibitive.

The by-products of orcharding are conspicuous by their absence in Georgia. There are some few canning establishments located near the large peach growing centers. Prohibition has successfully killed a very promising and thriving grape industry.

The Georgia Fruit Exchange has passed through another successful season. This organization is only a selling agency. The National Pecan Growers' Exchange was organized last spring. As the pecan industry is young the object of this exchange is to prevent errors rather than to remedy the same.

The following varieties are recommended for commercial purposes only in the sections of the state where generally adapted.

Apples:—Yellow Transparent, Red Astrachan, Julian, Brilliant, Fall Pippin, Grimes, Kinnard, Ben Davis, Black Ben, Gano, Stayman Winesap, Shockley, Terry, Yates, Winesap, Rome Beauty.

Oranges:—Satsuma.

Peaches:—Greensboro, Carman, Waddell, Hiley, Belle, Elberta, Fox.

Plums:—Wild Goose, Abundance.

Pomegranates:—Acid, Large Sweet, Spanish Ruby.

Pecans:—Alley, Bradley, Curtis, Frotscher, Moneymaker, Pabst, President, Schley, Stuart, Teche.

Pears:—LeConte, Kieffer.

Grapes:—Moore, Diamond, Brighton, Ives, Delaware, Niagara, Concord, Diana, and all types of *Rotundifolia* as Scuppernong and Thomas.

Figs:—Brunswick, Black Ischia, Brown Turkey, Celestial, Green Ischia, Lemon.

The Georgia State Horticultural Society keeps track of new varieties of fruits, vegetables and ornamentals, and from time to time publishes a catalogue of its recommendations and tries to prevent muddles in names and histories. Its president is an ex-officio member of the Georgia State Board of Entomology and through him the organization plays its part in safe-guarding the interests of the fruit growers. The Georgia State Horticultural Society and the Georgia Apple Growers' Association at their winter meeting in January, adopted a box 10½ x 11½ x 18 inches, inside measurement, as the

standard apple box and have requested all apple growers to use it.

Pear blight has been serious this season and growers have followed the system of cutting it out. Shot hole fungus has also attacked the peaches in some sections quite seriously. Brown rot on the twigs last year, was bad in sections. *Bacillus pruni* has also proven a foe. Spraying and general cleanliness are the systems followed in handling these troubles. The growers have access to the information and assistance of the various state and educational interests in controlling these diseases.

TEE H. MCHATTON.

IDAHO.

Some of us feel that there is not an unlimited market for extra fancy apples at $1.50 to $2.00 a box, and that we must cultivate the middle class of people who hestitate to purchase apples at a cost exceeding $1.00 to $1.25 per box. Many of us lean toward sizing the apples into a uniform size and then use a face and fill pack for middle class consumption. Last fall our orchardists paper-wrapped each individual apple in class three. It seems to me that it would be better to wrap only the extra fancy and face and fill the others. Those who spent least money on the pack last season received the largest net returns. When extra fancy Jonathan, each apple paper-wrapped, sold at seventy cents a box in Nampa in 1914, there seemed very little encouragement for paper-wrapping the whole crop. The North Pacific Association and a number of the independent dealers will face and fill the major portion of the Jonathan crop and probably some other varieties that should go into consumption before Christmas. There is a general disposition to size apples by machinery thus eliminating the slower and more expensive hand labor.

The middle class market is practically unlimited if satisfactory methods of distribution can be worked out that will satisfy the distributers and retailers with a moderate profit. Our most experienced growers regard twenty-five cents a bushel at the orchard for Idaho apples as extremely profitable, since it is not difficult to grow one thousand bushels per acre. The ten-year-old apple orchard of Mr. R. H. Woods, of Woodspur, produced 1295 boxes of extra fancy and fancy grades, besides several hundred bushels of low grade fruit per acre. There were eighty trees per acre and they averaged twenty bushels per tree.

The planting of commercial apple orchards has practically ceased in Idaho because people are waiting to see how they come out with what they have. Idaho has one hundred thousand acres of commercial apple orchards of which thirty-eight per cent are Jonathans. The crop this season will be larger than last year.

New plantations are almost entirely of Italian prune, probably three hundred thousand trees having been planted in the Boise-Nampa-Payette district in the last three years. The Italian prune as grown in southern Idaho is reputed to carry twenty-five per cent

more sugar than the same prune grown on other soils at a lower elevation. Three pounds of Italian prunes as grown there make one pound of dried prunes which are reported to contain thirty per cent of sugar. The southern Idaho Italian prune stands up remarkably well and can be carried to far-distant markets.

In favored localities with excellent air drainage commercial varieties of peaches are grown with great success. The section around Emmett expects to ship one hundred and twenty cars of peaches from the young orchards. At the end of June the contract price was $1.00 per bushel in boxes or baskets.

Sour cherries succeed everywhere and sweet ones do exceptionally well where there is suitable air drainage.

There is a general disposition to use some kind of mechanical sizer for apples. For large orchards the Manville fruit grader and sizer with a capacity of 2500 bushels daily has many advantages. This machine will deliver seven sizes of fancy on one side and seven sizes of extra fancy on the other side, each size increasing by one-eighth inch. The apples are automatically and carefully placed in boxes in seven sizes on either side of the machine. They are then ready to be paper-wrapped at less cost than if hand graded, or with a little additional work in regulating the top layer of the box the cover may be nailed on at once. This sizer is peculiarly suited to the face and fill pack and to the jumble pack, and it will grade and size the fruit with the help of six to ten women on either side of the endless belt at a fraction of the cost of hand grading and sizing. This machine handles apples with such care that it was used in grading and sizing the Grimes for the Manville section of the Idaho exhibit at San Francisco. By use of this machine apples can be sized, graded, packed and loaded into the car for four cents a box or less, depending on the amount of imperfect fruit to be thrown out by the sorters on the endless belt.

We have no new legislation worthy of particular mention and inspection is being carried forward under the laws of the previous two years. We are making an effort to have the deputy inspectors as well as the chief, teachers and friends of the orchardists, as well as exercising their police powers. The amount of money available for state inspection, about $28,000.00, is nearly $11,000.00 less than last season. We believe, however, that it will be handled with such energy and success as to answer the purpose.

There are perhaps seventeen store houses in southern Idaho that attempt to utilize the cool night air in autumn and spring and that safely carry a considerable portion of the crop until a market can be found in late winter and spring. In some instances electric fans are used to drive out the warm air and draw in the cool night air.

A good deal of orchard heating equipment was installed five or six years ago in the larger orchards. The oil used created a good deal of smudge or smoke which, coating the blossoms, seemed to keep the bees away. It is possible that some orchards did not have enough pots to the acre. At any rate the owners were disappointed in the results. People who did not attempt to heat fared about as well as

those who did. The present method of guarding against spring frosts is to turn in as much water as possible, commencing with the frost warning and keeping up irrigation day and night where a good head of water can be handled. This method has been quite helpful.

Cider and vinegar are being manufactured quite freely and with the advent of "*Idaho dry*" in 1916 we anticipate the use of a considerable amount of pastureized cider. Jonathan apples carry fourteen per cent sugar and make a seventy grade vinegar. Vinegar that runs as high as ninety-two grade has been made from our richest apple cider. By-product plants are very limited in number and comparatively little has yet been done along these lines.

The North Pacific Distributing Association has, I believe, about six or eight thousand growers organized. The Nampa sub-central has five hundred and twenty growers. Effort is made to purchase boxes and articles needed on advantageous terms. Independent dealers are also active and the Farmers' Equity Association has just begun to organize and ship their members' fruit to other equity organizations in other states with less attendant expense than by other methods.

The Jonathan has many friends so far and thirty-eight per cent of the orchards of the state are this variety. The Jonathan in southern Idaho develops good quality, bears apples when five years planted, is productive, and in our cold night-air houses can be kept until mid-winter without the expense of artificial refrigeration. Rome Beauty is a late blossomer and is productive. Winesap is very productive and is one of our best varieties. White Pearmain yields an abundant crop every other year, and keeps without artificial refrigeration until April or May. Delicious seems to be promising from a very limited experience. Arkansas Black succeeds and sells to advantage on southern markets. Quite a number of other varieties have been planted with more or less success.

E. P. STEVENS.

ILLINOIS.

Fruit crops of the last two years have been reasonably satisfactory to most Illinois fruit growers and there is a general feeling of encouragement for the future. Efforts to improve the quality of fruit harvested by greater attention to the details of orchard management, have been in large measure successful and marked advance has been made in the direction of improved grading and packing.

The introduction of mechanical sizers for apples is an innovation worthy of note. Sizing machines were used by several growers in handling the crop of 1914 with the result that a number of machines have been installed as a permanent part of the harvesting equipment. They effect a large saving in expense and in great part solve the problem of standardization of sizes. One grower has purchased ten and it is predicted that mechanical sizing will soon become universal in large orchards. The standard barrel continues in favor

and is in general use as the package for apples. No notable changes in markets have occurred. Summer apples from the southern counties find outlet mainly through Chicago, St. Louis, Indianapolis and Cincinnati, although shipments to more distant points are not infrequent. Distribution of winter apples from cold storage varies with the season and is in part governed by the magnitude of the crop in other sections of the country. Normally the southern cities absorb a considerable portion of the crop.

In general, new plantings of apples show preference for old established varieties. New introductions are but sparingly planted. In southern Illinois apple planting is mainly confined to summer varieties, chiefly Yellow Transparent, Oldenburg and Benoni. After several years, during which the peach was in disfavor for most localities, the last two years have witnessed a marked revival in the planting of this fruit. In area planted it exceeds the apple. Elberta is the variety most in favor.

Implements employed are, in the main, those that have been in use for several years. The light draft harrow is gaining in favor and the gasoline tractor is now entering as a factor in the culture of large orchards. A few of the larger growers now use the tractor and its most extended use is predicted.

Growers of winter apples use cold storage, but, so far as we know, pre-cooling has not been attempted.

Opinions of growers who have given orchard heating a trial indicate that the practice has been, or will be abandoned on the ground that benefits are not such as warrant the expense. When frost injury occurs it is usually under circumstances that render all efforts at protection ineffective.

Low grade apples are sold in bulk to evaporators or to manufacturers of cider and vinegar. Revenues from this source fluctuate widely in different seasons, but for most growers this method of disposition of waste fruit is the most convenient and satisfactory. In recent years there have been increasing efforts to reduce the amount of low grade fruit by careful attention to cultural details and these efforts are meeting with encouraging success.

Co-operative buying and selling is successfully practiced by growers of small fruits, but is applied in only a very limited way to orchard fruits. The Illinois Commercial Apple-Growers' Association is a buying association, organized by some of the leading growers and has operated successfully for several years, but this association does not attempt selling.

The varieties that have been thoroughly tested, have a recognized standing in markets and are now in greatest favor with growers, are as follows:

Apples:—Yellow Transparent, Oldenburg, Benoni, Maiden Blush, Wealthy, Jonathan, Grimes, York Imperial, Rome Beauty, Minkler, Gano, Willowtwig, Ben Davis, and for some localities, Winesap.

Pears:—Howell, Lawrence, Lincoln, Sheldon, Tyson, Garber, Seckel, Giffard, Kieffer. Kieffer is the only variety planted commercially in recent years, the other varieties are occasionally planted in home orchards.

Peaches:—Champion, Elberta, Early Crawford, Late Crawford, Carman, Foster, Alton, Amsden, and for the south, Mountain Rose, Ede and Salway. Elberta leads all other varieties in area planted.

Cherries:—Richmond, Montmorency.

The new or little known varieties recommended by Mr. E. A. Riehl, of Alton, are the following:

Apples:—Colton, McMahon, Jefferis, Oliver and Ingram.
Pears:—Giffard, Tyson and Smyth.
Cherry:—King (sweet).
Blackberry:—Ward.
Raspberries:—Manitou (red), and Black Pearl.
Currants:—Wilder and Perfection.
Nuts:—Thomas, black walnut; Boone and Rochester, chestnuts.

In 1914 occurred the worst outbreak of codling moth known since systematic spraying was introduced. The abundance of the insect was general and even the most thorough spraying was ineffective in controlling it.

The "Apple Flea Weevil" has been seriously injurious in some of the southern counties and does not readily yield to remedial measures.

Compulsory care of orchards has been under discussion and there is a strong sentiment in favor of legislation on the matter, but no definite action has been taken.

C. S. CRANDALL.

INDIANA.

Interest in horticulture in Indiana is largely confined to the apple. At a few points strawberries are grown to advantage and a few successful peach orchards are among us. Peaches are too often winter killed to prove a successful business, but apples are very rarely frost killed, in fact never in the southern part of the state. Apples grown in Indiana are of high quality and the kinds most desired in the markets are the ones that do best here. Yellow Transparent, Oldenburg, Grimes, Rome Beauty, Winesap, and in the northern portion of the state Baldwin, are the leading varieties. Our most sensational apple now is Dr. Matthews. Whether this is a new creation or an old one resurrected we are not sure. Be that as it may, the Indiana experiment orchard is giving it to the world. Nearly all who have tasted it exclaim "The best apple I ever tasted." It is medium to large; pale yellow, green and red, possessed of little beauty, but just good. It ripens in August but keeps well till May. The tree is a splendid grower and of spreading habit. Has not been tried outside of the experiment orchard.

We have had a boom in planting orchards, but all is quiet now. We grow only about one-tenth the apples we use, hence our markets are of the best and we do not need associations to sell our product. We pack altogether in barrels and are not interested in new packages and new styles of packing. We sell solely on the merits of the fruit and our market is the home market.

We are suffering much this season from fire blight on apple trees. It is very severe on Yellow Transparent, Jonathan and Wealthy. Aphis injury is as bad as usual. We are troubled with a new worm, or an old one with new ideas. It starts work like a codling moth and then quits. Whether it dies or moves on we do not know. It makes numerous punctures, but they are only skin deep. They do not hurt the apple seriously except in appearance. The codling moth seems to have given up old habits for it carefully avoids the calyx and we find it much harder to combat on the side of the fruit than it was in the calyx.

Most orchards are cultivated, but under protest, especially is this the case on the hilly land on account of erosion. We are looking for a permanent cover crop that will also be a mulch.

Without doubt we have in Indiana the best spraying outfit in the world. We refer to a compressed air outfit. This is a little costly to install, but after the first cost the operation is the cheapest, easiest and most satisfactory.

JOE A. BURTON.

IOWA.

Interest in commercial horticulture is increasing and a few commercial orchards were planted last year. There is no increase in farm orchards. Fewer varieties are planted in commercial orchards than was formerly the practice. Much attention is being given to grading and packing and a few apple sizing machines have been installed.

The weight of fruit has been fixed, and the size of berry boxes determined. There is nothing new in cold storage or orchard heating.

There is co-operation in buying supplies, but not in selling.

The following are desirable varieties for Iowa:

Apples:—Oldenburg, Wealthy, Jonathan, Grimes, Winesap.
Cherries:—Richmond, Montmorency.
Plums:—DeSoto, Wyant, Miner.
Grapes:—Concord, Moore.
Strawberries:—Dunlap, Warfield.

WESLEY GREENE.

KANSAS.

Many peculiar weather conditions prevail in Kansas at different times and during some seasons fruit has a very precarious time of it. Last season was very dry and this season we have had nearly as much rain during the last week of May and first three weeks of June as we had in the past three years.

Because of the terrible drought of 1913 about two-thirds of the apple trees and many other fruit trees in Kansas died, so there will probably be a great revival in the planting of fruit trees in the next two or three years. Fruit growers have finally decided that they cannot grow good fruit without a sprayer used intelligently.

We have plenty of markets in Kansas for our fruit were it not for discriminating freight rates. However, a state organization has been effected for the purpose of getting a more equitable rate on apples. Grading is as nearly standard as possible. Many growers are using boxes, packing with double facing and jumble pack. There is a good demand within the state for even the second grade and cider apples.

About the only recent legislation is a law passed that all wine measure strawberry boxes must be stamped stating the amount they hold. It has been proposed to legislate to prevent the sale of diseased apples in the state. Some work has been done by the State Agricultural College in a co-operative way in getting the buyer and seller together.

The best varieties of apples for Kansas are: Early Harvest, Yellow Transparent, Maiden Blush, Jonathan, Winesap, Grimes, Stayman Winesap, York Imperial and Delicious. Champion, Crosby, Carman and Elberta are the best peaches. Dunlap, Sons, Aroma and Sample are the best strawberries. The new ever-bearing varieties are bound to revolutionize strawberry growing in some localities and of these varieties Progressive is the best. It is one of the best berries to plant for June fruiting and it will produce many berries later in the season with favorable weather conditions.

Many diseases of apples are rampant in this state now and only during late years are growers trying to control them, apple blotch is probably the worst and does more harm than all others. The Missouri is suseeptible to this and should be disearded unless the trees can be thoroughly sprayed with bordeaux mixture at the proper time. The apple blotch can be controlled. Ben Davis is very susceptible also. Winesap is very seldom attacked and Jonathan is almost immune. The vast majority of farmers do not spray, therefore, much of the fruit grown in Kansas is unfit for market. The codling moth and cureulio can be controlled by spraying.

The drought of 1913 was no doubt a blessing as it killed most of the Ben Davis trees. This variety was always very susceptible to codling moth and fungous diseases, especially the Illinois canker. The Ben Davis has been a great apple in Kansas, but its day is about over. We regret to bid Ben Davis farewell, but its usefulness is just about ended here.

F. W. DIXON.

KENTUCKY.

There are few notable details to record in the development of Kentucky horticulture during the past two years. As for several years previous there was a rather heavy planting of apple and other orchards in the fall of 1913 and spring of 1914 resulting from the

high average of apple and other fruit prices for the several years preceding. As a result of the large crop of fruit in 1914 with consequent lower prices, orchard planting has diminished quite perceptibly during the past year. The high prices for apples during several recent years has led many owners of farm lands to plant orchards rather largely and not a few of these amateur orchardists have already seen their ardor cool somewhat on account of the 1914 drop in prices. Some of the speculative orchards have consequently suffered a greater or less degree of neglect.

In the Henderson County fruit district the interest in orcharding has been maintained, although the new plantings during the past year have been materially reduced as a result, no doubt, as elsewhere, of the lower prices in 1914. The orchardists in the Henderson district have continued their co-operative efforts to the extent of purchasing their spray supplies in common, though but little progress has as yet been made in standardizing the pack or otherwise uniting in the sale of the crop.

As the crop in the region has a large proportion of one high class variety—the Winesap—it would seem that this should be a promising field for the development of an efficient and profitable selling organization.

In 1915 in this district spray materials were purchased in common to the extent of one hundred and nineteen barrels of lime-sulphur and two tons of arsenate of lead.

The crop in this district is sold almost entirely in barrels, but little effort having been made to introduce the box pack.

The past two seasons have witnessed a very serious outbreak of fire blight which has materially lessened the crop of some varieties and which, under existing conditions, has been almost or quite uncontrollable. Cutting out the disease has seemed altogether impracticable and when attempted has afforded but little apparent check to the disease. Fortunately, the Winesap, the most important variety grown in Western Kentucky, seems to be much less subject to the ravages of this disease than other kinds; a suggestion that the comparative immunity of certain varieties may afford the most satisfactory final solution of this perplexing difficulty.

The strawberry growers of Warren County and vicinity continue to maintain a highly efficient and growing co-operative organization. During the present season they disposed of the product of 1100 or 1200 acres of berries at an average price of over $2.00 per crate (24 qts.), making a total shipment of one hundred and fifty-six cars sent from Bowling Green.

C. W. MATHEWS.

MAINE.

A state law pertaining to the packing, grading and shipping of apples has resulted in better grading and packing, especially with reference to filling the barrels properly so that they will stand shipment to different markets. Considerable fruit is being shipped to

England. The bushel box is being used to some extent. The best varieties of apples are McIntosh, Fameuse, Delicious, Baldwin, Rhode Island Greening, Northern Spy and Gravenstein. Not very much has been done in commercial orchard planting recently but a good many home orchards of from fifty to one hundred trees have been planted. Not much is being done in cold storage because large amounts are kept in cellars and storage houses on the farms.

There are eleven co-operative associations working independently, but an effort is being made to unite these and thus eliminate unnecessary overhead charges.

The past winter has caused more injury to the fruit trees than any other winter since 1907.

ROBERT H. GARDINER.

MASSACHUSETTS.

The past two years have shown a very decided difference in the orchard plantings in the state. In 1914 there was a very general interest in setting fruit trees and more were set than in perhaps any previous year. In 1915 the setting in the aggregate has been very decidedly reduced, while the individual plantings have been larger. The following are the leading orchard varieties at the present time:

Apples:—Baldwin, McIntosh, Wealthy, Wagener, Gravenstein, Rhode Island Greening, Northern Spy, Oldenburg.
Pears:—Clapp, Bosc, Bartlett, Sheldon, Seckle, Anjou.
Peaches: — Greensboro, Waddell, Carman, Champion, Belle (Georgia), Elberta.
Plums:—Bradshaw, Burbank, Red June, Yellow Egg.
Cherries:—Sour, Richmond, Montmorency, English Morello. Sweet—Windsor, Wood, Black Tartarian.
Grapes:—Moore, Winchell, Delaware, Brighton, Worden, Niagara.
Raspberries:—Black—Kansas, Plum Farmer. Red—Cuthbert, Herbert.
Blackberries:—Eldorado, Snyder.
Currants:—Wilder, Perfection, Cherry, Fay.
Gooseberries:—Pearl, Downing, Industry.
Strawberries:—Abington, Dunlap, Sample, Marshall, Glen Mary, Minuteman.

A law to govern the packing and sale of apples is now in force, establishing standard size of barrel; the four grades, fancy, standard A, standard B, and ungraded; the name and address of packer, name of variety, grade, minimum size, and quantity of contents must be stamped on package; fine of $50.00 for first offence and $100.00 for each subsequent offence in violating this law. An effort is being made to have all of the New England States adopt a similar law.

The past year has been marked by an increased interest in better methods of marketing apples and several co-operative organizations

have been formed to unify grades, establish trade brands and reduce marketing expense. Last year the bulk of apples at Hardwick were graded and packed under expert supervision and sold under a copyright brand. By thus collecting a large amount of uniform fruit the organization was able to sell at twenty per cent above ruling prices for number one apples. This year they have already contracted their entire crop to buyers who handled their pack last year. Officers of the organization report the contract price to be very satisfactory.

The past two years Colerain Fruit Growers' Association has acted entirely as a buying agency for the purchase of orchard equipment and supplies. This year steps are being taken to sell at least part of the apples grown by its members.

At Groton, Heath and Williamsburg co-operative fruit growers' Associations are now being incorporated for the purchase of supplies and the sale of the apple crop. The spirit and enthusiasm with which growers are taking hold of this method which has proven so successful in the West speaks for its success in Massachusetts. The present trend would seem to indicate that within a few years a considerable proportion of the commercial apple crop of this state will be sold on a strictly co-operative basis.

The principal by-products are cider and vinegar, although there is produced a limited amount of canned fruits, jellies and preserves. Thousands of bushels of apples are used in this way.

The brown tail and gypsy moths continue to be serious pests, particularly in the eastern part of the state. The so-called "red bug," *Heterocordylus malinus* and *Lygidea mendax*, is very destructive where not controlled by tobacco or similar sprays applied with great thoroughness. There has been a virulent outbreak of the common tent caterpillar this year.

MONTANA.

During the past two years little new planting has been done, but the exceptionally heavy plantings of the previous two years have been kept up in good shape with replants.

The varieties of apples most commonly planted are Wealthy, McIntosh, Rome Beauty, Tompkins King, Gravenstein and Wagener. A good many Delicious have been planted in some sections. We are testing one new variety of promise, the Vanderpool *(Red)*, which originated in Oregon.

The varieties of cherries most commonly planted are Bing and Lambert of the sweet cherries, and Montmorency, Wragg and Ostheim of the sour varieties.

The fruit growers are organized to sell their fruit through the Northwestern Fruit Growers' Association and are packing in accordance with the standard Northwestern packages.

Little is being done in the way of cold storage and with the varieties grown there is very little necessity for pre-cooling. No orchard heating of any consequence has been undertaken in Montana and

little has been done in the way of taking care of waste fruit or low grades by working them into by-products.

We have had no unusual outbreaks of insects or diseases unless we would consider our difficulties with blight unusual. During the past two years blight has destroyed a great many susceptible varieties of apples, but at present it does not seem to be serious. The early plantings in Montana consisted largely of Alexander and Transcendent crab. These have been practically eliminated by blight and the less susceptible varieties are now doing very well.

O. B. WHIPPLE.

NEBRASKA.

There was never a time in the history of Nebraska when commercial fruit growing looked as bright as it does now. Some of the apple orchards planted twenty to thirty years ago that have been given a reasonable amount of care, have demonstrated the possibilities of eastern Nebraska for growing a high grade quality of fruit.

Loess Soil: The characteristic loess soil formation found bordering the Missouri River, is an ideal fruit soil and it is on this type of soil that most of the commercial orchards are now being planted. The steep, rolling hills and bluffs, in many cases too rough for general farm purposes, are now recognized as being ideal fruit-growing soil. Several hundred acres of this soil have been planted to apples, grapes, and small fruits in the past two years. For the most part the apple orchards are being planted in units, ranging from ten to forty acres.

Organizations: The Eastern Nebraska Fruit Growers' Association was formed March 5, 1913. This Association was started by most of the larger growers in the eastern part of the state for the purpose of buying and selling as a unit. An association pack was established the first year and most of the fruit was barreled and put in cold storage, to be disposed of in mid-winter and early spring. In 1914 the Eastern Nebraska Fruit Growers' Association was changed to the Central Fruit Growers' Association, which includes not only the eastern Nebraska section, but also a portion of southwestern Iowa, northwestern Missouri, and northeastern Kansas, representing the same soil type. The success with which this association harvested and marketed its crop in 1915 has caused many more orchards to be planted in this section.

The Omaha Fruit Growers' Association handles most of the grapes and small fruits near Omaha.

Orchard Heating: Heating apple orchards by means of crude oil is being practiced by several growers. The loss from late spring frosts in orchards on well selected sites is so small it is a question as to whether the additional expense to equip for heating is justified.

Varieties: Winesap is one of the most profitable varieties for eastern Nebraska. Jonathan is being planted freely, and rivals Winesap in prominence. Ben Davis and Gano are being planted on account of their extreme regularity of bearing. Grimes, Paragon,

Oldenburg, Virginia Beauty, Stayman Winesap, and Wealthy, are also being included in many commercial orchards. Delicious is being tried out on a small scale in most of the orchards now being planted. It promises to be one of the leading varieties for the Missouri River loess soil. Missouri is used freely as a filler. This variety comes into bearing at an early age, and is very prolific.

Kieffer and Flemish pears are being grown commercially.

Early Richmond, Montmorency, and English Morello cherries are the leading commercial varieties.

Wild Goose, Wyant, Wolf, DeSoto, and Forest Garden plums are among the leading American varieties for this section.

Moore, Concord, Worden, Campbell, and Brighton grapes are among the leading varieties.

Diseases and Insects: Within the past five years the Illinois or blister canker *(Nummularia discreta)* has done more damage to apple trees in this section than any other fungous disease attacking the trees. Ben Davis and Gano seem to be extremely susceptible to this disease, while the Winesap, Jonathan, Paragon, Oldenburg are more or less resistant. In well cared for orchards that have been properly pruned and sprayed, and where the disease has been cut out when first noticed, this canker has not done any serious damage to any of the varieties, except the Ben Davis and Gano.

R. F. HOWARD.

NEW JERSEY.

Extensive plantings of fruit trees of all kinds are being made, but as yet the area covered is not as large as it was when the San Jose scale first appeared. This pest destroyed thousands of trees of all kinds, but is now being held in check. In 1910 there were over a million peach trees not yet in bearing and since that time the peach has been planted more freely than any other kind of fruit. The most popular varieties are Elberta, Belle, Carman, Champion, Hiley, Greensboro, Fox, Iron Mountain and Lola. The Georgia six-basket carrier is being used extensively as a shipping package in the central and southern parts of the state.

New Jersey ranks seventh in the Union in number of pear trees and many more are being planted each year. Bartlett and Seekel are taking the place of the Kieffer and LeConte in recent plantings.

The early summer and fall varieties of apples are proving very profitable, especially Yellow Transparent, Williams, Starr, Oldenburg, Gravenstein and Wealthy. Other popular varieties later in season are Grimes, McIntosh, Baldwin, Stayman Winesap, Rome Beauty and Paragon. Delicious and King David are quite promising in some sections.

A good many sour cherries are grown commercially, especially Early Richmond and Montmorency. Only a few sweet cherries are being planted at this time. The planting of plum trees has been practically discontinued since the early ravages of the San Jose scale.

Quinces seem to be very promising.

New Jersey ranks first in the production of small fruits, if cranberries are included in this class. The acreage devoted to cranberries exceeds that in Massachusetts and Wisconsin by many acres. The best varieties are Early Black, Howell, Champion and Centennial. Ward is the most popular blackberry, and Cuthbert, Ranere (St. Regis) and Welch are the best red raspberries. Wilder and Red Cross currants are the most profitable varieties, and Downing and Houghton are the leading gooseberries.

The small fruit industry would develop rapidly were it possible to secure labor.

Grapes are grown quite extensively, there being several vineyards comprising more than one hundred acres each. A considerable portion of the crop is made into wine and grape juice. Concord and Ives are the leading varieties.

Rapid progress is being made annually by the fruit grower in improved methods of orchard management and spraying. The auto truck is being used in marketing fruit from the larger fruit farms and is becoming an important factor in the fruit business, especially near the large cities.

M. A. Blake.

New Mexico.

During the last two years there has been more discussion and perhaps more progress made in the new methods of grading and packing of fruit than almost any other phase of fruit growing. Some fruit growers' associations have been organized and these have under consideration the adoption of rules on picking, grading and packing. The Mesilla Valley Fruit Growers' Association has very recently adopted a set of rules for picking, grading and packing of peaches and pears. These rules are very similar to those adopted at the Spokane meeting on April 15, 1915.

Some difficulties have been encountered in the marketing of our fruits and because of this more interest has been manifested by the fruit growers and the fruit growers' associations to reach out for new markets and to put in operation better methods for disposing of the fruit.

Very little work is being done in the originating of new varieties of fruits. The fruit growers are using old and well tried varieties. Many of the newer varieties of apples that have been recently introduced are being tested. For example, Delicious has been planted quite extensively all over the state and the results up to the present time seem to show that this apple does exceedingly well in the higher and cooler sections. Excellent Delicious are being grown at altitudes of six thousand to seven thousand feet. The fruits seem to vary considerably in shape, color and time of ripening when grown at lower altitudes, becoming very oblate in shape, dull purplish in color with little striping and ripening in August.

Many new plantings are being made in those fruit growing districts where there is plenty of water for irrigation purposes. In

the Mesilla Valley under the Elephant Butte Project, a great many plantations have been started practically all of the Bartlett pear.

Orchard heating, when properly done, will materially reduce the frost injury to some of the fruits, particularly the peach as experiments have shown. Very little has been done with apples and pears, as these usually blossom, in the lower and warmer valleys, late enough to escape the late spring frosts.

There are no co-operative buying and selling organizations.

There is some difference of opinion as to the best varieties for the state as a whole. For the higher altitudes such winter apples as the Jonathan, Winesap, Delicious, Black Ben, White Pearmain, Rome Beauty, Hoover (Thunderbolt) and Bellflower are among the most promising. In the lower altitudes the Jonathan, Winesap, Paragon, Black Ben and Arkansas Black are among the leading varieties.

Bartlett is the leading pear being grown on a commercial scale. In our experimental work Anjou, Winter Nelis, and Winter Bartlett are showing up very favorably.

Apricots, as a rule, are not considered commercially, because they blossom too early and, as a rule, are usually killed by late frosts. However, the trees are among the hardiest that we have.

Mayflower, Alexander, Hynes *(Surprise)*, Texas King, Elberta, Late Crawford, Crothers and Salway are the best peaches. The main trouble with peaches is that the late ripening varieties are liable to be injured by late spring frosts because they blossom about two weeks earlier than the Alexander.

Jefferson, Coe, Imperial Gage, Pond, Sargent, Yellow Egg, Agen *(French Prune)* and German *(Prune)* do very well. The Japanese plums are not recommended because they blossom too early in the spring. Wild Goose, Wayland, and Omaha are good native varieties.

Early Richmond, Montmorency and Ostheim are three of the best sour cherries. The sweet varieties, for one reason or another, are not doing very well in any of the fruit growing districts, particularly the lower and warmer parts.

The worst pest of pomaceous fruits is the codling moth. Fruit growers have come to realize that if they are going to grow pomaceous fruits they must spray, consequently, they are now partially controlling the codling moth.

FABIAN GARCIA.

WYOMING.

Naturally there is not much to be said on pomology for Wyoming. We are not yet shipping out of the state except very sparingly in apples. The standard western box is used. Most of our fruit of all kinds is marketed locally in "any old package."

No new fruits have been announced except two new seedling apples, from the State Experimental Fruit Farm, located at Lander. The State Horticultural Society has not passed officially on the standing of these candidates for recognition.

The new plantings are primarily apples, but hundreds of new home orchards have been started, in which fruits of all kinds are being tried out.

There is no legislation whatever as to grades and packages. We do not yet have need of cold storage and pre-cooling. Orchard heating is talked about, but not practiced. It is generally not needed. Some fruit was killed by frost this year late in May. There are no by-products except cider and vinegar for home consumption. No fruit associations have yet been organized.

Our State Horticultural Society is pushing the establishment of home orchards and incidentally encouraging commercial planting and is offering medals for worthy new fruits. Several commercial orchards are just coming into bearing. The Big Horn Apple Company has one block of one hundred and thirty-five acres.

Two counties have suffered terribly from fire blight. Efforts have been, and are being made to get concrete action in an effort to control it.

Codling moth has only recently been detected in a few isolated localities, and literature is being spread everywhere outlining the best known methods for its control or extermination. No other pests or diseases of importance are yet within the state.

AVEN NELSON.

NEW YORK.

There are no new methods of grading and packing in New York that have become prominent, except that there is a fairly marked interest in the possible use of mechanical fruit sizers as a means of making compliance with the new apple packing law easier.

A considerable number of growers in New York have interested themselves in the development of special personal markets whereby the fruit is sold directly to consumers or stores handling high grade fruit. During the past year it is said that a considerable number of apples were taken from storage late in the season and evaporated for shipment to European markets.

For the past year there has probably been less planting than usual in the various fruit sections of New York.

During the winter of 1913-14 a fairly rigid apple packing law was passed by the New York Legislature. This law established a "Fancy" grade with no tolerance except five per cent on minimum size; and "A" and "B" grade; and an "Unclassified" grade. Even in this last it is necessary for the grower to mark barrels "Scabby," "Wormy," or "Wind Falls," if such apples are to be found in the package. The first experience with the law was during the harvesting season of 1914; there was both satisfaction and dissatisfaction among the growers. It was found by experience that the law could not well be enforced as drawn, since it did not give to the Department of Agriculture the right of seizure in order to secure evidence. During the legislative session of 1915, the law has been revised, giving the Department of Agriculture this right, and, perhaps, increasing the tolerance in the different grades a little.

There is no interest in pre-cooling in New York State, owing to the fact that the markets are so near.

Orchard heating will probably never be of great interest in New York State, since very few crops are lost by frosts. Perhaps medium cold weather at blossoming time is the cause of very much more loss than freezing at blossoming time or later.

There has been interest in a new process of evaporating apples, known as "dehydration." It seems that the air is first exposed to very low temperature so that the moisture is precipitated, and is then passed through warm chambers. This dehydration can be made possible at a considerably lower temperature than can be used with ordinary evaporators. Whether or not the product can be produced cheaply enough to make it of any great importance is not yet determined.

There is small interest in co-operative buying and selling, though there is one large co-operative buying society in the Hudson River section, and during the past year a new exchange, doing a rather large business, operated in western New York.

The State Horticultural Society and the Western New York Horticultural Society have taken a marked interest in the new law regulating the packing of apples in this state—in fact, it was probably through their influence that the bill was secured, and they are being depended upon to keep growers from becoming dissatisfied with the workings of the bill before its possible usefulness is carefully determined.

During this present season (1915) there have been no severe insect outbreaks in so far as horticultural interests in New York State are concerned. The only unusual insect outbreak has been the appearance in very large numbers of the cherry leaf beetle *(Galerucella cavicollis)*. The adult has appeared in many sections of the state and has done considerable injury to the foliage of cherry, plum and peach. However, its ravages have been rather easily controlled and no serious material injury has resulted.

The fruit diseases common to New York State have been generally prevalent during 1914 and 1915. Experiments conducted by Reddick and Crosby (N. Y. (Cornell) Agr. Exp. Sta. Bul. 354, 1915,) in dusting apple trees with sulphur and lead have, compared with spraying, given very satisfactory results.

Peach Leaf Curl was very prevalent in the spring of 1914 and 1915. The poor results secured by growers from the application of lime-sulphur solution is attributed to late and to careless spraying. Carefully sprayed orchards have been free from diseases. Reddick and Toan (N. Y. (Cornell) Agr. Exp. Sta. Cir. 31, 1915,) report as a result of experiments and observations that a dormant late fall or early winter application is as effective as the early spring sprayings in controlling the curl.

Fire blight has damaged many pear trees in 1914 and 1915, and also appeared generally in 1914 as a twig blight of apples. It has not been possible to demonstrate conclusively that the recommendations usually made for the control of this disease are entirely

effective. Growers here are not successful in controlling this disease. Better results have been secured where growers have jointly hired a competent and trained man to fight blight for them.

W. H. CHANDLER.

OREGON.

Nothing new of importance in methods of grading and packing fruits is reported.

No new fruits have been reported in the past two years which have attracted attention.

The apple-planting boom subsided about two years ago. Very few new plantings of apple trees have been made since that time. There were extensive plantings of loganberries in western Oregon in 1914. It is probable that more prune trees have been planted in the past two years than of any other orchard fruit, but the aggregate planting of prune trees has not been large. There has been a revival of interest in walnut culture in past year and several thousand walnut trees have been planted.

A number of new machines for grading fruit, particularly apples, are being introduced, and some appear to have much merit.

There has been no new legislation in this state relating to standard grades and packages for fruit. The only change in inspection law is a provision making it the duty of county horticultural inspectors to inspect fruit evaporators when in operation.

Cold storage and pre-cooling plants have been established at the leading shipping points. Most of these plants are owned or controlled by associations of fruit growers.

The only portion of the state in which orchard heating is practiced is in Jackson County. In that county most of the orchardists practice heating their orchards in spring when severe frosts are likely to do serious damage. Crude oil is the fuel commonly used and fires are operated so as to make as much smoke as possible.

Much interest in the matter of by-products has been shown in the past year or two. The production of evaporated prunes has long been one of the leading horticultural industries of the state. An increase in the production of other evaporated fruits and of canned fruits is taking place. The most notable increase is in the production of evaporated loganberries and the manufacture of loganberry juice as a beverage, and as a base for the manufacture of jellies, flavorings, etc. The production of loganberry products gives promise of becoming an industry of much importance in this state.

Owing to the extraordinary diversity of climatic conditions in Oregon it is impossible to give a list of best varieties in this state. Orchard planters in Oregon have incurred very great loss as a result of planting varieties of apples said to be the best to grow in Oregon, but which were in fact best only for certain limited districts.

The law of this state makes infested trees or diseased trees, if the disease is liable to spread, a public nuisance and provides a method of abating the nuisance at the expense of the owner of the

property on which the trees or plants are growing. Any unusual outbreak of diseases or insects can be handled under the provisions of this law. There is also provision for quarantine when advisable.

H. M. WILLIAMSON.

TEXAS.

There are two new varieties of peaches that have been introduced in our state that are worthy of mention. The Yellow Swan, introduced by J. F. Sneed, of Tyler, is a large yellow peach, a seedling of the Elberta and quite similar to it, but ripens some two weeks earlier than Elberta. The Frank, originated by Mr. J. W. Stubenrauch, of Mexia, Texas, and introduced by Will B. Munson, of Denison.

Some of Mr. T. V. Munson's recent productions in grapes (seedlings germinated by him but which did not fruit before his death) promise to excel even the finer varieties introduced by him in prior years. These new grapes have not been named, but after this summer's test a few of the choice ones will be selected with a view of introducing in a year or so.

There has been a pre-cooling plant established at San Benito. This is used in cooling vegetables in carload lots before they are shipped to northern markets. It has worked very successfully and there is talk of establishing several other similar plants in the Brownsville country. The question of cold storage in the fruit and vegetable centers of the state is receiving a great deal of attention and it will only be a question of a short time when there will be a great many cold storage plants established.

There has been considerable advancement in the protection of fruit crops in this state by the use of smudge pots. These smudges have been used on the citrus fruits and figs in the coast country, and on the peaches and apples in north and east Texas.

A marketing association has been organized among the fruit growers in Denison and vicinity, and the Chamber of Commerce has a man to keep in touch with all the markets and advise the fruit growers; also to make sales and allow the fruit growers to fill the orders. In this way, orders are received from near-by towns which prevent the market from being glutted. This relieves the local markets considerably. There have been a number of fruit and vegetable growers' organizations organized in the southwestern part of our state. Some of these have been operating very successfully.

Some of the best fruits for Texas are the following:

Apples:—Shockley, Ben Davis, Red Texas, Jonathan, Gano, Arkansas Black.

Peaches:—Mayflower, Mamie Ross, Carman, Yellow Swan, Elberta, Augbert.

Plums:—Gonzales, Abundance, Terrill and Burbank.

Grapes:—Concord, W. B. Munson, Herbemont.

Strawberries:—Klondyke, Lady Thompson.

Blackberries:—Spaulding, Early Harvest and Dallas.

Dewberries:—*(Austin)* Mayes, Haupt, San Jacinto.

Figs:—Magnolia.

Oranges:—Satsuma.

The codling moth is becoming a serious pest of the apple and pear. The growers are beginning to spray against this pest successfully with arsenate of lead.

The San Jose scale is also becoming a very serious pest of the fruit industry of this state. The growers are beginning to use lime-sulphur solution against it.

E. J. KYLE.

UTAH.

The tendency in Utah is toward a cheaper fruit package. There is a strong inclination for peach growers to get away from the peach box and to adopt the bushel basket. The bulk of the crop was handled that way last year and three-fourths will be handled in bushel baskets this year. The tendency among cherry shippers is to use a twenty-pound cherry box with one side faced. This year's crop was partly handled in these with the balance in sixteen-quart crates or twenty-four-pint crates.

Growers are encouraging manufactured fruit products and disposing of as much fruit as possible to local canneries, etc. A new evaporator has been established at Ogden under the management of Everfresh Company of Portland.

There are practically no new fruit plantings in Utah excepting replacements.

A law was passed by the last Legislature establishing pints and quarts for Utah sale, these to be stamped. It will become effective for next year's crop.

Cold storage and pre-cooling are among the most important necessities of the fruit growers of Utah. We need up-to-date storehouses and more modern home-packing plants. These are some of the main features we are urging.

Interest in orchard heating is waning. A few years ago it took a boom, but now the effort is to select orchard sites not susceptible to late spring frosts.

There is increased interest in by-products and all canning factories and evaporators are running this season.

The Utah Fruit Growers' Association last year handled at least three-fourths of the Utah crop. This year it will do almost as well. The distribution of the fruit is handled by the California Distributing Association at so much per car, and has proven satisfactory.

The best varieties for Utah are:

Apples:—Jonathan, Rome Beauty, Winesap.
Peaches:—Phillips, Runyan, Gleason.
Cherries:—Lambert, Bing, Orb, Windsor, Napoleon.
Apricots:—Jones, Chinese, Moorpark, Blenheim.
Pears:—Anjou, Bartlett, Winter Nelis, Kieffer.

The apple leaf roller proved serious in two sections of the state. There was increased damage from apple mildew and the Califor-

nia peach fungus also. The aphides covered all kinds of fruit trees in the worst outbreak ever known here.

Fruit shippers of Utah are seriously handicapped in that they are kept out of Montana markets on account of a quarantine which the Montana officials maintain on account of supposed danger of introduction of the Alfalfa Weevil so prevalent in Utah. This works an injustice to Utah shippers and should be modified by the Montana officials if possible.

E. P. TAYLOR.

VERMONT.

The 1914 apple crop was about equal to the average of the past ten years and was fairly remunerative to the growers. Pears and stone fruits were fifty per cent of an average crop. Red raspberries are grown extensively in the Connecticut river valley and are shipped largely outside the state.

The 1915 fruit crop promises to be about one-third the ten years' average. This is largely due to the unusual drought, frosts and cold, dry winds early in the season.

There is an increased planting of fruit trees throughout the entire state. Co-operative buying of fertilizers is practiced and considerable money has been saved to the growers as a result. It is expected soon that co-operative selling will be started also. A new grading, packing and inspection law has been passed, but it is too early to state what benefits will follow.

Vermont leads the East in the innovation of irrigation of orchards. Mr. C. H. Holmes, of Charlotte, has recently installed a powerful engine to pump water from an adjoining lake and distribute it to a system of ditches over his apple orchard covering one hundred acres. There are several other irrigating plants which have been installed as a result of three seasons of extended drought.

The State Horticultural Society is in flourishing condition and its meetings are well attended. Since there is more or less damage to fruit trees each year by deer the question of the value of fruit trees has been settled by the Horticultural Society as follows: "A tree set less than one year is worth not less than one dollar, and that said tree or trees increase in value at the rate of not less than one dollar a year thereafter." This valuation has been approved by the State Game Commissioner.

Some of the best varieties for Vermont are Northern Spy, Rhode Island Greening, Red Canada, Sutton, Esopus and McIntosh. The best pears are Bartlett, Seckel, Flemish, Comice, Winter Nelis and Anjou. The plums recommended are Lombard, Green Gage, German (Prune), Bonum, St. Ann, Niagara and Monarch. The Montmorency, Early Richmond, English Morello and Ostheimer are suggested as the best cherries for Vermont. Some of the new varieties of apples worthy of trial are Delicious, King David, LaVictoria, Canada-Baldwin, Fameuse Noire and Wismer. The pears suggested for trial are McLoughlin, Worden, Rossney, Fame and Bart-

lett Hybrid. The plums for trial are Black Diamond, Italian *(York State Prune)*, and Tatge. The cherries are Baldwin, Ostheimer, Suda and Tenny *(Early)*.

D. C. HICKS.

VIRGINIA.

The growers generally have adopted the specifications as outlined in the Sulzer law for grading and packing apples. The results have been most satisfactory. An effort is being made to have the Bureau of Markets of the U. S. Department of Agriculture send a special agent to South America to open up markets for American apples.

The amount of fruit tree planting has fallen off, and Ben Davis is no longer being planted. Orchard tractors are being used by several of the largest fruit growers, and apple sizing machines are proving to be a splendid success, but are not yet entirely adapted to sizing for packing in barrels. The cedar rust law has been upheld as constitutional. New cold storage houses are being erected to take care of the increased yield of fruits from year to year. Orchard heating has been tried in a few orchards. The number of vinegar factories and evaporators is being increased. Co-operative buying and selling is receiving considerable attention but has not been attempted on a large scale.

The State Horticultural Society is endeavoring to secure accurate and complete stock statistics throughout the marketing season. It favors governmental inspection of fruit both at the shipping point and at destination. It approves any intelligent effort to get the consumer and producer closer together and thus eliminate unnecessary service by middlemen.

The commercial varieties of apples in their order of preference are: York Imperial, Winesap, Ben Davis, Yellow Newtown (Albemarle Pippin), Arkansas, Grimes, Stayman Winesap, Rome Beauty, Black Ben, Delicious.

WM. P. MASSEY.

ON SCORE CARDS AND JUDGING.

W. T. MACOUN, *Chairman*.

In view of the fact that a part of this committee is a part of a similar committee of the Society for Horticultural Science, which has spent two years in preparing score cards that have been published in the Annual Reports of that Society for the years 1913 and 1914, your Committee has decided that it would be better for the American Pomological Society to adopt these cards rather than to try to prepare other score cards which would not differ materially, if at all, from those of the S. H. S. We, therefore, beg to submit for your approval the score cards referred to.

Your committee feels that some explanation, necessarily brief, is due you regarding the several factors and their values appearing upon the score cards about to be submitted. In our opinion, form, size, color, uniformity, and freedom from blemish are factors that ought always to be considered. In most cases it is difficult and

often impracticable to pass judgment upon quality, although such judgment would be desirable. In order to suit, as far as possible, all conditions and all opinions the cards for plate fruit of everything except grapes are made up of values totaling 100 points upon the first five factors, quality being omitted. Then if it seems desirable to the judge to score quality it may be given an extra 25 points for perfection, making 125, or as will probably be true in most cases it may be left out entirely. Passing to the other factors, form and size are considered of equal importance in the pomaceous fruits (quinces being an exception) while in drupaceous fruits size is considered of greater importance than form. Uniformity in most instances is considered of about equal importance to color, and no other single factor is given greater consideration than freedom from blemish.

SINGLE PLATE SCORE CARDS FOR FRUIT OF A GIVEN VARIETY.

Apples and Pears.

Form	15
Size	15
Color	20
Uniformity	20
Freedom from blemish	30
Total	100
Quality when scored	25

Peaches and Cherries.

Form	10
Size	20
Color	20
Uniformity	20
Freedom from blemish	25
Total	100
Quality when scored	25

Plum.

Form	10
Size	25
Color	20
Uniformity	20
Freedom from blemish	25
Total	100
Quality when scored	25

Quince.

Form	15
Size	20
Color	15
Uniformity	20
Freedom from blemish	30
Total	100

Grape.

Form of bunch	10
Size of bunch	15
Size of berry	10
Color	10
Uniformity	10
Freedom from blemish	20
Quality	20
Firmness	5
Total	100

Collection of Fruits With Specified Number of Plates.

Value of varieties for purpose stated	50
Condition of fruit (average of individual plate score)	50
Total	100

Largest and Best Collection.

Numbers of varieties	33 1-3
Value of varieties for purposes stated	33 1-3
Condition of fruit (average of individual plate score)	33 1-3
Total	100

Score Card for Sweepstakes Prizes.

or other competitions between different varieties of packed fruit.

Box.		*Barrel.*	
Texture and flavor	100	Texture and flavor	100
Value of variety	100	Value of variety	100
Size and form	100	Size and form	100
Color	120	Color	100
Uniformity	100	Uniformity	100
Freedom from blemishes	130	Freedom from blemishes	150
Total	650	Total	650

Box.		*Barrel.*	
Material	30	Staves	10
Marking	10	Hoops	10
Solidity (nailing, cleats, etc.)	10	Heads	10
		Nailing	20
		Marking	20
Total	50	Total	70

Box.		*Barrel.*	
Bulge or swell	100	Facing	80
Alignment	20	Tailing	50
Height of ends	60	Pressing	70
Compactness	80	Packing	80
Attractiveness and style of packing	40		
Total	300	Total	280
Grand Total	1000	Grand Total	1000

FOR BARRELS AND BOXES OF A GIVEN VARIETY.

Box.		*Barrel.*	
Texture and flavor	100	Texture and flavor	100
Size and form	100	Size and form	100
Color	150	Color	150
Uniformity	150	Uniformity	150
Freedom from blemishes	150	Freedom from blemishes	150
Total	650	Total	650

Box.		*Barrel.*	
Material	30	Staves	10
Marking	10	Hoops	10
Solidity (nailing, cleats, etc.)	10	Heads	10
		Nailing	20
		Marking	20
Total	50	Total	70

Box.		*Barrel.*	
Bulge or swell	100	Facing	80
Alignment	20	Tailing	50
Height of ends	60	Pressing	70
Attractiveness and style	40	Packing	80
Compactness	80		
Total	300	Total	280
Grand Total	1000	Grand Total	1000

DEFINITION OF TERMS.

Your committee feels that this is somewhat of a local problem, but in our effort to secure unity of action as far as possible we venture to make the following suggestions:

FORM in all cases refers to the normal type of the variety, region of growth considered.

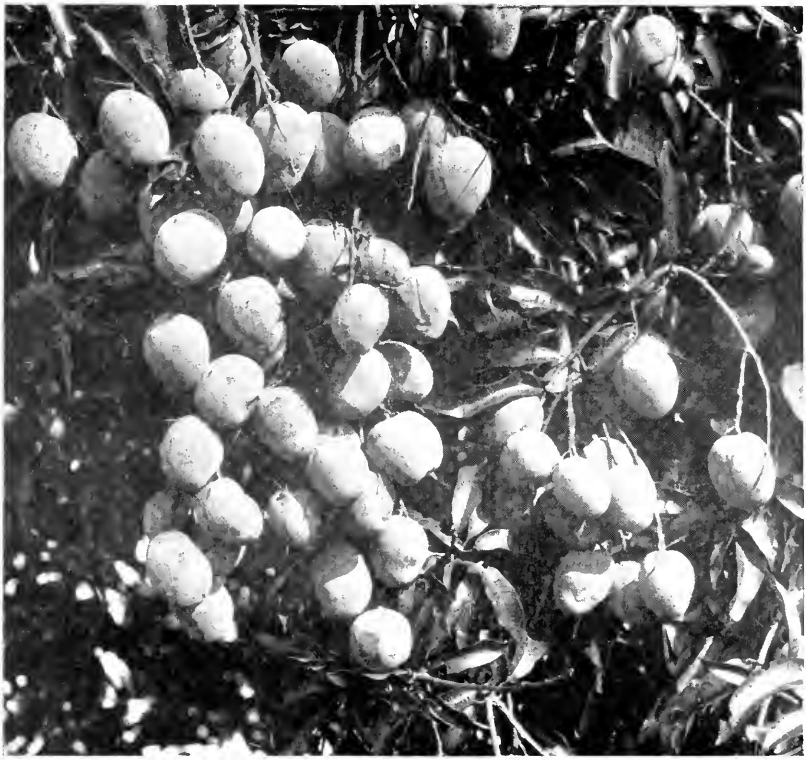
SIZE. The most acceptable commercial size for the variety should be the ideal. This should be somewhat above the average size for the variety in regions where it is well grown. Extremely large size should be discouraged.

COLOR. In red, blushed or striped pomaceous fruits high clear color is desirable. In typically green or uncolored fruits a blush shall not be considered either favorably or otherwise. In drupaceous and vine fruits the highest color is the most acceptable.

UNIFORMITY. This factor infers that all fruits shall be uniform in form, size and color.

QUALITY. When scored shall include texture, juiciness, flavor, aroma and any other characters that may give pleasure to the palate.

VENDOR OF MANGOS, GUANAJAY. THE FRUITS ARE SEEDLINGS OF THE MANGO RACE.



SHOWING THE FRUITING HABITS OF THE MANGA AMARILLA TYPE.
SANTIAGO DE LAS VEGAS.

IDEAL SIZES OF EXHIBITION APPLES, DIAMETER GIVEN IN INCHES.

Variety.	*Summary.*
Akin	2¾–3⅛
Alexander	3⅜–3⅝
Arkansas	3 –3½
Arkansas Black	2¾–3
Babbitt	3⅛–3⅜
Bailey	2¾–3⅛
Baker	3¼–3½
Baldwin	3 –3⅜
Baltimore	2⅞–3¼
Beach	2⅞–3⅛
Belmont	2⅞–3⅛
Ben Davis	3 –3¼
Bietigheimer	3⅝–4
Black Ben Davis	3 –3¼
Black Gilliflower	2½–2¾
Blenheim	3⅜–3⅝
Blue Pearmain	3 –3¼
Canada Reinette	3¼–3½
Chenango	2⅝–2⅞
Collins	3 –3¼
Delicious	2⅞–3¼
Domine	3
Dudley	3¼–3½
English Codlin	3¼–3⅜
Ensee	3¼–3⅝
Esopus	3 –3⅜
Ewalt	3 –3⅛
Fallawater	3⅜–3¾
Fall Pippin	3 –3½
Fameuse	2½–2¾
Nodhead	2¾–3
Northern Spy	3⅛–3½
Northwestern	3¼–3¾
Nyack	3¼–3⅜
Oldenburg	2⅞–3¼
Oliver	3 –3¼
Opalescent	3¼–3¼
Ortley	3⅛–3⅜
Black Oxford	2¾–3
Palmer	3 –3¼
Flushing	2¾–3
Gano	3 –3¼
Garden Royal	2⅞–3⅛
Golden Russet	2¾–3
Gilpin	2¾–3
Gravenstein	2⅞–3⅜
Green Sweet	2¾–3
Grimes	2¾–3
Grindstone	3¼
Herefordshire	2¾–3
Hubbardston	2⅞–3¼
Hurlbut	2⅞–3⅛
Hyde King	3½–3¾
Isham Sweet	3 –3¼
Jacobs Sweet	3⅛–3⅜
Jefferis	2¾–3
Jonathan	2¾–3
Kaighn	2¾–2⅞
King David	2¾–3
Kinnard	2¾–2⅞
Lady	1¼–1½
Lawver	2¼–3¼
Maiden Blush	3 –3¼
Mann	3¼–3½
McIntosh	2¾–3⅛
McMahon	3¼–3½
Milden	3 –3¼
Missouri	2⅝–3
Mother	2⅝–2⅞
Nero	3¼–3⅜
Sheriff	2¾
Shiawassee	2⅞–3⅛
Smith	2¾–3
Smokehouse	2⅞–3⅛
Starr	2⅞
Stark	3 –3⅜
Stayman Winesap	3 –3⅜
St. Lawrence	3 –3¼
Sutton	2¾–3⅛
Swaar	2⅞–3⅛

Palouse 2⅞–3¼
Patten 3¼–3½
Peck 2⅞–3⅛
Pewaukee . . . . . 3 –3¼
Porter 2⅝–2⅞

Pumpkin Sweet 3½–3⅞
Rainier 3⅛–3⅜
Ralls 2¾–3⅛
Rambo 2¾–3
Red Astrachan 2⅝–3⅛

Red Canada 2⅞–3⅛
Red Russet 2¾–3
Rhode Island . . . . . 3 –3⅜
Rolfe 3¼–3½
Roman Stem 2½–2¾

Rome Beauty 3¼–3½
Roxbury 2⅞–3⅛
Salome 2¾–3
Scott 2⅝–2⅞
Shackleford 3¼

Tolman 2⅞–3⅛
Tompkins King 3¼–3⅝
Twenty Ounce 3½–4
Virginia Beauty 2¾–3¼
Wagener . . . . . 3 –3⅜

Walbridge 2¾–3
Wealthy 2⅞–3¼
Westfield 2¾–3
White Pearmain 2⅞–3¼
White Pippin . . . . . 3 –3½

Williams 2⅝–2⅞
Willowtwig 2¾–3
Winesap 2¾–3
Winter Banana 3⅛–3⅜
Winter Paradise . . . . . 3 –3¼

Wolf River 3½–4
Yellow Bellflower . . . . . 3 –3¼
Yellow Newtown 2⅞–3⅛
Yellow Transparent 2⅝–3
York Imperial 3⅛–3⅜
York Stripe . . . . . 3 –3⅛

W. T. Macoun, Chairman.
C. P. Close,
L. R. Taft,
W. L. Howard.

ON INSPECTION AND GRADING.

C. I. Lewis, *Chairman.*

Professor Lewis: I have a written report of the work done and will send it to your Secretary. We have made certain progress in the last two years. New York State and California have passed good laws. An effort was made to have the Rocky Mountain and Pacific Coast States pass uniform laws on inspection and grading. Selling agencies have agreed on uniform grading of their fruits.

We have also met with the various nurserymen's organizations on this Coast, and the national organization at its Cleveland meeting. They are co-operating with us and we will make progress.

The bill on National Boxing of Fruit did not pass the last session of Congress, but we expect and hope it can be revived.

THE FEDERATION OF HORTICULTURAL AND POMOLOGICAL SOCIETIES.

W. R. LAZENBY, *Chairman.*

Mr. President, your statement that the Executive Committee has been conferring is hardly true. The Committee has had some correspondence and I think its members substantially agreed on the main issue, that some federation, provided it can be effected, of all the horticultural interests of America would be a good thing.

Now, I have prepared a short report, mainly along the line of suggesting how this federation of horticultural and pomological societies may be begun. It is merely suggestive. It is only a plan, and certainly may not be the best.

In spite of the fact that I have not yet had an opportunity to confer with my associates, since the matter was prepared, yet I shall present this as a report, hoping that these members will feel free to express any dissent which they may have.

Your committee appointed by President Goodman to consider the question of the federation of the horticultural organizations of America begs leave to present the following report:

No special plea is needed to show that a genuine federation, leading to co-operative action on the part of all the horticultural interests of America through the various organizations representing the same, would be a step in advance and could scarcely fail to promote all branches and divisions of horticulture.

Genuine co-operation is the word of hope and cheer for thousands engaged in horticultural pursuits. We deem it unnecessary to present any argument to show what such a federation might accomplish in the way of collecting and disseminating accurate information regarding crop conditions, in improving the machinery of exchange and distribution, in promoting a campaign to increase the use of fruit as a food, or securing uniform and equitable laws where legislation is needed, and in multiplying and improving rural homes.

We do not minimize the difficulties to be overcome or the sustained effort required to effect and successfully maintain such a federation. Some of the difficulties are obvious. Horticultural interests are widely diversified.

What is of paramount importance in some states or regions, is of little or no importance in others. The growers of semi-tropical fruits in California and Florida may seem to have little in common with the fruit growers of Ontario or Michigan. The seedsmen and vegetable growers have a common bond of interest but neither may appear to be intimately connected with the orchardist.

Another difficulty is that the geographical extent of America is such that anything like frequent representative meetings of a federation appear to be well nigh impossible.

These, and other difficulties are not insurmountable, and in view of the possible benefits of a real federation can scarcely be considered.

For the purpose of organization the following general plan is recommended: Every existing horticultural organization of reputable standing shall be invited to take part in the proposed federation in accordance with the following provisions:

(1) Each organization shall be entitled to one elector or vote, because it is an horticultural organization representing and presumably promoting some phase of horticulture. This provision gives each organization one elector irrespective of number of membership.

(2) It would be manifestly unfair to have all organizations, whether large or small represented equally. To obviate this difficulty, each organization shall have one elector for each one hundred members after the first hundred. That is, for each organization that has two hundred members one additional elector shall be allowed; for each that has three hundred, two; for each that has four hundred, three, and so on. In this way disregarding fractions, each one hundred members would be represented, and at the same time any organization of less than one hundred members has one representative.

(3) It would not be equitable to base representation on number of members alone. Some old societies with a quite restricted membership have a rich accumulation of experience and influence. They have the wisdom of age—the power that comes from sustained effort. They are among our most truly representative horticultural organizations. Some young, untried associations may have a much larger membership but their experience and influence may be much less. We recommend, therefore, a representation based on age, say one elector for every ten years of existence. Our Pomological Society has a membership of five hundred, while the American Apple Growers' Association has a reported membership of over five thousand. We could scarcely equalize the representation that each of these national organizations should have on the basis of membership alone.

The Columbus (Ohio) Horticultural Society has less than one hundred members, but it has a history covering seventy years. It is clearly entitled to a larger representation than a society of the same size that has been in existence but one or two years.

(4) To meet the expense of organization we recommend that each organization that signifies its willingness to join a federation be assessed as follows:

Each national organization	$15.00
Each state or large district	10.00
Each town or county district	5.00

According to the best data at hand there are in round numbers two hundred and fifty horticultural organizations.

Of these, twenty are national; seventy are state or large districts; one hundred and sixty are town, city, county or small districts.

The twenty national organizations average six hundred members.

The seventy state and large districts average three hundred and fifty members.

The one hundred and sixty town, city, county or small districts average one hundred members.

In other words, the total membership is:

10,000 for national organizations.
24,500 for state and large districts.
16,000 for town, city, county or small districts.

This makes an aggregate or total membership of 50,000. It should be borne in mind that in such an enumeration there will be a large duplication. That is, many if not most of the individuals who are members of the national organization are also members of the state or county organizations.

If we divide our total membership by three there is still a vast army to form a federation.

(5) The federation shall be a membership body with a distinct name, governed by a constitution and by-laws and supported by annual dues from each member. Experience has shown that the strongest bond to hold a great membership in any organization is a live publication that adequately represents the interests concerned. The success of the American Geographical Society, the American Forestry Society, The American Association for the Advancement of Science, and other organizations, that might be named depends very largely on their publications. By reason of their journals these great organizations number their membership by thousands. And are growing in strength and influence.

Any action looking toward a federation of our great and varied horticultural interests that is to be of a permanent and beneficial character must take this into account. If we are to have a great American Horticultural Society we must have an adequate publication to represent it.

(6) Owing to the difficulty of holding a meeting of delegates that would be truly representative, we recommend that the Federation be effected mainly by correspondence and that each horticultural organization that is willing to take a part in such federation be allowed to vote by mail in accordance with the plan proposed. That is the number of votes cast by each organization shall be in accordance with the plan outlined.

(7) We recommend that a committee of five be appointed to correspond with and invite the co-operation of all known reputable horticultural organizations in forming a federation of the horticultural interests of America.

When it is found that a majority of the electors of the various horticultural organizations favor a federation, then a committee of nine shall be named by the President of the American Pomological Society. This committee which should fairly represent the organizations favoring a federation, should at once prepare a constitution or articles of confederation, and this should be submitted to each or-

ganization for its ratification. If two-thirds of the electors approve the constitution a meeting to effect a more complete organization should be called.

Now, Mr. President, I have only a word to add to what I have already said. I feel so sure that unless we have some very fair and equitable plan of representation, the whole plan will prove to be a failure.

The last meeting of the Hague Conference particularly interested me. They agreed upon quite a number of propositions, and then came the most important proposition of all: "How shall we have an international court of arbitration?" Now, the forty-two nations represented were all in favor of this court, but they did not secure it because they could not agree on any single plan of representation. China, with large population and small commercial interests said she could not agree to representation based on commercial interests, as some desired. Others wanted it on a basis of population, and there was no substantial agreement and they failed in this, the most important issue which was placed before the Congress. I hope, if we attempt a federation of the horticultural interests in this country, that it will not fail for that reason. I, therefore, have tried to suggest a plan whereby fair representation would be given to all the horticultural interests which signify a willingness to join a federation. (Applause.)

Discussion.

The President: The matter is before you, now, gentlemen, for discussion.

Professor Lazenby: Mr. President, I am particularly anxious to hear Mr. Roeding and Mr. Macoun, the other members of the committee.

The President: We will hear from Professor W. T. Macoun.

Mr. Macoun (Ottawa): Professor Lazenby is mainly responsible for the preparation of this report. We have contributed in a small degree, but he has done the main portion of the work. There are minor differences of opinion.

Professor Lazenby has not mentioned the benefits which would arise from that organization, or one of that kind. It is for this meeting to show what the benefits thereof are. If there is not to be sufficient benefit, then we had better not start it. If it is worth working for it is worth our best effort. It may be this is not the society which is to effect it, but I think it is the work either of the American Pomological Society or of the Horticultural Society. Its object will be to increase the love of fruit for itself and for the growing consumption of vegetables, the fruit, as well as the growth of flowers.

There are millions of dollars at stake in this matter. There is probably a question of overproduction, and it is a duty of those who love fruit for itself to try to do something to stave off this overproduction, and keep men who have put money into it to see if they

cannot get something more out of it than a bare living. And I think if some means could be devised whereby the commercial interests and the amateur interests could be united, it would bring great advantage to the people engaged in the business. I know it is true that as a rule the amateur interests and the commercial interests are wide apart; but in this association I think we have the best of the amateur spirit and the best of the commercial spirit. The men and women who are members of this Society love the fruit for the sake of the fruit, and for the fact that it brings them their bread and butter. And anything that can be done to advance this good work will be for the benefit of this society. It is for the members of this Society to consider and find out whether it is worth while to attempt a federation of all the horticultural organizations.

THE PRESIDENT: We will now hear from G. C. Roeding, of California.

MR. ROEDING (California): I am sorry I did not have an opportunity to confer with Professor Lazenby, but I was unable to be here yesterday.

Professor Lazenby wrote the various members of the Executive Committee in reference to this matter and we have all tried to help a little. I want to say that I approve of many of the facts that Professor Lazenby has brought out. On the other hand I feel that it would probably be a mistake to change the name of the American Pomological Society after it has been in existence for so many years, to some other name, in order to take up this work. I appreciate the importance of work of this kind. I realize, I believe, as forcibly as anybody, that back of the organization work it is absolutely necessary to have some economical point. Unless some economic point can be arrived at it is very difficult, to my mind, to maintain these organizations. That is the problem which every organization today in horticultural work or in any other class of work must fight. They must get down to the economics. That is, down to the benefits that the members of the organization will derive from their membership in such an organization. That is the point which must be before us all the time, and just how to bring that about is a problem which seems difficult.

Personally I feel that the name of the American Pomological Society should be continued. It is one of the oldest horticultural organizations in the United States. It has created a standard, and it would be a great factor, to my mind, in strengthening anything recommended in the report by Professor Lazenby.

Professor Macoun said it is quite apparent that there is overproduction in fruit. I do not agree with that quite. The real trouble is not in overproduction, but is in poor distribution. That is the great problem which we have before us today—it is to try to find some method of creating a wide distribution for our fruits. Now, if in this organization, through some of the recommendations made by Prof. Lazenby we can bring that out more forcibly, it will

accomplish much good and it will bring members to our cause that we otherwise would not get. That is the problem before us.

Now, the great trouble with many of our organizations that are in the fruit business is that they attempt to put men out of business who are regularly engaged in the distribution of our fruits, and they are working along the line of putting the experienced men in our line of business out of it. That is a mistake, I think.

The necessary thing to do is to bring about a certain control, if there is any way of compelling a wider distribution of fruits, by putting certain prices on fruits, if possible, so that there can be less difference between the price which the producer gets and the price which the consumer gives. That would be a welcome innovation. That is one of the difficulties today. And if there is anything that can be done to bring about closer relations between the producer and the consumer we can accomplish a great purpose by adopting it. And the question is: Can this proposition be certain of getting these organizations to join with us?

Now, in the matter of a publication; there is no question but that a publication on fruit lines which would show the fruit interests in different parts of the world, and their methods of procedure, as the geographical interests are shown in the American Geographical magazine, to the people of the United States, would be well received. In other words, if the American Pomological Society, the oldest organization of the kind in the United States, is willing to start such a movement, develop such a great idea, and carry it out, it will be a splendid work.

The whole object before us is to devise some plan which will create this great federation which has been proposed. I would oppose any change in the name of this organization. The name is easy and established, and it has been recognized during a period of years, and to my mind I think it should be maintained. The very standing which this association has acquired has made it possible for it to bring about closer affiliation with us by opposing plans of organizations that do not believe in the wide distribution of fruit. I do not think there is overproduction. It is merely a matter of encouraging the production of fruit of a better quality, and getting the fruit growers to believe that the better and the higher the grade, and the better it is packed, the better it is for our interests generally. If we can inculcate those ideas among the pomologists of the country and bring about closer relations between producer and consumer we will have done much. But, do not forget that you must get down to the economics of the situation in order to get them interested. You cannot get the interest of fruit growers unless you can show them forcibly that it will put money in their pockets. That is the only way to do it. (Applause.)

PROFESSOR LAZENBY: My friend Roeding missed one point. I made no suggestion that we should change the name of the American Pomological Society, but merely said that we should take the lead in the federation. The federation may be named anything you

choose. I think I said it might be called the American Horticultural Society, or something like that.

PROFESSOR LEWIS: It seems to me that of these suggestions which have been made, the part which appeals to me most is the matter of publication. I believe nothing would help the cause of pomology more than a good strong publication, national in scope. If there is any noticeable characteristic of American pomology today it is that of factions. Take the question of national legislation which we may desire on packing and grading: It is impossible for us to get anything because we are all split up into factions and can agree on no one single plan. There are many things we could accomplish for American pomology by going before the national Congress as a unified body. We lack reliable statistics. Take the different estimates which we get in the United States of the yield of apples, and the only one that approaches the truth is the International Apple Shippers' Association. We found the condition in this country varying in different reports from thirty millions up to two hundred and seventy million barrels of apples. Now, that was the difference on apples only. But if we had a publication in which we could drive home the matters of getting legislation, of preparing proper statistics, and of cementing ourselves closer together, I believe, as Mr. Roeding has said, it would be a success, particularly as it would appeal to the fruit growers through their pockets. Until we do this, it will be hard to get them to come in and get interested. We have to approach them on the line of their interests.

MR. TIPPEN (Missouri): This is an important and far-reaching question. It has occurred to me for a good many years that if the American Pomological Society would constitute itself a forum or bureau of information, or a source from which the grower and the consumer and the dealer could obtain reliable information, facts, this problem would be solved.

As some of the gentlemen in the audience know, I have worked on both sides of the fence for many years; and the information obtained from one side is always so diametrically different from that obtained from the other, that it makes both worthless.

Knowing what I do of the substance of human nature, and of the disposition of so many men to not be able to see a fact but from one viewpoint, and that is the viewpoint of their personal interests; and knowing that these interests must come into an organization of this kind, that this Society could not do a greater work for the fruit industry than to start out and take the position of being a forum. And put out a publication. A prominent man has said that every man who writes an editorial should be compelled by law to put his name to it. Strong men write on one side or the other, and they are absolutely governed by their personal interests in the question.

Now, if we had a source of information which we could know was absolutely correct (and such information could come from the American Pomological Society), then these different interests could be unified in their operation. I would rather see that.

To illustrate what I mean: A representative of the Post Office Department called on me recently at the Missouri Booth of Horticulture at the Exposition grounds, he discussed with me for some time the proposition which the Post Office Department was taking up, of mailing apples by parcel post throughout the United States. He asked me for my opinion in regard to it.

The more I thought of it the more I saw in it. And I think it is possible through the Post Office Department, by means of the parcel post, to reach lots of consumers in this country who would consume perhaps one-fourth of the product grown in the United States. If that is correct, and this body was influential, think what it could do. But, gentlemen, let me say, you have a great deal of selfishness to overcome before you can do anything in these matters before civic bodies.

MR. OGLESBY: I am interested in this particular phase of the work, Mr. Chairman. As some of the men in the University know I have talked a good deal about some phases of this. I want to leave with you some statistics, and then you can tell whether we are overproducing or not. This goes through my own house:

Three hundred pounds of fresh grapes; 100 pounds of raisins; 30 boxes of apples, that would make 1200 pounds; 500 pounds of peaches, fresh; 200 pounds of pears, fresh; 100 pounds of prunes, fresh; 200 pounds of berries; 400 pounds of citrus fruits.

To my mind inefficiency in distribution is the cause of our trouble. Parcel post costs too much. It has been spoken of here in the University. There are other things that make it practically impossible. People do not always stay at home waiting for the packages, and the parcel post must be eliminated from our system of distribution. If the Pomological Society can do one thing, determine upon some line of legislation that will enable us to get at what we are doing, what it costs to do it, then it will be possible to know what it shall be possible for us to do in the matter of actual sales that will bring a profit. I think that is one of the big things which the Society must undertake in this federation work. I have suggested here to the members of this faculty and to the statistician of the State the idea of the state-wide collection of statistics on the planting of the different trees. In other words, a survey each year that will enable us to know the planting and what the crop conditions are. There is perhaps only one source through which this can be collected annually, and that is the assessor.

Now, the assessor will not do this unless he is required to do it. And there must be some great body of thinkers who will put their influence behind the movement to demonstrate the advantage of such statistics; because, cupidity enters into the matter very largely. And the assessors will give from year to year figures that are not worth that much (snapping his fingers). Farmers, otherwise honest, will tell all kinds of lies about what they have on the farm. They all do it. Why?—because we would like to get out of part of the tax; but we overlook the fact that it is imposing a heavier tax

than we would have if we had given a full statement of what we actually had. In this state perhaps thirty-five dollars an acre would be added to make a fair estimate.

Now, if we can demonstrate to our growers that the few cents they save in additional tax would furnish them with correct information as to crop conditions throughout the state, and as to their holdings, I think they would prefer to pay the additional small sum in order to get the correct information and the advantage which they would derive from it.

Now, as to the middleman; we do not know what it costs to produce and distribute fruit. We cannot tell what the middleman is getting out of it until we know what it costs to produce and distribute our products.

I am sure we can more than consume in our own country the fruits which we are producing. And I think it is an excellent suggestion that this great body should put itself on record as determining upon some method of furthering the interests of the commercial side of our industry, to say nothing, of course, of the improvement of varieties of the methods of packing and marketing and the standards, and the grades of our products. The primary consideration is what shall be our standard of excellence, and how shall we make practical horticulturists understand that this standard must be adhered to all over the country. We have to do it, as we are 3,000 miles from most of our markets. We cannot help it. Our noses are up to the grindstone by the inexorable law of economies.

THE PRESIDENT: I have allowed this discussion to proceed from the primary discussion. The real question before us is the federation of the different societies. We have drifted into "overproduction" and "economics" and marketing, and other side issues. Those questions relate to it, but let us get closer to the main question: How best to federate, if we decide to federate.

MR. DUMAS (Washington): I have listened with favor to the views expressed here. I think it is possible to bring to the minds of the other men interested in this business the importance of this federation. I believe that one of the best means of starting this federation is a magazine. I do not think it is necessary to talk more about that. If this is a great organization of fruit growers, we should have something to speak for us that will be read by fruit growers all over the world; and if we have reliable statistics published in the magazine it would prove a financial success from the very beginning.

The National Geographical Society has become highly prosperous by selling their magazine at two dollars a year. I would like to give twenty-five dollars or thirty dollars towards such a magazine, that dealt with my business on the same scope that the Geographical magazine deals with the business of that society. It is not a question of dollars, it is a question of giving people what they want. I deplore the idea that because we inject some idea of commercialism, that we are getting over-selfish. We all must live, and we

are entitled to live when we make proper effort. The value of this organization depends on what it is able to contribute toward the sum of human happiness. If it is able to advance human progress, then it is of value to the world. Now, if we can induce people to eat more fruit I believe we are advancing human progress. I will tell you one of the reasons, not from a horticultural source, most of you have visited the booth at the Fair, the Exposition, devoted to Racial Development, which shows in the opinion of the greatest physicians of the world the comparative value of different foods and how they conduce to the benefit of humanity and to the state. The first in the list is fruit; second is nuts; and then it goes on down to the other foods of lesser value.

I think we should make the world know that. Not by saying it once, but by ringing in various changes, and when the world knows the full food value of fruits and nuts, you will have no overproduction to worry about.

I am heartily in favor with this, and I hope this committee's suggestion may be worked out, and that we may succeed in forming this great federation. (Applause.)

PROFESSOR HUTT (North Carolina): This question now being discussed is a very vital question to this Society, and there seems to be an opinion that it would be a valuable thing for this Society's work, if it could voice its views on this subject.

I believe the American Pomological Society is not living up to the best of its opportunity. I believe it is a critical time in the history of this organization.

We must have a publication. Comparisons have been made with the American Geographical Society. I believe a publication by this Society would soon get into the same condition in which that publication is.

DR. WICKSON (California): I believe that the purpose and function of the American Pomological Society in this federation will be as a guarantee that the statements in the publication have the backing and support of the American Pomological Society, I believe that will have more to do with the success of fruit growing than any other single thing. I believe our views concerning the production of fruit and the cost of fruit for the consumer, would be an excellent thing. They want our views, and we want facts. We all know that a mighty small percentage of the boys and girls in this country have what they need of our two great fruits. I believe not only the American Pomological Society, but every county organization of the kind in the country needs but a stiff prod to make them live up to their idea of service. Then the watchword should be the two words we should think of in connection with this federation, in connection with this publication, and those two words are "service" and "efficiency."

We want efficiency in the distribution of our fruits, and any magazine that will come out with the facts, and say that it costs so

much to produce a box of lemons or so much to produce a barrel of apples, will certainly be eagerly sought for in this country.

We do not want our California lemons on the counters for less than it costs us to grow them. It is not good business, it is not good politics, nor is it humanity to wish to get another man's product for less than it costs him to produce it. A box of lemons selling in Kansas City for $1.35 that cost us thirty cents a dozen is one thing. But we want now to know what it costs to produce a pound of figs, and we want you to know when we send you a barrel of apples that we should have forty or fifty cents left in profit for ourselves. It is in giving these facts to the public today that we will find our interests advanced. We would have a better condition all over California if the world knew what it costs to grow fruit. Peaches are going to waste in California which should be used throughout the nation. Facts are needed, and ought to be the purpose of this Society, and its function, to guarantee to the state organizations, and through this publication which is suggested, to guarantee the truth as to production, distribution and consumption.

PROFESSOR HUTT: When you speak of a federation it means always bringing in a lot of other societies, and we do not know whether we control them or not. I move that we have a committee appointed to consider the whole matter of federation of the American Pomological Society, which would include the publication of the magazine, and the widening of the scope of the Society, and that that committee is to report to the Executive Committee. Seconded by Dumas.

MR. ROEDING: To extend the scope of the Society—in other words you want to bring in other societies and widen the scope of the Society.

THE PRESIDENT: You have heard the motion. All in favor say aye; opposed, no. It is carried.

The Committee on Credentials reported the following Vice-Presidents and delegates present and qualified to act:

Vice-Presidents:

A. V. Stubenrauch, California;
E. R. Lake, District of Columbia;
T. J. Burrill, Illinois;
Albert Dickens, Kansas;
C. P. Close, Maryland;
L. R. Taft, Michigan;
Geo. T. Tippin, Missouri;
J. Van Lindley, North Carolina;
W. R. Lazenby, Ohio;
F. S. Reeves, Ontario;
C. I. Lewis, Oregon;
J. P. Stewart, Pennsylvania;

W. T. Macoun, Quebec;
Eltweed Pomeroy, Texas;
W. A. Macomb, Virginia;
J. L. Dumas, Washington.

Delegates:

T. J. Burrill, Delegate Illinois Horticultural Society;
C. H. Dutcher, Delegate Missouri Horticultural Society;
E. R. Lake, Delegate Northern Nut Growers' Association;
Eltweed Pomeroy, Delegate Texas Horticultural Society.

ON WILDER MEDAL.

C. P. CLOSE, *Chairman.*

A silver medal was awarded to the T. S. Hubbard Company, Fredonia, N. Y., for a display of the Hubbard grape, a promising new variety, a cross between Brighton and Campbell.

Honorable mention was given to Joseph Bachman, Altus, Ark., for an exhibit of his seedling grape No. 109, a cross between Ameriea and Star.

C. P. CLOSE,
L. R. TAFT,
W. T. MACOUN.

ON NOMINATIONS.

A. V. STUBENRAUCH, *Chairman.*

California, A. V. Stubenrauch; District of Columbia, E. R. Lake; Illinois, T. J. Burrill; Kansas, Albert Dickens; Maryland, C. P. Close; Michigan, L. R. Taft; Missouri, George T. Tippen; North Carolina, J. Van Lindley; Ontario, F. S. Reeves; Oregon, C. I. Lewis; Ohio, W. R. Lazenby; Pennsylvania, J. P. Stewart; Quebec, W. T. Macoun; Texas, Eltweed Pomeroy; Virginia, W. A. Macomb; Washington, J. L. Dumas.

The following report was made by this committee:

For President, W. N. Hutt.
For Viee-President, W. T. Macoun.
For Secretary, E. R. Lake.
For Treasurer, L. R. Taft.
For Exeeutive Committeemen, W. R. Lazenby, E. W. Kirkpatrick, F. C. Sears, L. A. Goodman, J. L. Dumas.

On motion of Mr. Pomeroy, seconded by Professor Lazenby, the Secretary was instrueted to east the ballot of the Society to adopt the report.

THE PRESIDENT: The motion is that the rules of the Society be suspended and that the Secretary be authorized to cast one ballot for these names as suggested by the Nominating Committee. Are you ready for the question? All in favor say aye. Opposing, no. It is carried.

RESOLUTIONS.

ELTWEED POMEROY, *Chairman.*

Mr. Pomeroy, reporting, said:

Mr. Chairman, we have six or seven resolutions. May I ask that action be taken on each one as I read it. The first is:

"Resolved, That the American Pomological Society wishes to return most hearty thanks for the uniform and cordial welcome and the courtesies extended to the Society and its members from their entrance into California at the South, to this meeting at Berkeley under the courtesies of the University, and the promise of further welcome and courtesies on the return of its members through Oregon and Washington.

"These courtesies have been so numerous that it would be difficult and invidious to enumerate—so thoughtful and minute that we have been surrounded by an atmosphere of warm hospitality adding very much to the success of the Society's meeting, and we will return home with the warmest feelings towards our hosts of the Pacific Coast for the meeting of 1915."

(Moved, seconded, stated and carried that the Society adopt the resolution.)

"Resolved, That the thanks of the American Pomological Society be given to the Santa Fe Railroad and its representative, Mr. Hagenbush, for the care and courtesy which made our journey to San Francisco a pleasure."

(Moved, seconded, stated and carried that the Society adopt the resolution.)

"Resolved, That the American Pomological Society in regular session assembled sends greetings to the Australian Fruit Growers' Conference and the Australian Pomological Conference, and requests co-operation in standardization of nomenclature and other international affairs, an exchange of publications and information, and invites them to send friendly delegates to our meetings; and we request our Secretary to send copies of this resolution to the Secretaries of these Societies: The Royal Horticultural Society of Westminister, England; the National Society for Horticulture in France, and other national societies."

(Moved, seconded, stated and carried that the Society adopt the resolution.)

"Resolved, That the American Pomological Society in regular session assembled in 1915 sends greetings to the National Association of Nurserymen, the National Florists' Association, the National Association of Nut Growers, and requests that they hold their national meetings in 1917 at such common time and place as these allied societies may fix, and that there be then at least one union meeting, there to consider topics and questions common to all branches of horticulture, and take a union action on these subjects, to co-operate and co-ordinate allied and parallel activities, and for

better acquaintanceship, among ourselves, and a later meeting and more public education on horticultural lines.

"Further, we request our Secretary to send copies of this resolution to the Secretaries of these Societies, and with the aid of the Executive Committee to arrange such union meeting."

(Moved, seconded, stated and carried that the resolution be adopted.)

"Resolved, That the American Pomological Society take up with foreign, state and local horticultural societies, with the National Nurserymen's Association, individual nurserymen, and the United States Government, and any others who may be of aid: the standardization of nomenclature of fruits, and in order to make a beginning, to take some small branch of the subject, and if possible secure the preparation of a monograph on this branch before our next meeting, and its publication as a government bulletin."

(Moved, seconded, stated and carried that the resolution be adopted.)

"Resolved, That we urge all state and local horticultural societies to officially join our American Pomological Society, and to send delegates to our National meetings and request a representative from our National Society at their meetings.

"Further, we request our Secretary to send copies of this resolution to the secretaries of all such societies which he can find out."

(Moved, seconded, stated and carried that the resolution be adopted.)

"Resolved, That our Secretary be requested to send invitations to the Agricultural or Horticultural Departments of the Governments of Mexico, Central and South America, to send delegates to our next meeting."

(Moved, seconded, stated and carried that the resolution be adopted.)

MR. POMEROY: There is one other subject recommended to us by the Committee on Nominations that concerns a resolution regarding the payment of dues. Instead of two dollars, running from one meeting to the next meeting, that it be made from the 1st of January to the succeeding January 1st. We took it under consideration, consulted our Treasurer, and he preferred the present arrangement —from one meeting to another, as he could then collect it at the meeting instead of having a large correspondence to attend to.

Further, we asked him about the rate of the annual dues. We tried to consider it from the standpoint of what was giving the largest revenue to the Society. Belonging to this Society may be worth fifty cents to one man and fifty dollars to another. A few years ago the dues were four dollars, then they were reduced to two dollars with the idea that the revenue would remain the same. We decided to do nothing on that point.

Be it Hereby Resolved, That in the deaths of Colonel Brackett and Professor Van Deman this Society recognizes its great loss, not alone in that two active workers, faithful members, loyal advisers and counsellors have departed from its ranks, but in that two of the

foremost workers in American pomology have taken their last farewell of us. It is with the deepest feeling of appreciation of their great services that we offer this humble tribute as an expression of our sympathy for their bereaved families, and as an evidence of our heartfelt sorrow.

MR. ————————: I did not know Colonel Brackett, but I did esteem the friendship of Professor Van Deman most highly. I feel we have lost a friend and brother. I feel one of the great men in horticulture has gone out, and that many men, by having known him, are better horticulturists.

I move the adoption of the resolution by a rising vote, and that the Secretary be instructed to send copies of these resolutions to the bereaved families.

PROFESSOR LAZENBY: I second the motion, and I wish to say that I feel we have suffered a very great loss in the death of these men. Of Colonel Brackett, may I speak; what a fine life it was! It was a most happy blending of what we might call the strenuous life and the natural life. He was a strenuous, and an indefatigable worker. He lived close to nature, and that is perhaps one reason why he attained such a great age. But most of all, his life was abundant. It was abundant in love, health, opportunity, accomplishment, honor, and abundant in friendship. And I think we honor ourselves in honoring his memory.

THE PRESIDENT: We will take a rising vote on this motion. (All rise.) Carried.

THE PRESIDENT: Now, we have the question of invitations for the next meeting. You can act on these invitations now if you choose. What is your pleasure. We have invitations from Nashville, Baltimore, Buffalo, New York, Chicago, Cincinnati, Knoxville, St. Louis, Columbus, Boston, New Orleans.

MR. TAFT: I move that they be referred to the Executive Committee. Seconded.

THE PRESIDENT: This has been the usual way for the last twenty to thirty years, as I know, as we do not know all the conditions, but the Executive Committee can make arrangements to examine into these different invitations and accept one of the invitations and make the necessary arrangements. The motion before you is to refer them to the Executive Committee. The motion has been seconded. All in favor say aye; opposed, no. It is carried.

Saturday night is the banquet night, and the Secretary must have the names of all of those who are to attend. We meet inside of the grounds at 2 o'clock in the center of the Horticultural Building. The officials of the Exposition will conduct us through a series of horticultural exhibits between that time and the time set for the banquet. The officials will there be present to give to this Society a bronze plaque. It will be necessary for you to give your name and two dollars and a half to the Secretary, in order that he may arrange for the proper number of plates on that occasion. The dinner is to be held at the Old Faithful Inn.

OFFICERS' REPORTS.

OF THE TREASURER.

The report of the Treasurer covers the period from November 5, 1913, to August 7, 1915.
L. R. Taft, Treasurer,

In account with American Pomological Society,

Dr. to receipts as follows:

1913.				
Nov.	5	Cash on hand	$996.20	
1915.				
Aug.	7	Interest on bonds, 2 years at 5%	400.00	
"	"	Contributions to Judging Trophy	45.00	
"	"	Receipts from Washington Meeting	293.33	
"	"	Sales of Proceedings and Reprints	8.75	
"	"	Receipts from Life Memberships	365.00	
"	"	Receipts from Biennial Memberships	531.50	
"	"	Interest on Life Memberships to July 1	20.00	
		Cr. by payments as per list, and vouchers		$1,898.02
		Cash on hand		781.66
			$2,259.68	$2,659.68

Of the above balance it should be noted that the sum of $365.00 is in the permament life membership fund and the sum of $355.14 is in the Wilder medal fund, leaving in the general fund and available for paying the current expenses of the Society the sum of $41.52.

Respectfully submitted,

L. R. TAFT,
Treasurer.

Statement of Bills Paid.

1913.			
Nov.	17	Whitehead, Hoag Co., badges	$49.30
"	"	R. P. Andrews, paper and plates	9.30
"	"	Palais Royal, burlap and cheesecloth	18.12
"	"	Dulin & Martin, drinking cups	2.00
"	"	Telegram to Maine	.50
"	"	Berry & Whitmore Co., trophy for judging team	51.00
Dec.	20	R. H. Darby Printing Co., programs and posters	80.25

Jan.	12	National Museum, extra labor	77.64
"	"	S. A. Beach, postage and labor	2.43
"	"	R. H. Darby Printing Co., bulletin, etc	39.25
Feb.	4	Maurice Joyce Engraving Co., halftones	25.66
"	"	E. R. Lake, expense account	51.06
"	12	W. W. Greene, reporting Washington Meeting, (part)	100.10
Mar.	7	Simons Bros. Co., Wilder medals	89.52
"	21	R. H. Darby Printing Co., printing	6.75
"	"	Maurice Joyce Engraving Co., halftones	14.20
Apr.	28	R. H. Joyce Printing Co., wrappers	4.65
May	16	E. R. Lake, expense of Washington Meeting	184.34
June	2	R. H. Darby Printing Co., printing report	673.11
Aug.	31	E. R. Lake, expense account	37.31
Sept.	18	R. H. Darby Printing Co., printing	37.85
"	"	E. R. Lake, salary to Sept. 15	100.00
1915.			
Feb.	28	R. H. Darby Printing Co., printing	21.00
July	31	L. A. Goodman, expense account	10.36
"	"	E. R. Lake, salary and expense	158.83
"	"	R. H. Darby Printing Co., printing	40.05
"	"	L. R. Taft, office expenses	23.44
			$1,898.02

THE PRESIDENT: The report will go to the Committee on Audit, of which Mr. Hutt is chairman.

MR. HUTT: We have been over the Treasurer's books, and checked off the different items, and found them to be correct.

TREASURER TAFT: We have only $42 to pay for the printing of the report. So far as the current funds available are concerned, that is. Three hundred and sixty-five dollars is tied up in the Medal funds, and the Secretary tied up the life membership fees of three hundred and odd dollars last year. The Society voted to place the life memberships in a permanent fund, and if we carry out those instructions the money is not available.

MR. HUTT: I move that the funds collected on life memberships, which were set apart at the last meeting be put into the current expense fund.

(Motion stated, seconded and carried.)

OF THE SECRETARY.

The work of the Secretary's office continues to grow. The correspondence has increased to such an extent that it has been impossible to carry it forward with the home force, thus necessitating the use of office time and labor to complete the work. Fortunately "Uncle Sam" saw a way by which he could co-operate in part of it such as that which involves questions of varietal culture, history, nomenclature, discription, synonomy and behavior; however, if this

phase of the Society's duties increase it will be necessary to employ, on partial, but regular time, a qualified typist in order to give prompt and efficient attention to the requests of correspondents, outside of that part which may be construed to be co-operative with the government.

The campaign for new members from the Secretary's office has waned during the past biennium, for the very pertinent reason that there has been less available personal time to give to the matter and for the further reason that the usual advertising methods have not brought out the results of former years. A new course of proceedure must be evolved to meet the changed conditions. Either the policy of the Society must be strengthened in the direction of a more pronounced amateur tone, or it must become more professional or possibly both. There seems to be no satisfactory "middle way." In any event my own opinion is firm in the belief that we must finally have a permanent home and annual meetings if we expect to accomplish the best part of that object for which the organization has been so long pre-eminent.

Again permit me to call attention to the fact that there should be some closer tie between the state societies and the Vice-Presidents. At present this wheel of the organization is nearly useless, as many of these men forget their responsibility, if they have any, to the Society between the meetings. Possibly the consideration of the question of federation may uncover some means of remedying this trouble.

To the question of complimentary memberships we wish to revert again this year. It seems to us that the election of certain men, such as the editors or managers of the horticultural press to be complimentary members in recognition of their services (publicity, if you please) to the Society would be both creditable and serviceable to the great industry which we represent.

Revision and Catalog.

A revision of the catalog has been completed together with a realignment of district boundaries in conformity with the results of recent observations made by active members, notably in districts No. 7 and 10. The plan of revision has been based upon that adopted by Ragan in Farmers' Bulletin No. 208, U. S. Department of Agriculture. This form of publication is much less expensive than the regular department bulletins Nos. 6, 8 and 151, in which there is much tabulation. In this later form the varieties are arranged in groups for commercial and home uses and, in the opinion of Col. Brackett, affords quite as much information, so far as the value of varieties for districts is concerned, as the tabulated form, but it does not supply the ready reference information as to the behavior of a specific variety as was done before, but this appears to be a minor matter compared with the cost of publication.

This material could have been off the press months ago, except that the department has decided, through its publication committee,

that it does not desire to publish matter of this character jointly with outside bodies. The question then naturally arose (in view of the protest made at the Washington meeting) as to the advisability of issuing the material as an A. P. S. separate. Because of financial conditions this was debatable and the problem is still unsettled and we shall hope that this meeting will endeavor to make a decision on this point.

If it is not deemed desirable to continue the work of issuing a catalog of varieties based upon district boundaries we ought to be prepared to take definite action in the case and thus enable the Secretary to fully advise inquiring persons with reference to the subject. There is frequent demand for copies of the catalog, whether by mere curiosity seekers or real cultivators, we cannot say, but in any event we should be able to give a definite answer as to whether or not we are to continue work along this line.

Moved, stated and carried that the report be adopted.

MR. DUMAS: Four years ago I was a member of this committee, and I think I may say I really did some work on the lines suggested. Two years ago I was unable to be present and that work was coldly turned down, and this time I have been unable to get the committee together.

THE PRESIDENT: It is a good thing to be knocked down once in awhile.

MR. DUMAS: Yes, if one can get any where as a result. This organization must reject the three hundred and ninety varieties now being planted in the United States and Canada, and select a small list of really commercial apples, and that list should be pushed so that people may know the real varieties of apples. At the present time it is absolutely impossible to make head or tail of the catalogue of the American Pomological Society for apples.

My report was in the hands of Professor Lake two years ago. I would report that again and ask this Society to make a small and selected list of commercial fruits, to be placed at least at the head of the list if they are to retain the trash in the catalogue. We should kill off two hundred and fifty varieties of the trash we now have.

NOMENCLATURE.

In the absence of Colonel Brackett, who has been for a long time chairman of this committee, and by virtue of the fact that I have been actively and intimately associated with him, it appears proper that I should at this time report progress for this committee and ask for further instructions.

During the past year notable progress has been made in this subject through the official action taken first by the California Association of Nurserymen and later by the National Nurserymen's Association, in adopting the code of this Society as a basis of action for their organizations. This brings the subject, backed by very strong endorsement, directly to the attention of a class of men that have been for years charged with gross violation of the principles of the

code and with utter disregard of its teachings. Now, it appears to me it is our duty to cordially co-operate with these and other organizations which may later take similar action in bringing about the actual use of our approved list of names for all current varieties of fruits.

At the request of the California Association, we, speaking for the office of Pomology in the Department of Agriculture, have undertaken to compile a list of acceptable names for all varieties of fruits as published in the current catalogs of American nurserymen. We find it no small task to bring system out of this almost chaotic mass of varietal terms, and we feel that we cannot hope to complete the work for the use of publications issued for distribution early in the year 1916.

The preliminary list offered will contain only those names that have been generally accepted; later it is expected to get out a complete list, including those troublesome ones such as "J. H. Hale" and "B. F. Mason" peaches; "Mammoth Black Twig," "Spitzenburg" and "Oldenburg" apples; "Fellenberg," "Robe de Sargent" and "Silver" prunes; "Bahia," "Golden Nugget Naval" and "Improved Navel" oranges; "Praeparturien" walnut; "Mrs. Munson" grape, and scores of similar ones. Just how some of these shall be settled looms as a big question, especially since this Society has set its seal favorably upon "Lue Gim Gong." Another type of name coming into quite frequent use is the hyphenated term such as Stump-the-world, Stayman-Winesap, Pride-of-Michigan, Bartlett-Seckel, and the like. To the specialist in nomenclature these terms are like a thorn in the flesh. Positive action should be taken by this Society covering these points.

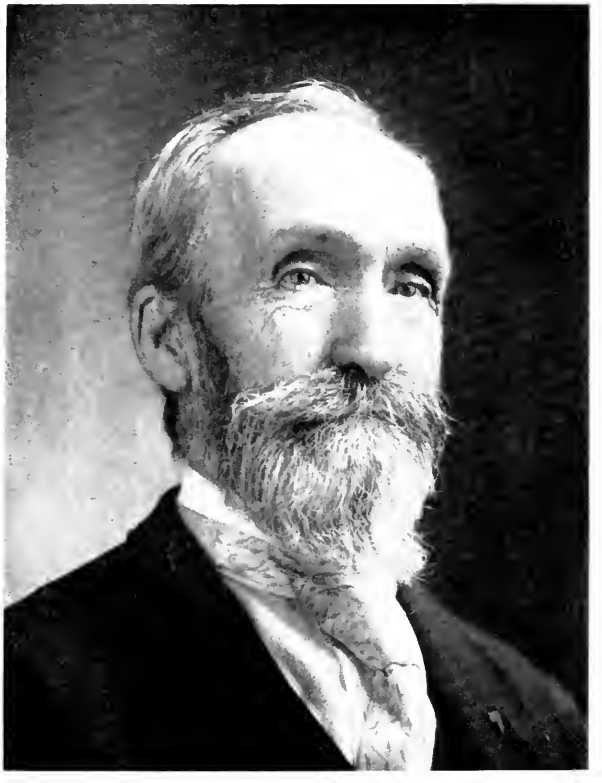
Though I have not consulted the whole committee in this matter I feel assured that the members would heartily endorse such action as the following, as emphasizing Rule Two of the Code:

No compound or hyphenated terms shall be deemed acceptable as a name for a variety of fruit; neither shall the name of a person be used for such purpose when the initial or initials of such person's name are employed as a part of the term.

OF EXECUTIVE COMMITTEE.

THE PRESIDENT: We will now receive the report of the Executive Committee.

MR. LAZENBY: Mr. President, there is only this point: The Executive Committee has had some conference as to how the membership could be increased, and it has been thought by a portion of the Committee at least, that a circularization might be effective. That is, select the names of men who are somewhat prominent and interested in horticulture, and send them a brief statement of the purposes of the Society, especially announcing that the old reports will be given, and that life membership can be secured for $25. I think we could secure quite an addition to our membership in that way.



COL. G. B. BRACKETT.

PROF. H. E. VAN DEMAN.

I speak of this as I am interested in our State Historical and Archeological Societies. It was suggested there that this be done, and the Board thought it was hardly worth while. But our Secretary finally persuaded them that he be permitted to make the experiment. He sent out two thousand circulars and received two hundred life members at $25 each. It might not be as successful in the case of the horticulturists, but it is worth trying.

SECRETARY LAKE: Do you wish this circular prepared by the Secretary, or by the Executive Committee, and have the Secretary send it out?

MR. LAZENBY: Either.

THE PRESIDENT: Let us put this job on the Treasurer. He will prepare a circular and make this appeal.

PRESIDENT GOODMAN TRANSFERS GAVEL TO PRESIDENT-ELECT HUTT.

PRESIDENT GOODMAN: Mr. Hutt, will you please come forward? I am very glad, sir, to turn over to you the office of President of the American Pomological Society, and trust your meetings with it will be as pleasant as mine for the past ten years. This gavel is delivered to you to be retained and delivered to your successor. (Applause.)

PRESIDENT-ELECT HUTT: Mr. President and gentlemen of the American Pomological Society, I usually find words to express my thoughts, but on this occasion I am at a complete loss to express what would be proper on the occasion. I was taken completely by surprise, when Professor Close and Professor Stubenrauch came and sat beside me and said the duties of this Society would fall upon me, I appreciate the honor placed upon me, but I feel diffident about trying to live up to the history of this Society in the past.

Some very great men have been in this position, and it seems that the honor might have fallen on more worthy shoulders. But since you have chosen me I will not impugn you choice, but I will do my very best to make what I think this Society should represent in American horticulture. I am going to look to every member of this Association to stand by me and help me to make the American Pomological Society what it should be in American Horticulture. (Applause.)

MR. POMEROY: The Resolution Committee has one other resolution, and that is, that the American Pomological Society pass a vote of thanks to the retiring President, and the other retiring officers for the way in which they have performed their duties.

(Motion seconded.)

PRESIDENT-ELECT HUTT: It gives me great pleasure to present that vote. I know you will all agree with me in my appreciation of the love and efficiency and the personal attention given to this Society by Mr. Goodman. I hope you will all show it by a rising vote. (All rise and applaud.)

It certainly gives me pleasure, Mr. President, to tender to you this very hearty and cordial vote of appreciation by the members of this American Pomological Society for the work which you have done.

PRESIDENT GOODMAN: I have always found the members loyal and true and willing to do their part whenever called for. I thank you. I think that closes all the business before the Society.

Meeting adjourned.

RECEPTION.

Wednesday evening was devoted to an informal session and reception in Agricultural Hall of the University. Professor J. W. Gregg presented an interesting and intensely instructive illustrated talk on the Gardens, Landscapes and Landscape Gardening of California. George E. Stone, of Berkeley, exhibited a unique and delightfully interesting collection of his own moving pictures of insects and microscopic forms of life, with remarks thereon. Following these talks all adjourned to the quaintly decorated reception room where a delightful collation of light refreshments was served, including delicious Loganberry juice, served by the Williamette Valley Counties (Oregon) Association, and lucious red apples tendered by the Missouri Exposition management.

Good cheer and wholesome fellowship prevailed until a late hour and some one suggested "lights out"—a college trick, to which even the Stubenrauchs, Roberts and Hutt and one or two other "jolly good spirits" had to yield, and desist from "that reminds me" and hasten "the parting sip" of the juice that sparkles and yet only delights a discriminating palate—Loganberry.

THE BANQUET.

A delightful and memorable feature of the meeting was the banquet at "Old Faithful" Inn on "The Trail" Saturday evening, September the fourth. Over half a hundred covers were spread and the occasion was one of pleasure to both the physical and intellectual elements of the guests.

The special part of the program on this occasion was the presentation to the Society by the Exposition management of a beautiful bronze medallion suitably engraved in commemoration of the occasion and the place. In a few appropriate and felicitous remarks Mr. Charles A. Vogelsang, representing President Moore, of the Panama-Pacific Exposition, tendered the souvenir to President Goodman, who responded in his usual happy vein. After this somewhat formal or scheduled function, informality reigned supreme and Goodman, Roeding, Powell, Hutt, Macoun, Dennison, Stubenrauch and the Chef kept up a feast of wit and a full plate until, at a late hour, all voted it a jolly good time and adjourned with the "round robin hand-shake" and later betook themselves to the "grotto" with its display of the scenic Yellowstone Park with its mud pots, geysers, hot springs and weird night phenomena.

NECROLOGY.

This page is dedicated in a spirit of sadness and affectionate remembrance to those members who have departed for the life beyond during the past biennium. May the bonds of cordial goodwill and fellowship that have bound us one to another in the labors and pleasures of membership and association in this Society be again reunited in that larger field of the life to come.

Life Members.

Alexander Pullen, C. H. Rodgers, C. U. Shepard, Clarence M. Stark, Prof. H. E. Van Deman, Col. C. L. Watrous.

Biennial Members.

Col. G. B. Brackett, J. C. Williams.

OBITUARY.

COL. GUSTAVUS BENSON BRACKETT.

It is with the deepest regret that we note the passing of Col. G. B. Brackett, who was for many years Chief Pomologist of the United States Department of Agriculture, and for, perhaps, sixty years one of the leading spirits of the American Pomological Society. He was intimately associated with such great men as Dowing, Wilder, Warder, Barry and others, and to many of the younger men was the connecting link between the past and the present. On account of his knowledge of the lives and works of the founders of American pomology he was selected to write their biographies for the Encyclopedia of American Horticulture. He was a recognized authority on varieties and nomenclature. In Col. Brackett the Society has lost one of its most ardent supporters and the gap caused by his death will never be closed. His influence on the lives of the present generation of American Pomologists will be felt for many years to come.

C. P. Close.
Albert Dickens,
C. I. Lewis.

President Goodman:—

Just on the even of departure for this meeting I was distressed beyond measure to hear of the death of my old friend and co-worker, the dear old pomologist of the United States for lo these many years, Col. G. B. Brackett. At our meeting in Washington two years ago the dear man seemed so delighted to think of the trip to California once more.

Colonel Brackett we shall all of us remember as a genial soul, full of sympathy for everyone above himself, unselfish to the highest degree. He has been the guiding spirit to all the work in the Department of Pomology of the United States and those who knew him best, loved him best. Honor to his name, glory to the cause he loved so well, respect and love to his memory. We are all thankful to the good God Who gave him long life and honor and glory and wisdom to guide the Department of Pomology through all its trials unto a more and more perfect day of success. The Department of Pomology will be the crowning glory of our dear one, Col. Brackett.

> "Oh, mountains, woods and streams, help, help us to mourn him, — for ye loved him too —
>
> "He was so human — where'er he met a stranger, there he left a friend.
>
> "Thou are not idle in thy higher sphere — Thy spirit binds itself to loving tasks. And strength, to perfect what it dreamed of here, is all the crown and glory that it asks."
>
> — *Lowell.*

Grand Rapids, Mich., August 15, 1915.

My Dear Goodman:

Permit me, even altho' I cannot be present at your meeting in San Francisco, to write you a brief missive expressing my feeling concerning the passing on of my dear friend and long-time counsellor, Col. G. B. Brackett.

Col. Wilder, Dr. Hexamer, Patrick Barry, W. H. Ragan, T. T. Lyon, J. J. Harrison, Brackett and Watrous had a great deal to do with the shaping of my career, through their counsel and the inspiration of their devotion to progress in American Pomology.

I am deeply grateful to them all. When I was chosen Secretary of the American Society I was a mere boy in horticulture and Col. Brackett was a sort of "Father Confessor" to me, and through his gracious manner, assisted in guiding my youthful impetuousness into safe channels and gave to me from his own rich experience a love for the things which, as I approach life's decline, I can see will be a sweet resource and a continuous blessing. His kindliness, modesty, thoughtfulness for others, together with his granary of broad experience and rich observation, gave him an unusual influence upon the younger men entering the field of horticulture.

I cannot express my gratitude more effectively than by saying that I acquired for him a deep and abiding affection, and mourn his loss to us by continuing this affection through thoughtful remembrances until I shall join him in that realm where attributes always are pictured in my mind by the possibilities in horticultural attainment. I shall miss him but he has etched so much of his career into the evolution of American horticulture that he will never seem very far away.

I regret my inability to be with you and desire to convey to you and all my old friends on this excursion my best wishes and most kindly regards.

Faithfully yours,

CHAS. W. GARFIELD.

PROF. HENRY E. VAN DEMAN.

In the death of Prof. H. E. Van Deman this Society and American Pomology have lost a most enthusiastic and active member. He was the first United States Pomologist and organized the Division of Pomology along lines which are still being followed. He had a larger acquaintance among the fruit growers of America than any other man and was regarded as a true friend and an authority on pomological affairs. He was considered one of the best judges of fruits and fruit products, and was chief judge at many of the national fruit expositions, apple shows, state fairs, etc. His honesty and fearlessness in making awards, and his systematizing of exhibits and score cards, has exerted an influence on exhibitors and judges which will long be felt. His writings in horticultural

periodicals are authoritative and form part of the horticultural literature of his time. His influence on American Pomology will last for generations.

C. P. CLOSE.
ALBERT DICKENS,
C. I. LEWIS.

Professor Henry E. Van Deman, well known to readers of The R. N. Y. as a frequent and valued contributor, died at his home, Washington, D. C., April 28. He was born at Concord, Ohio, his early life being spent upon his father's farm, where he gained his first knowledge of fruit-growing, both his father and grandfather being practical orchardists. While preparing for college, in 1863, he enlisted in the First Ohio Heavy Artillery, remaining in the army until the close of the Civil War, after which he was associated for a time with Dr. J. A. Warder, of Ohio, a famous old-time pomologist. From here Mr. Van Deman went to Michigan, and later settled in Kansas, where he took up a homestead, and became an important factor in the development of fruit growing in that State. From 1878 to 1880 he held the chair of botany and horticulture in the Kansas Agricultural College. In 1886 Prof. Van Deman was appointed pomologist of the National Department of Agriculture, with the work of organizing the new Division of Pomology. He continued in charge of this important work until 1893, when he retired. Since then he was very active in literary work, as a contributor to many farm and garden publications, and was also in frequent demand as a judge at fruit exhibitions all over the United States, both local and international. He was much interested in the development of pecan culture in the South, as well as northern fruits. He is survived by a widow, a son and a daughter.

PRESIDENT GOODMAN:—

In the death of our old friend and horticulturist, Professor Van Deman, we lose a valuable co-worker, an able assistant. The nation loses an American pomologist who has for forty years been one of the leading lights in the science and art of pomology on this continent.

Personally I wish to attest my regard for him, for his labor and ability of all these years. I knew him as a fruit grower in Kansas, as an exhibitor of fruits at many of our Western displays, as a judge for our various state fairs; as the official U. S. Pomologist, the first one appointed under the first Secretary of Agriculture, Norman J. Colman, and later as judge for the wonderful fruit exhibitions of our great Northwest. He was always an enthusiast for fruit growing, and a judge who was fair and just, able and honest in all his decisions.

At our last meeting in Washington, he told me that he was looking forward to a pleasant, happy year at the San Francisco Fair, to be judging fruits all the season.

We mourn his loss, and I personally mourn his going, because of the old friendship, and the interesting times we expected to have together, here at Berkeley and the Exposition. We were always twitting each other as Missourians and Kansans are always doing in good part in upholding the name each of his own state.

We honor him for what he has done and say of him as is said of Johnny Appleseed:

"And as long as poor humanity stands naked in its need,
God send us souls as white as that of Johnny Appleseed."

ALEXANDER PULLEN.

In the death of Mr. Pullen, which occurred at the Masonic Home, near Wilmington, Del., December 10, 1915, this Society loses a long-time life member. Mr. Pullen, who was an active and well-known character in the nursery business of the "Eastern Shore" territory between the later sixties and the end of the century, joined the A. P. S. in 1897.

Active in public as well as business matters, Mr. Pullen held many local offices of responsibility and honor in his home town, Milford, Del. For several years past ill health has prevented his participation in matters pomological, but a keen and lively interest in the work and activities of pomology and horticulture has been manifest throughout this period. His passing takes another worker from the ranks of those old-time amateurs who delighted in the testing and bringing out of new varieties, not alone because of the inherent merits of the fruits, but for the love of watching a new form of plant life unfold and come to fruitage. A mild and harmless form of gambling, but doubtless quite as satisfying, and to certain characters fully as exhilarating, as the more orthodox kind.

To those of our pioneer members who were most active in the work twenty-five years ago, the news of Mr. Pullen's death will come with peculiar sadness. With such members in particular the Society joins in extending to the bereaved family, a wife and two sons, its sincere condolences.

COL. C. L. WATROUS.

In the death of Col. Watrous this Society has lost another member of the old guard. For years he was one of the most vigorous of our active members. Until the California meeting, at which time he was not in the best of health, he was a regular attendant at the biennial sessions. The death of his close friend, Col. Brackett, no doubt had something to do with his decision not to make the far western trip. His death, which occurred February 9, 1916, at his home in Des Moines, Iowa, followed a very brief illness.

Col. Watrous became a member of the Society in 1889, and served as President from 1897-1903. It is quite remarkable that three men, Brackett, Van Deman and Watrous, who had done so much to direct the course of the Society, and who were likewise closely associated

in their daily occupations, all members of the G. A. R. and all intensely interested in trees and fruits should pass within a year. Van Deman, April, 1915; Brackett, August, 1915; Watrous, February, 1916.

Those of us who mingled with these men in our daily tasks learned to esteem them beyond the power of words to fully express. An irreparable loss to pomology and this Society will be felt in the passing of these notable characters who did so much to stimulate, direct, and uplift our continental pomology and this generation of American pomologists. —E. R. L.

Grand Canyon of Arizona.

NOT ONLY THE GREATEST OF ITS KIND BUT THE GREATEST OF EARTH'S WONDERS. I WAS NOT DISAPPOINTED AT FIRST, BUT IT GREW UPON ME RAPIDLY AS I CONTINUED TO LOOK AND THERE CAME, TO BE UPPERMOST IN MY THOUGHTS, THE MAJESTY AND SUBLIMITY OF THE SPECTACLE QUITE APART FROM THE MERE NOTION OF A NATURAL PHENOMENON. —*T. J. Burrill.*

THE CODE OF NOMENCLATURE.

of the

AMERICAN POMOLOGICAL SOCIETY.

Priority.

Rule 1. No two varieties of the same kind of fruit shall bear the same name. The name first published for a variety shall be the accepted and recognized name, except in cases where it has been applied in violation of this code.

A:—The term "kind" as herein used shall be understood to apply to those general classes of fruits which are grouped together in common usage without regard to their exact botanical relationship; as, apple, cherry, grape, peach, plum, raspberry, etc.

B:—The paramount right of the originator, discoverer, or introducer of a new variety to name it, within the limitations of this code, is recognized and emphasized.

C:—Where a variety name through long usage has become thoroughly established in American pomological literature for two or more varieties, it should not be displaced nor radically modified for either sort, except in cases where a well known synonym can be advanced to the position of leading name. The several varieties bearing identical names should be distinguished by adding the name of the author who first described each sort, or by adding some other suitable distinguishing term that will insure their identity in catalogues or discussions.

D:—Existing American names of varieties which conflict with earlier published foreign names of the same, or other varieties, but which have become thoroughly established through long usage shall not be displaced.

Form of Names.

Rule 2. The name of a variety of fruit shall consist of a single word, whenever possible, or compatible with the most efficient service to pomology. Under no circumstances shall more than two words be used. When the exigencies of a case make it appear expedient such words as early, late, white, red, and similar ones may be used as part of a name.

A:—No variety shall be named unless distinctly superior to existing varieties in some important characteristic nor until it has been determined to perpetuate it by bud propagation.

B:—In selecting names for varieties the following points should be emphasized: Distinctiveness, simplicity, ease of pronunciation and spelling, indication of origin or pa[illegible]tage.

C:—The spelling and pronunciation of a varietal name derived from a personal or geographical name should be governed by the rules that control the spelling and pronunciation of the name from which it was derived.

D:—A variety imported from a foreign country should retain its foreign name subject only to such modification as is necessary to conform it to this code or to render it intelligible in English.

E:—The name of a person should not be applied to a variety during his life without his expressed consent. The name of a deceased horticulturist should not be so applied except through formal action by some competent horticultural body, preferably that with which he was most closely connected.

F:—The use of such general terms as seedling, hybrid, pippin, pearmain, buerre, rare-ripe, damson, etc., is not admissible.

G:—The use of a possessive noun as a name is not admissible.

H:—The use of a number either singly or attached to a word should be considered only as a temporary expedient while the variety is undergoing preliminary test.

I:—In applying the various provisions to this rule to an existing varietal name that has through long usage become firmly imbedded in American pomological literature no change shall be made which will involve loss of identity.

Rule 3. In the full and formal citation of a variety name, the name of the author who first published it shall also be given.

Publication.

Rule 4. Publication consists (1) in the distribution of a printed description of the variety named, giving the distinguishing characters of fruit, tree, etc., or (2) in the publication of a new name for a variety that is properly described elsewhere; such publication to be made in any book, bulletin, report, trade catalogue or periodical, providing the issue bears the date of its publication and is generally distributed among nurserymen, fruit growers, and horticulturists; or (3) in certain cases the general recognition of a name for a propagated variety in a community for a number of years shall constitute publication of that name.

A:—In determining the name of a variety to which two or more names have been given in the same publication, that which stands first shall have precedence.

Revision.

Rule 5. No properly published variety name shall be changed for any reason except conflict with this code, nor shall another variety be substituted for that originally described thereunder.

LIFE MEMBERS.

Allan, Alex. McD.....169 Mutual St., Toronto, Ontario, Canada
Alwood, Wm. B.....Charlottesville, Virginia
Ash, John.....Pomfret Center, Connecticut
Atkins, Chas. G.....Bucksport, Maine
Austin, Mrs. Helen V.....625 S. W. A. St., Richmond, Indiana
Austin, C. F.....Herradura, Cuba
Babcock, J. Lyman.....Norfolk, Virginia
Barry, Wm. C.....Rochester, New York
Berryhill, J. G.....304 New Call Bldg., San Francisco, California
Black, Charles.....Hightstown, New Jersey
Blackmore, John C.....Christchurch, Canterbury, N. Z.
Blair, J. C.....Urbana, Illinois
Blanchard, N. W.....Santa Paula, California
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Harrison, Orlando ..... Berlin, Maryland
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Alabama Polytechnic Institute, 1904-1934....Auburn, Alabama
Arkansas Agricultural Experiment Station Library, 1889-1919 .....Fayetteville, Arkansas
Burbank Press, Luther, 1912-1942.....Santa Rosa, California
Citrus Experiment Station, 1912-1942.....Riverside, California
California State University Agricultural Library, 1913-1943 .....Berkeley, California
Central Experiment Farms, 1899-1929.....Ottawa, Canada
Colorado State Agricultural College, 1902-1932 Fort Collins, Colorado
Cornell University Library, 1889-1919.....Ithaca, New York
Crerar Library, The John, 1909-1939.....Chicago, Illinois
Detroit Public Library, 1890-1920.....Detroit, Michigan
Georgia State University Library, 1911-1941..Athens, Georgia
Georgia College of Agriculture Library, 1915-1945 .....Athens, Georgia
Illinois State University, Horticultural Department, 1908-1938 .....Urbana, Illinois
Iowa State College Library, 1892-1922.....Ames, Iowa
Iowa State Horticultural Library, 1892-1922..Des Moines, Iowa
Kansas State Horticultural Society, 1897-1927.Topeka, Kansas
Maine State Experiment Station Library, 1906-1936 .....Orono, Maine
Maine State University Library, 1909-1939...Orono, Maine
Maryland Agricultural Experiment Station Library, 1905-1935 .....College Park, Maryland
Massachusetts Agricultural College Library, 1910-1940.....Amherst, Massachusetts
Massachusetts Fruit Growers' Association, 1914-1944 .....Marlboro, Massachusetts
Michigan Agricultural College Library, 1872 .....East Lansing, Michigan
Minnesota Agricultural Experiment Station Library, 1899-1929 .....St. Anthony Park, Minnesota
Mississippi State Agricultural College Library, 1900-1930 .....Agricultural College, Mississippi
Missouri Fruit Experiment Station, 1901-1931.Mountain Grove, Missouri
Missouri State Horticultural Society, 1897-1927 .....Columbia, Missouri
Missouri State University Library, 1898-1928.Columbia, Missouri
Montana State Board of Horticulture, 1911-1941 .....Missoula, Montana
Montana Experiment Station Library, 1904-1934 .....Bozeman, Montana
Nebraska State University Library, 1914-1944.Lincoln, Nebraska
New Hampshire Agricultural Experiment Station, 1910-1940 .....Durham, New Hampshire
New Hampshire State Library, 1901-1931....Concord, New Hampshire

New Mexico A. & M. College Library, 1904-1934 . . . . . Mesilla Park, New Mexico
New York State Experiment Station, 1900-1930 . . . . . Geneva, New York
New York State Library, 1900-1930 . . . . . Albany, New York
North Carolina Department of Agriculture, 1907-1937 . . . . . Raleigh, North Carolina
North Carolina College of Agriculture, 1908-1938 . . . . . West Raleigh, North Carolina
Ohio State University Library, 1912-1942 . . . . Columbus, Ohio
Ohio Agricultural Experiment Station, 1899-1919 . . . . . Wooster, Ohio
Ontario Agricultural College Library, 1902-1932 . . . . . Guelph, Ontario, Canada
Oregon Agricultural Experiment Station, 1907-1937 . . . . . Corvallis, Oregon
Oregon Agricultural Experiment Station, 1912-1942 . . . . . Talent, Oregon
Purdue University Experiment Station, 1912-1942 . . . . . Lafayette, Indiana
Purdue University Library, 1912-1942 . . . . . Lafayette, Indiana
Rhode Island Experiment Station Library, 1890-1920 . . . . . Kingston, Rhode Island
Riverside Public Library, 1915-1945 . . . . . Riverside, California
Sapporo Agricultural College, 1904-1934 . . . . . Sapporo, Hokkaido, Y. Hoshino, **Japan**
Texas Agricultural College Library, 1906-1936 College Station, Texas
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Virginia Polytechnic Institute, 1907-1937 . . . . Blacksburg, Virginia
Washington Agricultural College Library, 1907-1937 . . . . . Pullman, Washington
West Virginia University Library, 1913-1943. Morgantown, West Virginia
West Virginia Agricultural Experiment Station, 1913-1943 . . . . . Morgantown, West Virginia
Wild & Brothers, James B., 1904-1934 . . . . . Sarcoxie, Missouri
Wisconsin State University Library, 1904-1934 Madison, Wisconsin
Worcester County Horticultural Society, 1911-1941 . . . . . Worcester, Massachusetts
Wyoming State University Library, 1898-1928 . . . . . Laramie, Wyoming

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