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PROCEEDINGS
OF THE
AMERICAN
POMOLOGICAL
SOCIETY

TOLEDO, OHIO
1921

PROCEEDINGS

OF THE

Thirty-Eighth Convention

OF THE

American Pomological Society

ORGANIZED 1848

TOLEDO, OHIO
December 7, 8 and 9, 1921



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PROCLAMATION

OF THE THIRTY-EIGHTH CONVENTION OF THE AMERICAN POMOLOGICAL SOCIETY.

We hereby proclaim that the American Pomological Society is to hold its thirty-eighth convention in the city of Toledo, Ohio, on the days and evenings of December 7th, 8th and 9th, being Wednesday, Thursday and Friday, in connection with the National Farmers' Exposition. In pursuance of the time-honored declaration of the constitution, the conclave is called for "the advancement of the science of pomology." To this end we cordially invite all friends of fruit-growing to attend the convention and to take part in the discussions, and request that horticultural societies, organizations and firms send delegates.

We solicit specimens of good fruits, fresh and preserved, for the exhibition tables, as also manufactured fruit products, machines, devices, apparatus, materials, nursery stock, and whatever else may contribute to the attractiveness and educational value of the general display. It is the desire to make the convention, both in its speaking program and its exhibition, a worthy expression of the best development of pomology in the United States and Canada.

It is expected that the program will outline the large forward movements in organization, transportation, marketing, governmental oversight, and the prospects of the fruit industry, as well as to consider problems of production and the valuable knowledge of species and varieties. It is purposed not to duplicate the work of state and provincial horticultural societies, but to give the meetings a national and international character. The convention should be a clearing-house for the problems of both the commercial grower and the amateur.

The student fruit-judging contests and the participation of collegiate members from the colleges of agriculture should be attractive features.

The American Pomological Society stands for an educational policy and program, and we ask the cordial cooperation of

the fruit-loving public as a renewal of fellowship and a contribution to the public good.

L. H. BAILEY, *President*.

R. B. CRUICKSHANK, *Secretary-Treasurer*.

October 25, 1921.

THIRTY-EIGHTH CONVENTION AMERICAN POMOLOGICAL SOCIETY

Toledo, Ohio, December 7, 8, 9, 1921.

The Thirty-eighth session of the American Pomological Society was held in Toledo, Ohio, December 7, 8, and 9, 1921. The first meeting was called to order at eleven-twenty a. m., December 7, in the Moose Hall, by the President, Dr. L. H. Bailey.

THE PRESIDENT: Ladies and Gentlemen: The meeting will come to order. I presume at subsequent sessions we shall have a larger attendance as persons begin to come in.

You have the program before you. You know that the proceedings this morning are largely formal, having to do with the report of the Secretary-Treasurer and the Address of the President. The first in order is the Presidential Address.

PRESIDENT'S ADDRESS

DR. L. H. BAILEY,
Ithaca, N. Y.

Ladies and Gentlemen, I welcome you to the thirty-eighth convention of the American Pomological Society. This I do with reverence for the past and confidence in the future. The Society is in its seventy-fourth year. The conventions have been biennial, until this one and its predecessor. Movements are now too rapid to await a biennium.

The program is before you. Some of you are surprised that the first business session opens with reports from the different States. This is in some sense a reversion to the older plan of the Society, whereby the convention developed at once into an experience meeting. In the early years, the convention consisted of two parts, — the reports of the fruit committees and the open discussions. In those days, pomologists did not come together

"to hear papers." They told each other what they had learned in the two years, for the custom had not then developed of asking government for aid, of demanding redress of grievances, and of laying great plans for the securing of rights and the furtherance of trade.

For more than half a century this Society occupied a distinct field quite its own, concerned largely with amateur interests and the varieties of fruits because, at first, there were practically no other interests. Its work was associated with production. But the great State horticultural societies came into existence; large commercial interests developed; distribution and marketing took precedence, in public discussions, over production; the scientific undertakings received great stimulus and the investigators made an association of their own. The old Society came into difficulty, and almost before anyone was aware it found itself without a field of effective operation. There have now been some years of prospecting. We think we now have a program, and we know the field is clear. There is nothing in the genius or even in the history of the Society to prevent it from occupying a large place in the stirring processes of the twentieth century.

YESTERDAY

In a peculiar sense the Society now stands between yesterday and tomorrow. It emerges from its long and honorable past into a future of a somewhat different direction. First, then, may we take a retrospect. Let us sit calmly for a few moments and try to reconstruct in our minds the temper of one of the early conventions. By the time of the fifth meeting, held in Boston in 1854, the Society had gained its headway and its character was known. It was a delegate convention. The proceedings of this convention are in my hand. Be attentive while I read.

"The morning session was opened, at ten o'clock, by the President, Hon. Marshall P. Wilder, of Massachusetts, who took the chair, and called the Society to order. The Secretary, H. W. S. Cleveland, of New Jersey, was present, and took his seat. The delegates were then requested to hand in their credentials to the Secretary for examination.

"Col. Henry Little, of Maine, moved that when the delegations from the different States, should have presented their

credentials, the President proceed to appoint a committee, consisting of one gentleman from each State, to nominate a list of officers for the next biennial term; and the motion was unanimously adopted. The President said there were other delegates in the city; but as the time was passing, it might be expedient to proceed at once to business. He then requested those present to answer to their names, as the list of delegates was called in congressional order. The gentlemen present responded."

The delegates were: seven from Maine; thirty-nine from Massachusetts; nineteen from Connecticut; twenty-six from New York; twelve from Pennsylvania; eight from New Jersey; two from Maryland; one from Ohio; two from Illinois; one from Iowa; one from Missouri; three from Florida; and one from District of Columbia, — 122. It is a mistake to suppose that in the old days the attendance at the conventions was large. I think the attendance was fair to good, but it was of superior quality and influence. The memberships in 1854-6 were 114, of which 26 were from Massachusetts, 23 New York, 23 Pennsylvania, 10 New Jersey, 15 Connecticut, 5 Ohio, 4 Maryland, 3 Maine, 2 each from Virginia, Florida and Illinois, one from each of several States including one member as far west as Davenport, Iowa. There was none from Canada. In 1867 the membership, as published in the proceedings, was 308; in 1885 it was 322; in 1895 the number was 347; these figures include both life and biennial members.

"After the calling of the list of delegates, an invitation was extended to all persons present, and feeling an interest in the objects of the association, to take part in its deliberations.

"Hon. Marshall P. Wilder, the President, gave notice that he should hold a Levee, on the evening of the next day, Thursday, at eight o'clock, at the Revere House; and extended a hearty invitation to all the members and delegates of the Society, to be present on that occasion.

"The President then rose and delivered the following address."

The President's address was the dignified, hopeful and artistic statement that was always received from Marshall P. Wilder. In this day we should call him "a gentleman of the old school." We now speak of our fellows as men, persons, delegates and associates. The particular points emphasized in that address were the methods to be invoked for "the production from seed of new varieties of fruits adapted to particular localities, or to general cultivation"; the "arts of cultivation"; a discussion of "appropriate fertilizers for fruit-trees"; mention of the difficult subject of "summer pruning"; the necessity of regarding "the affinities between different varieties in the arts of multiplication"; the maladies of trees; "the preservation and ripening of fruit." He admonished the delegates that "eternal vigilance is an indispensable condition of success." The conclusion of this worthy address was the following paragraph:

"Gentlemen, Go on. Prosecute the work you have so honorably commenced. Sow the seeds of your best fruits, — raise new varieties, — ply the arts of judicious cultivation, — study the laws of nature, and extend your researches and labors, till our beloved land shall be adorned with orchards, vineyards and gardens; and man shall realize the poet's idea of Paradise regained!"

The President's address was received "with enthusiastic applause." The President appointed twelve persons to serve as the nominating committee. A committee was then appointed by the President "to report business for the convention." Then "The President invited all editors and reporters of papers to take seats at the board, and requested gentlemen having list of fruits, which they might have contributed, to pass them into the Secretary's hands, and they would then be disposed of by the Committee on Fruits."

The convention then proceeded to hear and discuss the reports of delegates representing the different states as to the condition of pomology, particularly in respect to the varieties of fruits. About one-half of the report of 258 pages is made up of a record of this part of the proceedings. The second half of the report comprises a miscellaneous discussion, which turned to a considerable extent on the kinds and varieties of fruits.

It will be seen that this convention turned mostly on the subject of the production of fruits. Judging from the character of the experience which is recorded, it must have been a fraternal and entertaining series of meetings. The reason why production was the theme of the convention was because the commercial side of fruit-growing had not then come into existence. The marketing of fruit was a local and personal practice, and did not need to be discussed before a convention. Remember that in that time there was no great fruit-growing West and practically no subtropical pomology. Railroads were few. If there had been marketing problems at that time, the Society undoubtedly would have attacked them.

In the proceedings of the 11th session held at St. Louis in September, 1867, the Society was addressed by M. L. Dunlap of Champaign, Illinois, on the subject of "Packing and marketing fruit." In subsequent reports the commercial subjects associated with pomology are given increasing attention.

TOMORROW

We now come to a time, nearing the end of the first quarter of the twentieth century, when the delightful subjects associated with the kinds and varieties of fruit are readily and effectively handled by State, Provincial and local societies. The production of fruit is largely a series of geographical questions, and the methods employed in one part of the country may not be applicable to remoter parts. The national fruit-growing subjects are rather those that have to do with policies and programs. How to organize and to effectualize the forces of society for the furtherance and protection of fruit-growing are problems for a national and international society to consider. The different State and Provincial societies represent political divisions of the continent. All of them, however, must consider large questions of policy associated with transportation, distribution, selling, marketing, storage, quarantine, packages, and many legislative matters that touch the fruit-growing industry. It would add much to their effectiveness without detracting anything from their initiative and integrity if they could act through a body of continental scope, including both the United States and Canada. This is the large field of the American Pomological Society.

Some of its friends have felt that the Society should not be "commercialized." We need, however, to understand what we mean by this word. I would not have the Society commercialized in the sense of becoming a trade organization; it should not engage in buying and selling nor become an agency of distribution; it should not be a pooling company or a fruit-growers' exchange. However, it may very properly cover all the educational and informational subjects associated with the commerce in fruits as well as those associated with the breeding and production of fruits. The Secretary's office should be prepared to give information on the fruit crops of other countries, and of North America, the prospects of the export trade, the laws and regulations touching the handling and the movement of fruits, and all other subjects that will aid the fruit-grower in the better conduct of his business. At the same time, the Secretary's office may give any information it is able to collect that will help persons better to understand and to grow fruits, whether these growers are commercial men or amateurs on village lots. All new findings of experiment stations, conclusions as to new varieties, new apparatus, methods and practices, opinions of persons competent to advise, may be distributed freely to the membership. Although the Society may cover commercial fruit-growing in this way, it must never lose sight of the amateur and the small planter, for it is on this body of non-occupational fruit-lovers that a successful and growing commercial fruit-growing must rest. The American Pomological Society, therefore, may stimulate all planting of fruits independently of the size of those plantings. It must encourage the growing of single trees and plants as well as of large orchards, for the interest of fruit-growing holds together from one end to the other.

If these statements are sound, then it follows that the central service of the American Pomological Society is not in its conventions and exhibitions, however important they may be, but in the Secretary's office. I am convinced that the Society may exercise a very large usefulness and make a great impression on the country without any conventions whatever. Such a frequent periodical issuance of helpful information from the Secretary's office as I have in mind, aided by supporting officers and by the membership, is competent to interest a vast number of people. The return for the membership will lie in a useful, attractive,

well-bound annual report promptly delivered, in circular letters frequently issued, in the member's privilege of being able to write a central office for information, in the exchange of sample fruits and of cions, and in the support that a good organized body may give to all worthy needs and purposes of fruit-growers. The Society should be prepared to exert its influence promptly when questions of public policy touching fruit-growing are pending.

To this end, the Society invites membership from all persons who are interested in fruits, whether they grow the fruit-trees in suburban lots or whether they have large commercial areas, and also those who grow the trees, who manufacture appliances and supplies used by fruit-growers, from traders in fruits, and all others interested in the subject. Local and state horticultural societies are invited to affiliate and to take part by means of delegates, as are also institutions and business organizations.

The active personal membership is in two parts, -- the regular adult members, and the collegiate members. The collegiate membership is a departure, and the organization of it is not yet perfected. I trust that we may now complete the plans for it. These members in the colleges should have full standing, receiving the annual reports and all the literature. They should hold chapter meetings, with suggestions, so far as possible, from the secretary's office. They should be led to expect a talk or lecture once each year by some officer or member of the parent society if their local organization is active and effectual.

The Society should cover the field; and as the field is increasingly commercial and legislative, so must the Society attack these economical and legal questions if it is to represent North American pomology. It shall represent and cover this field by means of education and stimulation rather than by buying and selling. What, then, are its agencies?

1. A sustained Secretary's office, giving its entire time to the work of the Society.
2. Conventions and exhibitions, held annually in different parts of the country.
3. The annual report and yearbook, containing the proceedings of the conventions and also much collected matter of timely interest to fruit-growers.

4. Monthly or twice-monthly letter or bulletin from the Secretary's office to the membership, keeping the membership informed on new fruits, new methods, insects and diseases, new movements, the state of the fruit crops, the projected and pending legislation, the markets, and whatever else the Secretary may be able to assemble that may be of current value.
5. The re-issue each year of the fruit catalogue.
6. The giving of medals and awards for meritorious fruits, worthy inventions, and notable contributions to the science and practice of pomology.
7. The distribution, under proper safeguards, of cions, cuttings, and samples of fruits to the membership.
8. Eventually, a permanent home for the Society, with land, buildings and library.

THE PROGRAM

This is a day of programs. You have a schedule for three days. This includes the careful inspection of the exhibitions. These three days will set many things in motion for the coming year. I have a few other propositions to recommend for your consideration.

1. That you commend the untiring labors of the Secretary and ask for a continuation of these efforts in making the Society known and in obtaining memberships.

2. That you set forth a regular activity to increase the consumption of fruits and their products. This shall be accomplished by all proper means of publicity, including regular advertising when we have the funds. In particular, ask every college of agriculture and experiment station to issue at least one bulletin in 1922 on the food and health value of fruits. The many departments of home economics can help greatly. Ask, also, all public health and sanitation and welfare bodies to issue such publications or leaflets.

3. That a definite program be set afoot to encourage the home planting of fruits. The fruit-garden seems now to be little known in the old sense; or if it exists, it is likely to be no more than a plantation of berries. But to collect and to grow varieties of the different fruits is as joyful an enterprise as to grow a collection of roses, peonies or irises. It is said that the

home orchard is going out. This may not be a misfortune if the home orchard is merely a small commercial plantation, forming an unimportant and uneconomical adjunct to a farm enterprise, and competing with what may be called professional orchards. But it is a tremendous misfortune if it means that fruit-growing is to be in the hands of only a few large area growers and that the people are to be deprived of the vast spiritual resource of growing choice fruits and to be divorced from personal knowledge of them. Our concern, as public men and women, is quite as much to multiply the resources and satisfactions of the lives of the people as to swell the volume of trade. Home-making is the major concern of society. A fruit-garden as a part of every home, in which it is possible to rear one, should be a cardinal objective of this Society.

Publications to this end may be prepared; and definite co-operation with State and local societies should be undertaken with the view to have this subject entered on all the programs of 1922.

4. That the Secretary's office issue a printed or mimeograph letter or bulletin at least six times a year, devoted to the purposes of the Society and distributed to the membership.

5. That the first bulletin be a record of the resolutions and programs adopted by this Convention for the furtherance of the activities of the Society.

6. That the code of nomenclature be published as another bulletin, having been edited for the purpose, together with the names of current varieties made to conform to it.

I recommend that two new principles be incorporated in the code, — the principle of alternative names, and the principle of fifty years of accepted usage.

By the principle of alternatives the Society makes legal the use of two names for the same variety, when these names are thoroughly established in popular usage. Thus, both Newtown and Albemarle may be allowed and perhaps also both Duchess and Oldenburgh. This is only making the rules practical, for the Society cannot expect the people in the Albemarle region to say "Newtown." This means that the name Albermarle may be raised from synonymy and given good standing.

By the principle of a half-century established usage in times past, a name remains standard, even though it does not conform

to the code. Thus, Rhode Island Greening and Esopus Spitzenburgh and Roxbury Russet, are untouched. Again we are only making the rules practical, for the Society cannot expect the people to forget childhood and Downing and say Rhode Island, Esopus and Roxbury.

To carry out these recommendations I suggest a committee of three to prepare the nomenclature bulletin.

7. That the Society establish a regular official size of page and style of binding for the Report and Annual.

There has never been an official size and format. At one time the proceedings were published in quarto. Hereafter the volume should be bound and a regular design of cover should be adopted. For this result a small committee should be constituted.

8. That we now make up our minds just what we want to do with the collegiate membership idea, and that we issue a bulletin on the subject.

9. That the Society delegate certain of its members to act as advisors to the Secretary in the working out of the activities entrusted to his care. There should be one advisor, for example, in the publicity-for-consumption enterprise, one in publicity-for-planting, one in marketing, one in co-operation, one in affiliation and so on. These advisors should not constitute a committee or organized body.

10. That we here and now raise a supplementary fund, above the usual income of the Society, to put through the new work. Are there twenty persons and firms ready to contribute fifty dollars each? The contribution could be charged to the advertising appropriation of the firm. Or are there ten persons and firms who will contribute fifty dollars and twenty who will contribute twenty-five dollars? Or are there one hundred who will give ten dollars?

Aside from these suggestions let me call attention to certain resolutions adopted at the Columbus meeting, on the recommendation of the Lake Committee, and which have not yet been carried out so far as I know. They are printed on page 112 of the last Report. There are five of these resolutions needing attention: on the conduct of fruit shows; statement on condition of commercial fruit-growing in United States and Canada; encouraging of students' judging competitions; the offering of prizes

in plate apples; inquiry into cost of producing apples. Attention should also be called to the excellent suggestions contained in the Report of Professor Lake, retiring Secretary, printed on page 115.

The Convention is now before you. I trust it will be satisfactory to you, and inspiring. I hope we shall set our faces toward the future, taking a long look. We cannot stand still. To make no progress is to admit defeat. The officers cannot carry the work alone. There must be a large and helpful membership. The members must give as well as receive. We must be a working company.

Let us keep constantly before us the three larger purposes of the Society. These purposes are: to encourage the production of more and better fruit; to increase the consumption of fruit; to enable everyone to have greater joy and reward in the knowledge and the growing of fruits.

CHARLES E. GREENING (Monroe, Michigan): I move that we adopt the recommendations of the President's Address.

THE PRESIDENT: May I make a suggestion — that inasmuch as you want to take these recommendations up in detail, the motion be changed and that a committee be appointed to consider them, the motion being that a committee be appointed to dissect the President's Address.

(This change was accepted, the motion seconded and unanimously carried).

CHARLES E. GREENING: I move that the President appoint a committee of three for this purpose.

THE PRESIDENT: It would be better to have them named from the floor.

H. P. GOULD (Department of Agriculture, Washington, D. C.): I move to amend the motion and that the Secretary appoint this committee.

(The amendment was accepted, the amended motion seconded and unanimously carried.)

THE PRESIDENT: The appointments will be made later in the session.

I do not know how many of the people here are members of the American Pomological Society, but at all of these sessions

we want those who are not to make themselves known to the secretary — the handsome young man sitting over there. His name is Cruickshank — and he will take everything you have for the American Pomological Society.

We shall now have the report of the Secretary-Treasurer, Mr. R. B. Cruickshank.

REPORT OF THE SECRETARY-TREASURER

This report is presented in full realization that the secretary has not been able to accomplish during the year any great part of the program laid out for his office at the last meeting. Circumstances explained below and the impossibility of devoting to the work of the Society more than a small fraction of the time which it requires have interfered and kept tangible results below expectations.

Finances — One of the purposes of the partial reorganization at the last meeting, was to interest financially in the Society those industries allied to the business of fruit growing. The report in this connection is not as satisfactory as was hoped a year ago. A meeting of the executive committee was called in Chicago in January. At this time, plans were laid to approach members of these industries through the several persons on the executive committee, to begin a widespread campaign for membership through the farm papers and through the literature issued by such allied interests as were in sympathy by means of membership application coupons. The business men on the committee were confident that a large sum for underwriting the expense of an extensive program could be raised and that a greatly increased membership of national distribution and proportions could be obtained.

However, before this work could be gotten underway, a conference of fruitgrowers was called for April in Chicago by the American Farm Bureau Federation. There immediately arose a question as to what this gathering would decide to do, and for fear there might be a conflict of action, it was felt advisable and necessary to allow our plans to rest until after that conference.

The executive committee met again the evening before and on the day of the fruitgrowers' conference. It appeared then that the new program of the American Pomological Society might in large measure be a duplication of what was proposed in the resolutions adopted by the conference, and to show its interest in the movement, one of our members seconded the motion for the appointment of a general fruit committee of 21 by the American Farm Bureau Federation. Efforts to raise money through large subscriptions were again postponed.

Meanwhile President Bailey had returned to the United States and another executive committee meeting was called and held in Toledo, July 26. Dr. Bailey was of the opinion that regardless of the probable program which might evolve from the American Farm Bureau Fruit Committee of 21, there was still a large field of useful endeavor for the American Pomological Society and that it could be placed in a position to give generous service to the fruit industry without interfering with or duplicating the work of any other organization.

With the loss then of eight months of valuable time, definite work began. Firms were written by both Mr. Stark and the secretary, asking not for actual donations, but for subscriptions which would be repaid if desired whenever the Society found itself in position to do so. The responses were sympathetic, but in almost every case we were reminded of the present business depression, of the necessity for complete financial retrenchment and of the utter impossibility at the present time to help out.

The exact results of the canvass are these. Stark Brothers Nurseries and Orchards Company of Louisiana, Mo., and The Hardie Manufacturing Company of Hudson, Mich., each gave \$100.00. The Niagara Sprayer Company of Middleport, New York, gave \$50.00 and the Package Sales Corporation of South Bend, Indiana, gave \$200.00. None indicating a desire for return of same. Many other concerns left themselves open to be approached again later, upon return of better business conditions. In addition, \$1700.00 have been promised as a contribution to a given working fund. Representatives of two business enterprises thought their firms would be willing to donate a small percentage of their profits towards the maintenance of a going

organization. The American Fruitgrower offered a full page in each issue for items concerning the Society.

It appears that there are many allied businesses in the country which see value in a strong, constantly functioning national or international organization to the fruitgrower and of course indirectly to themselves, and that they are ready under improved business circumstances and upon a reasonable state of readiness on the part of the American Pomological Society to underwrite it sufficiently to establish and equip a permanent office, without dictation by themselves. If but a little money has been collected, the past four months' effort seems to show that there is good promise of necessary funds.

The complete financial report is herewith appended. The money received has been spent. It was spent with the idea of making it do the most to put the Society in position to progress.

Membership — The roll of the Society now consists of 131 Life members, 297 Annual members, 36 Collegiate members, 2 Society members and 64 Institutional members, a total of 527. This is approximately what it was last year and, therefore, no increase is shown.

The same circumstances which necessitated postponement of the financial campaign acted similarly against a big membership effort until late in the year. However, during the past few months, many of the State Horticultural Society members have been canvassed with the result that since August 1, 200 of the 297 annual memberships have been received. This would seem to mean that members can be obtained if they are insistently followed through a whole year and with a program of service to the individual and to the industry.

During the past year, approximately 12,000 pieces of mail have gone out from the office of the secretary. Much of this has been an attempt to acquaint growers with the work and proposed work of the Society. In addition, news items have appeared in agricultural and horticultural papers to the extent of over a million copies.

This widespread advertising is certain to exert a pulling force and gradually to increase the membership if properly followed up. The circulation manager of a national fruit paper estimated that 100,000 members could be obtained at a cost of \$1.00 each.

Once begun with sufficient financial foundation, there is every reason to believe that the Society could be developed into a strong factor in the pomological world.

Publications—During the year, the Proceedings of the Thirty-sixth meeting at St. Louis and the Thirty-seventh meeting at Columbus were printed and distributed. Together with this, was issued the first Pomological Annual, most of the material for which was gathered by former Secretary Lake. It comprised ninety pages of the volume. This feature has possibilities of great value and interest to members of the Society.

Late in the year, in an attempt to keep the members more frequently and more completely in touch with the policies and activities of the Society and to give them more definite service, your secretary began sending out monthly mimeographed letters. Three were issued. While far below their possibilities, judging from the responses received, they appeared to be welcome. At least, they served to put the Society in mind more or less regularly. Such letters, though not so attractive as a printed page, have the advantages of being less costly, of consuming less time in the secretary's office and of possessing a more personal atmosphere. A sufficiently organized secretarial office could make of these a source of real pleasure and worth to members. They like to hear from headquarters.

The President's Proclamation, calling this convention into session, was printed and mailed to members, to horticultural societies and to agricultural magazines.

Obituary—The following deaths have been reported to me during the year: Mrs. Helen V. Austin, Richmond, Indiana, and Prince E. L. Odescalchi, Turser, Hungary, both life members; Mr. George W. Trowbridge, Glendale, Ohio, and Mr. George B. Thomas, West Chester, Pa., annual members.

Awards—Silver Wilder Medals were sent to the Central Experimental Farm, Ottawa, Canada, and to the Buckeye Nurseries, Tampa, Florida, the latter for the Temple Orange.

Bronze Wilder Medals were sent to the New York Agricultural Experiment Station, Ohio Agricultural Experiment Station, Experiment Station, Kentville, Nova Scotia, Wisconsin State Horticultural Society, New England Fruit Show and Miss Elizabeth C. White, New Lisbon, New Jersey.

A silver cup was given to the successful judging team of the Department of Horticulture of the Ohio State University.

Silver medals were sent to Mr. A. L. Laisy and Mr. H. L. Geer, of Ohio and Massachusetts, respectively, as awards for their high scores in the judging contest at Columbus last year.

In conclusion, your secretary is of the opinion that the American Pomological Society is in better position than it was a year ago. Its new policies are better defined, it has introduced itself to many thousands of fruitgrowers who previously had not heard of it, it has had widespread publicity which can be capitalized, it has been promised the financial support of many businesses allied to the fruit industry, it has had correspondence with all state horticultural societies and with a large number of fruitgrowers cooperative associations, it has kept in close touch with its membership and has given considerable personal service to them, it has been stirring and has attracted attention to itself.

COLUMBUS, OHIO,

December 6, 1921.

R. B. CRUICKSHANK, *Secretary-Treasurer*.

In account with the American Pomological Society.

		1921		
March	1.	To Cash.	Received from L. R. Taft..	\$608 91
Dec.	6.	" "	297 Annual Memberships...	594 00
		" "	1 Life Membership.....	50 00
		" "	30½ Collegiate Memberships	30 50
		" "	State Memberships.....	20 00
		" "	Institutional Membership...	50 00
		" "	Subscriptions	448 00
		" "	Reports sold	53 10
		" "	Interest on Bonds.....	200 00
				\$2,054 51
Feb.	23.	By Cash.	F. E. Dillon, Stenographic Service, Columbus meeting	\$152 90
Nov.	21.	" "	R. B. Cruickshank, Expense Office and Ex. Com. meeting, Chicago.....	19 10
April	1.	" "	Madge Guyton, Stenographic Service.	40 00
	9.	" "	F. J. Heer Printing Co., Letterheads..	25 00

	9.	"	"	Mary E. Brown, Merchandise.....	2 60
	21.	"	"	R. B. Cruickshank, Expense Office and Ex. Com. meeting, Chicago.....	48 24
	22.	"	"	F. Craneheld, Expense Ex. Com. meeting, Chicago	28 16
May	4.	"	"	Madge Guyton, Stenographic Service	40 00
June	1.	"	"	Madge Guyton, Stenographic Service.	40 00
	20.	"	"	H. M. Aldrich, Legal Opinion.....	25 00
July	1.	"	"	Madge Guyton, Stenographic Service	40 00
	30.	"	"	Madge Guyton, Stenographic Service	40 00
		"	"	F. J. Heer Printing Co., Letter Heads	10 00
August	4.	"	"	Trafford Talmadge Agency Co., Premium on \$10,000 Bond.....	35 00
		"	"	L. Roesch, Return on Overpayment of Dues	1 00
	9.	"	"	Weinland, Kahle & Doud, Legal Service	2 50
	12.	"	"	E. S. Welch, Return on Overpayment of Dues	1 00
Sept.	1.	"	"	Frances Carlisle, Stenographic Service	40 00
	5.	"	"	F. J. Heer Printing Co., Envelopes, Letter Heads, Paper.....	41 50
	23.	"	"	F. J. Heer Printing Co., Envelopes for Report	15 00
	26.	"	"	F. J. Heer Printing Co., Bill Heads..	3 50
	30.	"	"	Frances Carlisle, Stenographic Service	40 00
Oct.	8.	"	"	Xantha Day, Stenographic Service...	20 00
	20.	"	"	Simons Bros., Philadelphia, Wilder Medals and Cases.....	79 00
		"	"	Xantha Day, Stenographic Service...	24 00
		"	"	F. J. Heer Printing Co., Stamped Envelopes, Folder, Paper.....	141 20
	31.	"	"	Frances Carlisle, Stenographic Service	40 00
Nov.	3.	"	"	F. J. Heer Printing Co., Envelopes...	10 00
	5.	"	"	Xantha Day, Stenographic Service...	24 00
	11.	"	"	R. B. Cruickshank, Office Expense...	88 65
	30	"	"	Frances Carlisle, Stenographic Service	40 00
		"	"	F. J. Heer Printing Co., Annual Re- ports	758 80
		"	"	R. B. Powers, Ribbons.....	9 00
					\$1,925 15
				\$2,054 51	\$1,925 15
Cash to balance.....					129 36
				\$2,054 51	\$2,054 51

Ex-treasurer Taft reported that his books showed a balance of \$730.00 credited to the Life Membership fund, and that the receipts from the Wilder Medal fund had exceeded the outlay for medals by the sum of \$499.20, but that it had been necessary to draw upon these funds to pay current bills. One new life membership has been added, making the total fund now \$780.00. There were expended for Wilder Medals \$79.00; receipts were \$40.00. This fund therefore stands reduced to \$460.00.

Respectfully submitted,

R. B. CRUICKSHANK,
Secretary-Treasurer.

Columbus, O., Dec. 1, 1921.

THE PRESIDENT: You have heard this report. It is in two parts as the office is now a secretaryship and treasurership. Whether you wish to do anything with the secretary's report more than to receive it, is for you to say. It is the usual custom to have an auditing committee appointed to go over the Treasurer's books, and a motion to that effect would be in order.

H. P. GOULD: I move that an auditing committee of three be named by the Chair to go over the Treasurer's report.

(Motion seconded and carried.) The president named:

Charles E. Greening,
Fred Johnson,
J. E. Cochran.

THE PRESIDENT: We are now ready to adjourn this session. We are to be back here at two-thirty ready for a trip to the plant of the Rex Spray Company, and before that time we will have our afternoon session. The program calls for one o'clock, but it has been suggested that this be made one-thirty, which will leave us an hour for our program. If there is no action to the contrary we will now adjourn to meet at one-thirty by this clock.

Any further business to come before this session? If not we will stand adjourned.

WEDNESDAY AFTERNOON SESSION

The Wednesday afternoon session was called to order at one-forty by the President, Dr. L. H. Bailey.

THE PRESIDENT: We have one or two things left over from the morning session. One is the appointment of the committee to dissect the President's Address. This committee was to be appointed by Mr. Cruickshank.

THE SECRETARY: That committee will be:

H. P. Gould, Washington, D. C.

Frederic Cranefield, Madison, Wis.

M. B. Davis, Ontario, Canada.

THE PRESIDENT: A committee was appointed this morning to audit the Treasurer's Report. No action was taken, however, in reference to the report of the Secretary. Do you wish to accept it?

CLARK ALLIS (New York): I move that the report of the Secretary be accepted.

(Motion seconded and carried).

THE PRESIDENT: We have two numbers on the program this afternoon. Mr. H. C. Taylor of Washington is not able to be here, but his paper is in our hands. I think we ought to give Mr. Allis whatever time he wants, and I propose therefore to call on him first. Then if we have time before going to the plant of the Spray Company we shall have the other paper read.

Mr. Clark Allis of New York will now read a paper on "Pure Fruit Juices."

PURE FRUIT JUICES

CLARK ALLIS,
New York

Mr. President and Fellow Members: I think perhaps in fairness to the victims I have before me that I should announce that I am a manufacturer of cider; I am also a fruit grower. I

am very much interested in growing fruit, apples principally, and I think there is no field in the fruit industry that offers the chance that does the manufacture of the by-products of the apple. Perhaps I am a crank on that subject. I never drank cider until I began to make it myself.

This short title does not sound like the biggest thing and the greatest opportunity that has ever come to any class of ordinary business. Very few, if any, realize that this one demand, if catered to and encouraged, with a publicity campaign carried on in keeping with the magnitude of the fruit business, would take all the fruit juice we could make. A billion dollars does not make a loud noise any more, but a billion spent by Americans last year for so-called "soft" drinks would boom the fruit business so all the world would hear.

Much of the soft drink business is but a left-over from the brewing and whiskey-making days and is the most prolific source of bootlegging and drink with over one-half of one per cent. that the prohibition officers have to handle. Most of the near-beers, pops, Bunco-Bunco and drinks with similar compound names that have such immense sales are absolutely worthless and dangerous. Dye stuffs, chemicals and drugs, with the addition of a small amount of saccharine and canal water, make a concoction that is beautiful to look at, that sells readily, and is almost all profit. Some of the most widely advertised drinks contain certain drugs that are worse than beer. Part of the brewers and makers of soft drinks are as unscrupulous as ever and are making a big drive against the largest manufacturer of grape juice because this manufacturer worked hard to make America dry. As a part of their contract with retailers they have this clause — that the retailer of pop, etc., shall not handle this brand of grape juice — and incidentally, any kind of fruit juice made from fruit.

A noted doctor who is a manufacturer of lemon, orange and other bottled fruit juices, gave me to drink at his laboratory several brands of fruit juices, none of which had a particle of fruit juice in them. In many cases of children's diseases where doctors have advised fruit juices, parents have bought commercial fruit juice without knowing that it was made entirely of chemicals.

The bottlers of America in their annual convention passed resolutions against certain editors of farm papers who were urging that school children should be furnished free, or at cost, milk to drink. They boom their hellish business even at the expense of children's health, and America will stand or fall on the health or illness of its children. Milk and fruit juices are Nature's complete foods. Constipation is called an American disease, but with the proper use of milk, fruit and fruit juices, the use of drugs and dope is not necessary. A vast amount of pop and dangerous drinks are always on sale where school children can get them and many parents do not know the harm such drinks do to the children.

Ikey went home one day to find his wife ill and wanting a doctor. Ikey hurried to get one, and his wife liked the doctor so well that she had him every day. Ikey objected, but his wife could not exist without the doctor's daily visit. Finally Ikey sent home a barrel of apples. When he came home his wife said, "Ikey, some one, I guess the doctor, sent us a barrel of apples." "Oh, no," said Ikey, "I sent them. I read in a paper that 'An apple a day keeps the doctor away.'"

Loganberry juice, with its exquisite aroma and taste is distinctly a product of our great Northwest and one of which she may well be proud.

Grape juice had long been a favorite with many people, but it took Bryan, the Boy Orator of the Platte and our perpetual candidate for President, to give it a deserved boom at Washington. Practically all fruits furnish juice that makes drinks that are refreshing and valuable as aids to health — currants and berries of all kinds.

Orange juice has sprung into great popularity and all the citrus fruits are valuable for their juices. No home or table is furnished as it should be without some citrus fruits always on hand, and lemonade — say boy! This would be a desert place indeed without lemonade, both hot and cold. I can remember in the olden days that I often faked a cold just to get a quart or two of hot lemonade, and we use lots of it the year around.

I am a great lover of citrus fruits and never read any of the wonderful ads. their associations put out but what I say, "Go to it! You have the goods."

In a recent campaign three thousand doctors have been written to as to the value of orange juice. I think so far all who have answered endorse it unreservedly. From Washington our Government is sending out floods of bulletins encouraging the use of citrus fruits. All this shows what a wonderful organization the citrus fruit growers have. I congratulate them and hope they continue to prosper. Up to the present time it has been impossible to pasteurize any of the citrus juices and retain a good flavor and color. Many have tried, but the results have been disappointing.

All that has gone before is but an introduction to the one fruit and its juice, whose glory shines so brightly and whose true merit and worth are so wonderful. No fruit can compare with it. Adam and Eve left Paradise and all its pleasures for a poor specimen of an apple, but what would they say now if they could but see and eat some of our luscious apples or have a drink of cider made from ripe, picked, sound apples — apples that are fresh from the trees with no rot, specks or dirt!

Do you know how Queen Victoria took her pills? In side'er (cider).

The apple is the king of all fruit, and cider is the queen of all drinks. The nectar that the gods of old were so fond of was poor stuff compared with cider. For ages cider has been of such poor quality and usually hard, that it has been quite properly classed with the outlaws. But made as it should be, from good apples, bottled, capped and pasteurized at 140° to 145° long enough to destroy all the ferment germs, it is truly a drink fit for the best people on earth, the Americans, and my ambition is to make cider America's royal drink.

Any process that will keep cider from working is all that is required, and pasteurization is the one usually followed. But one recipe is to get an I. W. W. to oversee the job — and the cider will never work — it is guaranteed never to work.

Grades and grading are drawbacks to apple growers, but with cider made as it should be, and all but the best grades of fruit made into cider, apples would have a boom that would benefit the grower, the dealer and the consumer alike. The grower would not have so many barrels or boxes to sell and would receive more money. The dealer could say the packages

contained nothing but No. 1 fruit, and the consumer would always be able to get high-class fruit.

Until recently the United States Department of Agriculture has advised pasteurizing cider at 175°. This is entirely too high a temperature to use, as some kinds of apples have juice that changes flavor at 140°. All manufacturers of bottled cider that I know have been after a clear cider that deposits no sediment after standing. They have produced a clear liquid almost like water. They have refined cider to death. A filter should be used that leaves a cloudy, natural-colored cider. The sediment, which is pectin, easily shakes into suspension again and is what gives the cider its fine flavor.

"Liquid apple" should be a standard product and everyone should ask for cider or apple juice instead of pop, Coca-Cola, etc. The International Apple Dealers' Association and other associations are ready to help in a campaign of this sort. Co-operative packing associations everywhere should back this movement to dispose of many of the apples now shipped in barrels and boxes. Cider can be made in years when apples are cheap, and held over until the following year or years. Cider sells well in the summertime, and this would help the apple business the year around. Publicity, a nation-wide campaign, and every grower a booster, would do this.

Doctor Bates, the great Indian expert at Cornell University, attended church on the Cattaraugus Indian Reservation. He and Hen Hawk, an Indian brave, were asked how they liked the sermon — an eloquent sermon on Adam and Eve — the sin of eating the apple, what might have been, etc., etc., etc. Doctor Bates of course praised the sermon, but when the minister tried to get praise from Hen Hawk he only grunted. Finally the minister urged Hen Hawk so hard that he said, "Adam damn fool." The minister was horrified to hear Hen Hawk swear, but asked him what he would have done with the apple, to which Hen Hawk replied, "Made cider."

Legislation is necessary to check the flood of soft drinks now being sold. Every bottle should be branded as to its contents and as to the purity of the water it contains. The Pure Food law covers part of this, but it is not strict enough. Many

of the brands now being sold should be prohibited entirely. Nothing will help the sale of fruit juices as much as making public the "dope" that soft drinks are made from. It is some job, but each and everyone should do his part. "Up, men, and at 'em!"

THE PRESIDENT: This interesting paper is before you for consideration and discussion, presented by one of the substantial fruit growers of western New York who is well known to all of us. Are there any questions?

A MEMBER: I want to ask about the length of time to hold it.

CLARK ALLIS: When you get it to 140° hold it for one hour. But never let it get beyond 140° or 145°

C. A. BINGHAM (Cleveland, Ohio): I would like to express my appreciation of this paper. I realize thoroughly the great business that can be done in bottling good fruit juices, because I know a gentleman who had made himself an income of over \$100 a day from the drink they call "Whistle." And he made a very small initial investment. His brother-in-law told me that when he died, at the age of about forty-five, he had an income of \$100 a day.

THE PRESIDENT: You may not all know it, but the person who just sat down is Dr. C. A. Bingham, President of the Ohio State Horticultural Society, one of the members of the Executive Committee of this Society, and a practicing physician of many years' standing.

We have time enough to hear the other paper on the program, by Dr. H. C. Taylor. Unfortunately, Dr. Taylor cannot be with us, but Mr. H. P. Gould, of the Department of Agriculture at Washington, is here and will read the paper, on "Economic Work of the United States Department of Agriculture in Connection with Pomology."

Lest there be confusion, let me say that this is Dr. H. C. Taylor, not Dr. William A. Taylor, Chief of the Bureau of Plant Industry, who was for some years the Secretary of this Society.

ECONOMIC WORK OF THE UNITED STATES DEPARTMENT OF AGRICULTURE IN CONNECTION WITH POMOLOGY

DR. H. C. TAYLOR,

Chief, Bureau of Markets and Crop Estimates, U. S. D. A.

The work of the Department of Agriculture having a vital relation to the economic advancement of pomology has many phases and is scattered through many offices in several bureaus of the Department. The field of pomological research is of major importance in such bureaus as Plant Industry, Markets, Chemistry and Entomology. Even the Weather Bureau and Bureau of Forestry are concerned with problems that contribute in some vital respect to the well-being and progress of pomology. But inasmuch as members of this Society are already well acquainted with much of the work conducted by the Bureau of Plant Industry, always ably represented at your meetings, and probably to a certain extent with the other lines in the other offices, it seems safe to assume that you expected in this paper special consideration of the economic work of a marketing nature.

Standardization.—Fundamental to all of our economic marketing work with fruits is the work relating to standardization. In the process of developing each of our other lines we have come squarely up against the necessity for more general and just recognition of standards now in use, for further development of standards and education regarding their purposes and use, to the end that we may have a generally recognized basis for buying and selling, a common language understood by contracting parties, a definite standard of quality upon which values may be fixed and quotations and determinations made.

Experience has shown that products which are sold by grade more readily find a market, bring better prices, and are marketed at less expense than those which are not so graded. The shipment of poor quality and ungraded commodities causes great losses and has a depressing effect upon prices of the good as well as the poor products. A great many fruits and vegetables are shipped to market whose value does not warrant the payment of the freight charges. This poor fruit occupies valuable space in

cars and not only results in a loss upon arrival at destination, but lowers the value of the good fruit with which it is often mixed.

Chiefly as a result of the work of the Department of Agriculture mandatory standards have been promulgated for several staples and permissive and tentative standards have been developed for various vegetables and fruits. The Department was able to be of considerable service to Congress in preparing the Standard Container Act and other standardization legislation now pending, and has had sole charge of the administration of the Standard Container Act, the enforcement of which is largely a matter of education. A Farmers' Bulletin dealing chiefly with much of our work of standardization has been issued. An article in the last Yearbook of the Department gives a popular review of the progress of standardization to date.

Crop and Market News Service.—The Department of Agriculture is making vigorous efforts to place the market news and trade information in its possession within the reach of all sellers and buyers whether they be farmers, dealers or ultimate consumers. The development of a nation-wide market news service, especially on vegetables and fruits, was one of the most insistent demands of the public when the Bureau of Markets was organized in 1913. Naturally the people at large were entirely uninformed regarding the complexity and magnitude of such an undertaking and had little idea of the expense involved in such a service. One of the first lines of work drafted and pursued by the Bureau of Markets was the investigation of the practicability, methods and costs of a general market news service on perishables, and by 1915 an experimental market news service on specified perishable commodities was in active operation. During the war this service reached large proportions and was truly nation-wide in a very real sense. Curtailed appropriations have necessarily meant a curtailment of the work but in all reductions of the service the national aspect has been kept in mind and the essentials for such a framework have been retained in so far as possible.

Whenever serious consideration is given to the complex and intricate problems of marketing and distributing farm products, the need for prompt and accurate market information at every stage in the process is quickly manifested. This is especially true in the marketing of such highly perishable

products as fruits and vegetables. If all parties to a commercial transaction are correctly informed with reference to the main conditions and circumstances surrounding the transaction, the possibilities for misunderstandings, misrepresentations, and unfair practices are greatly minimized. This is particularly applicable in the merchandizing of goods when the seller is hundreds of miles away from the buyer. If the buyer does not have dependable information regarding supply, movement, demand, and price, he is at a disadvantage. If the seller — the farmer or his agent — does not know the prices in the big markets; if he does not have reliable information regarding supplies, movement, demand and weather conditions in the markets and other shipping districts competing with him he is at a disadvantage. When these conditions prevail, suspicion arises, confidence is destroyed, and unfair practices are indulged in by the unscrupulous.

The circulation and dissemination of market information will not correct all these things, but it will go far toward allaying suspicion, establishing confidence, and in bringing about a better basis for common understanding. Its educational advantages to the farmer in particular are obvious. It demonstrates to him that he must know his markets; that he must be able to sell as well as to produce.

A market report must be more than a report of prices. It must describe weather conditions for the weather is an important factor in marketing fruits and vegetables. It must show supplies moving to market, supported by production data. It must indicate the trend of demand and movement. It should describe the products sold or shipped according to definite grade and container so that a common language will be used by both buyer and seller. It is difficult to report market conditions when the products are not standardized as to grade and container. Comprehensive market reporting has given an impetus to standardization work. There is now an unprecedented interest in standardization activities by State and Federal agencies.

The methods followed in collecting, compiling and disseminating this information are too detailed to be described here. Sufficient to say that earnest efforts are made to make the service of the greatest practical benefit.

Important reports on certain fruit crops showing condition during growing seasons, the prospective production, and later the

total production, are made available periodically by the Department. Perishables are so susceptible to the weather that these reports of conditions often show decided change in crop prospects from week to week and are awaited with much interest by the trade. Special reports on the commercial fruit crops were rendered for several years prior to 1920 but are temporarily suspended for lack of funds.

Through our foreign information service we are able to keep in touch to a considerable extent with export conditions as they relate to fruits as well as other commodities. Press material and Department circulars have been issued intended to carry to the public the results of some of our studies regarding foreign outlets for fruits.

As a result of the crop and news service work in the Department, many valuable statistics have been gathered day by day, week by week, month by month, and year by year. Many of these statistics have recently been compiled, tabulated and averaged and made available through a Department bulletin entitled *Market Statistics*.

Cost. — Cost and accounting studies under way in the Department have included fruits. Cost of production studies have included apples in New York and in the West and citrus fruits in Florida. Accounting systems for fruit associations have been worked out and are now in process of revision after being tried out under actual conditions. Accounting records for sampling apples by weight have been worked out for the packing houses of the Northwest that needed the system.

Handling, Transportation and Storage. — Much progress has been made in the prevention of waste in the handling, transportation and storage of fruits and vegetables. All the effort and expense that go into the production of a fruit crop for market may be largely wasted unless it can be transported to the market in sound, edible condition. The investigations of the factors influencing the keeping qualities of fruits and vegetables in transit and storage have pointed out why careful handling and refrigeration in transit reduce the losses from deterioration and decay of these products during their transportation and distribution in the markets. Careful studies of the precooling of fruits and vegetables have led to the installation of many precooling plants in producing districts which have contributed to the elimi-

nation of waste in transportation. During the last five years extensive investigations have been made by the Department to determine the factors influencing the efficiency of refrigerator cars. Very definite improvements in the type of this equipment have been worked out with the cooperation of the fruit growers, shipper and the carriers. Many of these improved cars are being built by the railroads of this country to replace old and obsolete equipment. The refrigerator cars of this type are capable of transporting fresh fruits and vegetables to distant markets with a minimum of loss from spoilage and deterioration in transit. Better methods of applying refrigeration and ventilation for the safe and economical transportation of these products are being studied and improved methods worked out and widely demonstrated.

The causes of poor keeping quality of fruits and vegetables in storage are being studied and many of the destructive diseases and other troubles affecting these products in storage are being brought under control through proper methods of handling, and by determining the most favorable temperature, humidity and air conditions which effect the storage life of perishable products. The Department is called upon to assist fruit growers and shippers in the building of efficient storage houses, based on the findings of its investigations. Assistance has been given in the building of several thousand storage houses for apples, pears, sweet potatoes, Irish potatoes and other fruits and vegetables.

Market Inspection of Perishable Products.— Inspection of perishables at the market is sought by the shipper that he may know the condition of the goods if they arrive unsold. It is sought by the city buyer or receiver when he feels that the goods received are for any reason less valuable than he had a right to expect.

Market inspection is not sanitary inspection, nor quarantine inspection nor regulatory inspection. Market inspection is a service rendered to aid in merchandizing the goods inspected.

If this service is to be of real value it must be technically efficient and thoroughly impartial. Public sentiment in America will credit none but an official agency with a combination of these qualities. Therefore, Congress authorizes the Department of Agriculture to sell the services of men trained for this purpose.

in the principal terminal markets of the country. With the service thus instituted private enterprise has made no effort to compete.

Inspection under the Food Products Inspection Law, first effective in 1917, may involve any fact, condition, or quality which affects value. It may be invoked by any party interested in or having custody of the products. It is forced upon no one. A fee is charged which approximately covers the cost of the service and a certificate is issued setting forth in detail all the facts discovered which affect the value of the goods. Congress has made this certificate prima facie evidence in all United States courts as to the true grade, quality or condition of the products when inspected. As a result the certificate is usually made the basis of settlement out of court.

Market inspection may be desired to determine grade, quantity, quality or condition, or two or more of them. Larger and larger volumes of fruits and vegetables are offered or contracted for on the basis of grade. When deliveries are made the receiver, if the market is declining, is anxious to secure a concession from the contract price and will often challenge the grade of the goods on the slightest pretext. The boxed apple crop of the Northwest and a large part of the potato crop are sold on grade. The volume of these products is enormous and the number of honest controversies over the question in grade is large.

The question of quantity may be raised on account of breakage, slack or improperly filled packages, excessive shrinkage caused by evaporation or decay, or caused by pilfering en route to market.

Inspections for quality usually involve grade but are often requested on products for which no grades are established. The controversy or complaint may involve maturity, color, freshness, flavor, odor, texture, freezing or any factor which by injuring the character of the product tends to reduce its market value.

Inspection for condition is likely to be asked when perishables arrive with many packages broken and the contents of the car disarranged and injured by rough handling on the road. Improper loading and the use of frail containers are frequent reasons for arrivals in bad mechanical condition. General deterioration, however, may result from deficient refrigeration,

improper ventilation, delays in transit, freezing, general disease infection and many other causes.

The economic value of the inspection service is seen in the fact that it expedites and renders safe transactions based upon standard grades and also provides expeditious machinery for the impartial determination of the facts upon which prompt settlement can be based in cases where the goods delivered are not exactly what the purchaser had a right to expect. In many cases also fault may lie with the common carrier, and many of the railroad companies are making the inspection reports the basis of judgment in cases where loss and damage claims are filed by the shippers of perishables.

The Office of Fruit-Disease Investigations in the Bureau of Plant Industry cooperates closely with the Bureau of Markets and Crop Estimates in this inspection service, by identifying the fruit diseases on the market, investigating the cause and spoilage of fruits on the market and giving advice and instruction to the inspectors on matters, pertaining to fruit pathology. Other important lines of work conducted by that office are probably already known to you, as it has continued for years the investigations relating to the diseases of fruits and fruit trees, including citrus and subtropical fruit diseases, the diseases of cultivated nuts and the grape, cranberry, and small-fruit diseases.

In the fruit utilization investigations of the Department, better methods are being developed for the canning, preserving and dehydration of fruits that products which would otherwise be wasted may be utilized for food purposes. The discovery of new and promising fruits, the improvement of varieties by selection and breeding and the introduction and propagation of the most valuable fruits of other lands, has been an interesting and highly productive work of the Department.

In fact, much more has been attempted and accomplished in the study of production problems than in the equally important field of distribution and marketing. As you are aware, scientific study of marketing may be said to have had its beginning in 1900 when the U. S. Industrial Commission called attention to the need for intelligent analysis of the marketing problem. Even with this impetus to study, scientific investigations in this field were slow to develop even among agricultural research workers

until the Federal Government took action in 1913, resulting in the organization of the Bureau of Markets.

Economic conditions today, however, force the Nation to an acute consciousness of the necessity for pushing such work with vigor and determination. We have been laying the foundations for safe building; we must press on with practical and constructive work, accompanied by close study of economic forces and of changing economic conditions.

DR. L. H. BAILEY: I am sure you will all agree that this is a very valuable paper, setting forth as it does this particular work of the United States Department of Agriculture. This subject takes on a particular interest just now in view of certain statements in the address by President Harding before Congress yesterday. He said he was shocked to learn — as it is shocking to all of us — that it is more profitable to raise nine billion bales of cotton than to raise thirteen billion bales (my denominations may not be exact); that it is more profitable to raise seven hundred million bushels of wheat than to raise one billion bushels; and yet there are persons everywhere greatly in need of fabrics and also in need of bread. He brings out the fact very strongly that there are great deficiencies in our distributing and marketing systems whereby these goods must be sold. But to me the significance of these statements has another very important bearing — it constantly suggests to a man that three-fourths of his production is at the expense of four-fourths of his effort.

It is important that every man and every woman in a republic put forth the best effort of which they are capable. It is the only way whereby we can become the best type of citizen, and certainly there must be something radically wrong in any situation that does not give to a man the proper reward for the expenditure of all his efforts. Every statement, therefore, that has any bearing upon this general question of marketing and distribution and selling is of great importance to us, not only as fruit-growers and those interested in getting a return on our investment, but also to bring to us as citizens that we must develop that type of effort that will allow a person to put forth the best effort of which he is capable and receive a return for the whole of it.

Is there any further discussion of this paper?

F. P. DOWNING (South Bend, Indiana): I am particularly interested in this paper by Doctor Taylor, probably because I was formerly associated with that Department. While we are in the employ of the Department we cannot have anything to say, but now that I am out I want to say just a word to the fruit growers here.

The work of the Bureau of Markets is something in which you as individuals and through your Society should be very much interested. This paper has very briefly told the various lines of activity of the Bureau of Markets—the work in reference to the marketing of surplus, the work in reference to the standardization of fruits and vegetables, and that referring to the inspection of fruits and vegetables. These three lines of activity should receive the undivided support of every fruit grower. It is absolutely to your interest to read these market reports yourself and to make use of this inspection service, because by it you can receive protection in the large markets of the country. There are of course certain interests that are opposed to inspection, and they are lobbying against this work. When the Committee on Agriculture holds its meetings there are very few fruit growers there to take a stand for the things they want—but the other fellows are there.

Let us hope that this Limitations Conference now meeting in Washington will be successful, and that when they accomplish their purpose we may get at least a portion of that money saved for the development of these activities that are being carried on by the Department of Agriculture—things that are worth while.

Gentlemen, I think there is one place where this Society, through its efforts in a national way, and through good legislation, can do a decidedly good work. That is one place where by organizing you can get together and send someone down there, or even through your own State Associations, you can voice your desires in this matter. It seems to me that this matter should receive careful consideration.

THE PRESIDENT: There is one phase of this question brought out by the last speaker that seems to me very significant—that if we are to save vast sums in the expenditure for armaments, not all that money should be saved ultimately to the tax-

payer, but should be put into constructive lines of effort. When you come to consider what a small proportion of public expenditure really does represent constructive effort, it is almost alarming, and if we can deflect a good part of the expenditure for armament into constructive channels it will make vastly for the happiness and health of the country.

Is there anything further to be said on this paper? The time has about come to adjourn. There is no regular program for this evening, but tomorrow evening there will be a program in the form of a get-together supper. Full arrangements for this have not been made, but they will be announced. I hope you are all planning to be free tomorrow evening so that we may get together in an informal social way.

This evening at seven-thirty I should like to have a meeting of the Executive Committee at the Hotel Secor. This Committee is not desirous of holding secret sessions, and if any persons connected with the Society desire to drop in and take part in any of the discussions of plans and policies which may be there suggested, we should be very glad to have them come. Bear in mind that you are welcome to come if you desire to do so, for the Executive Committee is your committee.

I hope you will be here promptly tomorrow morning when we will discuss the situation and the policies which obtain in the different parts of the country. This meeting is not large — although I can say frankly that it is larger than I at first expected. But I am particularly impressed with the number of young persons in the room. There was a time — many of the older members will remember it — fifteen or twenty years ago, when at the farmers' meetings you saw only graybeards; the young men were not going into the agricultural enterprises to any extent. Now in the meetings of stock growers, farmers, fruit growers, you see the young men coming forward. It augurs well for the future. The larger number of persons before me are young men, and as one of the older men I wish to say that we are especially pleased to have them, and we hope they will not feel that because some of us are older in years, they are therefore debarred from getting on their feet and saying what they think. I remember when as a lad I met with the American Pomological Society and had the privilege of the floor. I trust it will seem the same honor to these young men that it did to me. It is a great

privilege to inherit the traditions of the old Society, to know something of the men who have been at its head — Wilder, Berckman, Hale, Watrous, Goodman, Hutt — I have known them all — and the continuing welfare of the Society will depend upon these young people who will carry forward these traditions. I think I am the only one in the room who participated in these old traditions. I am sorry for it, but glad I had the privilege.

Before we adjourn I wish to say that we should have a Nominating Committee. Other committees will be appointed tomorrow, but I think the Nominating Committee should be appointed today. The election will not take place until the close of the program, but this committee should be at work.

H. P. GOULD: I move that a Nominating Committee of three be named by the Chair.

(Motion seconded and carried).

THE PRESIDENT: I will name on that committee: Clark Allis, New York; W. C. Reed, Indiana; M. B. Davis, Ontario.

We will now stand adjourned until nine o'clock tomorrow morning.

TRIP TO PLANT OF THE TOLEDO REX SPRAY CO.

The fruit growers attending the meeting were especially interested in the privilege extended for a trip to and through the plant of The Toledo Rex Spray Company.

First they were shown through the plant where they were producing Spraydried Lime-Sulphur Powder and which was a very interesting experience. In this Plant, the full strength solution is sprayed into a closed, heated room, the temperature in that room being maintained at uniform heat, the solution being sprayed in at different points near the top of the room, and by the time that fine mist gets down to the bottom, the moisture has all been taken away from it and the powdered material falls into hoppers in the bottom of which there is a conveyor which carries it directly to the packages without further exposure to air.

After being shown all through that plant they were taken through the Lime-Sulphur Solution plant, then all through the Arsenate of Lead Plant, and finally into the Laboratory, which is located on the second floor of the Arsenate of Lead Plant, and

there the fruit growers listened to a very interesting address by Dr. O. F. Hedenburg of the Mellon Institute of Industrial Research, Pittsburgh, Pa.

His talk was on the subject: "Importance of Quality," is summarized as follows:

Argentine Republic recently bought 85 locomotives for \$6,500,000.00 from a United States concern disregarding a 25% lower price by a German concern. Butter and apples, of high quality, are more desirable, demand a higher price, and find a ready market. Pure bred stock in being developed more each year because of the quality. Desirable features in anything mean higher quality.

High quality in Lead Arsenate has been sought for by many manufacturers and others. The REX Spray Companies founded a Research Bureau, five years ago at the Mellon Institute of Industrial Research, Pittsburgh, Pa., to develop new products for them and to improve all products to a high degree of quality.

Apart from total and soluble Arsenic in Lead Arsenate, covering power and adhesion, are qualities that are highly desirable. Ordinary Lead Arsenate does not cover nor adhere so well as desired.

A product has been developed for the REX people, at the Mellon Institute, which has all the desirable features required for spraying and this product is now being used in all parts of the United States and Canada. It is prepared by combining with the Dry Powdered Lead Arsenate a small quantity of a special colloid which gives the Lead Arsenate improved covering, spreading and adhesive qualities. This colloid is not an impurity but a component part of an improved product. Carbon, vanadium, chromium and molybdenum are not impurities in the steels to which they impart new qualities but are necessary components to produce a desired result. Starch in baking powder is not an impurity but a necessary component. This colloid improves the suspension of the Lead Arsenate in water by causing the aggregations of particles to be deflocculated into separate particles. As a result, the Lead Arsenate is given greater covering, spreading and adhesive properties. The surface of foliage will be covered with a more uniform covering of single minute particles instead of a deposit of aggregations of particles with uncovered spaces between the aggregations. The colloid causes

the particles of Lead Arsenate to adhere to a surface so that they are not washed off by flowing water. When the deposit of Lead Arsenate is dried on foliage and fruit it remains there after heavy rains have fallen. Ordinary Lead Arsenate would not remain under these conditions. Whereas, ordinary Lead Arsenate when combined with Lime-sulphur for summer spray is blackened and coagulated, the Lead Arsenate in this product containing this special colloid is not coagulated by Lime-Sulphur, but remains finely divided and is colored only a light grayish brown. The Lead Arsenate in this product will, therefore, also have improved covering power when used with Lime-Sulphur.

Many spraying experiments have proved the superiority of this product when compared with ordinary Lead Arsenate. Official tests made under direct supervision of State Experiment Station men during the past year have shown that this product gave a considerable percentage more of sound fruit. In Illinois, an experiment was carried on, without the REX people knowing anything about it, and in their experimental orchard at Plainview, results as taken from the printed annual report of the Illinois Horticultural Society, (1920, Page 174), show as follows:

	<i>NuREXform</i>	<i>Standard Arsenate of Lead</i>
Number of apples.....	624	687
Number sound	81%	70%
Codling Moth	3%	6%
Stings	3%	8%
Curculio	4%	6%
Scab	10%	15%
Other diseases	1%	1%

This table shows that NuREXform gave 11% better control than the old form Arsenates of Lead.

Fruit growers in order to protect and advance their own best interests from a dollar and cent or profit-paying standpoint must hereafter give more consideration to quality and less consideration to a little difference in price. For instance, the test above referred to shows 11% better control from using the improved quality product.

Figuring apples at \$1.00 per bushel, the matter figures out as follows:

1% better control makes the improved product worth 30c more per pound to the user.

2% better control makes the improved product worth 60c more per pound to the user.

3% better control makes the improved product worth 90c more per pound to the user.

10% better control makes the improved product worth \$3.00 more per pound to the user.

THURSDAY MORNING SESSION

The Thursday morning session was called to order at nine forty-five by the President, Dr. L. H. Bailey.

THE PRESIDENT: This morning is to be devoted, as you will see, to regional reports on conditions and outlook — etc. Not all of these persons are here, but their reports are in the hands of the Secretary, and we have enough for a full session this morning.

I will call first for the report of Mr. H. P. Gould, of the United States Department of Agriculture.

AN ANALYSIS OF SOME OF THE CENSUS FIGURES ON FRUIT TREES

H. P. GOULD,
U. S. D. A.

For the past week or ten days I have been spending considerable time trying to find out something about what the census figures on fruits really mean. While census figures are not of themselves untrue, one can prove almost anything by them if he only goes at it in the right way. There are certain outstanding facts which I think may not be without interest to those of you who have not been following the census summaries as they have come out from time to time.

There are some surprises — to me at least — as well as some things which on their face, if taken as they stand, are decidedly striking. One of these striking things, taken as a bare statement, is that, as of January 1, 1920, there were in round numbers 65,670,000 fewer apple trees in the United States than ten years before. Now a loss of sixty-five million apple trees and more, in ten years is no small thing! That loss is divided between bearing and non-bearing trees approximately as follows: 36,000,000 bearing trees, and 29,620,000 non-bearing trees. The census of 1910 showed 65,790,000 trees of non-bearing age, while

the census of 1920 shows only about 36,000,000 trees not of bearing age. Bearing and non-bearing trees taken together were in 1910: 217,000,000; in 1920, 151,000,000.

Referring to bearing trees, there are eighteen states which show an increase in the number of trees as compared with 1910. These instances range in number from 8,000 in Arizona and 14,000 in North Dakota, to almost 5,000,000 in Washington. Other States show, of course, some heavy losses. I was interested in trying to discover where these gains and losses were, because after all, the gains and losses are relative in importance, those in some States making very little difference. For instance, losses in such States as Florida and Louisiana, Nevada and Wyoming, and some others, would have no real significance so far as the apple industry is concerned, and I think I can show you that even large losses in certain apple-producing States do not have the commercial significance that the bare statement of the fact might suggest.

So far as gains are concerned, in trees of non-bearing age, I was interested to notice that there has been slight increases in all of the New England States except Maine, and in Massachusetts the gain was something like four millions. In Maine there was a loss of a half million trees, but that still leaves more than a half million not of bearing age in that State. There are gains also in non-bearing trees in New Jersey, Pennsylvania, Delaware and Maryland, as compared with 1910.

Then there have been quite appreciable losses in non-bearing trees, as compared with 1910, in Illinois, Idaho, Montana, Oregon, Washington, Texas, and some other States. Now let us see what these losses mean. For instance, in Texas, which is not a heavy apple-producing State, there were in 1910, 1,100,000 apple trees not of bearing age. In 1920, that number was reduced to 236,000. Montana in 1910 had 1,300,000; in 1920 that number was reduced to 69,000. The census figures do not tell all of the story by a long ways as to what has happened in that state. It was during the census decade that the great promotion development in the planting of apple trees occurred in western Montana. It reached its peak and was well started on its decline within this period. The decline is suggested by the relatively small number of non-bearing trees in 1910 but the maximum

number was undoubtedly much greater about 1913 or 1914 than is suggested even by the large number reported in 1910.

In Oregon, in 1910, there were 2,240,000 trees not of bearing age; in 1920, a half million. You will notice there have been some very decided reductions in some of these apple-producing States. In that number would be Washington, Oregon, Arkansas, Iowa and Illinois. Of course the trees reported as of non-bearing age in 1910 were included in the number bearing in 1920. That the number of non-bearing age should be appreciably smaller in 1920 as compared with 1910 is but natural; it reflects the influence of World War conditions, high prices, scarcity of labor, etc.

I will run over hastily a part of the figures in some of the important apple producing States, because even there heavy losses in the important commercial producing sections may not mean, from a commercial standpoint, just what the bare figures might suggest: In Arkansas, in 1920, there were 3,575,000 fewer trees of bearing age than ten years before. About 2,970,000, or all except some 600,000 of this number (3,575,000) were in Benton and Washington counties. These are the two largest apple producing counties in Arkansas. But even such losses as these do not necessarily mean very much in terms of actual apple production. In both Arkansas and Missouri the census figures, as in the case of Montana, do not tell all the story by a long ways. What was going on between the years in which the census figures were compiled, is not shown. This is true especially of the Ozark region. The crest of the wave of extensive planting was reached early in the census decade. Everybody, nearly planted an orchard. Many without previous experience planted 40, 60 or perhaps 120 acres to apples. Under such circumstances, fatal mistakes in the selection of sites, in the care of the trees and in other ways, was inevitable and failure was certain from the beginning. As a result of these conditions, hundreds of acres, once in trees, were never included in a census enumerator's record of trees in bearing, because they were planted and in turn dug up before the enumerator got around in his decennial visits. But thousands of the trees included in the decreases shown in the census figures represented trees planted on impossible sites or which for other reasons never possessed any potential value in terms of commercial production. In other

words, the decrease shown does not necessarily represent any decrease in the actual apple producing capacity of the States. This applies elsewhere as well as it does in the Ozark region.

In California there was a gain in the number of bearing trees during the decade in question of 645,000, not a great number for so large a State, but yet these figures have quite a lot of significance, because they include, among other things, the development of at least one new and rather promising apple area — the Yucaipa district in San Bernardino county. There was a gain in Sonoma county of 270,000, in San Bernardino county of 208,000, and in Riverside county of 97,000 trees.

In Colorado the gain is 89,000 in bearing trees, but in non-bearing trees, a loss of nearly 1,800,000 trees, compared with the number in 1910. Relatively speaking, the gain in bearing trees in Colorado is small, but on referring to the report of the census by counties some rather striking facts appear. In the three most important apple-producing counties of the state there were increases as follows: In Fremont County, 65,000; in Delta County, 117,000, and in Mesa County, 130,000, — a total of 312,000 trees for these counties. Note that for the state the net increase was only 89,000. There were appreciable gains in the three most important apple-producing counties, but there were evidently losses in the relatively small apple-producing counties which largely offset these gains. It may be questioned whether these losses affect the commercial crop in any appreciable degree.

In Delaware there is a gain of 386,000 in bearing trees and that gain means relatively quite a lot, the increase being from 430,000 in 1910 to 816,000 in 1920. By counties, 289,000 in Kent; 91,000 in Sussex; 5,000 in New Castle, all in round numbers.

In Idaho the gain in bearing trees was 1,375,000 trees. I was surprised at this. In some sections of Idaho where the early plantings represented promotion developments, the orchards have ceased to be, and the land has been planted to potatoes, alfalfa and other crops. These figures (1,375,000) show a gain in actual numbers from 1,005,000 in 1910, to 2,380,000 in 1920. It is not possible to make a comparison by counties in Idaho, because during the last ten years the county lines have been much changed and a number of new counties have been created. The

gains, however, are mostly in the Fayette and Snake River Valleys.

In Illinois we have to talk about losses, because that State shows in the decade, not gains, but losses of 4,800,000 trees of bearing age, and some of this heavy loss has occurred in some of the heavy apple-producing counties. Just what that means in potential production I do not know, but there are many counties in the State which show losses of from 50,000 to 75,000 trees.

I might digress here to say that a loss of 75,000 or 100,000 or even 200,000 bearing trees in a county does not necessarily mean that there is a loss in commercial production, as I had occasion to realize a number of years ago when I was sent into a county in northeast Indiana. I knew nothing about the county, but looking at the census figures it seemed as though there ought to be quite a lot of apple-growing there. If I remember correctly about 150,000 trees of bearing age were reported by the last census then made, but when I got into the county and tried to find the orchards and the people who operated them, not a commercial planting could be located. The number of trees reported was made up of small home orchards that were without commercial significance.

In Kansas the loss is 5,400,000, or a reduction from 6,900,000 in 1910 to 1,500,000 in 1920. I have no county figures at this time for Kansas, but I think that must mean some heavy losses in the commercial counties as well as in some that do not figure very much in the commercial estimates.

In Maryland there was a gain of 363,000, the gains being mostly in the Blue Ridge region and in the western part of the State. The largest county gain (161,000) was by Washington County.

In New Jersey the gain was 96,000. The situation there is not unlike Colorado with reference to the meaning of the figures. Burlington County has lost 94,000, while the net gain for the State is only 96,000. Burlington County has also 228,000 trees not of bearing age. Gloucester County has a gain of 41,000 trees of bearing age. This means of course heavy losses in other counties.

Missouri, so far as census figures go, shows by far the heaviest loss in trees of bearing age — something over 9,000,000 trees, the reduction being from 14,397,000 in 1910 to 5,160,000 in

1920. I have no county figures — at least I did not undertake to work out the county comparisons; but these losses occur quite largely in the Ozark region, and as I said in the beginning, the census figures do not tell all the story, because I have no doubt there was a considerably larger number of trees of bearing age subsequent to 1910 when the Thirteenth Census was compiled than was shown in that year. In other words, I do not think the 14,397,000 trees reported in 1910 represents the largest number of bearing trees that there were in Missouri at one time. During the last decade many orchards have been taken out in the Ozark region. They were planted during the boom period when farmers without any experience in orcharding frequently wanted at least 160 acres in apples. Many of these orchards were planted without regard to suitability of location or ability of the grower and the result in the final day of reckoning has been what these figures show. That, substantially, is the situation. I suspect the 5,000,000 trees of bearing age now in Missouri are worth more from the standpoint of production than the 14,000,000 of 1910.

I was interested to see what the crop estimates for Missouri showed in view of this production. Beginning with 1910, the estimated total (not restricted to the commercial) crop for each year in hundreds of thousands of barrels, using the first two figures only, was as follows: 1910, 25; 1911, 38; 1912, 64; 1913, 26; 1914, 41; 1915, 62; 1916, 27; 1917, 26; 1918, 14; 1919, 19; 1920, 16. These figures suggest a decrease in production, but the estimates are for the total or farm crop. They do not indicate how the commercial crop—that part of the total actually marketed—has been affected.

In 1921, Missouri was one of the States that was in the path of the spring freeze, and the estimated crop was only about 10 per cent of that for 1920.

New York shows some interesting figures. The reduction was 1,600,000 bearing trees—quite a sizable loss—yet some of the counties show an increase. Columbia County, the most important Hudson River county, shows a gain of 55,000 trees; Ulster County, a gain of 30,000; Orleans County, 107,000, and Wayne County, 107,000. These same counties have trees not of bearing age—Columbia, 199,000; Ulster, 203,000; Orleans, 205,000, and Wayne, 374,000. Of some of the relatively less impor

tant counties, Erie shows a loss of 133,000 bearing trees; Genesee, 60,000 and Oswego, 60,000. The State shows a total loss of 1,600,000 trees of bearing age, while four important apple-producing counties show a gain compared with 1910 of 299,000. These figures, in spite of the losses, make it look as though New York State was in pretty good shape—still on the map.

Running over the apple crop estimates in New York, these figures may not be without interest. Using the first two figures, or three as the case may be, as I did for Missouri, the crop in 1910 would be represented by 56; (5,600,000 barrels); 1911, 130; 1912, 146; 1913, 65; 1914, 165; 1915, 85; 1916, 126; 1917, 33; 1918, 136; 1919, 56; 1920, 157; 1921, 47.

These figures would make it look as if apple production in New York, even with the losses, has been maintained on a pretty good basis.

I think this sort of thing grows rather monotonous, and the only thing I hope to accomplish is to show that figures in many cases, whether indicating gain or loss, need interpretation on the basis of known facts in order not to be misleading.

I have here the estimated commercial apple crop since 1916. You may be interested to run over these figures with me in the same way we did for New York and Missouri. Using "millions" of barrels as the unit, the commercial crop for 1916 would be represented by 25; for 1917, by 22; 1918, by 24; 1919, by 26; 1920, by 37; and 1921, by 19. The average for these six years is nearly 26,000,000 barrels.

There is another thing I want to mention in this connection. Not infrequently we get crop comparisons, in the press and elsewhere, of different years. Such comparisons are likely to be misleading, unless the crop conditions in those years are known. For instance, suppose the year 1922 was the census year instead of 1920, and the census enumerators used the crop of the preceding year, which would be for 1921. What sort of a showing would the apple crop figures suggest if interpreted without respect to crop conditions for such states as Virginia, West Virginia, Missouri, Kansas, and so on for fifteen States in which the apple crop for that year was nearly wiped out by spring frosts and freezes? If the crop for 1921 in these States went into the

census figures there would be some pretty sad comparisons between that year and the one preceding. It would look as if they had gone out of the apple business! And yet that sort of interpretation of census figures and crop estimates is going on in some quarters all the time—facts so far as figures are concerned; but mere figures, even though they tell the truth, can be made very misleading.

I will not say more about apples, but will pass quickly over peaches. Substantially the same thing is presented in the peach data that appears in apple figures. One of my office associates commented to me a while ago to the effect that it had been shown by Government figures that in the course of twenty-five or thirty years peach growing in the United States would cease. I wondered for a moment what there was back of such a report. It happened, however, that just before this a summary of the census figures on the peach had been released for publication. I looked them up and sure enough, some interpretation as that just indicated might be possible. For instance, in 1910 there were in the United States 94,500,000 bearing peach trees. In 1920 there were 65,600,000, a reduction of nearly 29,000,000 trees. On that basis, a continued reduction at the same rate, during the next 25 years, would, for a fact, leave but a very small showing in the way of commercial peach growing in the United States. Such is the misuse of figures! In this case no account had been taken of the number of trees not of bearing age, nor of the fact that during the decade between the two Census reports the world had been turned up-side-down by war, and that the planting of peach trees had not gone on "as usual."

In non-bearing peach trees there was a decrease of nearly 21,000,000 trees as compared with 1910 (1910, 42,266,000; 1920, 21,623,000). The total decrease in both bearing and non-bearing trees for the same period was about 49,000,000.

But here again one gets into difficulties if one compares merely figures, since in spite of the loss of nearly 29,000,000 bearing trees between the two census years, the peach crop figures for 1919 show an increase of 16,000,000 bushels over the corresponding census figures of ten years previous. The gains and losses are significant—the States in which they occur—the same as with apples. Take, for instance, the gains in the number of bearing trees. I was quite a good deal surprised when I found

that all over the New England States there has been gains in the number of peach trees of bearing age. Maine has gained 564, Massachusetts, 190,000. The production of peaches in New England is of course a minor factor except in Connecticut and Massachusetts, and in Massachusetts the fruit is mostly marketed locally. There are sixteen States which show a gain in the number of bearing peach trees: These include New Jersey, Pennsylvania, West Virginia, Washington, Oregon, and California. The others I am not stopping to mention.

The States in which the heavy losses have occurred in bearing peach trees are significant, as I have already said. I did not have time to consider these figures from the county basis, but simply collected them from the State basis, and as I run over them it will come to your mind at once whether the State is a large or small peach producer.

In Indiana the decrease as compared with 1910 was 1,270,000; Illinois, 1,800,000; Iowa, 960,000; Missouri, 4,230,000; Nebraska, 1,093,000; Kansas, 3,550,000; Delaware, 700,000; Maryland, 500,000; Georgia, 2,000,000; Tennessee, 800,000; Alabama, 1,600,000; Mississippi, 870,000; Arkansas, 3,500,000; Oklahoma, 1,900,000; Texas, 5,200,000, and several others with smaller interests.

So you will see that some of these heavy losses have occurred in what we have come to think of as important commercial peach producing States, but judging from the yields it would look as if the production had been maintained on a pretty good parallel.

The gains in trees of bearing age were made in four States, compared with 1910: Illinois, 100,000; Virginia, 3,000; North Carolina, 233,000; Georgia, 1,800,000.

To suggest to you how the crops have run, let me go over the crop estimates very briefly. These figures are given in millions of bushels using the first two figures. 1919, 35; 1910, 48; 1911, 34; 1912, 52; 1913, 39; 1914, 54; 1915, 64; 1916, 37; 1917, 48; 1918, 34; 1919, 50; 1920, 43; 1921, 33. A five years' average, 1915-19, is 46,608,000 bushels.

Just a passing mention should be made of citrus fruits to show the trend of things. Because of the restricted distribution, geographically, of citrus fruit growing and from the nature of

the case, the statistics are pretty definitely commercial in their bearing. Of course only a few states are concerned with citrus fruit growing.

In California there were, in 1920, in round numbers 2,600,000 orange trees not of bearing age; over 10,000,000 in bearing. In 1910 there were 6,600,000 orange trees of bearing age. Lemons, — number of trees in 1920 not in bearing, 780,000; in bearing, 2,880,000. In 1910, there were 940,000 trees in bearing.

In Florida, orange trees in 1920 not of bearing age, 2,300,000; in 1920, in bearing, 3,600,000; in 1910, in bearing, 2,766,000. Grapefruit in 1920 not bearing, 960,000; in bearing 1,680,000. In 1910, in bearing 656,000 trees.

In Alabama, oranges principally of the Satsuma group, 1920, not in bearing, 165,000; in bearing, 260,000. In 1910 there were only 2,600 orange trees in bearing in this state.

In Texas, mostly in the Lower Rio Grande Valley, there has been considerable planting of oranges and grapefruit during the past few years. During the past decade also, in the Gulf Coast region, great numbers of orange trees of the Satsuma varieties have been destroyed. It is therefore, rather difficult to tell just what statistical reports actually signify.

The figures for Arizona are not available at this time.

One might go on studying census figures almost to the end of time, making minute comparisons, but in order to really know just what the differences mean in the net total one has to know pretty nearly what the local conditions are. In other words, fruit statistics, taken by themselves, do not always mean just what they appear to mean, any more than do averages. I heard the other day of a man who tried to shoot a rabbit with a double-barreled shotgun. The first time he fired he shot a foot too far to one side; the next time he shot a foot too far to the other side. Now, according to the law of averages, the rabbit ought to have been dead, — but he wasn't. So figures when averaged and adjusted without due regard to what *is*, are likely to show, what in fact *is not*.

THE PRESIDENT: You have heard these very interesting figures. I have come to feel that I will not read reports of census figures unless I see the name of the person who makes

the report. One must understand crop conditions, and all that. Census figures are exceedingly valuable when interpreted by persons who understand what they mean; otherwise, they are not. Are there any suggestions in connection with these figures?

There are some exhibits that need to be gone over with reference to the Wilder medals for this year, and there should be a committee appointed for that purpose. I shall appoint on that committee Professors Taft of Michigan, and Gourley of Ohio.

The Nominating Committee named yesterday had for its Chairman Mr. Clark Allis of New York. Mr. Allis was obliged to leave last night, and we must appoint someone else in his place. I will appoint Professor F. H. Beach of Ohio. The committee will now be, W. C. Reed, Chairman; M. B. Davis of Ontario, and F. H. Beach of Ohio.

I understand Mr. Drain is here from Massachusetts and will present the report of F. C. Sears.

FRUIT CONDITIONS IN NEW ENGLAND

F. C. SEARS,
Massachusetts

As a general statement I think it would be safe to say that the condition of the fruit industry in New England is excellent.

Certainly it is excellent when one considers the fact that our country is in the midst of one of the worst financial depressions ever known; and when he adds to that the fact that the crop of 1921 in our section was one of the poorest for many years. It is surely a sign of great vitality of the industry that fruit men are as cheerful and optimistic as they are.

As to the problems which face our fruit growers, we have, of course, those which face fruit growers everywhere,—the securing of an adequate and satisfactory labor supply; the choice of a market package which shall meet the requirements of our trade; the question of the extent to which dusting ought to supersede spraying; the attempt to formulate and have passed such laws as will benefit the industry; better control of pests; better fertilizing and cultivation and marketing.

In addition to these, New England may fairly lay claim to a few problems of its own, just as most other sections probably can. Some of these are the following:

1. We suffered more than probably any other section from the severe winter of 1917-18. The authorities in Maine estimated that that state alone lost over a million bearing apple trees. Other New England states lost very heavily. What is to be done about replacing these damaged or ruined orchards? Shall we reset our orchards or shall we grow potatoes or cabbages or cows? If we do reset shall we set out Baldwins, the variety which suffered more than any other, or shall we resort to some of the cast-iron varieties like Ben Davis and Stark and McIntosh and Fameuse? McIntosh is, of course, one of our best varieties but there is a limit to the extent to which this variety can be handled by any one grower. It will be seen that this one question of winter trouble involves all the problems that most men would care to shoulder.

2. A second problem which has just come upon us within the last fortnight is the damage from the most severe ice-storm in a century. It is too early to say what the damage has been but is it certainly tremendous. It will certainly lead to more care in the formation of the heads of trees, to greater interest in bolts and braces to support trees; and it is more than probable that it will modify the popularity of varieties since some have suffered much more than others.

3. A third problem which is as yet a New England specialty is the Gypsy-Browntail-Moth menace. It fluctuates somewhat as to severity but is always a serious added handicap to our growers.

Yet with all these handicaps, general and special, our growers are most of them confident of the future of the fruit business in New England.

Turning now to some of the more recent developments in the fruit business in New England perhaps nothing is of more importance in those sections where it has come than the roadside stand or market. The conditions in many parts of New England are ideal for the development of such markets, combining a maximum of traffic by a public which is almost wholly non-producing. And we might add, largely fairly well-to-do and with a distinct preference for country buying.

Naturally these roadside markets are of every conceivable variety, from the simplest sort of stand (or even no stand at all) to fairly good sized buildings. In many cases what started as a mere stand, has gradually developed into a fair sized market and finally into a combination of market and "tea room."

Of course the great advantage of these roadside markets is the fact that the farmers get the retail price and without any expense for transportation. There is also the added advantage that there is a sale, in fact an urgent call, for the ripper and softer grades which perhaps would not stand transportation to market. This is especially important in handling fairly large crops of such fruits as peaches.

Moreover there is a sale for any and everything that is, or can be, produced on the farm,—home made sausage, bread, pastry, candies and the like; wild flowers of all kinds, guinea pigs, chickens, hickory nuts, butternuts, elderberries and rabbits; all sorts of maple products, fresh eggs, sauer kraut, vegetables and fruits of every description.

Another development which has gone hand in hand with the roadside market and yet which is only now in its infancy, is the manufacture of fruit products. Customers who bought apples asked for apple jelly and the housewife made some. People who bought a basket of fresh peaches asked for canned peaches and they were forthcoming. In some cases this making of fruit products became the principal line of endeavor and the output was so large that some of it had to be marketed in the city; but in most cases it was sold right on the spot, no matter how large the output. And the beauty of this work is that it requires such a small capital. In one case a woman with an investment of not over \$100 for equipment makes a labor income of about \$2000. In another case a woman with certainly less than \$1000 for equipment makes a labor income of close to \$10,000. Of course in neither of these cases is the building included but in both cases the home has been utilized and only slight additions made to it.

This development has been greatly stimulated by the establishment some four years ago of a Department of Horticultural Manufactures at the Agricultural College at Amherst. Prof. W. W. Chenoweth is at the head of this work and the department now numbers four men with a registration last year of about 200 students.

Another very important factor in the present situation of the fruit industry is the adoption by some of the New England states, notably Massachusetts, of a 10-year program for the development of the fruit industry. Space will not permit more than a mere mention of it here but it is a very definite and concrete plan to improve the industry along certain lines. Some of the more important of these lines are as follows—

1. Better methods of planning, equipping and growing orchards.
2. Improvement in nursery stock.
3. A better selection of varieties; fewer in number, red in color and better in quality.
4. Management of orchards to secure better color.
5. Management to reduce the percentage of low grade fruits.
6. Better equipment and more efficient management of labor.
7. Better crop reporting.
8. Better advertising and publicity.
9. Better transportation.
10. More cooperation.
11. Better storage facilities.
12. Development of fruit manufactures.
13. Standardizing grades and packages.

Just a word in closing as to the outlook for the future. A glance at the accompanying table, which gives the percentage of increase or decrease in New England of the various fruits for the past ten years, will show that while New England has not kept up in production and acreage as was expected, yet it has made a better showing than many other parts of the United States and a decidedly better one than the country as a whole. And a very encouraging feature of the situation is the fact that while the number of bearing apple trees has decreased 22%, the production has increased 14%, showing that our growers are taking much better care of their orchards.

Moreover to the man who is now in the fruit business, or who is contemplating going into it, there is certainly every assurance that the market of the future will at least equal that of

the past and probably be very much better. The bogie of over-production which has been constantly exhibited by some people in an attempt to alarm the fruit grower, ought certainly to be laid to rest for a time at least. If the trees of bearing age in the United States have decreased 23% and those not in bearing 45%, one would certainly seem to be safe in sticking to the fruit business and in enlarging somewhat his plantings.

At least that is the view of our New England growers. We are facing the future with confidence! We believe in the fruit business and in New England! And to any man who tries to discourage us and to dampen our ardor we will say, with our brothers from Missouri, "You'll have to show *me!*"

Division and State	Small Fruits		Strawberries		Rasp-berries	Black-berries
	Acres — %	Production %	Acres	Production	Production (Quarts)	Production (Quarts)
New England.....	6.15+	13.98—	24.35—	46.19—	22.84+	1.80—
Maine	21.84+	31.67—	20.49—	45.04—	81.19+	57.64+
N. H.	73.30+	24.47—	18.06+	23.24—	51.51+	19.43+
Vt.	47.98+	9.33—	0.26—	30.44—	108.75+	101.25+
Mass.	0.81+	7.33—	28.98—	42.44—	24.61+	18.19—
R. I.	12.46—	22.51—	35.71—	64.28—	44.03+	64.04—
Conn.	11.52—	30.21—	35.95—	58.90—	29.59—	55.71—

Division and State	Apples			Peaches		
	Production (bushels)	Trees of bearing age	Trees, not of bearing age	Production (bushels)	Trees of bearing age	Trees, not of bearing age
New England.....	14.86+	22.72—	1.39+	17.22+	37.19+	43.36—
Maine	32.81+	18.50—	51.99+	8.69—	11.05+	22.59—
N. H.	23.66+	41.85—	9.95+	68.05+	41.19+	34.12—
Vt.	34.22+	39.75—	15.55+	59.30—	46.92+	45.02—
Mass.	24.97+	10.86—	122.48+	132.29+	123.98+	16.46—
R. I.	57.62+	13.88+	30.82+	62.51+	55.36+	17.63—
Conn.	9.46—	13.29—	25.76+	27.78—	7.37—	60.55—

Division and State	Pears			Plums and Prunes		
	Production (bushels)	Trees of bearing age	Trees not of bearing age	Production (bushels)	Trees of bearing age	Trees not of bearing age
New England.....	16.92-	25.75-	18.71+	23.74-	18.43-	40.81-
Maine	63.32-	51.75-	45.29-	36.93+	13.88-	58.23-
N. H.	28.68-	41.59-	17.49-	11.76+	20.81-	48.62-
Vt.	50.11-	45.45-	9.81+	71.38-	40.32-	32.00-
Mass.	12.06-	21.82-	37.43+	26.17-	20.75-	30.66-
R. I.	14.39-	20.54-	47.17+	75.16-	59.39-	47.30-
Conn.	38.33+	5.63+	34.28+	73.01-	47.87-	31.43-

DR. L. H. BAILEY: I think this is an exceedingly suggestive paper, as showing the tendencies in the development of a country which is old, and which has long since gone through its formative and exploitive stage, which has passed its period of miscellaneous planting of a great number of crops for the purpose of maintaining the home family, and which has outlived the epoch of discouragement that comes with the development of a new section. And now you find in New England a well organized, thoughtful, constructive movement in agriculture, perhaps one of the best movements in the United States, wherein persons are concerned with the careful study of the whole situation and with the homogeneous development of its enterprises and of its country life, as this paper very clearly reveals.

Another suggestion from the paper is the fact that with the coming of the automobile, the motor-truck and good roads in parts of the country largely filled with a city population, the buyers are coming to the farmer, and home manufacture is again developing. Perhaps we should not look for the mill along the creek any more, but the making of fabrics of home manufacture is beginning to find itself again and the return to the country is marked. Every agitation that exposes the deficiencies of our marketing system makes persons all the more anxious to do their own marketing at the source and to get away from the city markets as far as they can. Those who have automobiles go to the country to buy; and so you will find in the more thickly settled parts these wayside markets developing, and, as this paper suggests, they are coming to be of great importance. This probably means in the

future a different conception of market statistics for the different parts of the country, and any records which are to be made as to the output of the farms, must take into consideration this question of home sales.

I wish to call for the report of the committee on the President's Address. Inasmuch as certain recommendations were made in that address which may need some discussion it seems not to be wise to hold it until tomorrow afternoon if the committee is ready to report at this time.

REPORT OF THE COMMITTEE ON PRESIDENT'S ADDRESS

This committee has been somewhat handicapped by not having actually before it the record of the precedent to guide it in its action. We lacked assurance as to just what was expected of us. We have assumed, however, that our course should result in the Society's giving positive, detailed consideration to the program presented in the President's Address. The Committee therefore comments and recommends as follows:

We commend without reservation the forward-looking program outlined by our President, and congratulate the Society on the opportunities for serving the fruit industry of America that are before it. We feel that the Address should mark a new starting point in the work of the Society, and that it will be the document to which the officers of the Society in future years will refer to determine progress.

We recommend the adoption by the Society of the President's Address and the taking of such positive steps as will best insure the accomplishment of the program. These steps should include activities along several lines.

1. A full-time paid Secretary. The Society should commit itself to this idea and should consider every possible means to attain it. We believe the Executive Committee is at present in the best position of any group in the Society to deal with this matter. Our recommendation is that the Executive Committee be especially charged with the matter of securing funds by which a full-time Secretary may be employed.

2. It is too much to ask of a Secretary who serves without pay and with active duties that require practically all his time, to do all the work that is proposed for the Secretary's office. We recommend that a committee be provided to assist the Secretary, as he might direct, in the preparation of material for the monthly or bi-monthly letter to members, and in other ways. This recommendation in part anticipates one in the latter part of the President's Address where he suggests the appointment by the Society of advisors to the Secretary on publicity, consumption, planting, marketing, co-operation, affiliation, etc. These two features—advisors and special assistants—may well be considered together.

3. Membership—regular and collegiate. At present any campaign for new members rests with the Secretary. That of itself is a heavy burden, if the work be effective. A committee of really interested members could doubtless accomplish much. The work of such a committee should be directed by the Secretary. We recommend that a committee be appointed, with the Secretary as chairman, and that this committee be in two parts, one to cover the regular, the other the collegiate membership.

4. Medals, awards, etc. Our recommendation is that a standing committee on awards be appointed and that this committee be charged with the awarding of the Wilder medal and all others that may from time to time be given by the Society; further, that this committee be charged with the canvassing of the entire situation to determine what other awards, medals, etc., ought to be given by the Society, if any, in addition to those that are now given from time to time.

5. Increase in consumption of fruits. Our President recommends the issuing of bulletins by all the experiment stations, colleges, departments of home economics, etc., in which are set forth the value of fruit in the diet. We heartily endorse such a program, but this committee would place special emphasis on the work of the home economics departments in the colleges and also on the work of home demonstration and other home extension agencies. These are the people who are reaching those who put the food on the table. We recommend especially that, whatever else be done, the Secretary's office address a special letter to these agencies asking them to stress as much as possible

the use of fruit in the home and perhaps referring them to the literature already available.

6. Cooperation and affiliation with State societies. We cannot over-emphasize the importance of our President's references to such activities. The American Pomological Society ought to be the central clearinghouse for all the State and Provincial fruit-growers' organizations, and each one should be somehow linked up with it. We recommend that every Provincial, State and county organization or society be urged to designate a member who shall be its representative in the American Pomological Society and whose annual dues shall be paid by each society or organization so represented. It is believed also that as far as our funds permit the monthly or bi-monthly letters from the Secretary's office should be sent to all horticultural society secretaries and other officers as a means of interesting them in the American Pomological Society and its work. A committee on affiliation and cooperation between the American Pomological Society and other societies might well be designated. We recommend it.

7. The desirability of establishing a regular-sized page and style of binding for the annual report needs no discussion. It is self-evident. We believe this is a matter that the Executive Committee, in consultation with those familiar with printing, binding, etc., can best handle. We recommend that the Executive Committee be charged with this duty and that it be given power to act. That is, that the action of the committee shall be the action of the Society.

8. The raising of supplementary funds. The whole work of this Society seems to hang on funds, and our financial limitations mark the limitation of the Society's activities. The committee recommends that this Society give its earnest consideration to all possible sources of securing funds. The President had made certain suggestions with several alternatives. They merit consideration and action. This committee, however, feels that this is a matter on which it should withhold at this time any particular recommendation of its own.

9. The matter of nomenclature. We feel that the importance of this matter is very inadequately appreciated. Throughout its entire life this Society has stood as the one body in America that had had a directing influence on fruit

variety names. That influence has had more or less general recognition, but it has no compelling power. Its influence in this direction has sometimes waned, and many times has been ignored. The whole question needs careful, constructive, scientific consideration. This committee recognizes the fact that nomenclature work is very definitely research work. The results are not merely matters of opinion, where one man's is as good as another's; but rather, the results are matters of fact, and the problem is to establish the fact or facts which are involved. Not every one is so situated that he can do research work in fruit nomenclature. The placing of this work where it can best be done is a matter that calls for earnest consideration. Our President has said as much in his Address. He recommends the publishing of the Code, after proper editing as a bulletin. This committee emphasizes the need of action and recommends giving the widest publicity possible to the Code, after it has received the editing our President speaks of and consideration with respect to revision along the lines suggested in the President's Address, and in any other respects that are essential to make it scientific and workable. A committee to consider these matters should be appointed with power to act. The latter feature is necessary if the recommendations of the President for the publication of the Code as a bulletin are adopted.

We have not tried to include in our recommendations for action every detail presented in the Address, but we have endeavored in this way to suggest to you what we believe should be done to put the President's program, which becomes our program if approved, into real action.

H. P. GOULD, *Chairman*,
 FREDERIC CRANFIELD,
 M. B. DAVIS.

H. P. GOULD: It may seem that in the execution of the President's recommendations we have recommended the appointment of an unduly large number of committees. We realize that if you want to kill a thing the best way to do it is to appoint a committee to handle it and then have that committee inoperative. A dead committee means dead activity. Possibly some very worthy things promulgated by this Society have died in just that

way. We believe, on the other hand, that there are enough men vitally interested in the things we wish to accomplish in this Society so that these committees may be very valuable.

Another thing, I think one of the difficulties experienced by many committees is that they have been large and scattered over the country so that it was practically impossible to have a meeting of the committee. It seemed to this committee as we talked over this feature that very much smaller committees could accomplish everything that larger committees could accomplish, and much more in most respects, because of the situation I have just mentioned.

Then, too, there is one other feature with reference to committees. There has been an effort made in the past to have the committees represent the Society regionally, and that is theoretically a most excellent and essential point because of the nationwide scope of the Society, extending into international aspects — the American Pomological Society being Canadian as well as American. It has seemed to us that certain committees, as for instance the committees to advise the Secretary and assist in some of his work; the membership committee, too, should perhaps be regional because there are regional problems to work out and the work is necessarily regional. But the committee on nomenclature does not have regional problems. The giving of a name to a variety is the same whether it is in Manitoba, Florida, or Alaska, and the committee therefore does not, it seems to us, require regional representation.

THE PRESIDENT: What will you do with the report of this committee? Do you wish to consider it as a whole, or adopt it recommendation by recommendation?

J. E. SMITH: (Muncie, Indiana) I move that we accept the report of the committee.

(Motion seconded).

DR. L. H. BAILEY: There are some questions in regard to nomenclature on which I should like to express myself briefly. Nomenclature is exceedingly important, not merely academically, not alone in the finding of a set of names which will be usable and in all ways commendable in itself, but because the time is not far distant when some action may be expected by Congress that will require a standardized set of names of fruits. For example, a bill is now before Congress which seeks to regulate the sale of

nursery stock with respect to misnaming. Whether there is any chance of this bill passing Congress or not, legislation along this line is bound to arise. Whenever such legislation shall arise, the whole question of the proper naming of varieties, whether we are considering fruits or nursery stock, becomes very important and there must be a standard practice. The Government, probably in its own interest and in self-defense, must before long begin to compile a list of standard varieties which carries with it the determination of the proper nomenclature. As many of you know, this Society once had affiliations with the United States Department of Agriculture whereby the work in nomenclature was conducted by its members, some of whom were connected with the Department, and the fruit catalog was published by the Department.

It is one thing to make a set of standard names; it is another thing to find a means of publication and of distribution. The question is whether this Society should memorialize the Secretary of Agriculture looking toward the renewal of such cooperation. Very important questions arise at once in the consideration of nomenclature, particularly in view of the fact that the American Joint Committee on Horticultural Nomenclature is putting into type its second list or report. This committee, representing nurserymen, florists, landscape gardeners, the American Pomological Society and practically all the national societies that deal with plants, is now waiting to publish something from the American Pomological Society.

I do not know that the committee has definitely passed on the two recommendations I made as to new principles to be considered.

H. P. GOULD: The committee recommended that a committee on nomenclature be appointed to consider this and other things, with power to act.

DR. L. H. BAILEY: The American Joint Committee on Horticultural Nomenclature is a going organization. It started in the nurserymen's organization for the purpose of determining a uniform practice in the naming of plants. This Society has taken action whereby it is to co-operate with the committee. It is very important, therefore, that this nomenclature question be considered at once and that this committee have power.

MR. FREDERIC. CRANFIELD (Madison, Wisconsin): It seems to me that the reason there is so little response to your request for discussion of this subject is that it is such a tremendously big subject — so many things involved. The success or failure of the work of the American Pomological Society is involved, and yet we pass it lightly off, extend our thanks to the Secretary, hope that by some means we may be able to employ a permanent secretary, and so on, and lo and behold, there is no discussion of the subject. These subjects are vital to the interests of the Society and its life in the future. Unless ways and means are found for carrying out these recommendations we might as well stop where we are.

Perhaps this is not the best time and place to discuss these things. It occurred to me while Mr. Gould was reading the report that perhaps at the informal supper this evening we may feel like taking these subjects up in detail. But we should not leave this convention without a fuller discussion of the points involved in the President's Address. I shall feel that my trip here is wholly in vain, with due respect to the other subjects on the program. I merely rise to invite fuller discussion, either now or at a later time. To my mind there is nothing else as important before the convention as the employment of a full-time Secretary and how we are to accomplish this end.

CHARLES E. GREENING (Monroe, Michigan): I feel someone should comment on the splendid, thorough, carefully worked out report that has been submitted by the committee. It is a difficult task to handle the subjects presented by the President, and I feel this report will help us a great deal in our discussion. I want to express my commendation of the work of the committee.

THE PRESIDENT: I may indicate to you what we have before us this morning. We have on our program for this afternoon Mr. Charles Brand, formerly with the Department of Agriculture, who cannot be here this afternoon. I propose therefore to call on him this forenoon. Before I do that, what do you wish to do in regard to this report which is before us? Shall you take action on the motion, or have further discussion of it tonight as to ways and means, and defer action now?

W. C. REED (Indiana): I think it would be better to discuss it tonight more thoroughly.

H. P. GOULD: We have this matter before us now, ready to speak or keep silent, as you see fit, and my fear is that if it is not settled now it will go by default — or some other road — and this motion that is before us be left hanging in the air.

PAUL THAYER (Ohio): I think the idea just expressed is the idea of all of us. I think we all agree with the suggestions of the committee, and the way to work them out it seems to me would be a fit subject for discussion now, not tonight. I therefore call for discussion.

(Vote on the motion of Mr. Smith. Carried).

THE SECRETARY: The Toledo Chamber of Commerce has arranged for a supper to be given in the Chamber of Commerce dining room on the top floor of the Nicholas Building corner Madison and Huron, tonight at six-thirty. The price is \$1.50 a plate. This will not be a banquet, but just a good supper, and I would like to have a show of hands now of those who will attend this supper.

THE PRESIDENT: Then we can discuss this subject which we have before us. I will now call on Mr. Charles Brand, whom we will be very glad to hear.

FRUIT FOR THE FUTURE

A BRIEF REVIEW OF ECONOMIC CONDITIONS AFFECTING FRUIT
MARKETING AND OF THE STATISTICAL POSITION OF
THE DECIDUOUS FRUIT INDUSTRY

CHARLES J. BRAND,

*Vice President and General Manager of American Fruit Crow-
ers, Incorporated, Pittsburgh, Pa.*

Economic conditions in the United States and in the world at large are such that we have far more than the usual interest in the future of the fruit industry. Our interest and concern most generally contemplate two phases of the problem; namely:

- 1.—The relatively immediate future, 1922 and 1923, and
- 2.—The longer pull of the census decade ending in 1929, but including as well the past year and the years immediately before us.

An intelligent consideration of the probable future involves not only a consideration of the present statistical position of the industry itself and a comparison with the past but also a study of economic events in past times under relatively similar conditions and the present trend of things commercially and industrially.

Every form of agricultural industry feels thoroughly deflated, and so it is, relatively, in greater measure than any other great industry that comes to my mind. As the editor of the *Wall Street Journal* recently put it—"not only has the water been squeezed out of farm prices but a lot of the blood." Prices of many manufactured products, particularly, are still on too high a plane compared with a five year average of pre-war prices. Retail prices of foodstuffs and particularly of fruits and vegetables are too commonly wholly out of line with wholesale prices. Within a week I have seen boxed Spitzenburgs, 96 size, selling on fruit stands at ten cents a piece or \$9.60 per box when the wholesale price was ranging between \$3.25 and \$3.75.

On the whole, fruit prices to the grower are ranging higher in comparison than live stock, grain and cotton prices. I heard the Chairman of the Congressional Joint Commission of Agricultural Inquiry, Mr. Sydney Anderson, of Minnesota, at the American Farm Bureau Federation Meeting at Atlanta give some decidedly shocking figures resulting from the Commission's investigations. The following implements are a necessity to the great bulk of our farmers; a wagon; a gang plow; a corn binder and a grain binder.

It was found that when the farmer buys these four implements paying for them in corn shipped to Chicago from Springfield, Illinois, and Oklahoma City, Oklahoma, the total freight in money is as follows:—

At Springfield, Illinois:—

1913	\$441
1920	474
1921	700

At Oklahoma City, Oklahoma:—

1913	\$484
1920	934
1921	751

Expressed in terms of corn the cost of the four implements is as follows:—

At Springfield, Illinois:—

1913	716 bushels
1920	583 bushels
1921	2,027 bushels

At Oklahoma City, Oklahoma:—

1913	932 bushels
1920	702 bushels
1921	4,191 bushels

The freight on the implements alone expressed in terms of corn was:—

To Springfield, Illinois:—

1913	71 bushels
1920	132 bushels
1921	265 bushels

To Oklahoma City, Oklahoma:—

1913	197 bushels
1920	308 bushels
1921	1,238 bushels

The freight on the corn plus the freight on the implements in 1921 was fifty percent greater than the cost of the implements. The blighting effect upon agriculture that the continuance of such a condition will produce needs no comment.

GENERAL BUSINESS CONDITIONS

While American business is enjoying a great deal of grief these days, conditions are by no means as bad in some ways as they have been, even in the relatively recent past.

Most of us find no difficulty in recalling the depression in 1900 followed by two years of recovery, and then by the com-

mercial and financial crash of 1903 and 1904. 1905 and 1906 and the first few months of 1907 represent a period of unusual prosperity which was followed by the panic of 1907 and 1908. In fact, a curve showing conditions shows with slight fluctuations a normal period to 1912, 1913 and 1914, followed first, by prostration at the outbreak of the war, with subsequent inflation, speculation, waste, extravagance, over expansion and uneconomic production that culminated in 1920, and from which we have been recovering or deflating since that time.

In a recent statement showing fifty different commodities, in which there has been a recession to practically pre-war levels, I noted that thirty-one were farm crop or farm crop derivatives. In any period of sharp price movements, particularly downward, farm and wholesale prices move first and farthest; retail prices move more slowly; wages change even less rapidly; and manufactured articles, having a high labor content, change more slowly than any of the foregoing; while salaries and rents change slowest of all. Farm and wholesale prices have receded to a considerable extent except in certain lines, but retail prices have not reacted satisfactorily and are at a serious disparity. This is especially true as to farm and food products.

Wages in other industries than agriculture are still exceedingly abnormal. While farm wages average now in the neighborhood of twenty cents an hour, common labor on railroads is still in many cases as high as sixty-one cents an hour. The wage scale of the United States has been increasing constantly for more than a hundred years. In 1820 the average weekly wage of an artisan was about \$7.00; by 1860 it was \$10.00 a week; during the Civil War it rose to a level of about \$15.00, where it remained relatively stationary until 1900. By 1915 it has risen to over \$21.00; while in 1920 it was \$42.00. Needless to say, with this fixed rise in costs deflation along many lines has proceeded necessarily slowly. Conditions are improving. In Pittsburgh a number of additional furnaces have been blown in. We hear the same news from Chicago, Cleveland and other points. There is a firmer undertone not only in business in general, but in the security and commodity markets. While unemployment is abroad in the land, improved conditions with constructive efforts at relief promise better conditions. This is of great im-

portance to the farmers and fruit growers of the United States, as purchasing power of the public will be one of the important determining factors in their operations during the next year.

There is ample evidence that the general trend of prices for a period of years will fluctuate irregularly downward, on the whole. Prices of farm products are more nearly normal than other commodities, and will, therefore, in the future recede less.

The index numbers of wholesale prices, using 1913 as 100, show the following situation:—

	<i>October,</i> 1920	<i>October,</i> 1921
Farm Products	182	119
Clothes and Clothing.....	257	190
Fuel and Lighting	282	182
House Furnishing Goods.....	371	218

From this it appears reasonable that agriculture on the whole will suffer less from further deflation than other industries. I am sure we are all thankful for this hope. Nevertheless, as perishable growers, we must remember that certain of our products are still above normal. This is particularly true of apples and potatoes.

After our war of 1812, which was a mere incident in the Napoleonic world war; and after 1864 the culmination year of Civil war high prices, there were periods of nearly thirty years of generally receding wholesale prices followed by twenty years in each case of ascending prices.

How long we will be in completing the cycle of receding and ascending prices under existing world conditions, it is of course, impossible to foretell. This much is certain, the elasticity of the modern financial structure with its marvelously increased facility to accommodate itself to changed conditions gives good reason to hope that the readjustment which we are now carrying on after the orgy of the past six years will be accomplished at a rate hitherto impossible, nevertheless we are in a period of genuine depression. Consuming power of great bodies of consumers has been impaired by unemployment. Continued high prices along many lines have decreased consumption. High costs of production seem in many cases to make profitable operations impossible. On the other hand, we have the statistical position:

First—Of population and hence of possible consumptive demand.

Second—Of acreage, both bearing and non-bearing representing available and prospective supply to consider.

By census periods our population has grown as follows:

1890	62,947,000
1900	75,994,000
1910	91,972,000
1920	105,683,000

These figures mean that in the last forty years our population has increased about 43,000,000 persons. This increase is more significant than the mere figures indicate. In 1890 the United States was still preponderantly an agricultural nation, so that the consumptive force of the population for commercially produced and commercially shipped products was not what it is in 1921. More than fifty per cent of our population has ceased to be rural, within the census meaning of the word, and being largely industrial and urban is dependent upon commercial production of fruit for supplying its needs. The other side of the picture, considering for purposes of illustration a comparison only peaches and apples, we find the following situation as to production as disclosed by the census figures:

APPLES

1889	143,105,000 bushels
1899	175,397,000 bushels
1909	146,122,000 bushels
1919	136,746,000 bushels
1920*	244,022,000 bushels
1921*	102,290,000 bushels

During more recent years the Bureau reports have presented commercial production as distinguished from total production. The commercial crop is expressed in barrels and by the term is meant that portion of the total crop which is sold for consumption as fresh fruit. The commercial production for the last five years according to the Bureau has been as follows:

* Bureau of Markets and Crop Estimates figures for November 1st.

1916	26,747,000 barrels
1917	22,341,000 barrels
1918	24,743,000 barrels
1919	26,174,000 barrels
1920	37,239,000 barrels
1921*	18,563,000 barrels

The average commercial crop for the five years from 1916 to 1920 was 27,848,000 barrels. Compared with this, the present commercial crop is approximately 9,285,000 barrels short, but compared with the year 1920 it totals only about one-half the quantity of commercial fruit that was put into consumption from the 1920 crop.

It will be noted by comparing total crop figures with commercial crop figures that the latter do not show the fluctuation the former show.

The unattended farm or garden orchard, left largely to nature's care, swells the total crop in years of favorable conditions, no doubt exercising a profound influence on the prices of the commercial crop.

From Colonial time until about thirty to forty years ago specialized commercial orchards were practically unknown. Now a constantly growing proportion of plantings is in commercial orchards, well cared for by trained and successful orchardists. This fact must be borne in mind in considering the subsequent census figures:

BEARING AND NON-BEARING TREES

Trees of Bearing Age:

1910	151,322,000
1920	115,265,000

a decrease of slightly more than 36,000,000 trees or 23.8 per cent, as shown by the Bureau of the Census release furnished by Mr. Cruickshank. It is to be remembered that within the same period the population of the United States increased about 14,000,000; namely, from 91,000,000 in 1909 to 105,000,000 in 1919.

The short crop of the present year is, of course, merely a temporary phase in the situation, due to unprecedented Spring

* Bureau of Markets and Crop Estimates figure for November 1st.

frosts, particularly the one that occurred on Easter day. Nevertheless, it is of interest to know that the 1921 crop is the smallest but one in the last thirty-two years, the only one that was smaller being the crop of 1890, which amounted to 80,142,000 barrels.

As long ago as 1889, when the population of the United States was only about 60,000,000 souls, we had a total crop, according to the census, of over 143,000,000 bushels, compared with a total estimated crop of 102,000,000 bushels for the present year, when our population stands in excess of 105,000,000.

From the foregoing it is most obvious that the fundamental conditions, in so far as apple production is concerned, must be sound. We must, of course, bear in mind the greater efficiency of commercial production together with the fact that a very large percentage of our bearing trees are of an age that will lead to increased production without any necessary increase in plantings. The situation with respect to trees of non-bearing age is of the same kind.

There were trees of non-bearing age:—

1910	65,791,000
1920	36,171,000

a decrease of 29,620,000 or 45 percent of trees not of bearing age.

As it requires from 6 to 12 years for different varieties or different sections of the country to bring apple trees to bearing age, it is quite apparent both from an economic and a practical nursery standpoint that with the continued inevitable growth of our country, the fundamental outlook for the apple grower is good.

PEACHES

I have devoted so much time to apples, which are no doubt a premier crop both in quantity, value and importance as a food, that there is little time to devote to other fruit crops.

In the case of peaches; there has been a fluctuating but nevertheless on the whole a progressive increase in production during the 22 years from 1899 to 1921. The normal total crop amounts to about 46,000,000 bushels. As long ago as 1900 a crop of greater size was produced. The largest crop in our his-

tory was that of 1915, totalling 64,000,000 bushels. Its disastrous effect on the market is still recent enough in the minds of many of us so that no description of it is necessary.

The position with respect to trees of bearing age is as follows:—

1910	94,506,657
1920	65,654,219

The effective life of the peach tree is relatively so short that this decrease of 28,851,438 in the number of trees of bearing age is more significant than are the figures given for apples. Peach trees are so susceptible to bacterial and insect enemies that the mortality per year is extraordinarily heavy.

However, viewing the figures as they stand, the present plantings being more largely in commercial orchards have a greater potential productive capacity than a great number of trees had in earlier years.

The number of trees not of bearing age were as follows:—

1910	42,266,243
1920	21,623,657

a decrease of more than 20,000,000 or 48.8 percent.

It is evident from the foregoing that production possibilities both present and prospective do not point to any grave dangers through over expansion and wild exploitations in the near future.

It is so commonly said that figures lie that we are forced to hesitate, but we do know the stupendous decreases both of bearing and non-bearing apple and peach trees. The census figures, however, are certainly to be relied upon implicitly, within the limits of probable error in any task so enormous.

PROSPECTS FOR THE REMAINDER OF THE 1921 CROP.

The crop in the barrel states shows a decrease of almost 71 per cent from 1920, while the crop from the box states shows an increase of over 39 percent, indicating one of the largest, if not, the largest box crop on record. The average decrease for the whole United States, compared with last year is approximately one-third. The movement of the crop to the first of December was as follows:—

BOX SECTIONS :

Total this season to November 26th.....	40,311 cars
Total last season to November 26th.....	24,357 cars
Total last season — 1920.....	36,293 cars

BARREL SECTIONS :

Total this season to November 26th.....	21,614 cars
Total last season to November 26th.....	50,999 cars
Total last season — 1920.....	72,417 cars

As the total barrel crop for this year is about 29 per cent of last year it would appear that the movement has proceeded more rapidly in 1921 than in 1920, in relation to the probable total crop. Similarly the box crop seems to have moved more rapidly into consumption or storage or both, in relation to the size of the crop, than last year.

The December 1st cold storage report is not available but the November 1st holdings were:—

BARREL APPLES :

November 1, 1920.....	3,516,000 barrels
November 1, 1921.....	1,815,000 barrels

BOX APPLES :

November 1, 1920.....	2,878,000 barrels
November 1, 1921.....	5,348,000 barrels

It will be seen from the above that, while the deficiency in barrel apples is very great, the quantity of box apples in storage is such as to leave the total deficiency only 231,000 barrels in 1921 as compared with 1920.

As usual, when the supply and demand operate with relative freedom, the barrel deal, with its short supply, will show higher returns per package but very low returns per acre.

The conclusion of the box deal depend on skillful salesmanship and the general character and quality of the stock in storage.

In closing, may I say that the situation in the fruit industry as a whole is unquestionably good. That does not mean that efficient work, elimination of waste, the application of sound economy and a most careful cutting of all the corners will not be necessary. In fact, judged from previous economic history, as

very briefly outlined above, economy, thrift and efficiency will be absolutely essential.

A MEMBER: What about the probability of exporting apples in the future?

CHARLES BRAND: I feel that the export problem will be determined largely by a reasonable system of parity of exchange, and as the pound Sterling has gotten above \$4.07 in the past ten days I think the outlook in that respect is very favorable.

THE PRESIDENT: We will now have the report of the Auditing Committee.

REPORT OF COMMITTEE TO AUDIT TREASURER'S BOOKS

TOLEDO, OHIO, DECEMBER 8, 1921.

The Auditing Committee wishes to report that they have gone over the books, vouchers, receipts and bank balance of the Treasurer and find them correct. We therefore move the acceptance and adoption of the treasurer's report.

CHARLES E. GREENING,
FRED JOHNSON,
J. E. COCHRAN.

(Motion seconded and carried.)

THURSDAY AFTERNOON SESSION

The Thursday afternoon session was called to order at one-thirty by the Secretary, Prof. R. B. Cruickshank.

THE SECRETARY: Doctor Bailey has been detained, but will be here shortly, and he asks that the program go forward even though he is absent.

One of the men on the program this morning who was not here was Prof. Laurenz Greene of Indiana. We would like to hear from him at the present time.

FRUIT GROWING IN THE EAST NORTH CENTRAL GROUP OF STATES

LAURENZ GREENE,
Purdue University, Lafayette, Ind.

This group of states is a general farming country with few well developed orchard districts. It contains the agricultural states of Ohio, Indiana, Illinois, Wisconsin and Michigan. Door County, Wisconsin, with its cherries and western Michigan with its general fruit plantings mark the most highly developed horticultural industries. Southern Illinois is distinctly an early apple district but the orchards are not so thickly planted as in the districts named.

In addition to the general farming this region is noted for its industrial development insuring markets close at home. The great "Calumet Region" with its hundreds of thousands of workers and the automobile industries of Michigan are the most famous. Of equal importance from the marketing standpoint are the numerous large towns, small cities and great industrial centers over the central part of this group of states.

Because the bearing apple trees — found in the farm orchards comprise a relatively large percentage of the total the mortality during the decade covered by the recent census has been rather high. This region lost one third of its bearing apple trees during that period. During that same time there was a loss of 35% in the number of bearing peach trees, 30% of its bearing pear trees, 50% of its bearing plum trees, while the small fruit acreage was increased less than one per cent.

Non-bearing fruit trees tell about the same story. This region had 70% as many non-bearing apple trees in 1920 as it had in 1910. Only 48% as many non-bearing pear trees were found in the last census as were found in its predecessor but this crop is unimportant as only about three million pear trees of all ages were found in 1920. Only half as many non-bearing plum trees were found in 1920 as were reported in 1910.

It was noted that there was a slight increase in the small fruit acreage but there are few cars of this fruit shipped out of the counties where it is produced as compared with the better developed small fruit sections. With a few exceptions, labor con-

ditions remaining on either the present or a pre-war basis, no large development of this industry may be looked for and the opportunities where labor can be secured are excellent.

Approximately 20% of the total population of the United lives in this group of states. They produce but 17% of the total apple crop of the United States during the period 1911 to 1920, inclusive. A large percentage of that was produced on the farms and was not marketed nor marketable. The commercial crop of the United States is 45% of the total farm crop while in this section only 35% is called commercial, according to Bureau of Markets figures. Such conditions make for excellent markets within the district.

As a further illustration of these markets and their supply it is interesting to note that in 1918 this group of states supplied their large markets of Cleveland, Detroit, Cincinnati, Indianapolis and Chicago with less than one third of the cars of apples consumed by those markets.

The east north central group of states produced less than 10% of the cars of apples that were unloaded on the 14 larger markets of the country. Of the fruit marketed in these cities that was produced in this group of states practically 90% was marketed within the border of the group. Either New York state or Washington supplied more apples for the markets in these five states in 1918 than came from their orchards. During that year New York supplied Indianapolis with six times as many cars of apples as were received from either Indiana or Illinois. Indianapolis in that season received less than seven percent of its apple supply from the state of which it is the capital.

Because of this shortage of supply and the apparent demand at home the average farm price is higher in this section than in the United States as a whole. It was 13 cents per bushel higher for the ten year period just past. In 1919 it was 54 cents per bushel higher in these five states than the average for the United States and in Indiana that year it was 81c per bushel higher.

The automobile trade is developing rapidly and many orchardists are finding they do not need to provide packages, storage and marketing facilities beyond the limits of their own farms. Isolated orchards can not supply the demand at the orchard while the elimination of the farm orchard crops is adding to the joys of the commercial man in increasing his orchard trade. One In-

diana berry grower with fifteen acres sells his berries on the vines and the customers pay for the privilege of picking them.

The loss of the large numbers of trees and the increasing city populations with smaller and smaller crops of fruit coming from the farm orchards makes a very bright outlook for the real commercial fruit grower in these great lakes states. There have been no boom plantings since the nineties and the neglected orchards put out at that time are nearly gone. There are no young plantings coming on to supply the demand ten, fifteen, or twenty years in the future. It is undoubtedly a most opportune time to plant fruit in this region. Good care has produced some splendid orchards that have proven highly productive and profitable to their owners. Personally I believe that it is not only a most opportune time to plant orchards in the east north central group of states but I also believe that this region is the most promising place to plant fruit that can be found in this or any other country.

THE SECRETARY: Is there any discussion of this paper? There seems to be no question but what, so far as Ohio is concerned, a great many men are beginning to develop markets such as Professor Greene has indicated.

I will now call on Mr. H. G. Ingerson to tell us something about the census figures from the standpoint of a man interested in the manufacture of spraying machines.

UNITED STATES APPLE PRODUCTION IN 1930

H. G. INGERSON,
Ohio

I have taken for my topic, "United States Apple Production in 1930." I think we like to look forward, but perhaps not for more than a ten-year period. We can only arrive at that approximation by what has happened in the past ten years, so I will present in a brief way my personal opinions on this matter, and then just briefly state what I feel, as a manufacturer of spray machinery, should be the trend of orchard planting from the standpoint of orchard economics.

A study of the United States census figures on apple production in 1909 and 1919, and the relative number of bearing and non-bearing trees in 1910 and 1920, shows clearly the following condition: That of a total of 216,000,000 bearing and non-bearing apple trees in 1910, but 115,000,000 were in bearing in 1920; a loss of 47 per cent. With this same ratio of loss prevailing (and we have no reason to doubt that it will prevail), from the total of 151,000,000 bearing and non-bearing trees in 1920 we will have but 80,000,000 bearing apple trees in 1930, or but slightly more than half as many bearing trees as in 1910.

The production figures for 1909 and 1919 show an increase from one bushel per tree to 1.2 bushel, or 20 per cent. increase. With an additional increase per tree of another 20 per cent., which I think we may expect from our improved methods of pruning, fertilizing and spraying, we shall still be short 33,000,000 bushels, or 23 per cent. of the 1909 crop.

So far we have not considered any increased consumption of apples. I think we all realize that consumption could be greatly increased if high quality apples could be furnished to our people at reasonable cost. How much this increase may be we will leave to our advertising friends to estimate, but surely enough to care for the increase per tree that we are securing.

With these facts before us I believe we must agree that a period of apple tree planting is just ahead of us, and I feel that it is for an organization such as the American Pomological Society to point out the course that such planting should take.

I submit that the most successful and profitable orchard in the future will be the two-man commercial orchard, probably thirty to fifty acres of mixed fruits, within trucking distance of several small towns, or a city of some size. I see the advantages of such a location as follows:

i. Production:

1. A constant supply of labor, the owner and son, or owner and one good tenant.
2. Economical use of labor throughout the season in production and marketing work.
3. Economical use of orchard equipment.
4. Low overhead.

II. Quality fruit:

1. Because relatively small acreage of each kind and variety can be harvested and marketed in best condition.
2. Because storage varieties can be placed in home storage immediately following harvest and marketed when in best condition.

III. Most important of all, the marketing of fruit at lowest possible cost effecting the following savings over the grower who must pick and ship to distant markets:

1. Packing expense	5c to 10c bushel
2. Shipping expense over local market package	5c to 10c package
3. Season storage	10c to 20c bushel
4. Commission	10c to 20c bushel
5. Drayage to freight car and to storage or commission house.....	10c to 15c bushel
	40c to 75c
Total saving per bushel.....	

I am assuming that the total cost of trucking to local markets will not exceed the cost of freight on distance shipments.

I believe we must recognize that the unusual development of automobiles, trucks and roads, and the growth of our urban population is calling for a rapid change in our marketing methods and that the future orchard plantings should be made with these things well in mind.

Now just a word as to the attitude of the sprayer manufacturers on these things. We believe we had better have less fruit on the market and have it of higher quality. A lot of this home farm orchard fruit on the market serves no good purpose and should not be there, and we feel that rather than encourage the general planting of farm orchards we should rather discourage them and encourage the commercial orchard on an economic basis.

THE SECRETARY: Is there any discussion of this paper? He has brought out some figures which you may or may not agree with, and we would be glad to have the subject discussed.

PROF. LAURENZ GREENE (Indiana): Mr. Ingerson brought out a thought that I am wondering about. That is that apple planting occurs in cycles. If that is the case, the last cycle has been a long period. If I remember history right, the last general planting in most of the orchards through the country west of us, including the Missouri River country and the Ozarks, was from about 1883 to 1893. Aside from the planting in the Pacific Northwest we have not had in the eastern or central west extensive commercial planting since that time. I wonder if he has the facts as to the general planting that we had at that time?

H. G. INGERSON: No, I do not. Personally, I do not feel that we will see the extensive planting that we have had in other periods of inflation of the orchard industry. I believe the fruit growers will avoid planting exceedingly large orchards, such as the big plantings of the Ozarks and other places. The smaller tracts can be handled well and sold to advantage. I feel the fruit grower of the future will be the man who puts out thirty to forty acres and cares for them well without a big investment. In other words, a substantial commercial orchard.

T. B. WEST (Perry, Ohio): I think the passing of the farm orchard is much to be regretted, if it is true. I think an organization such as this, and organizations such as the state horticultural societies, should encourage the planting of small farm orchards. I think in the passing of the farm orchard you are hitting hardest at farm life. I think everything should be grown on the farm for the comfort and enjoyment of the people who live on the farm, and they should be encouraged to produce them. If the farm orchard is a thing of the past, as the talks here would seem to indicate, it is very much to be regretted. Children on the farm should have apples where they can get them. You know the average farmer's attitude towards buying fruit for the family—if he does not grow it he will not buy it. I think as men who stand for and represent this industry we should encourage the planting of the small farm orchard for the benefit of the farmer's children. The farmer should be encouraged to take care of a few trees so he can have the fruit for his family. I think it is very much to be regretted that we are losing that great asset to our American farms.

PROF. LAURENZ GREENE: I may be guilty of starting this discussion. I think every one of us is absolutely with the last

speaker, with one proviso — that the farmer will take care of the planting, that he will plant fifteen or twenty trees in place of three or four hundred, as Mr. Ingerson mentioned. I believe it is the place of the fruit industry to encourage an orchard on each farm, but this fruit should be taken care of.

FREDERICK CRANEFIELD: I agree with all these gentlemen. When you get down to the bottom there is no difference of opinion. I think perhaps we might use another term that would help in this matter. Why not say "home orchard"? That is what we mean — enough fruit trees to produce sufficient fruit for the home needs, for the family, and as Professor Greene says, with the proviso that these trees be taken care of. If you can do that you will have done a great thing. We have been working at this in Wisconsin for years, through the Horticultural Society, the Farmers' Institutes, etc., trying to induce the farmers to care for their farm orchards, and we have helped some. Further than that I would not have the farmer go. We say up in Wisconsin that no farmer has brains enough to be a successful stock grower, dairyman and fruit grower at the same time. He is not able to do it even if he has the equipment. He is compelled to provide the equipment necessary to take care of his overhead, and then the question arises of marketing the fruit. It is no problem for the farmer to market his stock, or his dairy products; that is comparatively easy. Sometimes he asks whether he is getting the price he should be entitled to, but the matter of disposing of his product is pretty well settled. There are certain definite channels through which these products go. But not so with fruit. He must seek his market. Can the average farmer do that? Experience shows he cannot, and I doubt if it will ever be done successfully. In years of over-production there is a glut and it is not reasonable to expect the average farmer to produce the good quality of fruit, so let us burn out every farm orchard in the United States except what will supply the farmer's needs, but let us at the same time encourage the farmer to plant trees enough to supply the needs of his family.

R. A. SIMPSON (Vincennes, Indiana): I would like to emphasize the importance of selling from the orchard. You can develop a home orchard trade and supply the wants of the family and children by advertising, because the people from the city will come out to the farms and buy fruit at half the price charged

by the stores, and therefore they will use a great deal more fruit. For instance, at our place, we find if we sell our fruit to the stores, which we do, the price immediately goes up 100 per cent, it keeps down the consumption, and there are not as many apples used. If we sell direct to the customers they come to the farm for the fruit and a great many more apples go to the children. The farmers want apples, but they are not willing to pay the price and take care of their orchards. They say they want to take care of the orchard, but the corn has to be cultivated, or something else must be done, and they cannot take proper care of the orchard. I do not believe it will hurt the consumption; I believe it will increase it.

THE SECRETARY: In that connection I might say that our Ohio farm bureaus are buying apples by the car-load in the Fall for those members who do not raise fruit. It seems to be a work that is developing very rapidly.

W. S. PERRINE (Centralia, Illinois): Either the farmer should take care of his orchard, or cut it down and this will be necessary if the commercial man is to take care of his orchard. The farmer who has had a commercial orchard should either care for it or take it out. In Illinois, especially in the southern part, we have thousands of acres of uncared-for orchards, and they ought to come out. I believe it is in the province of this Society and others like it to lend their influence along that line and get these orchards taken out or cleaned up. It is a great handicap to the healthful development of the fruit industry to have these orchards standing there uncared for. These census figures undoubtedly are true, but it is a fact that we have more trees in the United States at the present time than we need to produce the fruit that is being produced. It is a question of care, not the number of trees. Not more trees, but better care, not only on the part of the commercial growers, but everyone who has trees. I want to emphasize the need of either caring for the farm orchards, or the commercial orchards, or cutting them down and cleaning them out.

THE SECRETARY: I think this Society is committed to the proposition of better home as well as commercial orchards, and certain publicity ought to be carried on in that connection.

THE PRESIDENT: Some of these numbers on the program are represented only by papers. Inasmuch as the program is full

the probability is that we shall not have these papers read, but of course they will be available in the Annual Report. Others have not even sent in their papers. The program will therefore be more or less mixed for the remainder of the afternoon, but we hope to get through with the persons who are here without holding any over until tomorrow. We are now on the general subject of the analyses of the census figures for fruit trees. Mr. Pratt of New York is here. We will hear from him.

SOME LESSONS FROM THE 1920 CENSUS REPORT

B. G. PRATT,
New York

During the past ten years the general opinion as expressed by many of our fruit growers has been that the fruit business is being overdone; that when the young orchards being planted had come into bearing, the price of fruit would go so far below the cost of production that fruit growing would cease to be profitable and orchards would be cut out to make way for more profitable farm products. The late Mr. J. H. Hale stated in my presence, several years before his death, that he believed that fancy grade apples would reach as low a price as \$1.00 per barrel, which would mean the destruction of many of our orchards, especially those uncared for.

And while I am not a prophet, nor the son of a prophet, my observation in visiting orchards throughout the country was, that despite the heavy planting of young trees, too many orchards, both young and old, were receiving but indifferent care and that it would be a case of the survival of the fittest.

With these facts clearly before me, I have set out over 30,000 fruit trees in the past ten years and expect to plant as many more in the next five years. I am an optimist but I have been long enough in the game to appreciate the difficulties and disappointments, as well as the possibilities of profit.

This reminds me of Fisher Ames' description of the difference between a monarchy and a democracy. "A monarchy," he said, "is like a merchantman; you get on board and ride the wind and tide in safety and elation, but by and by you strike a reef and

go down. But democracy is like a raft; you never sink, but, damn it, your feet are always wet." You seldom hear of a fruit grower (not a fruit company) failing, but his feet are always in the water. After he has done his part, there are frosts in the spring, hail in the summer, winds in the fall, railroad freights and commission men after picking. He even questions the validity of the check when he receives it, especially if it is a large one.

But what is the actual condition of the fruit industry as shown by the U. S. census report, released June, 1921? It was a surprise to me, although I was more or less prepared for it. Mr. D. E. Lewis of the Central States Orchards Company, Kansas City, Missouri, in an address before the Horticultural Society at Topeka, Kansas, last winter gave a summary of reports received throughout the country on the lack of care of the apple orchards during the past five years and the small plantings of young trees. This he had gathered to convince his board of directors of the advisability of planting more orchards at once. I am sorry that I could not get a report of this address, for it was the first word of encouragement for planting young orchards I had heard in five years. This year's census report confirms all he said, but dwarfs it by comparison.

What does it say? That in 1910 there were 151,000,000 apple trees in the United States of bearing age, while in 1920 there were only 115,000,000, a reduction of 23.8%. It also says that in 1910 there were 65,000,000 apple trees under bearing age, all of which would be of bearing age or dead in 1920, so that the figures show an actual loss of 101,000,000 trees, or 47% in the past ten years.

But unfortunately, this does not represent the total loss. The planting of apple trees after the census was taken in 1910, 1911 and 1912 was very heavy, amounting to millions of trees more, most of which are included as bearing trees in the 1920 census. So you see that it is safe to say that one-half of all the apple trees in the United States ten years ago are today dead; and there are only 36,000,000 apple trees under bearing age today against 65,000,000 ten years ago, — a decrease of 45%.

With all the trees planted out in the past thirty years, we have today 5,000,000 less bearing apple trees than we had in 1890, thirty years ago; 86,000,000 less than 20 years ago, and 36,000,000 less than ten years ago. I am sorry that the census

does not give the number of apple trees under bearing age in the census of 1890 and 1900, but from the figures we have, it is reasonable to calculate that we are losing apple trees today faster than in the palmiest days of the San Jose Scale.

The length of life of an apple tree is almost comparable with that of a human being. Twenty years ago there were more than two bearing apple trees for every man, woman and child in the United States. Ten years ago there were $1\frac{1}{2}$ bearing apple trees per capita. Today there are not much more than one. If the present mortality continues, we will have to plant 20,000,000 apple trees every year for the next ten years, or about five times as many as we are today planting, to place the apple industry on the same plane as it was only ten years ago, with a reasonable expectation that the population will be 20% greater than it was at that time.

I assume that the census figures are as near correct as similar figures can be and represent a true condition of the apple industry today.

But there is a cause or causes that dominate every effect, and with your permission I will try briefly to point out some of the causes for this tremendous economic waste. It is a tremendous waste when 50% of our apple trees do not reach bearing age or die prematurely, for an apple tree of bearing age represents a value of at least \$10.00 and pays a handsome dividend on a much larger amount, so that the loss of 100,000,000 trees in ten years represents an economic loss of at least \$1,000,000,000 or \$100,000,000 each and every year. Can we afford it?

What are some of the causes? There has been no general alarm such as that experienced by the fruit growers fifteen or twenty years ago when the San Jose Scale threatened the destruction of the orchard, yet the danger is evidently as great. Only once in a while a voice is raised and then none too strongly.

Naturally we would expect 10, 15 or possibly 20% of our bearing trees to go out in ten years from old age, yet I know of orchards in New York State a hundred to a hundred and twenty-five years of age still in profitable bearing.

Then again, large tracts of land have been planted to apples during the past twenty years by orchard companies for speculative purposes that have been neglected and finally passed away, but in the states where these speculative orchards have been

largely planted, the mortality in the past ten years has reached as high as 81%.

While there are a number of other minor causes for the death of our apple trees, there is one other cause that I believe dominates them all, and that is the blight organism, *Bacillus amylovorus*, either as a primary or secondary cause. Its appearance as twig blight is alarming because it is so noticeable, yet it is the least dangerous form and only the beginning of the trouble,—the flower, so to speak. It is the blight canker or hold-over canker as it appears on the branches, the larger limbs, the crotch, the collar and the root that is to be most feared, and the danger increases in the order named.

It would be presumption on my part to attempt to describe so common a trouble before the American Pomological Society, but I do not think that as a rule we, as apple growers, appreciate how serious our losses are from this trouble alone, or if we do, do nothing to combat it.

The Pennsylvania Experiment Station Bulletin, No. 136, of August, 1915, by Professors Orton and Adams, on page 6 says: —“The loss from collar blight alone in Pennsylvania is conservatively estimated at 2% annually”. If this is conservative it will account for 20% of the loss in Pennsylvania, where the total loss for the past ten years is only 34%, — very much lower than the average.

Please do not say that it is useless to combat it; that it cannot be done. In an orchard, not over 25 miles from the Pennsylvania State Line, of 3,000 apple trees ranging from twenty-eight to forty years of age where collar blight had been taking its usual toll, we have not lost a single tree from collar blight or rot in ten years. What has been done and is being done can be done again.

But that is not the question. What does the census report mean to the fruit grower? To my mind it means the dawn of a new era in the apple industry; that there is no over-planting and no over-production; that there will be a good demand and good prices for all the good apples we can raise for a good many years to come, and the man who neglects his orchard today is blind to his opportunity. The great danger, as I see it, is that apples will be put in the luxury class, cutting down the demand. If we

would prevent this, we must stop wasting trees and wasting fruit and put business methods and business organization behind the industry; give personal attention to the details of the orchard and organization for distribution and sales.

An old stage driver was showing his dexterity with a whip to a young city chap who was driving beside him on the box.

"You see that fly on the right ear of the off lead horse?" He flipped it off without even cracking his whip.

"See that yellow leaf, the first sign of frost?" Again he nipped it off neatly.

Then it was the city chap's turn. "See that gray ball hanging on that birch tree by the side of the road? Let me see you hit that."

The old driver gave a grunt. "Look here, young man, a fly is a fly; a yellow leaf is a yellow leaf, but a hornet's nest is an organization."

I thank you.

THE PRESIDENT: I certainly am impressed with the changes that are coming to pass in the fruit growing business. As I have stood here today, coming after an absence of two years, I am impressed with the remarkable optimism. It would seem from the census figures, as they appear on the face, that the opposite would be the result. But the vigor and energy manifested in these papers is really inspiring.

Mr. D. C. Babcock of Ohio is here and will present a paper in this symposium.

ANALYSIS OF CENSUS FIGURES FOR FRUIT TREES

D. C. BABCOCK,
Ohio

The Department of Census at Washington has published from year to year figures on the growing apple industry. I say growing in spite of the fact that the total number of bearing trees for 1920 is given as 115,265,029, or a decrease of over 36,000,000 bearing trees as compared with 1910. We must first

bear in mind that these figures do not differentiate between the farm orchard and the commercial orchards that are now coming into existence and have helped materially to bring apples up to the ninth place among farm crops. The production of apples both commercial and non-commercial for 1919 is given as 136,746,154 bushels, or a decrease of over 8,666,164 bushels. A decrease of 36,000,000 bearing trees with only a decrease of 8,666,164 bushels goes to prove the statement made by one of the horticultural investigators a few years ago that a great many apple trees in this country bore no more relation to commercial production than so many shade trees.

The number of bearing trees that can be reported in 1930 will show a decrease over the number reported for 1920, as there are 29,000,000 less trees not of bearing age than there were in 1910. The combined total of bearing and non-bearing trees in 1920 is just 100,000 more than the total number of bearing trees in 1910 (151,322,840). There has been very little planting since 1910 and this with the passing out of some of our old commercial orchards like those in western New York will have a pronounced effect within the next ten years, or before 1930.

Now how are we to interpret these figures for the fertilizer industry and what conclusions can we draw from them. In the first place the average yield per tree in 1910 was less than one bushel, while in 1920 the average yield was 1 1-3 bushels. This increase has been brought about by the paying of more careful attention to the production of apples by the commercial orchardists who realize the importance of fertilization. This group of commercial orchardists are practically the only fruit growers that are buying nitrogenous fertilizers, as the home orchards are being sadly neglected. The commercial crop of the United States amounts to about 75,000,000 bushels per year. The trees in the commercial orchards will average more bushels per tree than the average given for the whole United States. We will say that they average two bushels per tree. This would give us 37,500,000 trees in commercial orchards. That would leave about 75,000,000 trees of bearing age that are located in the home orchards and are producing only about 4-5 of a bushel per tree. Practically all of the fruit produced in these home orchards is

consumed by the owner's family, or disposed of locally to buyers whose purchases do not influence the market either way. The farmers will eat apples and use them in various ways when they have them in their own orchards, but they will not buy to any extent the apples offered on the market. The fertilizing of these home orchards which are in a deplorable condition will bring about an increased production that will be consumed largely at home and put apple sauce, apple pie, apple dumplings, etc., on the American farmer's table. The Pomological Society can do no better piece of work than to urge that more attention be paid to the farm orchard and make it possible for every American man, woman and child to "eat an apple a day and keep the doctor away."

Bearing apple trees that need to be rejuvenated should be fertilized with approximately four pounds of sulphate of ammonia, or five pounds of nitrate of soda. These home orchards would require 150,000 tons of sulphate of ammonia. The majority of commercial orchards that respond to fertilization are being fertilized at the present time. Therefore, the additional 150,000 tons can be profitably used by the apple growers of the United States.

Something must be done to help make up the big shortage in apple production and which is not going to be any better owing to the big decrease in bearing trees.

If we turn our attention to the peach industry we find a decrease of 28,852,000 bearing trees or one third less trees than in 1910 and with only one half as many trees not of bearing age as in 1910. Here a gain is a big field for the use of nitrogenous fertilizer and so it is all along the line in the fruit industry. Reports on pears, plums, strawberries, raspberries, etc., show a decided decrease in the source of supply. With the present developments in the use of nitrogenous fertilizers on fruit and the increased yields obtained from the use of these materials, I predict a big consumption of both sulphate of ammonia and nitrate of soda by this industry within the next ten years.

The home orchard with its neglected trees is the great field to be developed by the various forces.

REPORT ON FRUIT CONDITIONS FOR NEW JERSEY,
NEW YORK, PENNSYLVANIA, VIRGINIA,
MARYLAND AND DELAWARE

NEW JERSEY

PREPARED BY A. FREEMAN MASON AND ARTHUR J. FARLEY.

The Census Statistics for 1910 and 1920 are a little hard to understand in face of present day conditions. There has been a steady increase in plantings of apple trees, with no reductions of any importance, and, yet the Census figures only show a 400,000 tree increase for the 10 year period, while in peach plantings there has been a corresponding increase, and the reductions in the past 10 years have not been anywhere nearly commensurate with the reductions of the preceding 10 years, and surely not enough to account for the small increase indicated in the Census figures. Either the Census figures for 1910 were high, or else the Census figures for 1920 are not entirely reliable in our estimation.

PEACHES

There has been a steady planting of peaches for the last 10 years, culminating in a boom during the past 2 seasons, during which time we believe 300,000 trees have been set out, which are not accounted for in the 1920 Census. During the past few years, fewer old orchards have gone out than formerly, due to the greater care and the renovation work carried on. The high prices of nursery stock, and the cost of bringing an orchard into bearing caused the growers to take better care of their old orchards. There has also been a corresponding increase in per tree production, due to the improved cultural methods during the last 10 years.

The outlook is for increased plantings in the peach sections of Burlington, Gloucester and Cumberland Counties. The Vine-land and Hammonton sections are reducing their acreage, due principally to "yellows" and "little peach." The varieties being planted are principally the later peaches coming after Carman, with Elberta leading. There are very few of the early varieties being set out. New Jersey has not approached the former high mark reached in 1900, when it had five or six million trees in the state, but which were destroyed by scale, "yellows" and neglect.

The prospects for the industry are bright. The marketing question is a paramount issue. Until recently all of the New Jersey crop was marketed in Philadelphia, New York and nearby points, but with the rapid increase in bearing trees these markets are not absorbing the crop in a satisfactory manner and a wider market is being sought. Along this line, steps were taken recently to organize the New Jersey Fruit Growers' Cooperative Association, with the intention of marketing the peach crop alone. No steps other than to vote for the formation of such an organization have been taken.

APPLES

During the past 10 years there has been a steady, heavy planting of apples, which is believed to be much heavier than indicated by the Census figures. This reached a maximum probably in 1915 and 1916 and 1917, but slowed down in 1918 and 1919, due to the high prices of nursery stock and scarcity of labor, while now a normal planting is taking place, principally by old growers who are extending their present holdings. One firm alone, however, during the last 2 years has set out 50,000 apple trees. Stayman, Delicious, Rome Beauty and Old Winesap form the bulk of the late varieties, while Starr and Wealthy are the principal early varieties being planted, — equal quantities of early and late varieties being set out. The outlook is unusually bright for the apple industry, and without doubt the marketing work now being undertaken on peaches will be extended to apples in the near future.

PEARS

There has been a steady decrease in pear acreage during the past 10 years. Kieffer is the only variety now being grown extensively, and many Kieffer orchards are being pulled out due to the uncertainty of setting a crop, and the expense of spraying and other cultural methods, and to prevailing low prices for the product.

CHERRIES

Only sour cherries are being grown commercially in New Jersey, principally in Burlington and Camden Counties. There has been a slight increase in the last year or so, but there is a big decrease from the 1910 figures.

RASPBERRIES AND STRAWBERRIES

Raspberries and strawberries have both decreased, the strawberry probably having dropped more noticeably. Formerly there were large acreages of these small fruits near Hammonton, but the growers went out of small fruits to go into peaches. There has been a general decline in interest in strawberries in all sections of New Jersey.

GRAPES

There is only a small acreage of grapes planted commercially in New Jersey, but there have been large extensions of plantings by growers formerly having small blocks. Concord is the principal variety planted, followed by a few Niagara and other varieties.

PLUMS

No commercial interest, due to uncertainties of market and lack of facilities for drying.

NEW YORK

REPORT PREPARED BY RALPH W. REES

In New York State there has been a decrease in the number of peach trees due to their having been very few profitable seasons on peaches during the past 10 to 12 years; also, the freeze of 1917 and 1918 made a very marked decrease in the number of trees throughout our peach belt. Nurserymen tell me there is an increased interest in peach planting this year, and that the spring of 1922 will see the largest peach planting in New York since about 1913 or 1914.

In apple planting there has not been a marked decrease or increase since 1914. During the war the scarcity of labor, high price of trees and only a moderate return on fruit, tended to make a gradual decrease from 1914 to the present time. There has been some planting going on primarily in the old established apple sections, particularly in the lake counties from the Niagara River east along the southern shore of Lake Ontario. Planting has been done very largely by present fruit growers who have extended their plantings. There has been very little speculative

planting in this state. Apples lead among the fruits; the varieties have shifted to a smaller percentage of Baldwin, Greening, Spy and Kings which are at present the leading varieties, to a higher percentage of McIntosh, Wealthy, Twenty Ounce and Wagener.

The present outlook seems to be for a commercial planting about equal to the decreasing commercial acreage. There is practically no planting of home orchards and there has been a very high mortality among home orchards during the past 10 years. The whole tendency is to drift from the home orchard to commercial plantings.

MARYLAND

REPORT PREPARED BY E. C. AUCHTER

The reason for the decrease in the number of trees may be due to the fact that growers have realized that large plantings have been made and they probably felt that there may be an over-production of fruit and have stopped their planting somewhat. The other reason is, that fruit trees have been so high in price during the last five years, that orchardists have felt that they could not afford to plant until prices came down.

During the past year with lower prices, we have had large plantings all through the western part of Maryland. Apples and peaches in equal number are being planted.

Varieties being planted are Stayman, Winesap, Yellow Transparent, Williams Early Red, Northwestern Greening, Delicious, Duchess and Jonathan.

Of peaches, the varieties being planted are Carman, Hiley, Elberta, Belle and some Salway.

The outlook appears to me to be excellent at the present time.

Very few pears and plums are planted in this state. The pears blight so badly that our growers do not want them around, because of the danger of getting blight in the apple orchard. The crop from plum trees appears to be lost from early frosts so much, and they are so subject to brown rot, that our growers are not planting them. Then, too, with no drying plants, they are compelled to market the fruit in a fresh state and this had not been worked out very well in this region.

Grapes should be very profitable in Maryland, and we are recommending that more of them be planted.

PENNSYLVANIA

REPORT BY DR. S. W. FLETCHER AND A. FREEMAN MASON

The decrease in the number of trees in Pennsylvania during the last 10 years has been due principally to the dying out of the old farm orchards in the Northwestern central portions of the state. This is not at all indicative, however, of the real status of the fruit industry; there being at the same time a tremendous increase in commercial plantings which has been reflected in a tremendous increase in the commercial crops. However, there has been a steady increase in the peach industry, due to plantings in the southeastern part of the state, and this industry will probably hold its own in the future.

The principal plantings are in Adams and Franklin Counties, although there have been extensive plantings over the entire southeastern portion of the state.

Peaches and apples are the principal fruits planted.

The main varieties are Stayman and York Imperial; York Imperial furnishing almost a third of the entire plantings of the region and Stayman about a fifth. Rome Beauty and Delicious are also planted heavily.

The outlook appears to be excellent, due to the natural climatic advantages, and the adjacence to the market, providing that proper steps are taken to improve their marketing system.

There are practically no pears grown in the state in a commercial way. The plum and grape section is in Erie County along Lake Erie, and should be classed with the New York counties in this industry.

DELAWARE

REPORT PREPARED BY PROF. C. A. McCUE

At the present time Delaware has about 816,000 apple trees in bearing and about 308,000 not in bearing or only 28% non-bearing trees. This indicates a very steady increase in apple

planting. In 1910 there were only a total of 430,000 trees in the state while in 1920 the total is considerably above a million.

In the case of peaches there has been a decrease in planting. In 1910 there were 1,177,000 peach trees in Delaware while in 1920 there are only 557,000, and of these only a little over 90,000 were below bearing age. Only about 16% below bearing age. This indicated that the industry is on the decline because any district should have from 25 to 33% of its trees non-bearing in order to stabilize the industry. The peach industry is still undergoing an evolution whereby peach growing is becoming centralized in the hands of specialists. I look for an increase in planting among specialists, but for a general decline by the farmer and the ordinary fruit grower. A great deal of the decrease is due to the fact that most of our peaches are interplanted with apples and most of these trees have to be taken or have been taken out. It will only be in the new plantings of apples that very many new peach trees will be set out. The new plantings are largely centered for both peaches and apples in Kent and Sussex counties.

For peaches the varieties commonly used are Belle and Elberta. For apples, Yellow Transparent, Williams Early Red, some Duchess, Jonathan, Grimes and Stayman. Rome Beauty is slightly on the increase. I believe the outlook to be good for both peaches and apples.

The pear industry is on the decline and will become largely a thing of the past as is the plum industry. The grape industry is on the increase.

VIRGINIA

REPORT BY DR. S. W. FLETCHER

There has been a steady increase in planting during the past 10 years, which has placed the Shenandoah district among the foremost fruit growing districts in the United States. This has been due to unusually advantageous growing conditions, and nearness to markets, and the prevailing high prices during this period. During the past 2 years, however, there has been a serious slump in the orchard outlook, due to an ice storm in November 2 years

ago, followed by the low prices the following season, and again by the freeze this past spring.

Planting has been going on principally in the Cumberland-Shenandoah region, apples leading with some planting of peaches.

York and Stayman are the principal varieties being planted, with Old Winesap and Rome Beauty following closely.

The outlook appears to be good, providing the growers take the logical steps in organization and marketing.

There is very little interest in the grape, berry and plum industry.

FRUIT CONDITIONS IN THE PACIFIC NORTHWEST

C. I. LEWIS,
Salcm, Oregon

The season of 1921 will go down in the annals of the Pacific Northwest Horticulture, as a freak year. Seemingly the unexpected has always happened. Very satisfactory returns have been realized from many fruits, and very disappointing results from others.

The season of 1920 proved disastrous to the cannerymen. They paid high prices for the raw products, boxes, sugar, labor, — only to find such commodities subsequently dropping very rapidly in price. A buyers' market, which bought from hand to mouth, cancellations galore, with the result that the cannerymen found themselves holding huge stocks in the middle of the winter, on which they finally had to take heavy discounts.

This condition forced some into bankruptcy, others into receiverships, and made it difficult for others to operate. The condition which resulted from the collapse of the canning industry was that there was very little demand for canning fruits. The California growers were offered early in the season, about 3c a pound for strawberries. They started a newspaper campaign, sold them in the fresh state, netting the growers about eight cents a pound.

When the cherry season came on, most of the canneries would not offer more than five cents, many less, for a limited tonnage. California boxed most of their cherries, shipped them east, and netted the growers returns of probably an average of

not far from sixteen to seventeen cents a pound. The Pacific Northwest grows berries that cannot be shipped great distances, like the Loganberry and blackberry and many of the strawberries, of the softer types. So that the strawberry season on the whole proved to be rather disastrous. Right in the beginning of the season, high water in the rivers put some of the manufacturers of hallocks out of business, and there was a great shortage of crates and hallocks. Berries which were barreled and sold fresh, brought much better money than berries which were canned or made into juices.

The cherry price offered to the northwest growers was three to five cents. However most of the larger associations were so equipped that they began to ship cherries east immediately. The Oregon Growers' Cooperative Association alone shipped sixty three cars of cherries to eastern markets, including about twenty five cars of Napoleons, known locally as Royal Annes. This variety is not considered a shipping variety but the cars arrived seemingly in good shape, and undoubtedly the foundation has been laid for a splendid business with this variety of cherry in years to come, as it arrived on the Atlantic sea-board in such excellent condition. The growers will net several times as much for these cherries as they would have obtained had they been forced to sell them to the canneries.

When the Bartlett pear season arrived the California growers sold very little to the canneries, believing they could repeat their experience on cherries and berries, and the northwest followed suit. However, there was a decided slump in eastern markets, these markets were over loaded, at the same time with melons, grapes, green prunes, Bartlett pears, and peaches. The buying powers of the public were decidedly curtailed, and as a result, there was a terrific collapse in the Bartlett pear market. Those canneries which were able to can strawberries, Loganberries, Bartlett pears and similar fruits soon found a ready demand for their products, the result has been that the canneries have sold out practically their entire pack, and there is every indication that grocery shelves will be clear of canned goods this next spring, meaning that a new start can be made and the season of 1922 should be a profitable one for both growers and cannerymen.

APPLE GROWERS

The apple crop in the Pacific Northwest is the largest in its history and also the finest quality. There was an indication in June and July that the prices for our crop would beat all records. However the slump in the Barlett pear market was used by buyers as an index for prices on apples.

The growers in the northwest made the mistake of not being so organized that they could obtain a very wide distribution of their fruit. Independent growers sold to many cash buyers, who dumped much of the fruit in large centers like New York and Chicago. An attempt was made by the big cooperatives to launch an advertising campaign and develop new markets. The independent buyers and growers, however, would not join in this movement. The lack of joining in the movement has caused probably an average of a loss of fifty cents a box on the crop this year. However on the whole, the apple growers of the Pacific Coast this year are going to make money.

The high quality of the fruit and the fact that a large percentage of it ran to pretty good size and high color, has brought a very fair return. Small apples, even this year, have brought poor returns, and there is an indication that the small apple, except with a few varieties like Jonathan, and Grimes, is doomed. The program of the western grower will be in the future to attempt to grow a larger percentage of the larger sizes. This he will accomplish by more feeding of trees, intensive irrigation and tillage and heavier pruning.

DRIED PRUNES

Owing to the combined efforts of the Oregon Growers' Cooperative Association of Oregon, and the Washington Growers' Packing Corporation of Vancouver, Washington, the huge crop of 1920 was moved. If this crop had not been moved out, the result for the crop of 1921 would have been disastrous. As it is a large percentage of the 1921 crop of dried prunes was sold at a very satisfactory price, and the indication is that the season will be a very profitable one to the growers.

The fall of 1922 will show probably wholesale houses and grocery shelves cleaned up of dried prunes. This will be a splendid condition, because it is anticipated now, that the crop of

1922 will be the largest in the history of the northwest, and will mean much to the industry to have the supplies at the lowest possible point.

All in all the outlook for the Pacific Coast Horticulture is very bright. With the canneries getting back on their feet, the supplies of fruits being exhausted, with new channels and new outlets being developed, with a greater tendency on the part of all concerned on the coast, to cooperate, the problems of the future should be solved.

MONTANA HORTICULTURE

F. M. HARRINGTON,
Bozeman, Mont.

An examination of census figures does not appeal to me as giving the exact situation of the fruit industry of a state or region. The census figures for Montana for the years 1909 and 1919 would indicate that Montana is decidedly going back, or at least not making any progress along the various lines of fruit production. In part, the figures show the correct situation; in other ways they do not.

The census figures released June 27th show the following:

APPLES —

Production in 1909 — 567,054 bushels
 Production in 1919 — 673,716 bushels
 Trees of bearing age in 1909 — 696,753
 Trees of bearing age in 1920 — 1,059,198

PEARS —

Production in 1909 — 7,543 bushels
 Production in 1919 — 3,960 bushels
 Trees of bearing age in 1910 — 10,297
 Trees of bearing age in 1920 — 10,278

PLUMS AND PRUNES —

Production in 1909 — 8,777 bushels
 Production in 1919 — 9,575 bushels
 Bearing trees in 1910 — 21,140
 Bearing trees in 1920 — 24,501

SMALL FRUITS —

Production in 1909 — 766,791 quarts

Production in 1919 — 338,087 quarts

Acreage in 1909 — 562

Acreage in 1919 — 386

Apple Situation.

A talk with various fruit growers in the Bitter Root Valley for example, leads a person to believe that the situation there is better just now than has ever been the case in that valley previously. The Bitter Root Valley is one of those sections which was strongly boomed by orchard development companies a number of years ago. In the course of this boom development, it is very noticeable that orchards were planted and an endeavor made to develop orchards in places absolutely unfavorable. An inspection trip which I made through the valley this fall revealed orchards planted on unsuitable soils. Other orchards were pointed out to me which are being caught practically every year by late spring frosts. Other orchards were found which had been put out above the irrigation ditch, inaccessible to water which is an absolute necessary in that region. As a result, a person will find many orchards in the Bitter Root Valley which are being allowed to go back. Many of them have already been pulled out and the land has gone back to the use for which it is fitted. In addition to the poor locations, one finds some of these orchards filled with any and all varieties of fruit. As a result of this some varieties are being produced in a quantity which has not warranted their being handled in a commercial way. Other varieties as grown are not equal to the same variety grown in other localities and as a result are not in commercial demand.

The Bitter Root Valley, we might say, is just beginning to get back to normal. The orchards in undesirable localities are becoming a thing of the past and the varieties in turn weeded out. This past two years, the fruit of the district has been handled mainly through a cooperative growers' organization. This organization has established central packing and grading houses equipped with modern machinery. The fruit of the members of this organization has all been graded and packed in these central packng plants and as a result the packing has been standardized to a greater extent than ever before. The state de-

partment has maintained inspectors in these houses to insure proper grading and packing. This organization alone is already beginning to show its effects and an improved situation is beginning to develop.

The Bitter Root Valley has not, and that is still the case, been bothered to any great extent with insects and diseases. The codling moth is almost unknown in the valley and scab shows up but rarely. Many orchards are producing good clean fruit without ever having had a spraying outfit working within their boundaries. This situation is changing somewhat. The blister mite and leaf rollers are comparatively new pests in the valley and have raised havoc in some orchards. Their presence is going to mean the equipping of orchards with spray outfits and the starting of a fairly general spray program in the valley.

The handling of the soil is a matter in which the Bitter Root growers are not keeping up-to-date. In other words, they are depleting their orchard soils and so far are doing very little to bring them back or to keep up the present fertility. Clean cultivation seems to be the general practice. Marked results have been obtained in a few orchards by the application of commercial fertilizers. Other orchards have shown marked benefit as the result of growing a legume such as clover. This question of fertility is one which the growers must meet if their orchards are to continue to do well.

Apple production as far as Montana is concerned, is the only line of fruit raising which is possible on a commercial scale. With the elimination of undesirable situations and unsuitable varieties and by meeting the soil fertility situation and the spraying question halfway, western Montana, with its many young trees just coming into bearing should make a material advance in apple production during the coming years.

Cherry Production.

During the boom period, sweet cherries were planted pretty generally in parts of Montana. These trees have, to a great extent, been killed out, showing that the state is not suited to the production of sweet cherries, at least. Varieties of cherries, such as the Early Richmond are being grown in a number of localities to good advantage but the demand within a reasonable distance does not warrant their being produced on any extensive com-

mercial scale. The total production of cherries should increase but mainly as a result of planting in home orchards with small commercial plantings in the vicinity of certain larger cities.

Plums and Prunes.

Montana cannot produce a drying prune. The Bitter Root Valley can, however, produce such plums as Lombard, Green Gage and the Pond Seedling Prune. As a fresh fruit, there is a limited demand for such material. The part of the state east of the Continental Divide is only suited for the growing of Americana varieties. The Yellowstone Valley can produce such plums to very good advantage and throughout the Great Plains area of Montana varieties of the native plums are found doing very well.

Pear and Peach Production.

Pears and peaches might be said to be absolutely out of place in Montana. On such peach trees as are found, a crop is obtained once in a while. With the pears, the blight is such a factor that none of the desirable commercial pears can be grown to any advantage. An increase in pear production cannot be expected.

Small Fruit Production.

The census figures show a decided falling away in the production of small fruits throughout the state. As a matter of fact it would seem to me one line of fruit growing that should become more general. Small fruits generally throughout the state will need to be given winter protection. By giving such winter protection the small fruits are being found doing fairly well in all parts of the state. Inasmuch as it can be so grown while other fruits cannot in all sections, a person acquainted with the growing conditions would have expected a decided increase rather than a decrease.

Montana can never hope to be one of the leading fruit states of the union. It can, however, increase its total production of apples and small fruits in part by a good percentage. Extension work is needed along small fruit lines in order to acquaint the people with the proper methods of handling small fruits under the varying conditions. Such extension service has not been available to date but is likely to be inaugurated this coming year.

CONDITIONS IN THE SOUTHEASTERN STATES

N. D. PEACOCK,

Knoxville, Tenn.

In the report which follows I have included statements from prominent men in many of the Southeastern States and in that way I have attempted to give a reasonable impression of the conditions as they are seen by prominent workers. I have, during the past few years been connected with the horticultural work in Georgia and more recently in Tennessee, and, therefore, base my report of these States, especially the latter, on my own observations and investigations.

All of the economic conditions in the United States now are so unsettled and during the past few years they have been so abnormal that it is rather difficult to distinguish the superficial expression of these abnormal conditions from the underlying forces which tend to stimulate or retard progress.

Statistics show that the production of apples in Tennessee in 1909 was 4,640,444 bushels while in 1919 the production was but 1,258,878 bushels. However, production varies so greatly in different years because of climatic conditions, that averages are more representative. The average production in Tennessee in 1911, 1912 and 1913 was 5,233,333 bushels, while the average production in 1915, 1916 and 1917 was 5,325,333 bushels which is an increase of approximately 2%. The average production in Tennessee during 1918, 1919 and 1920 was considerably less than this but exact figures are not at hand. A study of the statistics on the number of trees shows that in 1920 there were 34% fewer trees of bearing age and 51% fewer not of bearing age than there were in 1910. The greater decrease in the number of trees than in the production is largely explained by the fact that a much larger percent of the trees in the State in 1920 were in commercial orchards which received better care, and, therefore, yielded more per tree.

Several factors may be mentioned which have had an influence in bringing about these conditions. First: It is during this period that many of our orchard pests which are so serious now were introduced. These pests rapidly destroyed the small home orchards which were given no care and they made the cost

of growing good fruit in well cared for orchards so much greater that many of these were abandoned. Second: The scarcity and extremely high cost of labor made it difficult to care for large plantings and prevented the setting of new orchards. Third: The abnormally high prices offered for other farm products which could be produced in a short time discouraged the setting of trees which would produce nothing for several years. The last two of these were temporary, and methods of controlling the orchard pests have developed so that they are no longer so greatly feared. This, together with the high price which has been secured for fruits during the past two years as compared with the price of other farm products, has wonderfully renewed interest in orcharding. Growers who have stayed in the business and cared for their trees are optimistic. Their fruit has helped them over the slump in business and made the descent less abrupt. Communities where fruit is produced have passed through the hard times thus far much better than the average community.

At present there is a very decided tendency to increase plantings and to set new orchards. I have been told by the large nurserymen of Tennessee that their sales are surprisingly large this season. All of those to whom I have talked are having no trouble to dispose of their entire production. During the season of 1920 there were 2,750,000 June bud peach trees sold from one county in Tennessee. In another county in Tennessee there were 200,000 peach trees set last year and the year before and 150,000 have been ordered for this year. There are several large companies being organized in this State which anticipate the setting of large acreages in the near future. As I see the conditions in this State, therefore, they are very promising for the man who will care for his trees and I anticipate a material increase both in the number of trees and in the production during the next few years.

J. A. McClintock, Physiologist of the Georgia Experiment Station, calls attention to the fact that there has been a large tendency to plant peaches in the Piedmont section of Georgia during the past few years, but that there has been less planting in Fort Valley and the other older sections. He states that many old orchards are being reduced in size because of disease.

Mr. R. H. Black, a prominent apple grower of Georgia, reports a general optimistic feeling among the careful orchardists

and states that the careless grower must go out of business. According to Mr. Black there was heavy planting of apples from 1908 to 1914, but there has not been a general planting since.

H. W. Harvey, Extension worker of Georgia, attributes the reduction in number of trees to the destruction of home orchards by insects and diseases.

Dr. T. H. McHatton's, Horticulturist of Georgia, letter is enclosed and it gives a good idea of the present condition in Georgia. The opinions of these men cover the conditions very much as I have observed them myself.

H. Garman, Entomologist of Kentucky, says that during the war, planting was at a standstill in that State, but that his impression is that now there is a renewed tendency to plant. He said that no definite figures were available at present in that State.

W. W. McGill, Extension Horticulturist of North Carolina, could give no statistics, but reported a very large increase in the planting of peaches due to the past crop which was very successful. He also reports an increase in the planting of app'les at the present time.

G. C. Starcher, Horticulturist of Alabama, attributes the reduction in the number of trees to the ravages of insects and diseases. He reports a slight increase in the strawberry planting but no great movement. He says further, "Apples in Alabama have good bearing records and statistics show that the first class fruit in Alabama brings a higher price than in any State in the United States."

George P. Hoffman, Extension Horticulturist of South Carolina, couldn't give statistics but reported an increase in the planting of peaches. Much of South Carolina is not adapted to the growing of apples.

W. P. James, State Fruit Specialist of Mississippi, was very enthusiastic over the conditions in that State. I am enclosing a copy of his letter to me.

As is clearly shown in this report the prospects for the horticultural development of this section of the United States in the near future is very bright. The growers who are caring for their orchards are optimistic and they are the only ones who have a right to be. Every state and every section has its advantages but

in many ways it seems to me that Tennessee offers as great opportunities for development as any other state and I believe that during the next few years we will see much of this progress.

AGRICULTURAL COLLEGE, MISSISSIPPI,
November 28, 1921.

MR. N. D. PEACOCK, *Field Agent,*
Tennessee State Horticultural Society,
Knoxville, Tennessee.

DEAR MR. PEACOCK:

Mr. H. E. Kimball referred your letter of November 16 to me and it is with pleasure I offer the following facts:

There are absolutely no climatic, soil or geographical reasons why Mississippi should have suffered the decrease of 50% in her horticultural industry in the last ten years. In fact the three phases mentioned above are so favorable to commercial apple, peach, pear, grape, satsuma and strawberry growing that Mississippi bids fair to wonderful strides in commercial fruit growing in the future.

One year ago only 50 acres of commercial peaches were in Mississippi. During the planting season of 1920-21, 425 acres were added. One county alone put out 250 acres. There will be approximately 500 acres of commercial peaches planted in December and a large setting in February.

The Plant Board has issued 10,000 more nursery tags than last year and new capital and large land owners are beginning to investigate the commercial fruit possibilities. Four companies for growing peaches were incorporated in the state last year. The southern part of the state along G. & S. I. R. R. territory is especially adapted to fruit growing with rich clay subsoil land, and splendid drainage with good elevation.

The satsuma or kid glove industry is being developed along the coast and one individual now has out 5,000 2 year old trees, is setting 6,000 more and installing power spray outfits and a power grader in his new packing house.

The Mississippi Gulf region is in the small territory peculiarly adapted to satsuma growing.

The State Horticultural Society which was allowed to divide and disappear in the past ten years, has been revived and the Annual Convention is to be held in December and is meeting with enthusiastic support throughout the State.

Home orchards are being planted extensively throughout the State with over 7,000 nursery orders having been sold in Mississippi last year. The strawberry acreage has been tripled for the coming season and two new points organized and placed on a stable basis.

Commercial fruit growing in Mississippi is fast approaching volume enough to insure its becoming one of the State's leading industries in the near future.

Very truly yours,

(Signed) W. P. JAMES, *State Fruit Specialist.*

NOVEMBER 21, 1921.

MR. N. D. PEACOCK, *Field Agent,*
Tenn. State Horticultural Society,
Knoxville, Tenn.

DEAR PEACOCK:—

Yours of the 16th. received.

I am glad that you are going to be able to go to the American Pomological Society meeting in Toledo, and if you are going to be there, there is no necessity for me to write a report for that Association as my report was only to be presented in case you did not appear, or so I understood, and I would be only too glad for you to incorporate in your report anything that you might from this section.

I do not think that I have anything beyond what you already know concerning conditions in this state. Of course you know we lost the apple crop, shipping somewhere around 200 car loads from Cornelia. The movement of the peaches was the greatest in the history of the state, being 11,000 car loads. The

producers made some money out of this crop. The speculators and buyers, however, claim that they, themselves, made little or nothing. As a matter of fact, they lost due to high freight rates. We have an exceptionally good pecan crop. The estimates, however, are not now available. Some varieties have been very seriously affected by scab in certain localities, but, in general, the crop is a good one and should move at a good profit. The watermelon crop was exceptionally big, there being about 12,000 cars shipped from the state. This was a very opportune crop, as it furnished considerable ready money just at a time when the farmer needed it and, as a matter of fact, the watermelon crop tided over the section which produced them and they are not suffering as seriously from the depression as the other sections of our state.

As a matter of fact, the horticultural industries of Georgia have been those that have seemed to help the farmers out in this present terrific cotton situation, and the horticulture of this locality is certain to be on the increase for the next few years. It will be the work of those interested along these lines to so direct those taking up the various horticultural ventures that they may be turned into profitable investments rather than into sink holes, out of which returns may never be expected.

For your own information, I would suggest that you also include the report on Florida, which at this time has one of the largest citrus crops in its history. It is to be hoped that this crop will greatly help the financial conditions in that state. I also further understand that there is a good satsuma crop around Mobile. Generally speaking, the other southern states are not as successful, horticulturally, as Georgia, due to the fact that a frost last year practically wiped out their peach prospects.

You can take this letter with you if you care to, or put it in as part of your report.

Trusting that this will help you and that you will have a good trip as I will not be able to be there, I beg to remain

Yours very truly,

T. H. McHATTON, *Horticulturist.*

MISSOURI

V. R. GARDNER, COLUMBIA, MO.

COLUMBIA, Mo.,
December 6, 1921.

In answer to your request for a report on conditions and outlook in the fruit industry in Missouri I may make the following brief statement. For a period of ten years there has been a gradual decrease in tree numbers in Missouri. Some new plantings have been and are being made, but I do not expect that they will make up for the losses for a number of years to come. In other words I expect a still further decrease in the number of bearing trees in this State, particularly apples. On the other hand I expect our average annual production to stay stationary because better care will probably be given to the orchards that remain. I doubt if Missouri is raising as many apples on the average as it consumes. Of course each year there is a crop of apples shipped out, and others are shipped in.

With other fruits the supply does not meet the demand, the small fruits particularly being very high priced. There is every reason to believe that this conditions will prevail at least for another decade, and probably very much longer. The only section of the State in which there is a boom to the fruit business is in Southwestern Missouri where they are making extensive plantings of the grape, especially the Concord which will be grown rather largely for grape juice purposes.

FRUIT IN NEW MEXICO

FABIAN GARCIA

The fruit situation in New Mexico has been more or less at a standstill since the war. That is, there has been no additional planting of large plantations. However, just now there is a marked interest taken in the planting of grapes, and I look for a good many vineyards to be put in this coming spring. The vinefera grape is the one that is planted in this section of New Mexico. The grape is one of the surest bearers of any fruits

under our conditions, because it begins to grow later than any of the other fruits; and thus it escapes considerable frost injury from the late spring frosts that frequently destroy the crops of other fruits.

In some of our fruit growing sections there has been a great deal of neglect in caring for old orchards, and as a result of this they decline very fast. On the other hand some of the young orchards that were planted five or six years ago are now coming into bearing, and in a general way, I am safe in saying that at present we have about the same number of bearing trees that we had a few years ago.

Due to the low prices for farm products I begin to see some new interest being taken in orcharding; and if nursery stock was not so high, I believe there would be considerable planting of small plantations at this time. I am inclined to believe that the old idea of planting large plantations is a thing of the past in this country, as it takes too much time and money to manage them. I feel that the future fruit business in New Mexico will develop along small, but more numerous, plantations, so that the individual growers can take care of them, instead of having to hire everything done as has often been the case in past years.

In New Mexico fruit growing can only be carried on successfully in the irrigated sections. On account of the high price of land and water our land owners are beginning to realize that they must grow more intensive crops than wheat, corn, or even alfalfa. So I feel that there are some chances of development along fruit growing.

FRUIT PRODUCTION IN PORTO RICO

BY T. B. McCLELLAND, *Horticulturist*,
Porto Rico Agricultural Experiment Station

Twenty years ago the fruit exported from Porto Rico was of little economic importance. Then its total value amounted to but slightly more than a hundred thousand dollars whereas today it does not fall far short of four million dollars. The fruits involved in this great change are grapefruit, oranges, pineapples, and coconuts.

The grapefruit groves are located principally in the vicinity of San Juan and along the north coast from San Juan to Arecibo and for the most part are in the hands of Americans. They have been planted and tended in systematic fashion and many of them are served by large community packing houses.

Duncan is the variety generally preferred. The quality of the Porto Rican grapefruit is high. The cost of production ranges anywhere from \$1 to \$2 per box. The department of farm management of the Federal Agricultural Experiment Station has estimated that in 1919 it cost from \$1.40 to \$1.70 to pick a box of grapefruit and place it in the auction room in New York. This means that the total cost to the grower may range anywhere from \$2.40 to \$3.70 a box plus a 6 per cent selling commission. During September and October prices are always high and the growers ship at that time all fruit which is available, a quantity however not very great. More than \$13 a box has been paid for extra fancy fruit. Due to heavy shipments from Florida and Cuba which compete with Porto Rico, prices are much lower thru the winter but rise again in the spring.

The Experiment Station is actively engaged in a study of citrus storage and of decay in transit. Other problems which confront the growers are the control of scab which makes much excellent fruit unsightly, and the profitable utilization of good but unattractive fruit.

In the past, the fruit growers have felt greatly handicapped thru lack of properly equipped steamers. This autumn a new line has entered the Porto Rican trade offering both ventilation and refrigeration for fruit shipments.

Most of the Porto Rican oranges are grown under very different conditions from the grapefruit as they are chiefly what is known as "wild fruit", that is, the produce of scattered trees found growing wild here and there through the country, principally in the coffee-producing sections. They are frequently carelessly picked and handled and often must be brought over long stretches of rough road. The owner receives relatively little for them, the crop being bought up by a few packers in the larger ports. These oranges are of delicious flavor when properly mature but many are shipped long before they are palatable.

Numerous sections of the interior are too inaccessible to permit exportation of the orange crop which proves nevertheless of economic importance in adding to the peon's food supply. The value of oranges exported has exceeded a million dollars in the years of heaviest shipments.

The pineapple growers have been this past year perhaps the most prosperous agriculturists on the island. Pineapples have sold at good prices thruout the season, the very fanciest fruit bringing more than \$13 a crate. Pineapple exportations show a decreasing production for the past few years. From 1906 to 1915 the increase was constant at which time the value of pineapples exported reached nearly $1\frac{3}{4}$ million dollars. Since then there has been a steady decline with an insignificant rise in 1920.

The pineapple growers are confronted with the difficulty of producing sufficient slips to maintain their plantings, the production of fruit of sufficient size for profitable shipment, and the necessity of a change of location as the same field does not produce profitable crops indefinitely.

The value of cocoanuts exported has increased steadily from \$8,334 in 1901 to \$1,142,412 in 1920 and the many young plantations along the coast point to a continued increase for some years. This is generally regarded as one of the safest of tropical investments and the cocoanut grower has fewer problems to meet than almost any other agriculturist.

Other fruits such as bananas, mangoes and avocados play an important role in the local food supply, but up to the present have been of little significance otherwise. All are abundant and better shipping facilities may mean their future transportation to the mainland. The Guatemalan avocado, more suitable for shipping than the West Indian type, is being tested at the Experiment Station where also many selected varieties of mangoes from other tropical regions have been extensively planted. To some of these choice mango importations the new environment has proved admirably adapted.

ALASKA

C. C. GEORGESON,
Sitka

The only fruits we can produce in Alaska are berries. Strawberries, raspberries, currants and gooseberries in all varieties do remarkably well, also about five or six species of native *Vaccinium*, but we are too far north to mature apples or any other tree fruit except when we happen to have an occasional very favorable season. In 1915 the season was of this character. We then matured early summer apples at the Sitka Station and also sour cherries in several varieties. The sweet cherries have never matured at Sitka nor have we succeeded in growing any variety of plums. We have a native crab apple that bears fruit every year. It is *Pyrus rivularis* (*diversifolia*). This year the crab apples have had a fine crop. These wild crab apples make excellent jelly. The Yellow Transparent has been our most successful apple and it matures only in favorable years.

THE PRESIDENT: So far as I know these are all the papers under these two headings — that is, all the persons who are here with their papers. If that is the case we will go on with our program.

Many years ago I was asked to discuss before a horticultural society the question whether there is likely to be an overproduction of fruit. Not knowing the facts, I engaged in speculation, and I remember starting with the premise that a certain percentage of failure follows human effort and that a certain percentage of accidents always occur, so that we could not expect anywhere near all the plantings to mature to bearing trees, and I gave at that time some figures. I am glad to say they were borne out by the census of the United States a third of a century later.

Now we are up with our program, and we are to begin with a discussion of "The Relationship Between the American Pomological Society and Allied Industries."

Before I call on the next speaker I wish to inject another statement in regard to the supper this evening. It is not merely

the coming together of a few persons here, it is a regular meeting of the American Pomological Society, and in order to save time and have a little pleasure we are to sit around the tables and have some discussion. There is no regular subject on the program for discussion, but this morning, as you will recall, the suggestion was made that certain of the questions raised in the President's Address, and also in the report of the committee who reported on that address, be discussed this evening. This discussion will be perfectly harmless, because the Society has adopted the recommendations.

We will now hear the paper of Mr. F. P. Downing of Indiana on the subject mentioned before.

THE RELATIONSHIP BETWEEN THE AMERICAN POMOLOGICAL SOCIETY AND ALLIED INDUSTRIES

F. P. DOWNING,
South Bend, Ind.

I wish to preface my paper by saying that I have not a single figure from the 1920 Census Report. (Applause).

It will be impossible in the short time allotted to the discussion of the relationship between the American Pomological Society and Allied Industries, to do more than outline in a very brief manner a few of the more important existing relations and I shall confine my remarks to two phases of the problem that I believe are of fundamental and of prime importance. Briefly, these two phases, can be boiled down so that they can be expressed by the two words — Interdependence and Cooperation.

It shall be my purpose, therefore, to show on the one hand the dependence of Allied Industries upon the fruit grower and on the other hand I wish to show that the prosperity of the fruit grower depends in a very large measure upon the prosperity of these Allied Industries.

First, what industries are so closely related to the growing of fruit that they can be called Allied Industries? Among the chief industries of this nature may be mentioned the Spray Companies that furnish chemicals and appliances for spraying orchards, the Fertilizer Industry, Farm Implement Manufactur-

ers, Orchard Supply Companies and Fruit Package Manufacturers. As I am more familiar with the Fruit Package Industry than with the other lines of work referred to, my remarks, while perhaps applicable in many ways to conditions existing in all these industries, will be particularly applicable to the industry with which I am directly connected, that is, the manufacture and sale of fruit packages.

The factory that manufactures fruit packages, and fruit packages only, is absolutely dependent upon the fruit growers of the country for its market. When there is a large crop of fruit there is a big demand for fruit packages. When the fruit crop is a failure the factory has no outlet for its product. The fruit package manufacturer is, therefore, vitally interested in the dissemination of information that will be helpful to the fruit grower, for he realizes such information will be helpful in his business. The publishing of market and crop reports; the dissemination of information of an educational nature that will help fruit growers in increasing production or improving grades are of great value to the fruit package manufacturer as well.

This interdependence of grower and package manufacturer can be illustrated in no better way than by referring to the disastrous frosts of last spring that swept over the country from New Jersey to Oklahoma destroying all prospects of a bumper fruit crop in some thirteen or fourteen states. This shortage in fruit was reflected in our business this past season in these thirteen states to the extent of some 700 carloads of baskets. I simply mention this to show how dependent the fruit package manufacturer is upon the size of the fruit crop for a successful business. With no fruit to market there is no demand for fruit packages. The factory must close its doors and there is no return to the stockholders on the capital invested.

Now, let us look at this matter from another viewpoint. Just as the factory is dependent upon the grower so is the grower dependent upon the factory for his financial success. He must have fruit packages in order to get his fruit to market in proper condition. Let us suppose, for example, that one half of the fruit package factories in the country were to be destroyed within the next three or four months by fire. You can readily see what a disastrous effect this would have upon the fruit grower. Unable to obtain a sufficient number of packages he would be

unable to place all of his fruit upon the market and the returns for his year's labor would be very materially reduced. Now, of course, it is not at all likely that half of the factories in this country will be destroyed within the next few months, but right now there are many serious problems confronting the fruit package industry that may have most disastrous results.

Like the fruit grower the manufacturer is in business to make money; like the fruit grower he is satisfied with a fair profit; like the fruit grower he can take his losses for one or probably two years as he has done during the past disastrous season, but he cannot keep this up indefinitely. I do not believe that there is a fruit package manufacturer that has made any money the past season, but I do know that most of them have sustained serious losses. They have been taking their liquidation. It has cost our New York factories more than \$2.00 a dozen to turn out baskets this past season without taking into consideration the selling overhead or the payment of freight. If this condition continues for any great length of time fruit package manufacturers will be obliged to shut down. In fact, a number of manufacturers have made it known to me this season that unless they can get a fair return for their packages they will turn their capital into other lines of industry. The shutting down of a considerable number of factories would, of course, be disastrous to the fruit grower.

Now, this brings me to the second phase of my discussion, namely that of Cooperation. The fruit grower of today should be vitally interested in the success of the package manufacturer. Where are the factories going to obtain their raw material? Timber is getting scarce. The big problems of reforestation should be of as much interest to the fruit grower as they are to the package manufacturer. Yet, very few growers see it in this light.

It is true that the grower has problems in which the package manufacturer is not interested just as package manufacturers have problems that do not concern fruit growers, but there are many important matters in which both are vitally interested and which can only be handled by an organization such as the American Pomological Society in which both fruit growers and Allied Industries are represented and where it is possible to get to-

gether and talk over problems that are of equal concern to both. This is true Cooperation.

I know that you will pardon me if I take just a moment to show you the feeling of cooperation toward the fruit grower that exists in the minds of the officers and directors of the corporation with which I am connected. I am going to take you back a few years and refresh your memory regarding the conditions existing in the fruit package industry at that time.

In the fight for business between manufacturers price cutting was rampant and quality of output forgotten. Conditions became so bad that it finally became necessary for the fruit package manufacturers either to organize or go out of business. Some twenty fruit package manufacturers set aside their personal grievances and incorporated as the Package Sales Corporation of South Bend, Indiana. After the organization of this new company conditions improved somewhat but not as fast as the officers of the corporation desired. Something was wrong. The bushel basket had a bad name in many of the leading markets of the country. It failed to satisfy the fruit grower, the carrier and the receiver. The directors of our organization decided that there must be a change in the attitude of these parties towards the basket. They felt that this could only be accomplished by rendering the fruit grower a real service and thru him the other interested parties would likewise be benefited.

To do this a Service Department was established. About two years ago I was put in charge of this newly created department. Instead of selecting field men from the ranks of the package industry I informed our directors that we must obtain men who were conversant with the problems of the fruit grower. One of our men was an extension horticulturist in one of the leading fruit states, another was in charge of the spray work conducted by a State University, another was taken from the Bureau of Crop Estimates, a fourth was a trained marketing man taken from the Market News Service of the Federal Bureau of Markets, and the fifth a man who has made a record for himself as a County Agent in a fruit county. These men were brought together, the condition of the basket industry was made known to them; they were sent out into their respective fields and were told to make a careful study of the situation. After

doing this they were brought together and we began to formulate our plans.

It was found that the fault stood in part at the door of the fruit package manufacturer and in part at the door of the grower. First, it was decided that the quality of baskets must be improved. Our field forces noticed that enormous losses were sustained through the manufacture of defective baskets. This matter was very carefully studied. A series of tests were conducted at the Forest Products Laboratory, Madison, Wis., with the object in view of determining the proper design and correct strength specifications for a good basket.

Experimental shipments of fruits packed in baskets constructed in accordance with the new specifications were made both by freight and by express and the weak points discovered. Finally the present wide bottom basket with star hoop cover was settled upon a satisfactory to the needs of the shipper.

The field investigators emphasized the fact that the basket was given a black eye largely because of the poor quality of fruit marketed in that container. Because of this general condition basket apples, regardless of quality, were often penalized on the markets. A campaign for better packing in baskets was then instituted. By means of addresses, publication of service literature and proper advertising, we are getting growers to see the need of careful packing in the basket, and for the first time this year apples in baskets brought better returns than apples packed in barrels.

Our Field Department reported that oftentimes baskets of proper construction and carefully packed did not arrive at destination in good condition because of the ignorance or lack of knowledge of many shippers in correct methods of loading. A careful study of proper methods of loading was instituted and as a result a Loading Booklet was prepared and distributed. The loss and damage claims against the railroads have been materially reduced this past season due in part at least to this booklet.

Our Service Department is now getting ready to demonstrate to the apple grower that he can pack and store his apples in bushel baskets with even better results than he can in barrels. We expect within the next few months to get out a booklet showing proper methods of storing apples in baskets but we do

not intend to stop here. We intend to go on and work out a package that will be suitable for export trade.

In our study of marketing conditions we know that the tendency is towards the use of a smaller container than the barrel. The barrel people already recognized this demand and at their last meeting in Atlantic City adopted the half barrel as a shipping container for apples. In doing the above lines of work we are not guided entirely by altruistic motives. We know that by making the basket popular we are increasing our output and developing the basket industry.

Service work of the type just mentioned can only be carried on at considerable expense. It will not pay our organization to carry on this line of work indefinitely unless we receive the backing and cooperation of the progressive fruit grower. We know that the fruit grower who makes use of our Service Department will be amply repaid in net returns on the fruit grown and marketed. I wish to emphasize the fact that our Corporation is doing more than selling the grower fruit packages. We are selling him a service that he cannot obtain through any other source. That service should be worth money to him. He should be willing to share at least a portion of the expense. The success of our Service Department depends upon a true cooperation, therefore, between the fruit grower and the package manufacturer.

There is need of education, or publicity, of a knowledge of actual conditions. Many growers are of the opinion that all fruit baskets are of the same grade or quality. It is true that baskets look alike but there is as big a difference between a good basket and a poor one as there is between daylight and dark.

I believe that an organization like the American Pomological Society could render both grower and package manufacturer a real service by making an unbiased study of this question. I do not ask you to take my word for anything but I do ask you to investigate. If our service is not worth anything to the grower it is a needless expense and it will be to the interest of both parties to have it discontinued at once. If it has a real value that fact should be given due publicity. Is this not a true function of the American Pomological Society?

A grower may be able to obtain packages from manufacturers not maintaining a Service Department at a price of from ten to twenty-five cents a dozen less than the container that we

manufacture but if in so doing he gets an inferior package, no service, no promise of prompt delivery, no surety that he will be able to obtain this package at all, the chances are that his net profit will be less than had he paid a few cents more for his container.

The successful business man of today realizes that the selling game is different from what it was a number of years ago. There is a changed attitude. To be successful in business today you must render a real service to your customers. You must not only sell them a manufactured article but you must guarantee quality, delivery, and above all, you must give them an article that is suitable to their needs. This is a practical problem and it deserves a practical answer. An organization like the American Pomological Society can be of great value to its members by combining theory with practice. The colleges of today, through Extension Departments, and close association with the various farm movements are trying out many different theories, finding which are practical and which are impractical. Their work can be supplemented by such an organization as the American Pomological Society.

Until quite recently most colleges and government activities were directed towards increasing the production of farm products, by studying processes of plant growth, spraying, cultivation, fertilizing and so on. But we are beginning to realize today, that the problems of finding a market for our fruits, of getting our fruits to market in proper condition are of equal importance, and I believe that this association should make a careful study and analysis of marketing conditions. Its fields of activities are much broader than the activities of the Service Department of the Package Sales Corporation, which is confining itself to the development or improvement of marketing conditions with one container.

The fruit grower of today must organize. It is only through organization that we can get anywhere. Working as individuals, it is true, we may accomplish something but by combining our strength through an organization such as this, through lending it our undivided support, we can obtain a much greater return than we can by working independently. Think of the national problems that an organization like this might handle. One needs but mention such problems as crop reporting, market demands,

improved methods of production, proper methods of distribution, traffic problems and legislative matters. Combine with these the dissemination of information relative to proper methods of packing, loading, storing, shipping and marketing and you will see that the field is unlimited, that it cannot be carried on except through a National organization with sufficient funds to maintain the right kind of an office, the right kind of help and the proper machinery for getting the information to the members.

At this very moment there is an important piece of legislation pending that should receive the undivided support of every member present. I refer to H. R. 7102, known as the Hamper and Basket Bill. This bill was introduced in the last session of Congress, was reported on the floor of the house favorably, but it has failed to pass thus far because the industries that are vitally affected have not shown a sufficient amount of interest to make the passage of the bill possible. As I stated this bill is of vital importance to every fruit grower. It provides for standard packages, standard bushel baskets, standard hampers and standard market baskets. It gives the Secretary of Agriculture power to prescribe regulations, it provides for the marking of the capacity on these packages, it provides that these baskets be made in accordance with certain strength specifications. It will improve the quality and cut down the number of packages and in that way will have a tendency to simplify factory operations and that, of course, will result in lower prices.

If the American Pomological Society has a Legislative Committee, I am going to ask that committee to investigate the provisions of this bill and if they find the same satisfactory that they instruct the Secretary to get busy and use his influence to see that the bill is passed at the coming session of Congress. I have copies of the bill with me and would be glad to give the same to individual members and I know that after reading the same it will be a pleasure to you to write your Congressman urging him to get back of the legislation.

In conclusion let me say that I believe the two main factors — Interdependence and Cooperation upon which I have briefly dwelt furnish the basis upon which the fruit grower will find it to his best interest to establish intimate and friendly relationship with Allied Industries. Your problems are our problems and

our problems should be your problems. Let us hope that this will be the ultimate outcome of your deliberations.

THE PRESIDENT: You have heard this very valuable paper which certainly opens up a new line of thought. Mr. Downing has mentioned Bill H. R. 7102, the Hamper and Basket Bill. This Society certainly must inform itself upon the movement in regard to packages, for this will take on international scope before long.

Is there any discussion? If not, we will pass to the next number, under this same heading of the relation of this Society to allied industries.

I was interested in the remarks of Mr. Gould, the chairman of the committee on the President's Address, when he said that we had heretofore made a mistake in thinking that our committees should have a large geographical spread, as a result of which they could not get together. I think that is true, and in appointing the Committee on Nomenclature I will name:

H. P. Gould, Washington, D. C.,
 U. P. Hedrick, New York,
 W. H. Chandler, New York.

We will now hear the paper of Mr. Gail T. Abbott of Ohio.

HOW CAN THE AMERICAN POMOLOGICAL SOCIETY
 BE OF INTEREST AND BENEFIT TO THE FER-
 TILIZER INDUSTRY SO FAR AS IT IS
 CONCERNED WITH ORCHARDS?

GAIL T. ABBOTT,
Medina, Ohio

When the American Pomological Society adopted its new expanded program at its Annual Meeting in 1920 the allied commercial interests which are vitally interested in the production of good fruit and more of it were given representation in the organization.

As one of the representatives of the fertilizer industry we gladly avail ourselves of the opportunity to make suggestions which we believe the Society might adopt to our mutual profit.

Since funds are provided for our Experiment Stations to be used in obtaining needed information along horticultural lines, I believe that we may well ask them for more information along the following lines. When Mr. Ballou started his pioneer work with fertilizers in the old orchards of southeastern Ohio, he arbitrarily assumed 5 lbs. of nitrate of soda, 5 lbs. of acid phosphate and $2\frac{1}{2}$ lbs. of potash to be the correct amount to apply to each tree. His work confirmed by that of many other experimenters has pretty well established the fact that nitrogen is the only element of the three commonly purchased in fertilizer, which will greatly increase the fruit crop. The majority of experimenters have made about the same application per tree as Mr. Ballou. Some of our best apple growers are coming to believe that 5 lbs. of nitrate of soda or sulphate of ammonia per tree is not enough and that twice that amount is frequently highly profitable. We know of two of the best apple growers in the state of Ohio each of whom is making a second application in June on the trees which are carrying a heavy set of fruit. Each of these men feels satisfied that he is not using any more nitrogen than is profitable.

We need a large number of experiments conducted on the different types of soil to determine more nearly the advisable amounts to use.

Truckers have found it profitable to make two or more applications of nitrate of soda to their crops, because of the extreme ease with which nitrate of soda may be leached from the soil. Because this is true in the case of truck crops some have thought that better results might be secured on fruit if several applications were made instead of one. Professor Roberts of the Wisconsin Station and many other authorities are now advising that we apply soluble nitrogen two to four weeks before the buds open, yet we need more work so that the question may be answered with authority by the experiment station in each state where fruit growing is of any importance.

Another question which arises frequently is the relative speed with which nitrate of soda and sulphate of ammonia will produce results when applied to tree fruits. The small amount

of work already done seems to indicate that no difference can be noted. In a few cases experimenters thought they observed a change in color of foliage sooner where sulphate of ammonia was applied than when nitrate of soda was used. The majority report that no difference could be detected. We need many more experiments to enable us to speak with assurance on this point.

When we discuss fertilizers for peaches we are more at sea than in the case of apples. While Alderman and a number of others have done some excellent work on peaches, the large percent of work on tree fruits has been done with apples and conclusions and recommendations for other tree fruits are largely based on the results of experiments with the former.

Peaches grow and produce fruit in an entirely different way from apples and we need much more work before we can say whether soluble nitrates should be applied to peaches at the same time we fertilize apples, or later in the season. We know that a peach tree will profitably use much larger quantities of nitrogen than an apple tree of the same age, because it comes into bearing and is gone and forgotten before the apple tree begins to bear, in many cases. How much nitrogen can it use? Should it be applied early, or later in the season? Should there be two applications, or only one, and should the same rule be followed when using sulphate of ammonia as when nitrate of soda is the carrier? Who can tell?

If our information on these points regarding apples and peaches is limited, what shall we say regarding pears, plums and cherries?

Pear growers have always had a great deal of trouble with pear blight, which has apparently been worse where there was a large amount of new wood. For this reason the opinion has been prevalent among growers that nitrogen should be used with a good deal of caution, yet the Oregon Station in an experiment with Winter Nelis pears used 5 lbs. of sulphate of ammonia and 10 lbs. of nitrate of soda per tree with very satisfactory results.

On plums and cherries we have practically no information regarding all these questions.

There is very meager data for guidance in applying fertilizers on the bush fruits and vines such as raspberries, black ber-

ries, currants and gooseberries. The best we can do at present is to reason from limited information we have on apples.

The Geneva Station in New York has done some good work on grapes, but only a beginning has been made.

Many of the results obtained by experimenters on apples are so absolutely at variance that the reader is tempted to inquire whether we know anything at all. In some of the older work some of the orchards were in sod while others were cultivated and cover crops sown. In some cases the nitrogen was applied in May or June and in others early in the spring. One experimenter may have applied nitrate of soda in a cultivated orchard very early and heavy rains leached it all away before the trees could make use of it. Another applied sulphate of ammonia on sod at the same time and had fine returns. The next man used sulphate of ammonia on sod in May and got nothing for his investment, while still another used nitrate of soda in two applications on sod, one early and the other the fore part of June with splendid results.

Can the amateur who reads these conflicting reports reach any safe conclusions? It seems to me as a Society we might recommend work along some of these lines which in time would give us information which we could follow in planting a commercial orchard with a reasonable expectation of getting results.

Could not we appoint a committee whose duty it would be to go carefully over the experiments already made and recommend to the experiment stations a program which we would like to see followed out?

I realize that it is a difficult problem, because the life of an apple orchard from setting to the end of its usefulness may cover a period of fifty or sixty years. The soil where it is located must be uniform in type and fertility. The varieties of apples on the different plots must be the same. The plots must be of considerable size. Experiment station workers hesitate to start such work, fearing they will be dead and gone before results will be obtained which will be of value. Experiment station regimes change and workers are removed by death or otherwise. New men are inclined to wish to start new work of their own instead of carrying on work started by someone else.

The advice and backing of this Society could do much to

encourage the starting and continuation of some such work as we have outlined.

I believe I voice the best thought in the great fertilizer industry when I say that we are willing and anxious to supply the fruit grower with the plant food which will give him the most satisfactory returns, not for one or a half dozen years, but for the entire life of his orchard.

In order to do this we must know what is needed.

We look to the experiment stations to supply this information.

THE PRESIDENT: This is a very interesting subject and probably in the older days would have aroused a great deal of discussion. Have you anything to propose in regard to these various suggestions?

Mr. Cashman of Minnesota is not here, but I understand that Mr. Paul Stark has his paper, and we will have him read it now.

PAUL C. STARK (Missouri): Mr. Cashman wrote me that he greatly regretted his inability to attend the meeting, but he had already accepted another appointment so the best he could do was to write his message and send it to the members of the American Pomological Society.

COOPERATION BETWEEN THE AMERICAN POMOLOGICAL SOCIETY AND THE NURSERYMEN

M. R. CASHMAN,

President, American Association of Nurserymen

The American Association of Nurserymen greet you and extend to you their hearty congratulations and best wishes for a successful and profitable conclusion of this, your annual meeting.

We nurserymen appreciate, perhaps more than anyone else, the noble impulses which prompted the birth of the American Pomological Society, and we look upon it as an instrument and means through which many providential blessings are bestowed upon mankind.

The ambition and desire to know nature and to search her marvelous treasury for new fruits and new flowers is indeed most laudable, and we can look upon the American Pomological Society as a congregation of men and women, prompted by lofty ideals unselfishly laboring in the garden of nature in order that this old world may be a better place in which to live.

The nurserymen are keenly interested in the work that this Society is doing for are we not following the same line of endeavor in our propagating fields that you are in your experimental plots. You may be working to originate or improve a variety of fruit while we are engaged in disseminating those of recognized merit. Without the pomologist the country would be destitute of many of the valuable varieties we now enjoy, and without the nurserymen our orchardists would be unable to obtain these valuable varieties even after they were originatd.

Your success is our success for our business is affected directly when something new is brought out that the American planter finds more profitable to grow than that he already has. Progress has always been a watchword of the American people; our forefathers laid the foundation of prosperity and left us a heritage of wealth and abundance, and our own generation has carried forward the banner of progress with no slackening of speed. The American business man as well as the American fruit grower never hesitates to replace the old with the new, if, by so doing, he can increase his returns. American genius has led the world in working out improved methods to increase production, and in the horticultural field we are not behind in the origination of new and valuable fruits for the fruit growers orchard.

This latter field indeed offers great and interesting opportunities to the nature-loving genius of the horticulturist, and it is not at all surprising to find in the ranks of the A. P. S. the names of men whose contributions to science and big business have made them internationally famous. The farmer, the orchardist, the nurseryman, the merchant, the doctor, the lawyer, the educator, the statesman, the author, and the naturalist, all find common ground in the pomological garden and therein commune with nature in the study of her charming mysteries.

Your Society, embracing, as it does, men and women endowed with such noble impulses and coming from all walks of life, can not fail to attract national attention to its work. The fruit grower is eager to adopt the new and improved methods of orcharding which you have worked out; he is eager to put out a new orchard of some new or improved variety which your organization recommends.

The fruit grower looks to you as a guiding hand in the conduct of his business. The nurseryman does not neglect to note the results of each year's experiments which your members are carrying on in all parts of the United States. Every improvement made either in the bringing out of a new variety of fruit or by improved orchard methods, vitally effects the nurseryman for when you assist the fruit grower to make his plantings more profitable, you also assist the nurseryman to sell more trees. The commission merchants, the transportation companies, the fruit dealers, and many other avenues through which fruit trade passes have been benefited by the work that this society has done and will continue to benefit just so long as your efforts are directed in the channels they now are. Your field of endeavor is not only extensive but very fertile.

You have achieved success, for the bounteous harvest of new luscious fruits speaks eloquently of your endeavors. Your labors, however, are just beginning for I feel sure that you recognize the tremendous possibilities that lie before you.

Let me urge upon you that you give no less attention to the essentials of fruit growing and fruit marketing that today seem to be very much neglected in so many sections of this country. The fruit grower needs your supporting hand and advice in order to make his business more profitable. The fruit industry does not afford the profit that it should because of the fact that scientific and practical methods are lacking.

Our state agricultural colleges and the U. S. Department of Agriculture have done and are doing great good throughout the country, but one central organization such as yours is highly desirable and necessary for the successful development of the fruit growing industry.

My heart is with you today and may God continue to bless your work. I would very much like to have met with you, but the distance and other vital matters make it necessary for me to

send my message. I trust that you will appreciate the fact that the American Association of Nurserymen is with you in all that you do. We feel a part of you and hope to assist in making the A. P. S. the dominant factor in promoting the fruit industry of American by urging every nurseryman in the U. S. to join your Society. Again I say, your success is our success.

THE PRESIDENT: We are now ahead of our program, and I propose we take an intermission before we go on with the program.

INTERMISSION

The American Pomological Society aims to be what its name indicates, really American, that is, international. The First Vice President is Profesors Macoun of Ottawa, who has served this Society for many years with ability and devotion. We are very sorry that he is not here to help us this year. As far as I know only two people from Canada are in attendance at this convention, and fortunately they are both to present us with papers.

The first one will be on "Commercial Fruit Growing in Canada," by Mr. C. W. Baxter of Ontario. Mr. Baxter is connected with the Department of Agriculture and has had charge of the fruit growing statistics and similar work.

I am obliged now to go to a meeting of the Executive Committee and I will ask Mr. Gould to take the Chair.

COMMERCIAL FRUIT GROWING IN CANADA

C. W. BAXTER,
Ontario, Canada.

I deem it a privilege to attend the Annual Convention of your Society and discussion with you for a short time some of the problems of the fruit industry. I am glad to have the opportunity of publicly expressing my great appreciation, also the appreciation of the fruit growers of Canada, of the generous cooperation and assistance we have received from the fruit growers in the United States and from your Federal and State Departments of Agriculture in our efforts to promote the fruit industry

of our Country. You are very generous in giving us the results of your many experiments along various lines and in forwarding direct crops and market information which we include in our Crop and Telegraph Market Reports. These reports are supplied free of charge to our fruit growers, shippers and dealers, thus enabling them to determine values and to find the most profitable market.

The production of fruit in Canada as compared to the United States is very small and it is of great importance to our industry that we keep very closely in touch with fruit growing on this side of the line. It is also desirable that the fruit growers on this side of the line should keep in touch with activities in Canada. Therefore, we have a great deal in common and meetings of this kind afford an excellent opportunity to get together and talk over the whole situation to our mutual advantage.

I have been requested by your President to speak to you on the outlook for commercial fruit growing in Canada and I shall be glad to refer briefly to conditions during the past few years, present conditions and our outlook for the future. As you know, we do not grow as many kinds of fruit in Canada as you do on this side. Our colder climate will not permit it and, in order to make what I wish to say as clear as possible, I will divide the fruit grown commercially into three classes: first apples, second tender fruits and third small fruit which includes strawberries, raspberries, currants and gooseberries.

Apples—As the distance between our Eastern Coast and the Pacific Coast apple producing provinces is approximately 3,000 miles it is quite natural that there should be considerable variation in growing conditions and in the fruit. When the extensive plantings in your North Western States and in British Columbia came into commercial bearing and the fruit was placed on the Eastern markets, not a few of our growers and dealers in the Eastern Provinces would refer to them as “nice looking apples but having little or no flavour.” However, this is now history and it is generally recognized that there is no one state or province which can produce the best fruit. The variation in soil and climatic conditions makes it possible to grow varieties especially adapted to certain conditions better in one particular district than the same variety grown under less favorable conditions. Thus is *one* state or province the conditions in one section

will vary from those in another not many miles distant. Because of the very great distance which separates our commercial apple growing districts and the variation in growing conditions, I think our situation will be better understood if we deal with each province separately.

Commencing at the Atlantic Coast we have in the Province of Nova Scotia, the Annapolis and Cornwallis Valleys, which are perhaps better known as "The Land of Evangeline," where apple growing is carried on to a greater extent than any other branch of agriculture. These valleys are especially adapted to the growing of this fruit and the close proximity to seaboard offers special advantages to the export markets of the United Kingdom and the Continent. In 1911, as the result of increased efforts on the part of the growers and exceptionally favorable weather conditions, Nova Scotia produced a crop of approximately 2,000,000 barrels—a record which has not since been reached.

During the Great War, as we know, there were many things affecting the fruit industry which were very discouraging to fruit growers. Fruit was considered a luxury and a non-essential and, while other Branches of Agriculture were being encouraged by increased demand and correspondingly increased prices, the difficulties to fruit growers were increased and the export markets were closed to fruit. As Nova Scotia had for many years exported the greater part of her crop to the United Kingdom and did not have a home trade connection with other provinces in Canada, these discouragements were felt more in that Province than in any other. The placing of an embargo on the importation of fruit into the United Kingdom resulted in an almost total neglect of orchards in some provinces but the growers in Nova Scotia notwithstanding the discouraging outlook continued to care for their orchards with the result that they have had good crops for several years.

Each year we find a greater number of growers practicing the best known methods of pruning, grafting and spraying, and the result has been very good average crops during the past three years of approximately 1,300,000 barrels of commercial fruit. A large percentage of the crop is marketed co-operatively. In one co-operative association there are between 1700 and 1800 members, representing about 40% of the growers of the Prov-

ince. I will not take up your time to explain the workings of this organization but we are always glad to point to it as one of the best examples of what can be done by organized efforts. This I think is one of the most efficient and most economical distributing organizations on this continent.

The St. John River Valley in the adjoining province of New Brunswick is especially adapted to the growing of some of the best hardy varieties, including McIntosh Red and Fameuse. This Province, at the Imperial Fruit Show held about a month ago in London, England, was awarded first prize in the "All Canadian" competitive section for both these varieties. The quantity has not yet been sufficient to supply the needs of the Province but as a railway has recently been constructed, formerly known as the St. John Valley Railway but now owned and operated by the Canadian National Railway System, we are confidently looking forward to this valley becoming one of the best apple producing districts in the Maritime Provinces. The commercial apple crop of New Brunswick in 1919 was 40,000 barrels and in 1920 was 30,000 barrels. The 1921 crop has been estimated at 33,000 barrels.

The Province of Prince Edward Island which, as you know, is situated in the Gulf of St. Lawrence and separated from the Mainland by the Northumberland Straits, is not a great factor in the commercial apple crop and a large portion of the fruit consumed is brought in from the adjoining provinces. It has, however, been demonstrated that the hardier varieties can be successfully grown there. This province is specially adapted to the growing of small fruits but on account of the difficulties of transportation fruit growing has not made any great progress during the past thirty years. The railway system of the Island is of the narrow gauge type, however, the more thickly populated section approximating 40 miles, served by this railway has recently been changed to the standard gauge and it is expected that in the course of a few years the whole system will be standardized. So that with improved transportation service which includes the excellent ferry system, now in operation and which is operated the year round it is expected that fruit growing in that province will be greatly increased in a few years.

Leaving the Maritime Province and traveling west about 800 miles, we come to the principal apple producing districts of

the Province of Quebec, where the Fameuse and the McIntosh Red varieties are grown to perfection. This province was unfortunate in losing a large portion of the Fameuse trees and many trees of the other varieties as the result of the unusually severe winter of 1917-18, but, notwithstanding this severe loss, the growers are not discouraged and these orchards are being re-established. The demand for the Quebec grown Fameuse and McIntosh Red in the Province of Quebec is such that the highest price paid for any variety has been obtained and it has not yet been necessary for the growers to look outside their Province for a market.

The Province of Ontario, which is one of the oldest apple growing provinces in Canada and which up to a few years ago produced the greatest quantity, also suffered from the severe winter of 1917-18 and a number of the trees were killed. Had the fruit growers of Ontario followed the practice of the growers in Nova Scotia and continued to care for their orchards during the war years, prior to 1917, the loss from the severe weather would undoubtedly have been less. This province during the past three years has produced the following commercial crops: in 1919, 879,000 barrels; 1920, 1,600,000 barrels, and the estimate for 1921 is 960,000 barrels.

Unlike the Provinces of Nova Scotia and British Columbia, where apple growing is a specialized industry, the bulk of the apples in Ontario are grown on mixed farms and, on account of the higher prices which have been paid of late for other farm products, the farmer-fruit grower has not been giving much attention to orcharding. However, now that prices of these products have been greatly reduced in contrast to the slight reduction in the price of apples, there is a greater interest being taken in orcharding and, while the process may be slow, nevertheless we expect that apple growing will in the near future be carried on as a specialized industry in Ontario as it is in the other provinces referred to.

In the Prairie Provinces apple growing is not carried on in a commercial way and our next and last commercial apple growing province is British Columbia on the Pacific Coast. This province has produced this year 4,000 cars of apples or approximately 3,000,000 boxes. This is about 100% more than in 1920. The increase is largely the result of the increased growth

of the trees recently come into commercial bearing. The growers in British Columbia like the growers in the North Western States have been compelled to adopt co-operative marketing. This province has now one of the most efficient co-operative marketing organizations in Canada and has established an excellent reputation for reliable grading and packing in both the home and export markets. During the past year the distribution has been greatly widened.

This will give you some idea as to the conditions in the commercial apple growing provinces in Canada at the present time but in order to form a definite opinion as to the outlook it is necessary that we review the marketing conditions during the past few years. It will be remembered that in 1912 the United States and Canada had one of the biggest apple crops on record and the returns to the growers, generally speaking, were very discouraging. The conclusion reached by many was that there had been over-planting and this conclusion was strengthened by the fact that there had been extensive planting in the North Western States and in British Columbia and when these plantings came into bearing the price of apples would be so low that it would not pay to care for the orchards. Planting, therefore, practically ceased in 1911. In 1914 we had another big crop and when the fruit was ready to harvest the markets were completely disorganized as the result of war conditions. Later an embargo was placed against the export of apples to the United Kingdom. Our growers were very much discouraged and, as already stated, in some of the provinces the orchards were totally neglected. Therefore, having regard to the fact that planting practically ceased in 1911 and many orchards since 1912 have been neglected, also the great loss of trees from the unusually long and severe cold during the winter of 1917-18 we are of the opinion that even under the most favorable growing conditions our maximum commercial apple production cannot exceed our greatest production of twenty-five years ago.

The supply of some agricultural products may be increased or decreased in one or two years, but with apples this cannot be done as the plantings of today represent the crop of several years hence and the law of averages is again asserting itself. Today although the prices of many agricultural products have materially declined the price of the best varieties and grades of fruit are

being substantially maintained. We, therefore, feel that the outlook for commercial apple growing in Canada was never better, providing that we profit by our past experience and plant only varieties which the market requires and which succeed best in the particular district. We are not convinced that we have at any time reached the stage of over-production but that our discouragements, especially in 1912, were due to lack of organized marketing facilities. The large cities and towns were over-supplied, while the smaller consuming centres, and we have many of them in Canada, were receiving a very small proportion of what they might consume. We are at the same time convinced that if we are to avoid a repetition of the unsatisfactory conditions met with in 1912 and preceding years we must develop an efficient co-operative marketing organization in proportion to our increased production. Unless this is done our industry will be unbalanced. In fact we are so firmly convinced that our future success is dependent on centralized co-operative marketing that we hesitate to organize more independent fruit growers' associations in Ontario until the independent associations now in existence have established a Central co-operative marketing organization. We fully expect that we will accomplish this before another crop is ready to market.

Tender Fruit. In regard to the growing of tender fruit in Canada, I may say that while pears and plums are grown in all the commercial apple producing provinces a very large percentage of the total crop is produced in the Province of Ontario and in the Okanagan Valley in British Columbia. With regard to peaches the history of commercial peach growing in Canada has convinced us that the area in which these can be grown with any degree of safety from winter killing is confined to the Niagara Peninsula in Ontario and the Southern parts of the Okanagan Valley in British Columbia. There are a few more districts in Ontario where peaches are grown, but the quantity can have very little effect on the market. Therefore, with efficient marketing facilities provided peach growing in both Niagara district in Ontario and the Southern part of the Okanagan Valley in British Columbia should be a very profitable branch of fruit growing. The same conditions would apply to the commercial growing of grapes although British Columbia has not yet produced any great quantity of these.

Small Fruits. Small fruits, such as strawberries, raspberries, currants and gooseberries, like pears and plums, are grown in all commercial apple producing provinces but the larger portion of the total crop is grown in Ontario. In the Eastern Provinces of Quebec, New Brunswick, Nova Scotia and Prince Edward Island strawberries form the major portion of the small fruit crop, the bulk of which is, as a rule, sold within the province. For several years prior to 1910, the prices received by growers were not satisfactory and it was difficult at that time to obtain sufficient help to harvest the crop, due principally to the exodus of our people to the Prairie Provinces. The result was that the acreage in 1911 was considerably reduced and as labor difficulties continued and were increased during the war years there was a further reduction in acreage. The demand, however, continued firm and there was a steady advance in prices which probably reached the peak in 1919 and 1920. Notwithstanding the advance in prices it was not until the labor situation improved in 1919 that our growers were able to increase the acreage to any extent. In 1919 and 1920 the acreage was greatly increased, especially on the Lower Mainland and on Vancouver Island, B. C., where a number of our ex-service men have taken up small fruit growing with considerable success under Government assistance. During the past season the price of strawberries and some other small fruit declined but the decline would not have been so pronounced had the jam and canning factories been able to handle even a small portion of their annual purchases. There has been a decided improvement in the marketing facilities for handling the small fruits during the past season and we are confidently expecting that this branch of the industry can, with profit, be considerably extended.

THE FRUIT MARKS ACT

The Canadian Fruit Marks Act applies to all fruit grown commercially in Canada, but was in its inception designed primarily to remedy certain evils which threatened the existence of the export apple trade. This trade was particularly important to Canadian growers as, especially in the early days owing to the comparatively limited local demand, it was necessary to look to distant markets to dispose profitably of the apples grown in the

large producing districts. But while the Federal Law was passed originally with the markets of the United Kingdom particularly in mind, it is recognized that the Regulations have strengthened the industry in all markets, local, inter-provincial and export, although the benefits have been particularly noticeable in long distance trading when a reliable system of grading is more important than in the case of local shipments where differences of opinion between shipper and consignee can be more easily adjusted.

A brief resume of our experience with Federal grading regulations may be of interest. Twenty-five years ago Canada was in danger of losing her export apple trade owing to the high percentage of consignments which were received on the British markets showing large quantities of over-faced and improperly packed and graded fruit. It was felt that the unsatisfactory conditions governing the industry were due largely to the absence of any regulations governing the packing, grading and marking, thus making it impossible to place any reliance upon the grade marks which appeared upon the barrels.

As the returns to exporters were reflecting the lack of confidence felt by buyers in the United Kingdom and, as it was realized by those interested in the welfare of the industry that the trade could not be saved from retrogression without standardization, the more progressive growers and shippers requested legislation providing for compulsory grading and marking, and in 1901 the Fruit Marks Act was passed. The object of the Act was to raise the standard of the commercial pack of fruit in Canada, the improvement of the export trade as noted before, being particularly in the minds of those framing its provisions.

The administration of the Act was placed with the Department of Agriculture and a staff of eight inspectors were charged with its enforcement. During the first few years of the operation of the Act the inspection was confined almost entirely to the ports of export, and almost immediately a marked improvement in the grading and packing of the apples offered for export was noticeable. Even as early as the second season the satisfactory results of its enforcement were being commented upon in the United Kingdom, one large fruit broker writing under date, January 10, 1903: "In reference to the packing of apples in barrels, there can be no doubt that the passing of the Fruit

Marks Act (1901) has had a most beneficial effect in improving the grading and marking of fruit." References were also made to the Act in the British press, an article in the Glasgow "Herald" of December 29, 1902, reading in part: "Recent legislation in Canada has done much to remove complaints as to the marking of packages and of the quality of the fruit."

As the advantages of the inspection service became apparent, growers, shippers and dealers urged upon the Department the necessity for an extension of the work to include the principal distributing and consuming points in Canada, and also to cover many other kinds of fruit grown commercially in this country.

The definitions of grade in the original Fruits Marks Act were not very specific, and many points were not considered that have since had to be regulated. Amendments have been made from time to time therefore, but I would point out that these amendments have been made, in practically every case, only upon the recommendation of the fruit industry as the need for further regulation along any particular line became apparent. Thus grade designations, grade definitions, packing regulations, standardization of packages, etc., have followed in natural sequence. This, together with the fact that the administration has been carried on in a business-like spirit, has meant that every forward step in our regulations has had public opinion behind it; consequently the Act has never been one of those pieces of legislation, some of which we have even in Canada, that have been put on the Statute Book but are practically "dead-letters" so far as enforcement is concerned.

From 1901 to 1912 the work of inspection was confined practically to the docks at Montreal, St. John and Halifax, and to the large consuming centres such as Toronto, Winnipeg, Regina, Calgary and Vancouver. The manner of inspection was to open and examine a number of packages from each lot, and if the fruit was not packed in accordance with the Act, a report was made to that effect and the packer prosecuted if, after thorough investigation, the facts warranted such action. While this method, which was the only practical one with the few inspectors on the staff, undoubtedly had a deterrent effect on packers and shippers who were anxious to avoid prosecution, it did not prevent the improperly packed and marked fruit reaching

the market. Also in the case of the less reputable packers and shippers, there was a tendency to run the risk of prosecution as the chances of detection were fairly remote, particularly in the case of export fruit, it being possible to inspect only a small percentage of the apples for export, owing to the speed with which these are loaded from the cars into the steamer's hold — the inspection being made on the dock as the loading was in process.

In 1913, therefore, some additional inspectors were appointed, and the work extended in certain sections to the shipping centres in the producing districts. This change soon showed a material improvement, and by 1914 this system of "inspection at point of shipment" had been adopted in all commercial fruit growing districts, and has been continued to date, so that this season practically the whole staff of over sixty inspectors are working among the growers and packers, not only inspecting the fruit after it has been packed, but giving instructions in the orchards and packing houses in the proper methods of picking, grading, packing and shipping fruit. Instead of waiting to detect false packing or grading after it has been done, the inspectors today are spending their time and energy in preventing the evil, thereby protecting the grower from commercial and financial loss in marketing his fruit and, in addition, protecting the consumer, and establishing greater confidence in the trade. This is particularly valuable in the case of export and inter-provincial shipments, as the inspectors endeavor to give special attention to all requests for the inspection of long distance shipments.

As the packing season is short, it is impossible for the inspectors to visit every orchard, and consequently a great many lots are inspected at the shipping station. If fruit is found not up to grade the inspector at once communicates with the packer and requests him to examine the shipment, giving him a practical demonstration in grading; the packer, if circumstances warrant it, is then given an opportunity to reduce the grade before his fruit is shipped. If the grade is not lowered in accordance with the quality by the packer the inspector may mark the words "Below Grade" on the package or he may efface the false mark and place the proper grade mark thereon.

Of special value in the case of inter-provincial shipments, particularly to the Prairie markets, is an arrangement made the past few years by which officers of the Branch are authorized to

give any shipper desiring it a copy of the report referring to his fruit, which is often attached to the bill of lading by request of the consignee. Such a report does not vouch for the contents of the car, but for those packages only which have been actually inspected and marked with the inspector's stamp, but dealers have demonstrated their willingness to purchase cars on the strength of these reports.

Since 1918 the inspectors at such points as Vancouver, Winnipeg, Toronto and Montreal have also been authorized to inspect rejected cars, and give a report to the consignee or consignor as to the condition. In the past serious loss and waste of fruit and vegetables have been incurred through consignees refusing to accept cars, necessitating the re-consignment and possibly a second rejection or a forced acceptance at a greatly reduced price. The principal reason for undertaking the inspection of such cars, which was started during the war years, was to facilitate prompt delivery, thus avoiding unnecessary waste of food. This service has also assisted materially in insuring prompt settlement of disputes between shippers and consignees, and has proved particularly valuable in inter-provincial trade where, the disputing parties being a great distance apart, one or other was very often at a disadvantage. The report of an impartial inspector has frequently been the means of effecting a prompt settlement.

In the early fruit inspection days apples were the principal fruit dealt with, but during the past few years all kinds of fruits grown commercially in Canada, and also some vegetables, have been inspected and as noted, special attention is given to long distance shipments. Special work in connection with our inspection service is also done by the Transportation Division of the Fruit Branch of the Federal Department of Agriculture. This Division was organized a little over four years ago in response to the request of growers and shippers throughout the Dominion, transportation problems going hand in hand with long distance trading in perishable products such as fruit and vegetables.

While it is recognized that the Fruit Marks Act has been an important factor in improving the Canadian fruit industry, and particularly the export apple trade, we realize that there is still room for improvement in the Act, and I may say that a strong feeling has been growing in regard to the need for more definite

grade definitions, particularly with respect to the size and colour of apples. It has also been suggested from certain districts that grades should be defined specifically for some of the tender fruits. Further amendments are to be expected, therefore, but this is quite in order as it was never intended that the Fruit Marks Act should be stationary, but it is expected to evolve with the growing needs of the fruit industry.

THE PRESIDENT: We look to Canada for so many elements of leadership because they have men who know and who can answer your questions authoritatively.

I may say that by arrangement we have transposed the papers of Mr. Davis and Dr. Chandler. Mr. Davis' paper will come tomorrow, and Dr. Chandler will read his this afternoon.

After we have had Doctor Chandler's paper there will be some rather important departures to be brought to your attention by the Executive Committee.

Are there any questions you wish to ask Mr. Baxter on the Canadian question?

H. P. GOULD: Is there any charge or fee for inspection?

C. W. BAXTER: No, we make no charge. We cannot inspect all the fruit that we are asked to inspect, but on the whole it is very satisfactory. If a man wishes to have a copy of the report to attach to the bill of lading, and if he will make request twenty-four hours in advance we are usually able to accommodate him; but during the great rush we have not been able to do this because it would require a small army. But on the whole our shippers have been entirely satisfied with the service, for which there is no charge.

F. P. DOWNING (Indiana): Is there any conflict between the standard package laws of this country and Canada?

C. W. BAXTER: Mr. Downing very kindly sent me a copy of this Bill he referred to. I received it just before I left home and looked it over on the train. I see it is proposed to prohibit the selling of fruit in the United States unless it is packed in packages described in that Bill. We have not gone so far as that. We say that all fruit packed in Canada for sale in Canada must be packed in specified packages of certain capacities and dimensions. I would not say that at the present time there is any con-

flict there because we do not put any restriction on packages coming into Canada. How long that will last I do not know. Last year when we had a surplus of strawberries and you needed them we were deprived of shipping twenty-five car-loads from one Province because our standard box is four-fifths of a quart and your markets demand a full quart box. I believe that our growers are coming to the point where they want to adopt the same box you have and I think before another season comes around they will do it.

Two years ago we adopted a standard barrel. We were just waiting for the United States to adopt a standard barrel, and, as soon as you did, we did. We have adopted standard boxes. I do not believe that you have locally adopted standard boxes, but we have what is known as the Oregon box. That is our standard and it is the standard in Great Britain, known as the British standard. We hope you will not be long following suit. At the present time there is nothing to prohibit the importation of fruit in your packages except with regard to the marking. If apples, peaches or pears are imported in closed packages bearing grade marks inconsistent with our grade marks, they must be completely erased and the importer must put his name on the box in order that we may fix the responsibility for the grading. That is the only restriction at the present time on import business. Prior to 1918 we required that only for pears coming into Canada in any other boxes than our standard, and these boxes had to be marked "short." But this was not satisfactory and was discontinued.

A MEMBER: What does a bushel of apples weigh in Canada?

C. W. BAXTER: I have never yet been able to determine what a bushel of apples should weigh, because a bushel of small Baldwins compared with a bushel of large ones would show a difference. I should say a barrel of Ben Davis or Snow apples would weigh about 150 pounds, while Baldwins or Russets would weigh about 180 pounds. But we have not attempted to fix the weights for fruit. What we have done in standardizing packages is to fix the capacity of our packages, and to secure the price that package must be full. We have found the fixing of weights for fruits and vegetables is unsound.

We have a bill started at the last session for the compulsory grading of potatoes and onions, and that bill was prepared as a result of a Dominion conference representing the potato and onion industry of Canada. They adopted a resolution and requested that the resolution be enacted. They made provision for the repeal of our present law which says that a bushel of turnips must weigh so much, and a bushel of carrots so much, and instead of that adopted a unit of one pound as the basis of all sales.

F. P. DOWNING: I think Mr. Baxter is absolutely right as to the stand they are taking in Canada — standardizing the packages on the basis of volume, not weight. We have in this country a volume bushel and a weight bushel, and confusion is the result. I think the members of this Association should ask our legislators to repeal a lot of these foolish weight laws. In some States they say 44 pounds of apples to the bushel, and in some States 45, and you know there is a wide variation in apples according to the variety and according to the season of the year. It is impossible to standardize capacity in terms of weight. That is why I think every member of this Society should get back of the proposed bill to standardize packages.

V. H. DAVIS (Port Clinton, Ohio): I want to emphasize what was said in regard to weight and capacity because I do not believe there is a fruit grower in Ohio or any other State that does not appreciate the utter absurdity of trying to put the same number of pounds of these different varieties of fruit into the same size packages. It does not work out. I do not know just how to better it, but when you see how inconsistent the State and National governments have been in regard to this matter it does seem that it is time an organization of this kind took some stand. The western box people appreciate the fact that they cannot get 48 pounds of apples into a bushel box, and they only guarantee 40 pounds. When it comes to peaches we can get 48 to 55 pounds, and we can guarantee 48 pounds and be safe. Why have it 48 pounds in this State and 44 in adjoining States?

C. W. BAXTER: Just to illustrate the point made by the last speaker. For some time we had a law which required that a barrel of potatoes shall weigh 165 pounds. If a barrel is made big enough to hold 165 pounds of large potatoes, that same barrel, when containing small potatoes would not be filled by some

eight inches, which meant that in expressing that barrel (most of our potatoes are handled that way) the potatoes would be bruised. It is not practical. I think that is the best illustration of the unsoundness of defining capacity by weight.

V. H. DAVIS: In southern Ohio a few years ago we happened to find most of the buyers buying Rambo apples by the barrel. They bought Ben Davis and Ganos by the hundred pounds, but they sold them by the barrel. You can readily see why if you know the difference in weight of the two varieties.

THE PRESIDENT: Tomorrow morning we will take up some papers dealing with college work in research and teaching as it bears upon this pomological situation. The first paper is by Dr. W. H. Chandler, who cannot be here in the morning but who is here this afternoon. He is Vice Dean of Research in the College of Agriculture at Cornell, and we will be glad to hear his paper on "The Prospect for Research in Pomology."

THE TREND OF RESEARCH ON POMOLOGY.

W. H. CHANDLER,
Cornell University

The earlier teachers of horticulture in the agricultural colleges were generally rather well trained in Botany and were inclined to form opinions concerning best practices by reasoning from the botanical or physiological nature of the trees. They were also inclined to lean rather heavily upon the agricultural chemist, particularly in their research. The number of publications suggesting cultural practices, such as fertilizer treatments based upon the result of analysis of tree tissues, is considerable. It is needless to say that conclusions based upon such studies were not always correct. Even with the present great increase of our knowledge of plant physiology it is not always safe to base recommendations as to orchard practices upon physiological knowledge alone. In fact, it will certainly be very long before physiological knowledge is sufficiently complete that one can know all of the principles involved in an orchard practice. It should be said for those workers that at that time few, if any, of

the colleges had facilities for extensive experimentation with orchard problems.

Somewhat later a rather large number of field experiments upon orchard problems, particularly in orchard soil management were begun. The results of these have been appearing in print during the past fifteen years. It is fair to say that they have not fully satisfied the hopes of workers in the subject. That the results of different experiments should be conflicting was to be expected since soil and climatic conditions were not the same. One result of these field experiments probably no one had anticipated, that is the very large experimental error involved. In very few, if any, of the experiments are conclusions justified where the differences are no larger than 25 percent, in fact, in a majority of cases a difference of 50 per cent would hardly justify conclusions, and with some a difference of 100 percent is not significant. In other words, with some experiments where a given treatment has seemed to double the yield, it is not at all certain that the difference in the yield of the two plots is due to the difference in treatment.

On account of these difficulties with field experiments there is among workers now a tendency to give them little value and to attempt answering practical problems by means of physiological studies, that is studies in the nature and response of the trees. In spite of earlier failures it seems certain that such studies are very valuable, and no doubt in many cases trustworthy answers to cultural problems may be secured in that way without resort to field experiments. For example, we often find it safe to assume that if a certain treatment will control a disease or insect the treatment will be profitable. At least, with many diseases and insects careful experiments to determine whether or not the cost of control is equal to the return from such control is not necessary, because the cost and returns can be estimated with sufficient accuracy. This, of course, could be true only where the returns were much greater than the cost. In the same way, if it should be found that less pruning when the tree is young would increase the yield it would hardly be necessary to conduct an experiment to determine whether or not such a practice is profitable for the cost in that case is reduced, while the returns are increased. No doubt there are many opportunities to secure results of practical

importance by merely learning more about the nature of the tree, and without the use of field experiments.

The conclusion, however, that field experiments are of little value seems hardly justified. In fact, a careful survey of the results of the experiments that have been done will, I think, convince any one that the contribution has been large. Thus, we have rather conclusive proof that in the American orchard potassium and phosphorus are so seldom present in the soil in insufficient quantities for the best production of fruit trees that, the problem as to these elements is, at least, a minor one. On the other hand, while we formerly applied nitrogen with some fear that it might stimulate vegetative growth to an injurious extent and thus reduce fruitfulness, we have found that this very seldom happens and, as a matter of fact, nitrogen is the element that can most often be applied with profit. Further, we have learned that while the soil must be low in available nitrates before apple or pear trees, or blackberry or currant plants in cultivated orchards will show response to applications of nitrogen, peach, cherry, and plum trees, and raspberry and gooseberry plants are much more likely to show a response. By field experiments we have learned, not only the injurious effect of sod on trees, but that by the use of nitrogen that injurious effect can be largely overcome. We have further learned that nearly all orchardists have been pruning all young trees too severely and thus delaying the time when the trees should be expected to bear profitable crops, and that summer pruning does not stimulate fruitfulness, but the reverse. We have also learned, with reasonable certainty, from experiments that alternate bearing of fruit trees cannot be prevented by thinning, and that thinning can be expected to be profitable only through the influence on the crop thinned, or through its effect on the growth of the tree. No reference is made to valuable contributions of field experiments in spraying because those have been made largely by plant pathologist or botanists and entomologists.

We can be certain, however, that in the future field experiments will be of a different type. First the problems investigated will almost certainly be of a more limited nature. We shall hardly expect reports of experiments concerning such general problems as the relative value of tillage and the sod mulch. In tillage we should expect to see problems investigated as to the

value of continuous tillage through the summer, let us say until September, as compared with ceasing tillage as early as July first or even earlier. In fact, a study might very profitably be made as to whether or not any tillage after the spring plowing and leveling of the soil is profitable. Even more specific problems as to whether or not ceasing tillage in June or earlier in order to permit the growth of a heavy cover crop actually reduces the moisture supply in late summer, that is whether the increased humus supply may not, by increasing the water holding capacity of the soil, increase the water supply more than late cultivation would. We should also learn by field experiments whether, when for unavoidable reasons the spring plowing has been delayed until after the fruit has set, or failed to set, and the season's growth has nearly been made, it is better to plow it then or wait until the following spring.

Similar, in the study of pruning, the relative value of specific types of pruning will probably be studied rather than such general problems as the relative value of much or little pruning, or summer and dormant pruning, though this last question can hardly be considered settled. Of even greater importance and requiring more detailed study is the problem as to the age of each kind and variety of fruit when for a given climate renewal pruning will begin to be profitable.

Experiments in the field will also be done with very much more care than was thought necessary at the time the earlier field experiments were planned. These earlier field experiments have given us valuable results only because in the problems studied the differences were very large. As we narrow the problems down to questions involving more minute details of orchard practices we must so refine our experimental methods that smaller differences will be significant. Several methods of reducing experimental error suggest themselves. First, there should be several plots receiving each treatment; these plots being distributed evenly over the experimental area. Thus, Batchelor and Reed found that the probable error on 16 trees was but half as great when each treatment was given to 4 plots of 4 trees each (these plots being distributed evenly over the experimental area) instead of to one plot of 16 trees. These authors found that there is little reduction in the experimental error by having more than 8 trees in the plot; the better plan is to have many small plots receiving each treat-

ment. Second, where trees of bearing age can be used in an experiment, perhaps the most important improvement in our experimental method would be to give all of the experimental area uniform treatment for a period of two to four years, after which the different plots would receive the treatments called for in the plan of the experiment. The plots could then be so arranged that the average yield for each plot during this preliminary period would be nearly the same, or if the experiment should be one requiring symmetrical arrangement of the plots the average yield of each tree during this period may be used in estimating the probable yield afterward, if the treatment had not been varied, and therefore in estimating the increase or decrease in yield due to the treatment. Third, where the problem concerns young trees the error due to the variations in the soil could be greatly reduced by planting the trees closely so that the experimental plot could be smaller and the possibility of introducing soil variations therefore smaller. By this method, too, the young trees could be dug up or cut off and weighted, or at least a part of them could be. It is not necessary to emphasize the fact that the weight of a tree is a much more accurate measurement of growth during a period of years than either trunk girth or twig measurements, this last being nearly worthless.

It is highly probable, however, that an increasing proportion of the research with fruit trees in the future will be physiological studies, that is studies pursued in the hope of learning more about the fundamental nature of the tree itself, or of the fruit. The phase of pomology in which our knowledge is now growing most rapidly concerns the storage of fruits and these problems are now being solved largely by physiological methods. Thus, studies in the respiration of fruits and the chemical substances formed by respiration at different temperatures is of the greatest importance concerning the influence of storage temperatures on flavor. You may expect to see very few bulletins reporting simply results of various storage temperatures of fruits with no effort to explain *how* the temperature influenced the keeping. More fundamental details will be studied in order that the results may be more safely applied to different conditions.

Such fundamental studies of the trees seem as necessary for safe conclusions as to cultural problems. The emphasis that Kraus and Kraybill give to the relation of carbo-hydrates and

nitrogen in the tissue is certain to interest many workers. We are interested to know what effect on fruit bud formation a high proportion of nitrogen with a low proportion of carbo-hydrates may have, and we shall want to know this for every portion of the growing period. Thus, we are learning that increasing the nitrogen content of the soil very seldom, or under practical conditions almost never, results in reducing fruitfulness when a period of several years is considered. It seems possible, however, that the proportion of nitrogen might be injuriously increased for a short period by indirect influences. Thus, let us say, the spring plowing of the orchard has been delayed until late in the period of rapid growth. The nitrogen supply being low until the plowing is done growth will be checked. The leaf surface of the trees will be reduced and, therefore, the possible carbo-hydrate supply. Then if the plowing is done and the nitrate and water supply increased, the available carbo-hydrate supply might tend to be exhausted or greatly reduced just at the time when seasonal conditions are most favorable for fruit bud formation. I do not say that this would happen, but it seems to be a possibility and I think that workers will continue to be interested in the carbo-hydrate nitrogen ratio until its possible influence through all cultural treatments upon all varieties is known. Probably many other physiological problems of the trees will have much attention. Thus the rest period of the trees will have much more extensive study. We want to know, not only its nature and the factors that influence it during the dormant season but, perhaps even more, its nature during the period after the terminal buds are formed and while the leaves are still active. We shall want to know just how difficult it is to take the plant out of the rest period during the late summer and what effect various treatments during that time may have. Thus, if nitrogen is applied after the tree has gone into the rest period, (that is into a condition in which new top growth will not be stimulated by a favorable water and nitrogen supply) what effect does that have upon the carbo-hydrate supply in the tree? If an increased nitrogen supply during the summer portion of the rest period does not stimulate top growth does it cause an increased root growth during the summer in which it is applied? What effect does an increased nitrogen and water supply during that period have on the ripening of the wood? Is the rest period as fixed for cam-

bium as for the buds? These are specific examples out of many physiological problems that will engage the attention of the scientist in pomology.

It seems certain that the pomologist will come to view his problems more nearly from the point of view of the fundamental scientist and to attack them in that way. Both because of his need for a broader fund of knowledge to present to his students and because of his own inclination, he will be anxious to have as complete knowledge as possible concerning the nature and behavior of his trees regardless of whether or not that knowledge may be of practical value. The fruit grower need not fear, however, that such a change will mean less interest in his problems or less beneficial results. It is not possible to know what information may prove to be of greatest practical value. Certainly, practical field experiments can be the more wisely planned, and more wisely interpreted, the greater the available supply of knowledge concerning the fundamental nature of the trees or plants. The greatest contribution to the fruit grower, and probably to the farmer generally, that has been made by the scientist, has been in the control of diseases and insects and this has been done by the botanist or the entomologist whose point of view was generally that of the scientist seeking the truth for sake of truth. It is becoming increasingly clear that only the highly trained scientist, who has come to seek the truth because truth to him is more worth seeking than anything else in the world, possesses the patience or the insight necessary to solve the difficult and complicated problems of the fruit grower and the farmer.

THE PRESIDENT: This is a very stimulating paper looking to the future. Are there any questions?

W. C. BAIRD (Ashtabula, Ohio): Speaking of the formation of the bud, is it not formed early in the spring?

DR. W. H. CHANDLER: The bud may begin as early as June, but that same thing may not begin until September. There is a period from June to September in which the fruit bud formation is beginning in the young buds.

DR. L. H. BAILEY: I have a question of the Constitution and By-laws now to bring to your attention. You must remem-

ber that the Constitution of the American Pomological Society runs back into the beginning of things so far as this organization is concerned, and we are now in our seventy-fourth year. With the changing standards it is only right that we should modify our Constitution and By-laws. Certain changes have been made the last two sessions and certain others, it seems to me, now need to be made.

In Article VII of the Constitution as it now stands — Officers and Executive Committee — the first paragraph reads as follows:

“The officers of this organization shall consist of a President, first and second Vice-Presidents, one of which shall be from Canada; Secretary-Treasurer and Executive Committee consisting of the President, first and second Vice-Presidents and seven additional members, six of whom shall constitute a quorum.”

You will notice that the four officers mentioned are not ex-officio members, they are real members of the Executive Committee. The seven elected members are in addition to these four, so that there is an executive body of eleven members, and a majority of six constitutes a quorum. This is too large a body to constitute a quorum. I do not think any national society could operate and work effectively on a basis of having to secure a quorum of six. You cannot get them together, particularly if the Executive Committee represents many parts of the country, as the present Executive Committee of this Society does. On the other hand, it is important that the Executive Committee should be large and representative. It does not follow, however, that the *ad interim* business of the Society should be handled by the full Executive Committee. The question is, shall the Executive Committee be reduced in numbers, or shall it increase its representative character, and shall the quorum be reduced to three or four? The members of the Executive Committee here present have discussed this question and they have a recommendation to make.

They would like to make the Executive Committee somewhat more representative by increasing its size. Instead of hav-

ing seven members to be elected by the Society, there should be eleven, and the four officers — President, two Vice-Presidents, and Secretary-Treasurer — shall be members of the Executive Committee ex-officio, having a vote; it shall be incumbent upon the Executive Committee to select a body of three from its number who shall carry the business incumbent on the Executive Committee, subject to the approval of the Committee. Probably it will not be difficult always to find three persons near enough together so that the Secretary, sometimes the President, could meet with them.

H. P. GOULD: I move that Article VII of the Constitution be amended to read: The officers of this organization shall consist of a president; first and second vice-president, one of whom shall be from Canada; a secretary-treasurer; and an executive committee which shall consist of eleven members and the officers ex-officio. The executive committee as soon as possible after election shall choose from among themselves a board of managers of three who shall conduct in the absence of the executive committee the *ad interim* business of the Society. Six shall constitute a quorum of the executive committee and two of the board of managers.

(Motion seconded and carried)

DR. L. H. BAILEY: There are one or two other matters in the By-laws that I should like to bring up. By-laws No. 5 reads:

“A Chairman of Fruit Committees for each State, Territory and Province, and a General Chairman over all, shall be appointed annually. 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 annual meeting, State Pomological reports, to be condensed by him for publication.”

This goes back to the time when there was no reporting service, when there were no great State societies gathering information, and no experiment stations or public service departments for agriculture. At present, this method is antiquated. If we operated under it we would now have forty-eight State chairmen, the District of Columbia would make forty-nine, nine

Canadian provinces would make fifty-eight, to which four would be added. This is practically the same as the By-laws of 1854. It does not work; so I would like to have this By-law stricken from the list.

PROF. J. C. BLAIR (Illinois): I move that the said By-law be stricken from the list.

(Motion seconded and carried).

DR. L. H. BAILEY: By-law No. 6 reads:

“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 annually on new fruits of American Origin, and also to examine, and before the close of the session to 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.”

Let me read you the Constitution of 1854. (Reads). We ought to have a Fruit Committee, but we are not doing business in the old way now, we do not have biennial sessions, and we are not concerned primarily with exhibiting varieties. What I should like to see here is the first line of this By-laws retained with a change in the number — the committee to consist of five, or three if you wish.

C. H. WAID (Ohio): I move that the change be made and that this committee be three instead of eleven.

(Motion seconded and carried)

DR. L. H. BAILEY: The seventh By-law reads:

“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 six.”

I will also read the Constitution of 1854. (Reads). The argument is the same here, and I think the same change should be made — the committee reduced to three. A committee of twelve members is likely to have four times the inertia of a committee of three. This would also apply to By-law No. 8, and I think the Standing Committee on Tropical and Sub-tropical Fruits should consist of three members.

PROF. J. C. BLAIR: I move that these By-laws be modified according to your statement.

(Motion seconded and carried).

DR. L. H. BAILEY: By-law No. 9 provides for "A Standing Committee on Nomenclature consisting of seven members." Inasmuch as about an hour ago a committee of three was appointed, I would like to have this changed.

DR. C. A. BINGHAM: I so move.

(Motion seconded and carried).

DR. L. H. BAILEY: We are through with our program and are now ready to adjourn until six-thirty, when we will get together for a feed at the Nicholas Building. That will be a meeting of the American Pomological Society and it will legally transact business.

Adjournment until six-thirty.

THURSDAY EVENING SESSION

Following the supper in the dining room of the Chamber of Commerce, there was informal discussion, Dr. L. H. Bailey presiding.

DR. L. H. BAILEY: You will remember the committee reported on the President's Address, and I think this evening would be a good time to discuss it. Of course I do not know what part of the report you wish to discuss, but let us start in an informal way with whatever comment you wish to make.

H. H. HARDIE (Hudson, Michigan): I think Mr. Crane-field has something of interest to tell us.

MR. FREDERIC CRANEFIELD: I felt in talking with some of the committee yesterday that the membership really ought to know what the Executive Committee had accomplished, or attempted to accomplish, during the past year. I hope you will pardon me if I go farther back than that.

My mind goes back to the meeting of the American Pomological Society held in St. Louis three or four years ago, at which time the Society was as near dead as could be. There was just a breath of life left in it, that was all. At that time the Society for Horticultural Science saved the day. A number of professional horticulturists were there in connection with the larger meeting — this is ancient history, but it leads up to the point I want to make. A meeting was called one evening and a number of these horticulturists were present — about fifty. Whether they were all members of the American Pomological Society I do not know; but there was a re-organization, and some life breathed into this ancient and honorable American Pomological Society with tradition and history back of it, but not much life. The constitution was revised at that time, and later, as I recall it, Dr. Bailey was elected President and other officers and committees appointed, one a committee to revise the constitution, and they revised that constitution to a fare-ye-well — did a lot of things to it, but as it transpires today, not quite enough, so we finished the job today and eliminated dead matter, etc. But the Society, through its Executive Committee, functioned fairly well the following year. The committee met at least three times in Columbus to discuss ways and means of making a bigger and better Pomological Society and we finally arrived at some conclusion about the things we wanted to do — the things that should be done and could well be done by a Society of this kind. We were progressing step by step.

Then came the meeting of the American Pomological Society at Columbus last year when we adopted the revised constitution as you have it today, providing for a working body and eliminating the old Vice-President idea.

But there was one thing always in the way, one stumbling block to our further progress. We could talk, and did talk, and then talked some more about things we wanted to do, that ought to be done, but we found no money with which to do these things and that was the greatest need of all.

Then followed the meeting in Chicago of the Executive Committee, and at that time it was thought to discuss the matter with the American Farm Bureau Federation to see what could be done in that regard, and it resulted in the calling of a conference of fruit growers from different parts of the whole country to meet in Chicago under the auspices of the Farm Bureau Federation and financed by the Federation. At that time the American Pomological Society saw that through its Executive Committee it should pool its interests, as it were, with this new conference. That conference resulted in a committee of twenty-one being appointed by the Farm Bureau Federation to study and consider means and methods of marketing fruits, and it seems to me at this point that we should know rather definitely, if possible, the scope of that committee's work — what the committee intends to do, how far they expect to go in this question of collecting data and information concerning the marketing of fruit, before the American Pomological Society undertakes any work of that kind.

That is as clear an outline as I can give of the things that have been done, or I might better say, the things that have been attempted in the past year by the officers and Executive Committee of the American Pomological Society.

H. H. HARDIE (Michigan): I would like to supplement what Mr. Cranefield has said by saying that at the time of this meeting in Chicago we had almost decided to take up this question of marketing American fruits ourselves; but the farther we got into it the more we saw that it was too big a proposition and we were afraid of starting something that we could not finish, so when the Farm Bureau came along and took the matter out of our hands we were very glad because we felt it was too much of a job for us.

As I understand it, the American Pomological Society, up to the time Mr. Cranefield mentions, was largely a society of experimenters, who no doubt did a very good work in this way; but I have come to the belief that unless this Society can make itself of real value to the fruit growers of the country we will have missed our opportunity. In other words, this American Pomological Society is handed over to us with a very good reputation, but it is liable to be like the girl coming over from Ireland if we don't watch out.

This girl was coming over, and on the same steamer was an old man from her home town. He asked her if she expected anybody to meet her, and she said she did not, but that she had a good recommendation, only she had lost it — could not find it anywhere. This man said, "Don't let that worry you, I'll write you another," and this is what he wrote. "Mary Hogan when she left Ireland had a good reputation, but she lost it on the way over."

We do not want to lose our reputation "on the way over," and I do not think it will be necessary. I think we can make this American Pomological Society of real worth. But I am more of a business man than a fruit grower. I play with fruit and suffer with my business. But there is one thing that we all know — that the first thing you must have is money. You figure how much you want, how much you might need, then multiply it by ten — and then you will not have enough.

The next thing we must have is organization. That is almost as necessary as money.

The next thing is business, and then you have a successful going concern. These are the three things we must have. This is a business organization. We must have capital, organization and business. The capital is pretty hard to get. If everybody is as poor as I am it will be very hard to get. However, the money can be raised in some way. The Rex Spray Company has been very generous to do what they have just done. No doubt the spray pump manufacturers will do what they can; no doubt the package men and nurseries will do something; but suppose they did offer to pay all the expenses of the American Pomological Society — a paid secretary and all that — it would not be a success. It will never be a success until you get a membership.

We were talking a minute ago about how many fruit growers there are in the United States. One man said 100,000, another said 500,000, and another 800,000. Suppose there were 500,000, do you know how many members we have? We have less than a thousand. That is not enough. My idea of the business is that you first of all must have money, and still you must have something that will sell, you must be able to give a man his money's worth, and if I know anything about fruit growing I know that you have to give him about ten dollars' worth for two dollars. And I think we can do it. I think this Ameri-

can Pomological Society can gather statistics and information that the fruit grower needs and which will be worth ten dollars to him, and sell it for two dollars. Of course you have to have money to start with, but I think you can get these allied industries to furnish enough money to put on a campaign to get membership; but the fruit growers must be the fellows to support this organization, and not the allied industries. What we need is not so much the fruit grower's money, as his membership and his interest. That is my plan to make the American Pomological Society worth while to the fruit growers.

DR. L. H. BAILEY: Are there any further discussions? Do you wish to say anything about this report of the committee? Of course that is not particularly before you, except that it was suggested on the floor today that we might discuss it tonight.

PROF. LAURENZ GREENE: I believe Mr. Gould, the chairman of that committee, had about ten points in the report, and I am wondering if it would not be a good thing to have him state what these ten points are that the committee recommended in connection with the President's Address.

H. P. GOULD: In the first place, the report was adopted as a whole. The first thing that was presented and which might call for discussion had already been touched upon—that of a full-time paid secretary. The committee commented on this as an essential feature and its recommendation was that the Executive Committee be especially charged with the matter of securing funds so that a full-time paid secretary may be employed. Whether you desire to discuss that further or not is of course the point to be decided.

May I say, however, in this connection, that the reason why the committee suggested that it be left to the Executive Committee was because of the fact that we knew the Executive Committee had given quite a little attention to this very thing during the past year, at least to the matter of raising funds, and a full-time paid secretary can be easily arranged for if we have the funds. Feeling that the Executive Committee had that matter in hand and that they knew the situation better than any special committee could know it, and also that they appreciate the need probably more keenly than the average member of the Society, and further that they had given some attention to this matter of securing funds, we felt it would be wise to have this matter remain

in the hands of the Executive Committee as their job, or a part of their job. Perhaps some of you have a hundred thousand dollars that you wish to endow the Society with, or you may know someone who is making his will and would like to do that sort of thing.

This is the recommendation of the committee.

DR. L. H. BAILEY: That has been the trend of the Executive Committee meetings for the past two years, and while direct progress does not seem to have been made, as a matter of fact many plans have been investigated and we know some of the things that will not succeed. It requires some years to get these things started. I am not discouraged, although I had hoped we would have an endowment before this. But of course we want the opinion of the audience just the same.

H. P. GOULD: The second point had to do with the work of the Secretary as that office is now constituted, the suggestions being based on the President's reference in his address to our appreciation of the work of the Secretary. We know the Secretary is busy with his work, the work of Secretary being simply an added burden. With the issue of the monthly or bi-monthly letter, which I think has been definitely adopted as a part of the regular work of the Secretary, it seems to the committee that the Secretary's office is being pretty well loaded up with work which has to be done as a voluntary contribution to the Society, so our recommendation was "that a committee be provided to assist the Secretary, as he may direct, in the preparation of material for the monthly or bi-monthly letter to members, and in other ways. This recommendation in part anticipates one in the latter part of the President's Address where he suggests the appointment by the Society of advisors to the Secretary on publicity, consumption, planting, marketing, cooperation, affiliation, etc. These two features — advisors and special assistants — may well be considered together."

It is a question of providing a committee, or some other constituted body, as a means of assisting and advising the Secretary in carrying on the work of which he has charge.

DR. L. H. BAILEY: May I say a word in this connection? Of course we want the Secretary to be paid a sufficient salary to make it attractive, and so that it will be a permanent matter.

Just now we have not the funds for that. We are fortunate to have a Secretary who is willing to carry on this work for a year without remuneration, on his part, and I think if we had a thousand dollars extra the Secretary could carry on his work and the other work fairly effectively, because a young woman has been trained this year who can take care of part of this correspondence. The Secretary reported that they sent out 12,000 pieces of mail this last year, and that is no small matter. The young woman who has been helping in this work would be available and a good part of this routine work could be put directly into her hands, under the general supervision of the Secretary, so that it would not be so much of a burden to the Secretary as you might think at first hand. Of course the management of all this does add to his work, but he is willing to assume it if it means that this Society is a going concern. If we had about one thousand dollars in addition to what we had last year it would enable us to employ the necessary help.

The other suggestion is that we have a series of advisors, and inasmuch as there has been some question as to the status of these advisors, let me explain what was in my mind when making the suggestion in the first place. I did not think of having an official body in any way competing with the Executive Committee. These were not to be officers of the Society, but my idea was that certain members would be designated as advisors to the Secretary. Suppose he is getting information on markets, some particular person in the Society who is skilled in that direction he would feel free to call upon for help and advice; and on the other hand, that person would feel free to offer his advice without being asked directly. The Secretary may follow the advice or he may not. In putting on a publicity campaign as to the consumption of fruit there would be some person who has had special training in that direction, who may be publicity agent for some concern, or advertising man, who knows the way to reach the people, and the Secretary would call on him for advice; but that man could freely offer advice without being called on.

And so on the question of relationships, I had in mind to help the Secretary, not to burden him. It would safeguard him also against mistakes which might be made in the office, and he would not feel that all the responsibility is on him. There could be as many advisors as there are subjects to be considered, and

certainly in every field there would be someone who could offer his advice to the Secretary with great benefit.

H. P. GOULD: In this connection I would like to call attention to the fact that we adopted the President's recommendations as our program, so we are simply commending this sort of thing.

DR. L. H. BAILEY: We commended this when we adopted the report of the committee, but no procedure has been taken whereby these advisors are to be appointed or elected. For myself, I should prefer that they be chosen from the membership by the members from the floor. If there are any suggestions to the contrary it might be well to think upon the matter over night and tomorrow take it up and call for names. This is not a committee — they are simply advisors to the Secretary on whom he can call.

C. W. BAXTER: It might be interesting to the members to know that we in Canada have been seriously considering something along similar lines. As I mentioned this afternoon, we have periodically called a Dominion conference of fruit growers. They are invited as guests of the Government, and we term it a Fruit Growers' Parliament. They are free to criticize the action of the Department, and to adopt resolutions having to do with the various activities, and I think I am safe in saying that every resolution adopted at any of these conferences has been acted upon by our Government. We have felt that there is need for a national organization. At the conference in December the matter was considered, but no definite action taken beyond electing a provisional Board of Directors, and many difficulties were overcome at that time, but evidently this Board of Directors did not feel it necessary to proceed. We have made great advance since that time and we believe that there is great power in numbers. If we have something we wish to present to the House of Commons in the way of legislation we like to have behind that all the force of the industry in Canada.

I happen to have in my pocket just a rough draft — this thing has not been presented to our people — but I put this in my pocket with the hope of being able to discuss it with some of my confreres in the Provincial Government. We have put down as the name, the Canadian Fruit Council.

I was interested in what Mr. Hardie said as a business man — that you must have something to sell. This is what our pro-

posed Fruit Council would have to sell and the things they hope to attain.

"The object of the Fruit Council shall be the advancement of all matters tending to the improvement of the fruit industry in Canada, including production, grading, packing, transportation, storage, marketing, etc., (a) by initiating, fostering and assisting in obtaining such legislation and regulations as will be beneficial to the industry; (b) by emphasizing through inter-provincial cooperation the importance of the fruit industry and obtaining for it the position it deserves as an important branch of agriculture."

We feel that we have not had in the past the recognition that the industry deserves. The product has been considered a luxury, a highly specialized industry, and we feel that it is essential to the welfare of the nation and the people. We also feel that the few deaths during the Great War was due largely to the fact that fruit was plenty at all times. We hope to have greater recognition.

"By encouraging the greater distribution of fruit and by systematic advertising to educate the general public as to the food value of fruit.

"By encouraging the adoption of uniform grading and packing regulations.

"By cooperating with the railroad, express and steamship companies in securing the best possible facilities for transportation and a just equalization of charges.

"By cooperating with any agency working in a national way for the improvement of marketing methods and for a most equitable distribution of the fruit crop.

"By carrying on any undertaking which may seem to the Council should be carried on in the furtherance of this business."

These are our ideas, in rough form. As to the members of the Council we feel that a big committee would be burdensome and less effective than a smaller one, and we propose that this Canadian Fruit Council shall consist of thirteen representatives. Eight of these shall be producers of fruit; two dealers in fruit; one representing the Provinces of Manitoba, Saskatchewan and Alberta; one the remaining provinces; one a manufacturer of fruit packages, one a nurseryman, and one a representative of the canning and jam industry. Of the eight producers two shall

be from the Province of British Columbia, two from Ontario, one from Quebec, one from New Brunswick and Prince Edward's Island, and two from Nova Scotia.

Then we have our constitution and by-laws, which are much the same as any commercial organization.

The question of finances was taken up and we have this outlined. In order that the Canadian Fruit Council shall secure funds sufficient to carry on its work each association or interest represented shall pay to the treasurer of the Council on February 1st of each year the sum of \$100 for each representative so appointed, and each interest such as package manufacturers, nurserymen, etc., shall be assessed one-tenth of one per cent. of its annual turn-over, such assessment to be paid to the treasurer of the Council.

These were our ideas as to how we might promote an organization of this kind. It is not new. We have our dairy industry working along similar lines. We do not know yet how we will succeed, but we are hopeful.

H. H. HARDIE: How much do you figure your program will cost you a year?

C. W. BAXTER: We have not figured that yet, but not less than \$10,000. We figure we cannot hope to make the organization successful without an active and efficient secretary, and we would have to pay him \$4,000 to \$5,000 a year.

M. B. DAVID (Ontario): The Dairy Council has \$12,000 to \$14,000. The first year they had their meeting someone guaranteed \$10,000, but that was not enough.

H. H. HARDIE: I do not know how the fruit production in Canada compares with the United States, but it certainly is less than one-fourth. They over there are starting out with a proposition that costs them \$10,000, and we are trying to handle the United States for \$1,000 or some such small sum. You cannot do it. This organization ought to have five thousand members, say at \$2.00 a year, that would be \$10,000. That is a conservative mark. I believe we can do it. I believe we can get five thousand members, and we ought to have them. We must have a sufficient proportion of the fruit growers of America to cut some figure and give us a voice in matters of legislation if we expect to accomplish anything.

M. B. DAVIS: Last night while we were discussing the report of the committee we discussed the question which you handed over to your Farm Bureau, the question of fruit packages, and it seemed to me that that was one place where this Society should be functioning. We should act as a national mouthpiece for every fruit growers' organization in the United States. It struck me that that was what this Society should do — get all the fruit growers' associations together and have the Society become partially a delegate Society, a national Society to act on matters of national import for all the fruit growers in the United States, and certainly the subject of packages is not only of national, but international, importance, as Doctor Bailey pointed out this afternoon. I think that work which has been handed over to the twenty-one members of the Farm Federation is something that ought to come back to this Society as soon as we can get under way. If you can function on that then you will have some reason for existence, but unless you can function as a national or an international organization representing the interests of all the fruit growers, I do not see any line of endeavor that this organization can really take unto itself. I think when you let that one thing slip through your hands you missed an opportunity.

C. H. WAID (Toledo, Ohio): No doubt this matter will come up tomorrow in connection with Mr. Farnsworth's report, but I think perhaps a word here might be in place. As I understand, the relationship that will exist between the American Farm Bureau and this organization will be something like this — that this organization will recommend things they want to see put through, such as certain rules covering packages, etc., to the American Farm Bureau because it can be of greater service, having such a large membership back of it, in securing Congressional action. I believe the two organizations can work together in that capacity, but I agree with Mr. Davis that it is well for this organization to be the mouthpiece for the fruit growers and indicate their wishes along such lines.

T. B. WEST (Perry, Ohio): It is just suggested to me that the nurserymen should get into this game. Our hearts are with you and we wish you well — even if you do intimate that we charged you too much for trees the last year or two. Our interests are identical with those of the fruit growers in this country. I think an appeal to the nurserymen of the country to give

a little publicity in their literature, in catalogs that are sent out, appealing to their customers and patrons to become members of this Society, would be a good thing, and I believe the nurserymen would respond heartily to the suggestion. I think it would be a practical way of getting in touch with a great many fruit growers of the country.

PAUL C. STARK: I do not know whether Mr. West was at the meeting in Chicago of the American Association of Nurserymen, but they went on record last year at that meeting as being in favor of boosting the American Pomological Society in every way possible, trying to get all their members to become members of the American Pomological Society, because they realized what it meant to the nursery industry indirectly. Anyone who heard the paper I read for President Cashman will realize that this association is receiving help from them.

There is one thing that Mr. Hardie mentioned, and something similar came up in one of the executive meetings, and that is the fact that you must show your prospective members that they are going to get some real benefit out of this organization — far more than two dollars' worth. I am a nurseryman, and also an orchardist. I have a young orchard coming on, and I am vitally interested in everything that shows new development in the orchard field. We have forty-eight States and there are experiment stations in every State, more in the agricultural colleges, and besides that we have our big departments of agriculture that are continually putting out bulletins; but of the 500,000 fruit growers there are very few who really have an opportunity to see what is coming out of these experiment stations, colleges and departments of agriculture. They are busy men and it is hard to get these bulletins, and they are too busy to read the bulletins when they do get them. That will bring up a point we discussed this afternoon. We should, as a national organization, be the mouthpiece of the fruit growers of America, and if these bulletins and articles giving the experiments that are being carried on through the country could be condensed in this monthly bulletin, maybe just a summary of the different articles and bulletins, it would be invaluable to the orchardist and he would have time to read it — and would read it. That is one of the things we can sell to the fruit growers and show them they cannot get along without this information. There are a good many more similar activities, but

that is one thing that would interest me very much as an orchardist and it would take more than ten dollars a year to keep that away from me. I think the more publicity we can get from nurserymen and spray manufacturers and other manufacturers sending out little pamphlets giving the advantages of the American Pomological Society, the more members we will get. Speaking for the nurserymen, I think they will be glad to do everything in their power to get this information to the fruit growers and get more members. I think there is a fertile field.

H. H. HARDIE: It goes without saying that the manufacturers of sprayers, of packages, the nurserymen and all the allied industries would be very glad to send out circulars of the American Pomological Society and do all they can to promote the interests of the Society, and we can do a lot, because there are thousands of pieces of mail sent out every day by the allied industries. But the question that strikes me is, What are we going to do with this Society. Are we going to be satisfied with 500 members paying \$2.00 a year, getting along with a Secretary who is over-worked and getting nothing, or are we going to try to make a healthy, useful organization? It seems to me we ought to set a mark and work to it.

F. P. DOWNING (Indiana): If you are going to make a campaign for membership you must do as the manufacturer does when he goes after business — you must use a follow-up system. You must get right out and dig for these members. They will not come to you. It seems to me if we could have the proper machinery for distributing these letters and making a direct appeal to the fruit growers and the allied industries, there is no doubt but what we could get a membership of five thousand, or even ten thousand.

Speaking for the package manufacturers, this is the first time I ever had an opportunity to attend a meeting of this organization, and I doubt whether there are a half dozen of the fruit package men in this country who know of this organization. We have a national organization, we have a paid secretary and a paid traffic manager. Our secretary gets out a bi-weekly letter, and I know he would be glad to call attention to the objects of this Society — I know that will be done. When I go back I intend to make a report and I know something of what this Society stands for. We have in the neighborhood of 1,200 members in our or-

ganization — there are probably 400 or 500 package manufacturers in this country, and if they knew what this Society stands for I have no doubt they would be glad to join and lend you their moral and financial support.

DR. L. H. BAILEY: These expressions are certainly very encouraging. These matters have been discussed by the Executive Committee and at least one man has been sending out literature. Let me call your attention to the Secretary's report, showing that something has been done in this direction, although it is very small compared with what ought to be done — twelve thousand pieces of mail last year. The Secretary did not take his office until after the meeting last year, so some work has been done along this line. But just such offers as have been made here will be of immense help.

V. H. DAVIS (Ohio): It seems to me that Mr. Hardie has well stated the case. We must have something to sell people before we can start with a program, and after that it is largely a matter of financing. It has occurred to me, however, that if we go before the fruit growers with a two-dollar program we will get a two-dollar response. It would seem to me, too, that we ought to be able to learn something from the experience of the Farm Bureau people during the last year or two, and also from the commercial clubs of the various cities during the last ten or fifteen years — that when the membership dues have been made worth while and a program that is worth while attempted, the result has been that the membership has rapidly increased in spite of the increased dues and something worth while has been done. We all know that the Farm Bureau has gotten immeasurably farther with the \$10.00 program than they could ever have gotten with the \$1.00 program, as they started out. As we all know, it is a powerful organization, and it is because it is properly financed. It would seem to me that if the fruit growers of this country are not sufficiently interested to put \$5.00 into this organization, then I do not think it will ever be successful on a \$2.00 basis. I do not care whether we have one hundred members or ten thousand, the principle will be the same. I believe we will be much more likely to get ten thousand members at \$5.00, or even \$10.00, than on the \$2.00 basis.

DR. L. H. BAILEY: It is to be remembered that we lose money on every membership if we are to put on the program we

have outlined. The annual report, these monthly or bi-monthly letters, the fruit catalog—the mere cost of printing and compiling costs more than \$2.00, and the more members you have the more money you lose from that point of view but of course it enables you to get money elsewhere, and we want all the members we can get. But from the financial point of view we cannot make it work out, so there must be other funds aside from the membership dues, which are not very high.

B. G. PRATT (New York): May I ask whether a regular prospectus has ever been gotten out for the Pomological Society? As Mr. Hardie says, we must have something to sell and we must tell people what we have to sell. So many people have said they do not know anything about the American Pomological Society. When we start in a new business we lay out a prospectus of what we expect to give for value received. If we ask \$2.00, or \$5.00, or even \$10.00, we should be able to tell the general public, intelligently and as briefly as possible, what the American Pomological Society proposes to give them.

I want to second what has been said by other manufacturers, that we will take pleasure in circulating any amount of literature in regard to the American Pomological Society that they will furnish. We will see that it gets into the hands of the fruit growers, for we believe there is a wide field of usefulness for this society.

Another thing occurs to me—would it not be proper to have a member of the American Pomological Society present at every one of our horticultural society meetings once a year to let them know what the American Pomological Society is and what it stands for. In that way we might be able to get the cooperation of every horticultural society in the country, which we should have.

DR. L. H. BAILEY: Mr. Pratt asks about a prospectus. We have a prospectus this year setting forth the aims and objects of the Society and the basis of membership. The Secretary sent out 8,000 this year and I sent out several thousand myself last year. That was a beginning.

With respect to the appeal to the different societies, we had last year one man who was to look after that phase of the work, Prof. Shaw of Maryland, and in the report of Secretary Lake you will find an account of his activities and the result thereof.

We have had the American Pomological Society presented at a number of these meetings. The difficulty is to find means to pay the expenses of the man sent there, and persons who have been members of the American Pomological Society in times past, unless they have been in touch with the meetings recently, are really not able to represent the Society. Correspondence has been had this year between the Secretary and the President's office as to the persons who would represent the Society at subsequent meetings, but we could not find those persons, and we have not the funds. Mr. Cruickshank has represented us this year at the Michigan meeting, so the work has already been begun, but the importance of it has been well emphasized by Mr. Pratt and I wish we had a membership on which we could call and the money to pay their expenses. We cannot send anyone to California, but if there was someone in active association with that society he could speak for us. But if we had a member who was in touch with the Society ten or fifteen years ago he would not be thoroughly acquainted with the progress we have made up to the present time.

PAUL C. STARK: Mr. Davis brought out the point of increasing the dues. I wonder if it would not be a good idea to hear from some of the members present as to what they think of that proposition. Of course some times it is inadvisable to increase dues, but it might be well to discuss that, for if we could get as many members at \$5.00 as we have at \$2.00 it would give us a whole lot more money. I do not know but what he is right, that we might get more members if we put out a good strong prospectus as to what we will give the people.

H. H. HARDIE: I think what the President said is germane to this matter. He says we will lose money by going on with what we have been giving for \$2.00. If we are selling something for \$2.00 and losing money, we must first find if we cannot cut our cost, and if not, then raise the price.

PROF. J. C. BLAIR (Illinois): I have been a member of the American Pomological Society for twenty-nine years. I think I attended the first meeting in December, 1892, and at that meeting and at subsequent meetings we have had some of the finest people on the North American continent to speak to us; but throughout all these years we have run the institution on a cheap plan. It has been said here that it is a \$10.00 program, then why

do we go along on a cheap scale. Why do we not, as business men, put the American Pomological Society on a steady, working, going basis, financing it in the way it should be. Let us make it at least a \$5.00 proposition.

DR. L. H. BAILEY: The membership fee was only \$1.00 for about seventy years, and two years ago when it was raised to \$2.00 many persons questioned whether that could be carried. If you want to make it \$5.00 I will support it, but there are some fruit growers who are not interested in the sale of commodities and therefore might not receive any greater benefit. Of course there are many fruit growers who will pay \$5.00.

W. S. PERRINE (Illinois): It seems to me we ought to pay \$10.00 rather than \$5.00. I belong to an organization in Illinois where the annual membership is \$20.00, and if we can pay \$20.00 to a State organization we ought to pay \$10.00 to an international organization like the American Pomological Society. So I am strongly in favor of putting it up to \$5.00, and more in favor of making it \$10.00.

R. A. SIMPSON (Indiana): I am like Mr. Perrine and Professor Blair—I would rather see it a \$10.00 proposition than \$2.00. I would feel I was more likely to get my money's worth than at \$2.00. We would not spend so much time on how to finance the Society, and have more time to put on the best program we could get.

PROF. W. S. BROCK (Urbana, Illinois): I am a fruit grower and belong to the same association Mr. Perrine speaks of, and we pay \$20.00 for the privilege of sitting in the meeting each year, and I believe I have an opportunity to get more information than nine-tenths of the men who belong to the association, because of the fact that I belong to the experiment station and college. But I think between now and January 1st I can deliver 100 members into the American Pomological Society at anything under \$20.00. I will guarantee to deliver that many.

DR. L. H. BAILEY: Who will agree to deliver another hundred?

W. C. REED (Indiana): I have been a member of the American Pomological Society for over thirty years and possibly I have missed two or three years in that time. I really never felt I got a great deal out of it except the meetings I attended. But if you are going to put on anything like the program mentioned

I think you will get a great many more members at \$10.00 than at \$2.00. I would gladly give \$10.00 a year if you carry out the program outlined.

GAIL T. ABBOTT (Medina, Ohio): I am not a fruit grower and anything I would do or say would be representing the fertilizer interests, but I do not think there is any question as far as they are concerned that they would back any program that has been mentioned so far. I think if we stick anywhere it will be with the individual growers. I do not think there is any question about the allied interests.

DR. L. H. BAILEY: Of course we do want this to be a growers' society and those who are interested in the production and sale of fruit, not all the others who are accessory thereto. Are there any growers here who wish to say anything?

MR. LANDFEAR (Ashtabula, Ohio): While I may appear to be one of the older members of the Society, I am one of the youngest, for I have just paid my two dollars, and when I did so I wondered how in the world they could afford to run an organization of this kind for two dollars. The first thought was that they could not give much for \$2.00. But I feel, while I am the youngest member, that the dues should not be less than \$5.00, or even \$10.00.

C. H. WAID (Ohio): I am a grower, as we'll as interested in other activities. I have watched the movements of the American State Farm Bureaus very closely and have been much impressed by the fact that the men who refused to give one dollar for membership in that organization gladly gave ten dollars. I have also watched the development of other organizations of a national character such as this, and I find the most of them have more difficulty on the small fee basis. In view of the fact that this organization has not been able to get a membership on a small fee it seems to me it would be wise to attempt a larger fee. I do not know whether it is in order or not, but I like to see action, and I am ready to move that it is the sense of this gathering that the fee of this organization be placed at \$10.00. I am willing to increase mine up to that amount.

(Motion second.)

DR. L. H. BAILEY: That is a radical change, one that it would be well to consider with care. This body here represents

a rather selected group. What about the other five hundred that are elsewhere? What effect will it have on them, not feeling the impulse of the meeting here? I am not opposed to this, but you must consider it on all sides. The Society has agreed that this shall not be a trade organization, and the higher fees are those that are particularly applicable to trade organizations which are engaged particularly in buying and selling and in combating other enterprises which have direct relation thereto.

This motion is before you now — a motion to increase the membership fee from \$2.00 to \$10.00.

W. H. LLOYD (Cleveland, Ohio): I believe if we could even find the money to finance a permanent secretary for six months, he would be able to show results such that there would be no question as to where the money is coming from.

H. G. INGERSON (Ohio): I have been using my pencil, and I figure that we have at least thirty State organizations and if we had thirty-five men out of each of these organizations it would give us one thousand members, which at \$10.00 each would give us some money to start on. I believe that in Ohio we can get thirty-five men, and if Michigan would do the same, and the other States, we would have something as a start.

H. H. HARDIE: I think I can guarantee to get one hundred men in Michigan at \$10.00 each.

B. G. PRATT: I am a life member of the American Pomological Society, and I think there are enough right here to put up \$100 for life memberships to guarantee that this will go through. I will be one of those.

PROF. W. PADDOCK (Ohio State University): It strikes me that the people who are doing most of the talking in favor of \$10.00 are either manufacturers or nurserymen — they are not fruit growers or college men. Of course the college men could pay \$10.00, for they get wonderful salaries, but I have been wondering whether a ten-dollar fee would not be pretty severe on the great bulk of fruit growers who are in moderate circumstance and have moderate incomes. Rather than have a limited membership would it not be better to have an organization that would appeal to the whole fruit growing fraternity of the continent? It strikes me that way.

Then again, the American Pomological Society, to tell the naked truth, has not amounted to a whole lot in the last fifteen

years. I do not feel that we have gotten a great deal out of it. Perhaps I am behind the times, but I did not get here until late this afternoon and I have not heard any declaration of principles as to what you are going to give these people for their ten dollars. If I am too late it might be a good thing to hash that over.

I can imagine where this Society might be worth a whole lot more than ten dollars, but if we are going to interest a lot of Ohio growers that I would like to see interested in this scheme, friends of mine, I can tell you that to the man who had a big crop a year ago and did not get anything out of it and did not have any crop this year, ten dollars is a pretty good-sized lump of money to put into something that they are not sure will benefit them. I do not like to throw cold water, but it strikes me that ten dollars is pretty steep.

PROF. L. H. TAFT (Michigan): I hardly know how we can handle this question. I have had the experience of taking in the memberships for a number of years, and I recall that at St. Louis a few years ago some ten men there pledged one hundred members from their States at \$2.00. We have not received one hundred members altogether, even at two dollars. It is a question of what we can furnish the members in return for their fees. If we can make it worth while to become a member at \$10.00, we can bring it up to that fee. Many of our members are paying \$10.00 a year for Farm Bureau membership and I think they would feel it pretty heavy to be asked to pay ten dollars here. If, however, we can show them another year that it is worth ten dollars, I think we can get it.

PAUL C. STARK: When I asked for discussion of Mr. Davis' discussion I had in mind that it would be a good thing to have a larger fee — as large a one as we could get by with and get in a good many members. Mr. Pratt has said he would take a life membership at \$100, and speaking for our company I will make it another \$100, and I think quite a number of the allied industries will do the same thing. That will help to finance the thing for a while, but I believe it would be a mistake to make the dues \$10.00 right now, although I am in favor of \$10.00 next year. I believe \$5.00 would come nearer to holding the orchardists, and then let as many of the allied industries and larger orchard men take out life memberships. That will give us quite a little money to begin with.

DR. L. H. BAILEY: Will you read the concluding recommendation of the ten made in my address yesterday morning?

H. P. GOULD: The tenth recommendation is: "That we here and now raise a supplementary fund, above the usual income of the Society, to put through the new work. Are there twenty persons and firms ready to contribute fifty dollars each? The contribution would be charged to the advertising appropriation of the firm. Or are there ten persons and firms who will contribute fifty dollars, and twenty who will contribute twenty-five dollars? Or are there one hundred who will give ten dollars."

THE PRESIDENT: I want to call your attention to a phase of this situation which has not been mentioned. We are here as commercial fruit growers, but we have taken action already in this convention to interest the amateur by trying to increase the planting of fruit in all areas where it is possible for the purpose of increasing the home-making value of growing fruits. If we are to do that it means appealing to the amateur as well as to the commercial man. Will he pay ten dollars?

C. H. WAID: In view of the fact that I made the motion I would like to say that I had in mind that it was a radical step. I also had this in mind, that there would be certain ones who would pay this fee and perhaps get the organization on a good financial basis. However, I can see plainly that it might have a tendency to keep some of the smaller men out, although the one dollar and two dollar fees have kept out ninety-nine out of one hundred so far. So if this Society thinks it better to have this \$10.00 membership made a little donation, leaving the present fee as it is, that would be perfectly satisfactory. I will be willing to withdraw my motion. My idea was that if we could get enough money to put the Society on a good financial basis we could show the small growers that it is worth while to come in.

H. H. HARDIE: We have a resolution, duly passed, leaving the financing of this organization to the Executive Committee. It seems to me the Executive Committee can get after these allied industries and get the money. I think it is up to the members here to fix the fee, but the plan of raising money as I understand it is left to the Executive Committee.

DR. L. H. BAILEY: That was the action of the convention.

H. H. HARDIE: If Mr. Waid has withdrawn his motion I move that the annual fee be five dollars.

(Motion seconded.)

DR. L. H. BAILEY: The Secretary has whispered in my ear — suppose the fee was ten dollars and the Secretary was not able to deliver ten dollars worth? But the larger question is as to the purposes of this Society. I think the fee ought to be raised, if not this year another year. I am not sure about this year. The question is, shall we make the fee so large as to make this purely a professional and commercial organization, missing the larger aims of the Society? We must not be misled by certain other organizations who are able to pay high fees. I belong to a society in which the fee is \$25.00 a year and I am glad to pay it; but this is quite another proposition.

W. W. FARNSWORTH (Ohio): I realize the force of Mr. Waid's statements, and I realize also the truth of what the Chairman has said — that this is a different proposition. My attendance at this Society dates back thirty years and I realize that a great many men who have loved and labored for this Society are men of moderate means but high ideals. I realize also that the force of this Society is not altogether a full treasury, and while I have no objection to the commercial interests taking as much of the financial burden as they care to, I would be very sorry, indeed, to see any fee placed upon the membership which would keep anyone out. I feel that two dollars is too small, but I do not believe we ought to make any further upward movement, especially now when the average fruit grower does not boast of a very full pocketbook.

MR. GOURLEY (Ohio): I have taken it upon myself on several occasions to talk to fruit growers' associations and ask for memberships in the American Pomological Society, and perhaps one or two would do so, but there was no general response. It seems to me that we must have this pretty clearly worked out, do something that is concrete, and give something for this money. Unless we can do that it is a question whether we are justified in adopting anything very radical in the way of raising our dues. Of course the thing to do would seem to be to make the Association worth while. Various things have been suggested. If we

could go before Congress with something tangible, if we could do something as to package standardization, or a uniform law for grading and packing of fruit, something of that sort would draw considerable attention, and perhaps considerable fire, to the Society and it thereby would gain strength. When the Farm Bureau raised its fee to ten dollars they had an organization by which they could do considerable work which they could not have done before. But there seem to be one or two here who do not have very clearly in mind the exact things the Society is going to do. They all should know because there are only a few of us here and when we go from here there will be a great many questions asked—how did the meeting come out, is it a going concern? Personally, I feel very much encouraged in comparison with last year, when there seemed to be a lack of purpose and policy. Now these things have been outlined more clearly and we know better what the Society is attempting to do. But I think a moderate course would be better and that perhaps five dollars is best for the present.

T. B. WEST: When does this become effective, this year or next?

DR. L. H. BAILEY: That depends on the action.

T. B. WEST: I did not understand whether it would take effect this year or next. I think without question the fee ought to be five dollars. All of us ought to be willing to pay five dollars to belong to this Society whether we get anything out of it or not. A society of national scope with a fee of only two dollars looks cheap to me. If you make a fee that they are willing to pay and then show the members you are doing something for them you will build up the strength of the Society. I think nearly every fruit grower in Ohio can pay five dollars and is willing to do it and I hope in the future we can raise it to ten dollars.

DR. L. H. BAILEY: The Secretary has a suggestion to make.

THE SECRETARY: I have certainly been interested in this discussion. It is necessary to have money in order to do anything, but I suggested to Doctor Bailey a short time ago that at the present time the Secretary, whether myself or someone else, has to do something else as his own business and do the work of the American Pomological Society when he can get a few hours, which means that he will not be able to give to the membership as much as he would like to and as much as they ought to have.

I would therefore make a motion that the fee be two dollars for 1922, or until the next meeting, with the recommendation that at that time it be increased to five dollars. I make this as an amendment to the other motion.

(Amendment seconded.)

Vote on the amendment; lost. (Vote on the original motion, that the fee be five dollars; carried.)

W. C. REED (Indiana): What do you want to do about life memberships. Do you want to change that, or do you want to see how many life memberships you can get here at one hundred dollars?

H. H. HARDIE (Michigan): I move that the life membership fee be left at fifty dollars.

(Taken by consent.)

W. C. REED: In order to finance the Society I would like to join nineteen others in taking out life memberships at fifty dollars each.

(The final subscriptions were):

B. G. Pratt.....	\$50 00
W. C. Reed.....	50 00
Paul C. Stark.....	50 00
H. H. Hardie.....	50 00
L. H. Bailey.....	50 00
J. E. Smith.....	50 00
Toledo Rex Spray Co.....	100 00
W. Paddock.....	10 00
J. H. Gourley.....	10 00
W. H. Lloyd.....	10 00
W. S. Brock.....	10 00
C. H. Waid.....	10 00
R. B. Cruickshank.....	10 00
L. V. Doud.....	10 00

L. H. BAILEY: If there is nothing further in this line we will take up the next item of this report.

H. P. GOULD: The matter is still undecided about advisors to the Secretary. I do not know whether this matter should be discussed and carried through tonight or handled in some other way.

DR. L. H. BAILEY: I should think those persons should be named from the floor.

J. H. GOURLEY: I move that the President appoint these men.

(Motion seconded, then an amendment offered that the President and Secretary make the appointments. Amendment accepted and amended motion carried.)

H. P. GOULD: The next item is membership.

"3. Membership—regular and collegiate. At present any campaign for new members rests with the Secretary. That of itself is a heavy burden, if the work be effective. A committee of really interested members could doubtless accomplish much. The work of such a committee should be directed by the Secretary. We recommend that a committee be appointed, with the Secretary as chairman, and that this committee be in two parts, one to cover regular, the other collegiate membership."

"4. Medals, awards, etc. Our recommendation is that a standing committee on awards be appointed and that this committee be charged with the awarding of the Wilder medal and all others that may from time to time be given by the Society; further, that this committee be charged with the canvassing of the entire situation to determine what other awards, medals, etc., ought to be given by the Society, if any, in addition to those that are now given from time to time."

DR. L. H. BAILEY: We now have a committee consisting of F. G. Charles, J. W. Crow, and B. D. Drain, and two of them are working on this very problem, working out the details of the judging contest tomorrow. It would be perfectly agreeable to us, as long as the members of this committee are not here, to ask them to get memberships in the collegiate branch.

H. P. GOULD: The matter of medals and awards has been handled and a committee appointed, so we can go to the next item.

"5. Increase in consumption of fruits. Our President recommends the issuing of bulletins by all the experimental stations, colleges, departments of home eco-

nomics, etc., in which are set forth the value of fruit in the diet. We heartily endorse such a program, but this committee would place special emphasis on the work of the home economics departments in the colleges, and also on the work of home demonstration and other home extension agencies. These are the people who are reaching those who put food on the table. We recommend especially that, whatever else be done, the Secretary's office address a special letter to these agencies asking them to stress as much as possible the use of fruit in the home and perhaps referring them to the literature already available."

The President's recommendation was that all the experiment stations and colleges be requested to issue one bulletin each during 1922 setting forth the value of fruit in the diet, and allied matters.

DR. L. H. BAILEY: I made that suggestion for the purpose of getting publicity on the use of fruit and fruit products. I do not know that any action is necessary as this is the program outlined by the Society. It is up to the Secretary's office — we want him to earn his salary — to correspond with these different agencies and see if they will take on such publication activities.

H. P. GOULD: If the committee had known when it made these recommendations what it knows now, it would not have made the next recommendation.

"6. Cooperation and affiliation with State societies. We cannot over-emphasize the importance of our President's references to such activities. The American Pomological Society ought to be the central clearing house for all the State and Provincial fruit growers' organizations, and each one should be, somehow, linked up with it. We recommend that every Provincial, State and county organization or Society be urged to designate a member who shall be its representative in the American Pomological Society and whose annual dues shall be paid by each Society or organization so represented. It is believed also that as far as our funds permit, the monthly or bi-monthly letters from the Secretary's office should be sent to all horticultural society secretaries and other

officers, as a means of interesting them in the American Pomological Society and its work. A committee on affiliation and cooperation between the American Pomological Society and other societies might well be designated. We recommend it.

In regard to the binding of the report the committee we thought this was administrative and belonged to the Executive Committee, and we have so recommended.

"7. The desirability of establishing a regular-sized page and style of binding for the annual report needs no discussion. It is self-evident. We believe this is a matter that the Executive Committee, in consultation with those familiar with printing, binding, etc., can best handle. We recommend that the Executive Committee be charged with this duty and that it be given power to act. That is, that the action of the committee shall be the action of the Society.

DR. L. H. BAILEY: There is no place in the annual report this year in which a statement is clearly made as to the status of society memberships. There is a regulation of this Society to the effect that other societies may take out memberships and pay a fee of \$10.00, and they have certain privileges. We have a printed slip which gives the official action of the Society taken some time ago in this respect and that has been sent to every State and regional society on the continent asking for their affiliation. Then as I told you, Prof. Shaw was last year designated as the person to attempt to procure these affiliated society memberships, the results of which is in the report this year. I think the fact that he did not get as many memberships as expected is no reason why this should be dropped. This should be taken up every year with these organizations. I think as soon as the Society is thoroughly on its feet there will be no question about the affiliations.

About the standardization of the report. Here is the report of 1854 — you can see the way it is bound. Of course the binding is an additional expense — about fifty cents for good cloth binding. But the question is as to the size of these reports. For some years they were published as quartos, and the suggestion is

that we adopt a size of page, a format, and a general method of compiling the report. I do not like the reports. They have good matter in them, but I think the arrangement might be changed so they would be more attractive and put up in the form of a book. But what kind of binding shall we have; what color shall we have? It has been recommended that this be referred to the Executive Committee with power to act. This means that someone who is familiar with editing and getting material ready for the press will look into it with a good deal of care.

H. P. GOULD: No. 8, which has to do with the raising of funds, has been discussed.

The last item is that of nomenclature.

"9. The matter of nomenclature. We feel that the importance of this matter is very inadequately appreciated. Throughout its entire life this Society has stood as the one body in America that has had a directing influence on fruit variety names. That influence has had more or less general recognition, but it has no compelling power. Its influence in this direction has sometimes waned, and many times has been ignored. The whole question needs careful, constructive, scientific consideration. This committee recognizes the fact that nomenclature work is very definitely research work. The results are not merely matters of opinion, where one man's is as good as another's; but rather, the results are matters of fact, and the problem is to establish the fact or facts which are involved. Not every one is so situated that he can do research work in fruit nomenclature. The placing of this work where it can best be done is a matter that calls for earnest consideration. Our President has said as much in his address. He recommends the publishing of the Code, after proper editing, as a bulletin. This committee emphasizes the need of action and recommends giving the widest publicity possible to the Code, after it has received the editing our President speaks of, and consideration with respect to revision along lines suggested in the President's address, and in any other respects that are essential to make it scientific and workable. A committee to consider these matters

should be appointed with power to act. The latter feature is necessary if the recommendation of the President for the publication of the Code as a bulletin is adopted."

Perhaps in this connection I might call attention to the fact that the committee on nomenclature of the American Society of Nurserymen is also interested in this matter, and two members, including the chairman, of that committee are here. They called my attention to the list of fruit varieties prepared in 1920 by Prof. Lake, a list which was, I think, prepared for the Nurserymen's Association. I am sorry to say that there are some things in that list which need correcting. Mr. Kelsey, member of the horticultural committee on nomenclature, is also a member of the committee on nomenclature of the Nurserymen's Association, and he has referred the matter to Mr. Simpson, who is chairman of that committee in the Nurserymen's Association, and with a little work I think we can bring that list to a higher degree of completion than at the present time. The question might be whether that list, brought up to date and with some corrections, should be the list that we turn over to this committee to print, or whether we should request that they print the list in the last issue of the American Pomological Association, the list which was published as Bureau of Plant Industry Bulletin 151.

DR. L. H. BAILEY: Could you go over the list for 1920 in a week or two and make it conform to the Code?

H. P. GOULD: I think so, putting in some new ones that ought to go in and making some omissions.

DR. L. H. BAILEY: If in a week or so you could make this list conform to the Code it could be given to this committee to print. Mr. Gould has been appointed the chairman of the committee on nomenclature, with power. Now go to it!

H. P. GOULD: Even though that list may not be the official list of the nurserymen it could be the foundation of a list of the Society and I am inclined to think such a list would be more satisfactory to the nurserymen than this list.

DR. L. H. BAILEY: It will be the official list for us — you are our committee.

W. C. REED: As a member of the Executive Committee of the American Association of Nurserymen I would urge upon you

that this be gotten back to Mr. Kelsey as soon as possible, as it is partly in type now, and as the Executive Committee of the Nurserymen's Association sent Mr. Kelsey a check for \$1000 to help get this out, I am sure that any corrections you wish will be all right with the Association.

DR. L. H. BAILEY: In connection with the matter of nomenclature it was suggested today that we might desire to re-establish the relationship between the American Pomological Society and the United States Department of Agriculture. An appropriation was made by Congress for nomenclature work and I believe three bulletins were published.

H. P. GOULD: There was no special appropriation made by Congress for that, but the Secretary, Mr. Morton, ordered the bulletins printed, and for several years after the death of Dr. Lyon, Prof. Ragan was chairman of the committee on nomenclature and a member of our staff, so that it amounted virtually to a paid chairman who devoted all his time to nomenclature work.

DR. L. H. BAILEY: These bulletins were very valuable and ought to be revived. In the early days it was published not only in the list of fruits but also in our Proceedings, the last of these being in 1891. The fruit catalog began about fifty years ago. We have now a definite action to revive the fruit catalog. Mr. Gould is chairman of the Nomenclature Committee connected with the Department of Agriculture and I think it would be a good plan to memorialize Congress asking that this be re-established. Of course the chances are that it will be regarded as a publication of the United States Department, and the danger is that the Society might lose something of its identity, although I think it was a perfectly satisfactory arrangement in Prof. Ragan's time. For myself, I should like to see a cooperative movement of that kind resumed. If we are to do that it is necessary to have a motion.

PROF. J. C. BLAIR: I move that this Society memorialize Congress looking toward the resumption of cooperative work in the preparation of a fruit catalog and the publication thereof.
(Motion seconded and carried.)

B. G. PRATT: I want to suggest this for the Executive Committee. I am a member of almost every horticultural society and I try to attend as many meetings as possible. Is there not some way in which the American Pomological Society through the Sec-

retary's office, can be a clearing house for the meetings of the different horticultural societies where this will not conflict with some constitutional requirement as to the holding of these meetings. As it is, a number of the meetings are held simultaneously. We cannot be in two places at the same time and I think where it is possible arrangements should be made to hold, say one meeting at the first of the week and another at the last of the week, and if the office of the Secretary could be a clearing house it would be a tremendous help.

DR. L. H. BAILEY: Personally, I feel the time for the meeting of this Society is September, as in the old days.

PROF. L. R. TAFT (Michigan): I would like to make a partial report for the Committee on Awards of the Wilder Medals. The will of Mr. Wilder left this Society \$5,000 to be used for this work, \$1,000 for Wilder medals. The Society has for a number of years given silver and bronze medals, sometimes in connection with the work in horticulture, other times for new fruits. The Committee wishes now to recommend that the silver Wilder medal for notable contributions to horticulture and to the work of the Society be given to our President, Dr. L. H. Bailey. (Applause.)

PROF. J. C. BLAIR: I move that this be done. (Motion seconded and carried.)

DR. L. H. BAILEY: I wish to say that I appreciate this very much. It so happens that I have been the recipient of certain medals and diplomas both from this country and abroad, and the one I prize most is the Wilder Medal which I received in 1885 for an exhibit of native nuts and fruits, and with this medal, coming at the last of my work, it is difficult to say which I will prize the more. I very much appreciate this action. (Applause.)

H. P. GOULD: There was a matter mentioned a little while ago which if it is possible to bring to a head now would be desirable. We have all seen the little medal which the Secretary has secured for work in connection with the judging contests. If I understood the suggestion it was that the design of this medal might be adopted as the official seal of the Society. It seems to me it is a very fitting and attractive design and I would like to move that the design of that small medal be adopted as the official seal of the American Pomological Society.

(Motion seconded and carried.)

(Dr. Bailey then read a telegram from the International Fruit Exchange of Chicago, inviting the American Pomological Society to hold its next annual meeting and students judging contest in connection with the International Fruit Exchange.)

PROF. J. C. BLAIR: I am sure I express the sentiments of everyone here tonight, and of all members of the Society whether present or not, when I say that we all appreciate the fact that after a term of years our grand old organization has had breathed into it the breath of life. The American Pomological Society it seems to me reached its lowest ebb in 1916-17, for I remember very well the meeting that was held in Boston in 1917 in connection with the Massachusetts Horticultural Society, at which time I think there were less than a dozen members of this organization present. I recall, too, the air of discouragement noticeable on all sides. A group of six or seven of the old guard met at the Copley Square Hotel on the second evening, in my room, to discuss ways and means, and the discouragement manifest at that meeting was great. I remember one member said, "Let's bury the d—d thing." Another said, "Yes, but let us have a rosewood casket and cover it with flowers and bury it with honor, for this is an honored organization we are laying away." And then later in the discussion there was one man who said that in the entire membership of this organization there was but one man who could save the institution, and was it not worth while to enlist his sympathy and help. Another man said, "Who is it?" and the reply was "Liberty Hyde Bailey." (Applause.) So it was decided to wire him and find out if he would take the job of putting new life into the Society. I am glad, Mr. President, that I was one of the five or six who signed that telegram which went to you asking if you would step into the gap and save the American Pomological Society.

Word came back the next morning that if it was the wish of those who had this matter in charge he would step in and do the best he could. That day at the meeting Doctor Bailey was elected President of this organization and from that day to this there has been a steady growth. He has put into it not only the breath of life, he has given it not only the inspiration such as seen today, but he has given it a stabilizing quality, he has put into us a faith in the organization which we have long wanted to have and now we see that again this institution is a real live, going concern.

Will you not rise with me in further expression to our honorable President of our appreciation of the service he has rendered. (Applause.)

PROF. LAURENZ GREENE: I think Professor Blair should tell us exactly who were at that meeting. From some of the quotations, I would judge that Frederic Cranfield was one of the number.

MR. FREDERIC CRANFIELD: I was at that meeting, and I opposed the election of Doctor Bailey, because I said there were too d — d many professors in the Society now. But I want to say that tonight I agree with every word Professor Blair has said, and it has been one of the greatest delights of my life to have been associated in this work with President Bailey.

DR. L. H. BAILEY: I think I must say a few words in respect to this matter. It was before the time of the Boston meeting that I retired from university and educational work, so I was not at that time a professor nor connected in any way with any institution. I expected and hoped never again to be connected in an official way with any society, not because I did not like the work, but because I had other work to do. I have consistently escaped such connection except in the case of the American Pomological Society. I want you to know the situation in which I now find myself. I am devoting the remainder of my life to other lines of work. I took the presidency with the distinct understanding that I should not stop my work and my travel for its conventions. I have stayed in the country this year for the purpose of attending this meeting when I should otherwise have been somewhere else. I am glad that I did. I may be nowhere near when you meet again. It is not fair to the Society that the president should be absent from the conventions. You ought to have someone as President who not only knows this Society and is in touch with it, but who can be present at its meetings.

I have been asked whether I would be willing to retain some connection with the Society. I say yes, but what that connection shall be I do not know; that is for you to decide. I am interested in it, and if I can do anything to help it along and still not neglect the work in which I am engaged, I shall be glad; but you ought to have someone who can be actively present and take part, attend Executive Committee meetings. Whether he is an acting Vice-President or an actual President, or whether he has some

other official capacity in connection with the Society — I leave that for you to work out. But I must not have the details of the American Pomological on my mind for the next few years.

Now you see my situation. I want you to take action. I do not say that I want you to disassociate me from the Society, but take some action whereby the President's work can be passed to someone else; within the limits of my power and of the opportunities I have and the leisure from other work, if I can be of any service I shall be only too glad to render it.

FRIDAY MORNING SESSION

The Friday morning session was called to order at nine-fifty by the President.

THE PRESIDENT: There was a time when the people attending a horticultural meeting got to the meeting at eight in the morning; but in these later days it is difficult to get them out.

We will now begin the last session of this meeting of the American Pomological Society. The first number on the program is a paper by Dr Chandler, which was given yesterday in the place of the paper of Mr. Davis of Ontario, so I will call on Mr. Davis now to give us his paper on "Canadian Efforts to Improve the Apple for the More Severe Districts." This will be particularly interesting to us on this side of the line — the development of fruit on our northern border.

CANADIAN EFFORTS TO IMPROVE THE APPLE FOR THE MORE SEVERE DISTRICTS

M. B. DAVIS,
Ontario

As the climatic conditions of the Dominion cover a wide range, from where practically all varieties of tender fruits may be grown to where only the hardiest of hardy fruits may be even attempted, there enters in the field a great number of possibilities and opportunities for the apple breeder. It remained for the Experimental Farms System, therefore, to decide upon some line of endeavor with regard to its projects for the improvement of the apple for Canadian conditions.

Three distinct phases or opportunities offered: First, to attempt to originate newer and better commercial varieties for the larger fruit districts where hardiness was of secondary consideration; second, to undertake the origination of varieties for the more severe districts which were limited to a few of the hardiest varieties for the more severe districts, which were limited to a few

of the hardiest varieties of our dessert apples; or third, to attempt to create a list of varieties for the prairies where it was impossible to grow edible varieties of the apple. The two latter phases were decided upon as being the most urgent.

The first attempt at improving the list of varieties for the severer districts was made in 1890, when 3,000 trees, grown from seed imported from Russia, were planted. From this lot a few apples were considered worth propagating, but after years of testing only one can be considered a valuable addition to the existing list of hardy varieties. This one is Rupert, an apple similar to Yellow Transparent, but hardier and earlier in season. From this attempt it became evident that improvement must be sought by introducing a greater amount of quality into the seedlings than could be obtained by merely selecting within the Russian varieties, all of which are medium in that respect. In 1918, therefore, seed was taken from such varieties as Northern Spy, McIntosh, Fameuse, St. Lawrence and Wealthy, which were growing in the orchard at the Central Experimental Farm, along with four or five hundred other sorts. From this seed about 2,000 seedlings have been raised, and the actual results have been most encouraging indeed, even though there is much yet to be achieved. To date well over 1,200 of these seedlings have fruited and the remarkable feature is that only 4 per cent of these produced fruit of crab-like nature. Another remarkable point was the influence of the female parent on colour, quality and keeping quality. Of the above lot about 100 were considered worthy of naming and holding for further trial, but gradually, through the process of elimination, this number is being reduced, although to date five named varieties have been selected for propagation and general introduction.

The list of really important commercial varieties which may be grown in the severe districts, at present may roughly be classed as Duchess, Wealthy, McIntosh and Fameuse, giving as one will see a rather short season for edible apples. The Duchess at best is only of medium quality and Wealthy can hardly be termed a high-class dessert fruit, so one might really say that these districts are limited to two high-class varieties whose season extends only to Christmas, as there are really no winter varieties of sufficiently high quality to compete with such apples as Spy and Delicious.

The object to be attained then resolves itself into obtaining varieties earlier and later than McIntosh, but approaching it in quality, and at the same time possessing the factor of hardness developed to the highest degree, and here is the rub, especially in the origination of the winter sorts. The first part of the program, namely the obtaining of earlier varieties, is practically accomplished by the introduction of the five sorts mentioned a few moments ago. These are all seedlings of McIntosh Red. Melba, the first of these in season, is ready for use about August 1st and is a highly colored apple of excellent quality and should prove a distinct acquisition to the fruit lists of any fruit growing centre desiring a high-class apple earlier than Duchess. To replace the Duchess variety, Joyce, of about the same season, may be mentioned. Practically as good as McIntosh, of high color and bearing at an early age, this apple would seem to merit considerable attention. The next in season is Pedro, somewhat earlier than Wealthy, midway in quality between it and McIntosh, and a regularly heavy yielder of high color. The next, Patricia, is a beautiful apple in appearance and quality, just after Wealthy in season. Lobo, the last of these, is looked upon in some districts as being a possible successor to Wealthy, being of about the same season, of better quality and a better keeper, of as high color, with a better shaped tree to recommend it.

In addition to these five apples there are several winter varieties which are decidedly better than any we now have, but which require further testing to determine their hardness. These are all seedlings of Northern Spy and are as follows: Spiotta, Emilia, Spiro, Bingo, Donald and Niobe. The last named is the best in quality, being excellent in that respect, but lacking in color. Of the others, probably Emilia is the best in quality, with a considerable amount of color.

Not all the work has been confined to growing seedlings where only one parent was known. Considerable cross breeding has been done, and it is of interest to note the crosses between Lawver and McIntosh and its reciprocal. This combination was made in the hope that a variety combining the high quality of McIntosh with the keeping quality of Lawver and the color of both parents would be obtained. Apples of high color and good keeping quality resulted, but were a keen disappointment when it came to the test for dessert purposes. Another series of hybrids between such

varieties as Antonovka, Duchess, Winter Rose, Wealthy, McIntosh, etc., has given little of promise. These hybrids were made after the test winter of 1903, when the majority of our best sorts were killed out and it was then thought that hardiness was the only consideration and that it would be wise to limit endeavors to the crossing of varieties which contained this factor highly developed, so with the exception of the quality from McIntosh little of that factor was introduced.

There are now coming into bearing a series of most interesting and promising cross-breds, made up of combinations between such excellent sorts as Cox Orange, Grimes, Gravenstein, Delicious, King and Bellefleur, with McIntosh, Wealthy, Fameuse, Duchess and Yellow Transparent as hardy varieties. Here we have combinations which should give us color, quality, hardiness and keeping quality, and it is hoped that from these series the latter part of our program will be completed, namely the obtaining of a number of high class winter varieties for the northern districts.

Reference must now be made to the efforts to create a list of hardy edible varieties for the Northwest plains. This work was inaugurated by the late Dr. Wm. Saunders, then Director of the Dominion Experimental Farms. He crossed the Russian species, *Pyrus baccata*, with such sorts as Northern Spy and McIntosh and obtained a number of first crosses, all crab-like but several times larger than the *Pyrus baccata*, which is about the size of a small cherry. Of these first crosses two, namely Osman and Columbia, seem able to resist the rigorous climate of the Northwest plains and appear to mark an advance in the desired direction. Dr. Saunders introduced a second infusion of true *Malus* blood into his first crosses and several varieties have resulted bearing fruit as large as 2½" in diameter and quite edible, while apparently hardy, although this latter point requires further testing in the Prairies. The best of these second crosses are (1) Rosilda, a cross between Pioneer and McIntosh, Pioneer being a cross between *P. baccata* and Tetofsky, a hardy Russian sort; and (2) Wapella, a cross between Pioneer and Northern Spy. If these two sorts prove hardy for the Northwest they will prove distinct acquisitions to the horticulture of that area and will mark a permanent step in the progress of the develop-

ment of satisfactory apples for that country. This work is still being prosecuted by adding another infusion of pure *Malus* blood to the best of these second crosses, by selfing for segregation where a variety is self fertile and by inter-crossing the best of the second crosses where the process of selfing is impossible.

It might here be mentioned that in the work of Dr. Saunders, *Pyrus baccata* was used as the female in every instance. Recently hybrids have been made where *Pyrus baccata* has been used as the male, using such varieties as McIntosh, Wealthy, etc., as the female parent, so that if there is any difference in the influence of sex in the transmission of characters, benefit should be derived from it in this latter series of crosses.

From all this wealth of material, by careful selection and testing, surely there is no reason to doubt but that ultimately we shall be able to offer the settler of the northern great plains a number of varieties of apples of good quality and sufficiently hardy to withstand his trying conditions. It is the work of many life times, but if each generation can but add its quota of progress, what appeared impossible forty or fifty years ago will become an accomplished fact.

THE PRESIDENT: Through some oversight there has not been a committee on resolutions appointed. I will ask Prof. Paddock and Mr. Cranfield to act on that committee. Is there any discussion of Mr. Davis' paper?

PROF. LAURENZ GREENE: I was very much interested in what Mr. Davis had to say regarding the early McIntosh with which they are trying to replace the Duchess and Wealthy. A number of growers in our southern territory, especially in Arkansas, have been anxious to find a red variety that would come at the season of the Yellow Transparent and would not be subject to blight. I am interested to know whether these McIntosh seedlings withstand fire blight.

M. B. DAVIS: We have very little of that in our orchards and consequently any information I would give in that respect would hardly indicate whether it was so or not. With us there are very few varieties that are ever touched with blight. These

seedlings with us are free. I think they have been tested at Ames. The earliest apple we have in Canada is the Crimson Beauty, but it is of poor quality and there is a great demand for a dessert apple at that season of the year. Of course the Duchess will always be used for that purpose, but at that time of the year the people are begging for apples and will even take the Crimson Beauty. There is a great opportunity for early apples and we think we have them now.

PROF. J. C. BLAIR: I would like to ask if in the breeding work in Canada they have found any satisfactory seedling variety which would do well in the great prairie region south and east of Calgary in the Albertas?

M. B. DAVIS: No; the only thing that approaches a variety that will do for them are some of this second list I mentioned. They are very crab-like in nature, the largest size is about $2\frac{1}{2}$ ", and the flesh is crab-like, but they are the only varieties that will grow in that part of the country. We hope eventually to get them some of these other varieties. We tested out thousands and thousands of the Russian varieties on our farms and they are living, but the only one that has been any good is the *Pyrus baccata*. In Manitoba they can grow the Duchess and Wealthy, but they cannot grow anything more, and that is limited to southern Manitoba.

THE PRESIDENT: Will the native crabs grow on the plains?

M. B. DAVIS: No; they will not stand the winters. The Red Siberian will come through most winters pretty well, but the native crabs are not hardy enough for the great plains. Even some of the hardy ones are killed back to the snow line. The Yellow Siberian is a hardy crab, but even that is killed back to the snow line on the prairies.

W. S. PERRINE: Southern Illinois is interested in a red variety about as early as the Transparent, and if there is anything anywhere we would like to know it. I would like to ask Professor Greene if he knows about the Carson. It is supposed to be a red apple about as early as the Transparent.

PROF. LAURENZ GREENE: I cannot answer that. I have seen the apple this year for the first time.

F. H. BEACH: I was talking to Mr. R. A. Simpson yesterday regarding this variety and his experience was this — that

it followed the Transparent, but owing to certain deficiencies in tree characteristics he is now top-working the trees planted. I am unable to give a detailed report, but evidently he was not pleased with this variety under his conditions at Vincennes.

PROF. J. C. BLAIR: I would like to ask Mr. Davis if he thinks it is the continuous low temperature in those regions that damages the fruit, or is it the variable temperature? Even when you get the temperature down to 30° below zero you will sometimes get considerable fluctuation. Is it the variable temperature or the low temperature?

M. B. DAVIS: I think it is due to the fluctuating temperature, say a sudden drop down 25° . The temperature does not go much below zero in Ottawa, but on the prairies it drops from a few degrees above to 25° or 30° below in thirty-six hours, and in the spring of the year it will rise, the trees will start growth, and then the temperature will drop below again. It is the sudden changes coupled with the fact that the trees do not ripen properly. The ground will sometimes be covered with snow, then the snow will go and the ground will be bare. It is not root injury, but top injury, and they attribute it to the dropping from above zero to 25° or 30° below, and then back again.

H. P. GOULD: I would like to ask Mr. Davis if he does not think the very dry condition of the atmosphere, the aridity, is also an important factor in the killing of these trees on the prairies and the great plains? I have had a little experience on the great plains and with some collections of fruit trees at some of the stations through the great plains area, and we always felt that the dryness of the atmosphere was a very important factor in the killing of the trees, as well as the low and the variable temperatures.

THE PRESIDENT: The next event on the program is "The Prospect for Teaching in Pomology," and we are glad to have this presented by Professor Blair, who has been responsible for the remarkable development along this line in Illinois. Professor Blair now has the floor.

THE PROSPECT FOR TEACHING IN POMOLOGY

PROFESSOR J. C. BLAIR,
Illinois

Mr. President and Members of the American Pomological Society:

After nearly thirty years of helping to teach the subject of Pomology I have reached the conviction that after all the most difficult of all of our college subjects to teach is that of Pomology. I am equally convinced that in the entire range of educational work there is probably no subject so poorly taught as the subject of Pomology. This statement may challenge a good deal of discussion in one place or another, but I make the statement deliberately and after having visited and examined the laboratory equipment in some thirty-four of our educational institutions in this country and in Canada during the last three years.

Pomology is the most difficult subject to teach because in academic work we have nowhere the wide range of varieties or the variable nature that we have in this field. And when I speak of the teaching of Pomology I do not mean only the teaching of apple culture in its various phases, but also the teaching of the other forms of tree fruits, vine fruits and small fruits.

This subject is the most poorly taught, on the other hand, for the simple reason that the equipment for the teaching of this subject is the most expensive to procure and the material the most difficult to present to the live, expectant student. It is a fine thing to have, as Professor Paddock and I had some twenty-six or twenty-eight years ago, the untiring leadership of a great man like Doctor Bailey in the classroom—even though he had to teach horticulture at Cornell University with inadequate laboratory facilities and without land on which to grow the plants he was talking about as only a great and inspired teacher can talk. Indeed it was that conviction borne in those early days that led me to answer the significant question which comes sometimes to the boy in the early years of his life when in school, the question which varies in one way or another but which came to me in this particular form from Dr. T. J. Burrill of the University of Illinois, in May, 1892, when he wrote to the school

boy in Ithaca and among other things put this question. He said, "What are your wishes and tastes with reference to your life work?" He had been led to write to me because there was a minor job in the State of Illinois that needed to be done and my teacher, Professor Bailey, said I was the man to do it. My answer to that was simply this, "That my ambitions and my tastes with reference to my life work were to make a contribution to the pomological and horticultural development of this country, especially in the way of so co-ordinating the work of a department of horticulture that the boys and girls could have better material with which to work than had been given them heretofore." Now you may think that such a program, starting so long ago, should have accomplished something tremendously significant; and yet as I stand here today I feel very humble indeed, for I look back over twenty-five years and it seems to me incredible that the amount of time and energy spent should have produced such small results. Nevertheless, some rather important results have been attained, especially in the matter of equipment and this is what I want to tell you about today.

Let me take you, by means of lantern slides, step by step through this evolution or growth which has taken place at Illinois, in the Department of Horticulture. Let me add here also, that Pomology is being better taught in all our institutions today because of the fact that the pomological and horticultural interests throughout the States as well as the instructors and students had reached the point where they were demanding and expecting the institutions to provide laboratory equipment for the proper presentation of their subjects, and which is so essential to the development of research as well as instruction.

I was told in those early days that Illinois was not a horticultural State; that it was in the great Mississippi valley where corn and hogs and cattle were to be raised, and not an apple growing or peach growing State; that these things did not belong to the prairie country. I did not believe that, and today I am sure we have reason to feel that Illinois occupies a rather enviable position from the standpoint of horticultural development, and no little part of it is due to the organized effort of the horticultural people of the State. I mean not only the great Horticultural Society under the leadership of such men as Mr.

Perrine, who is here today, and who was for a number of years President of that Society, but also the floricultural interests of Chicago and Cook County. That organization was just as important in establishing pomological laboratories at the University as the Horticultural Society, because of their influence with the legislators at Chicago, and in that way secured their interest. But, that was not all — the State Nurserymen's Association came into being as the direct result of the necessity for some one to look after the nurserymen's interests.

And so throughout the years there has been a gradual progress, yet with so many discouragements, so many breakdowns, as it were, that it seemed many times as though our efforts would be entirely nullified and lost. And on three different occasions the Department of Horticulture of our University was completely legislated, not only off the face of the campus, but so far as we could see, off the face of the earth. By patiently bringing together organized efforts over the State the situation has improved and now we have a fairly good working start in the matter of developing the horticultural and pomological laboratories. The land that we had in the early days was close in, and it is necessary, in order to teach pomology and horticulture to have our laboratories close at hand so the students can get to the plants. And that was the difficulty with our situation, for it seemed impossible to get the executive heads of the institution to the point where they would spend thousands of dollars for land upon which to plant trees when it was so sorely needed for military purposes and for buildings for the liberal arts, engineering, etc. There was the rub. We met that situation, however, by finally stepping outside the campus proper and making our campaign for a half section of land, 320 acres. We got two appropriations, and finally a third, for that enterprise. Now, we are at work developing plant laboratories to suit the needs for material for the teaching of the different courses of study. It is in these out-door working laboratories, and the indoor laboratories now being built, that students can get first-hand acquaintance with different plants, their characteristics and requirements.

Let me now take you, by means of lantern slides, rapidly over the program of development at Illinois, and show you in

concrete fashion some of the equipment we have brought together for teaching and for the research work of our Department of Horticulture.

(Slides shown.)

DR. L. H. BAILEY: I am wondering whether the persons here understand the epoch in which we live so far as the teaching of rural subjects is concerned. The teacher of literature, history and general science has his routine provided for him to a certain extent. He is set to teach a certain definite line of subjects and the results to be attained are projected and fairly well known. Then comes a series of subjects of this kind in which there are no standardized results to be secured, in which there is very little experience as to the methods to be pursued; and these persons are not only to teach the subject, but often they must convince the people that the subjects ought to be taught, and legislators that they ought to have facilities. It is a most remarkable state of affairs, and the very opposition, the inertia, the contention, have stimulated these men to greater effort and have made it possible for them to produce such developments as this of which we hear from Professor Blair. And if they had not had this opposition perhaps they would not have made such remarkable development in the teaching of rural subjects.

Those who have taught in these institutions have often had to spend the major part of their time and energy in merely finding the facilities with which to work. When we come to another generation with a more standardized effort we shall then understand what has been the contribution of men like Professor Blair and many others who have convinced the public mind that there should be facilities and opportunities for the rural-minded college youth of the land. Yet I sometimes fear that with the expenditure of less energy, with possibly the necessity for less public leadership, the teacher may lose some of the spirit of enthusiasm.

We are practically up to our schedule, and we will now have a paper by Mr. W. G. Farnsworth, "A Report from the American Farm Bureau Federation Fruit Committee."

REPORT FROM AMERICAN FARM BUREAU FEDERATION FRUIT COMMITTEE

W. G. FARNSWORTH,
Ohio.

Mr. President and Gentlemen:

The Fruit Growers' Marketing Committee of Twenty-one appointed by President Howard of the American Farm Bureau Federation for the purpose of determining market conditions and creating a better feeling between the consumer and producer and also the distributor, met at Atlanta, Georgia, on November 19th and I am glad to say there was almost one hundred per cent. attendance. In fact, out of the twenty-one members there were nineteen present, representing the various fruit interests from the grower, including the packer and shipper, to the marketing end of it, and representing nearly all sections of the country and all fruit interests, citrus fruits as well as the fruits grown in the east. I believe every member of that committee fully realized the position he was in, as well as the immensity of the problem that had been handed to them for solution, and I think nearly all of them came with the idea that they had but very little to offer. They were in the dark as to just what could be done, realizing there were so many problems and so many conflicting interests to be considered that it would be a difficult matter to form plans whereby they could all unite to accomplish the results they were hoping for.

I was very much pleased with the spirit in which the men went into the work. There was a gentleman there, Mr. Edwards, from Redlands, California, who has been in California for thirty-five or forty years. In fact, he made the statement that he had been with the orange industry from the time when oranges were packed in the orchard and hauled to the railroad station and shipped that way, up to the present time. He is one of the officers of the California Citrus Association who are handling oranges in a perfect way, not only owning their own packing plants, but manufacturing their own packages and looking after the selling. So he was well qualified to bring experience to that meeting. They were all broad-minded men, not looking for their own selfish interests entirely, realizing that this committee was

to work not only for the good of one branch of the industry, but for the fruit industry of the United States. They were all there in a spirit of hearty cooperation. We had a man by the name of Stewart from Florida, manager of the Florida Citrus Association. He came as a doubting Thomas, the same as most of them, doubting the possibility of what could be accomplished, but I am glad to say this morning that while he came as a doubting Thomas he went away a converted Paul. And this could be said of the rest of the committee. They saw a vision of what could be accomplished in time. I believe you realize as well as I do that this project cannot be put across in a week, or a month, or a year, but we must grow to it as we gain information and knowledge along these lines.

Your committee met on November 19th, called to order by the temporary chairman, Mr. Nicols of Michigan, who was elected permanent chairman. Mr. Durst of Chicago acted as secretary of the meeting. We discussed the various problems confronting us and each member was called upon to give his views. But no one had any definite plan in view. They were there with open minds to study the problem from all angles and to decide carefully. You can realize that a mistake could easily be made when so many interests are considered. After discussing the various problems the committee dissolved into small sub-committees appointed by the chair and went into separate sessions to take up the problems assigned to each individual committee. At last something tentative was decided upon and I will read you the plans, which are not completed as yet.

They elected an executive committee for the purpose of looking after the executive work of the entire committee. This committee was James Nicols, Samuel Adams, of the American Fruit Grower of Chicago, and J. S. Edwards of Redlands, California, a man of deep thought and very careful in his statements; a man of few words, but what he did say counted. I think this would apply to the other members, and I know it will to Professor Greene from Purdue, a very strong man on the committee, who did his work and is still doing it, heart and soul, for the good of the public in general.

Then there was a committee on inter-relations, which will work out lines of relationship between the fruit growers' associations and submit plans for the organization of a new as-

sociation. This committee will have a difficult problem. Some of the strong organizations are almost perfected in the South and they will have to form some plan that these large associations can adopt with profit to themselves; also a plan that will appeal to the associations that are weaker and smaller, possibly to the local units that have no State Federation as yet. Then they will have to appeal to the individual growers in different localities, or to the local units, showing the advantage to be gained by State and Federal organization. So you see the immensity of the problem this committee has on their hands.

Then we have a publicity committee which will investigate the advertising of fruit and ways and means of increasing the consumption of the products. This committee will look after what to my mind is the educational part of the work—seeing that fruit is advertised so that its value as an article of diet will be recognized.

Then we have a committee on transportation. This committee will investigate the car supply, the character of equipment, and study the freight rates.

Then we have a committee on the standardization of packages, which will study and recommend containers which will insure the honest packing and grading of fruit. This will redound to the benefit of all parties concerned. That is one point where the entire committee agreed perfectly—that anything that was done along this line should be done for the benefit not alone of the manufacturer, not alone of the consumer, but for the general good of the entire public, realizing that the only way we can accomplish anything and get anywhere is when we lay aside all selfishness and unite for the common good. That is what this committee has in charge—the standardization of packages, and Professor Greene is the chairman of that committee.

The legislative committee will study legislation affecting the fruit industry, particularly as related to the manufacture of fruit juices, and the grading laws. We have on that committee Mr. Gray Silver. You know of his work in connection with the American Farm Bureau Federation, which I must say is something out of the ordinary, the work he has accomplished along legislative lines for that association.

Then we have also a finance committee which looks after the financing of this work.

In closing I want to say a word or two as to the future plans of this committee. The plan is that the various committees appointed are to hold separate meetings and take up the special problems assigned to them. They are to get all the data possible from all sources, and after studying this data and looking it over and digesting it, then the Committee of Twenty-one is to be called together, possibly along in January, if we can get the preliminary work done before that, and then take up the entire problem and see if we can work out a plan that will take in all this association should do and get the plan working in entire continuity.

I would like to ask you this morning for the hearty cooperation of this Society. We know this Society can be of vast help in solving these problems and I believe it is the duty of the American Pomological Society. I know the committee will welcome any suggestions or assistance you may give them, and I hope you will take some action before you close this session whereby something can be done — some one person appointed, or a committee, as you see fit, to act with us and meet with the entire committee when we meet in January. I believe it is the intention of President Nicols to call for a representative from the different associations to give suggestions and assist in formulating these plans, and I hope some action will be taken here this morning before you close.

THE PRESIDENT: This report is now before you for attention. This is the last paper on the program. The other papers, not being represented by their authors, will of course be published in the report. The remaining business will be the discussion of this report, the reports of one or two committees, and the election of officers. This report of Mr. Farnsworth is before you.

PROF. LAURENZ GREENE: Last year some of us who were working on the Executive Committee of the American Pomological Society tried to devise ways and means whereby this organization could be of better service, knowing that only through that method could it live and prosper as it has done in the past. A lot of the things which Mr. Farnsworth has told you this morning as to the plans of the marketing committee were in the mind of Dean

Bailey and the Executive Committee as the program of work for the American Pomological Society. The matter of the affiliation with the American Farm Bureau in some form through its Chicago office was discussed; the possibility of the establishment of the office of the American Pomological Society there was discussed. It was my dream that the American Pomological Society should be a national organization of the fruit growers of America and Canada, through which they could speak in legislative matters, transportation matter and other things; whereby the strawberry growers of the Ozarks, which is not a strong organization could get the active cooperation and support of the apple growers' organization, a strong, going concern; whereby the individual grower who had some problem which he was not able to handle alone, could get the active cooperation and help of the fruit growers of the country. That looks like the thing that the American Pomological Society should do and I believe that today it is the biggest service it can render.

With that idea in mind, some of us felt that a national secretaryship should be established with well equipped offices that could supply information on markets, on our own crops and the possibility of their being marketed profitably, and in other ways act as a bureau of information which would be of real service to the individual grower, and where you could sell him ten dollars' worth for two dollars. I believe that the Executive Committee last year had this vision, but at their Chicago meeting after discussing the problem the American Farm Bureau Federation representatives were called in. The result was the conference of fruit growers held in Chicago on April 5th which requested the American Farm Bureau to appoint this Committee of Twenty-one.

It was a matter of deep regret to me that the American Pomological Society, through its Officers and Executive Committee, did not absolutely handle that conference, did not supervise the appointment of the Committee of Twenty-one, did not actively cooperate with President Howard in this movement. It seems to me that it is not too late for the American Pomological Society to be the centre of the organized fruit interests of the United States. If the plans which Mr. Farnsworth has just told you about crystallize, two things are going to become facts within the next decade, and possibly sooner than that: First of all, a

fruit marketing department will be established by the American Farm Bureau. I do not want to say anything here that will be misunderstood, but I am confident that a paid secretary will be established in the office of the Farm Bureau to look after the fruit interests of the country — the thing which we have been talking about in the American Pomological Society. What will be his duties? To send out the marketing information to members of the American Farm Bureau and cooperative associations, to State and county units; transportation problems, legislative problems, everything that we have been talking about will be the duties of that official.

The second thing that I believe is coming to the pomological interests of America is an organization — I do not know what form it will take — where the California citrus exchange, the Florida citrus exchange, the members of the federated associations of the Northwest, the apple growers, the packing association of New York, the strawberry association of Louisiana, the cherry growers of Wisconsin, are going to have a central organization through which their problems will be considered, and the force, not only of all these large organizations which I have mentioned, but of the smaller ones, and of the Farm Bureau Federation, will be brought to bear upon legislation, transportation and other matters.

Here is the problem which I want to put to the American Pomological Society membership. Will a duplication of effort on our part as members of the American Pomological Society get us very far? I do not want to criticize. The thing I have in mind in bringing this to your attention is this — is there not some way by which the American Pomological Society, with its long standing, can become that central organization, can direct the work of the secretary in charge of the marketing department of the American Farm Bureau? I do not know that there is. I make that suggestion for your consideration. It seems to me that it will be very difficult to get the fruit growers in Indiana, Ohio and Iowa — these central states where the Farm Bureau is strong — California with its central organization — to pay five dollars into the American Pomological Society for the same service they get for the ten dollars they pay for membership in the State Farm Bureau, and other service in addition. This is a practical problem. I do not want to throw cold water; I simply

want to bring this to your attention to see if it is not possible before it is too late for the American Pomological Society to become that central organization of the fruit growers of this country. I should like to have Professor Paddock, Professor Blair and other members in the Central West tell us whether or not, on the program I have tentatively outlined, we can go out and get a five dollar membership fee for the American Pomological Society. Is there not some way that we can combine our efforts along this line?

THE PRESIDENT: We have a very fundamental problem before us, one that should have very careful attention.

MR. FREDERIC CRANFIELD: With Professor Greene, it was a matter of keen regret to me that the American Pomological Society, through its Executive Committee at least, seemed unable or unwilling to dominate that conference, and for a considerable time thereafter I regretted it. I felt that this Society through its Executive Committee had done the pioneer work, if you please, and then when the time came we seemed to slip back and let somebody else do this work. But after considering it for several months I have lost this regret. I am well satisfied with the outcome. Especially am I well satisfied since hearing this report which we have looked forward to for some time. I wish we could have had it last evening when we were discussing the President's report. I understand now more clearly than before just what this committee intends to do. That is purely a commercial proposition. The Committee of Twenty-one will use their utmost efforts to advance the fruit interests of the country in the marketing and sale of fruit and in finding the outlet for fruit. It is very largely a dollars and cents proposition, affecting, as Mr. Farnsworth has said, both the producer and distributor as well as the consumer. Such work belongs properly in the hands of such a committee and has the further advantage of having the backing of a tremendous organization with almost unlimited funds. That has been one drawback in the American Pomological Society. We could do everything but raise money. But immediately this committee was appointed there was any amount of money at its disposal. Therefore is it not better that we lay aside all our regrets and any little petty feeling we may have had at any time and offer to cooperate with that association?

When it comes to the matter of duplication, that has been a puzzle to me — how we were to offer our good will and all that sort of thing to this Committee of Twenty-one, and then do the things which Mr. Farnsworth has outlined in his report — then what is left for the American Pomological Society to do? But frankly, Mr. President and members, I am not worrying about that. I used to worry a great deal years ago, when I was third assistant to the janitor of the horticultural department of the agricultural college of the State of Wisconsin, about work. I was afraid somebody else was going to do the work that I was to do. But after a great many years I saw that there is so much to do that with all our efforts we can only make a little dent in it. There is still much work for the American Pomological Society to do. We have just scratched the surface, and there is more work than this Committee of Twenty-one can do in the lifetime of its members. In the meantime let us give to the Committee of Twenty-one the right hand of fellowship and lend to it all the support possible.

H. H. HARDIE: When this problem came to us it came in the form of a marketing proposition, and when this Committee of Twenty-one was formed by the Farm Bureau Federation it was, as I understood it, a marketing division. When we first took up the problem that was what we called it — the marketing division of the American Pomological Society. When we got into it further and analyzed it, considered what it meant to market fruit over the United States, the problem looked so big that it frightened us. I do not suppose anybody would dream of trying to raise a million dollars this year for the American Pomological Society; you would think it out of reason if I were to say a million dollars was a small sum to put behind the marketing division of the American Pomological Society. It is such a big undertaking that there is only one concern that can handle it, which is the American Farm Bureau Federation and nobody else. There are only two fruits grown in this country that are properly marketed; one is the banana and the other is the cranberry. The marketing of the banana is remarkable, for they have it down to such a science that it is almost true that you can buy bananas any place at any time at about the same price. But you find out what it costs — I venture to say it has cost over a

million dollars for the marketing division of the United Fruit Company to market the banana alone.

This American Pomological Society started out to be a scientific organization. We felt if we could get the Federation of Farm Bureaus to take up this proposition of marketing American fruits, there were still plenty of things the American Pomological Society could do. It seems to me what it should be more than anything else is a clearing house for information pertaining to matters connected with the fruit industry, and I do think there should be very clear lines established. We ought to have a clear program of what we are going to do and what we can do, and I am very much against trying to start something we do not think we can finish. But I do think we ought to have a clear program as to what we are going to do, and also a clear program as to what the Farm Bureau is going to do. I do not think it is necessary for them to clash. There is so much to do that both organizations can be kept busy and can use all the brains and money at their command, and still leave a lot of things undone.

It seems to me the most important thing to do at this time is to have a clear understanding of the program, of what the American Pomological Society is going to do, and then cooperate with the Farm Bureau Federation, so we are not trying to do the same thing. I think that could be worked out very easily and the two jobs divided. They would naturally interlock to a certain extent, but we can have a definite program for both organizations

THE PRESIDENT: This goes to the root of things with respect to this Society and we ought to discuss it pretty thoroughly.

PROF. LAURENZ GREENE: I would like to hear from Mr. Simpson. He is a Farm Bureau man and was a delegate to the conference in Chicago. If the American Pomological Society deletes from its program all that pertains to marketing, will it be easy to go out and sell memberships in the American Pomological Society in the corn belt?

R. A. SIMPSON: I believe after this work is started and the farmers and fruit men understand the possibilities of what is being done by the Committee of Twenty-one, that they have something that is feasible, that the Pomological Society will naturally develop and get a great many more members through

the farmers' organization. And since we cannot finance this thing first-hand from this end the thing for us to do is to have this executive committee of this Committee of Twenty-one, who are probably all members of the American Pomological Society, represent us, appoint them as our representatives, and in that way cooperate with them. We could then get a good membership and really be the ones who are at the head of this marketing organization.

THE PRESIDENT: Mr. Simpson makes the same suggestion as Mr. Farnsworth did—to have a committee to stand between the two which will represent this Society in the Committee of Twenty-one.

PROF. LAURENZ GREENE: There is one impression that I want to correct. Someone, I believe it was Mr. Cranefield, said that there was an unlimited fund immediately available for the Committee of Twenty-one. Mr. Farnsworth will tell you that the Committee of Twenty-one had no funds. The members paid their way to the first meeting. Whether they will ever be reimbursed is a question. So far as I know of the Farm Bureau Federation, not one cent from their treasury will go to this Committee. It will be financed entirely by the fruit growers and fruit growers' organizations.

R. A. SIMPSON: I think the American Pomological Society might do some good work by throwing out the precaution that the Committee of Twenty-one do not undertake more than they can put over; to go step by step, not attempting too much. It would be a mistake for this committee to try something and fall down. I believe in that way we might be able to do something that is worth while. There is no use undertaking something that we are not pretty sure we can put over. Better take it step by step.

W. G. FARNSWORTH: I see that Mr. Simpson has the same idea that the Committee of Twenty-one had. They wanted to go carefully. They realized the size of the problem they had to solve, and that is why these various committees were appointed, to meet again in a general committee meeting later on. As Professor Greene said, the committee financed itself. A good many of the larger organizations in California and Florida are taking care of the expenses of their delegates, and they have an unlimited fund to fall back upon.

MR. CRANEFIELD: I stand corrected, Mr. President. I was under the impression that this work was to be financed wholly by the American Farm Bureau Federation.

W. G. FARNSWORTH: Not the preliminary work.

MR. CRANEFIELD: Will it later?

W. G. FARNSWORTH: Yes.

MR. CRANEFIELD: If the Committee does not derive support from the Farm Bureau Federation, from what source is it expected that the support will be derived? I am asking this question, not to inquire into the work of the Committee, but I am trying to arrive at something.

W. G. FARNSWORTH: The American Farm Bureau has offered us help in the way of furnishing a secretary to take care of this work of collecting data and information, but they have not offered us financial aid to take care of the expenses of this Committee of Twenty-one. A number of the members of the Committee said they believed their State associations would take care of the expense for the preliminary work until something definite comes out of the work, and then that it will be taken care of by the American Farm Bureau Federation, we hope.

FREDERIC CRANEFIELD: I am trying to fix this thing clearly. The expenses of the Committee of Twenty-one is an insignificant matter; it will not amount to much one way or another. But the field of work you have outlined is not insignificant; it will cover years and years and will take hundreds of thousands of dollars to complete it. It is quite likely that the Committee has already looked ahead to see the sources from which that money is coming, just as the American Pomological Society is looking ahead. I want to repeat that it is quite within the province of this Committee to do this work, and the thing for us to do is to cooperate, unless they try to cover the whole field of horticulture, marketing, distribution, and everything else in the whole wide world, and if they attempt to do that then there is nothing left for the American Pomological Society to do. That seems to be pretty nearly the way it has been outlined — marketing, transportation, publicity. I am anxious at this moment to know what the American Pomological Society is going to do and what is the work of the Committee of Twenty-one.

PROFESSOR LAURENZ GREENE: I would like to say one word in regard to financing the Committee. The Committee of Seven-

teen on grains was financed by donations from various State farm bureaus, I think about six or seven states, not from the treasury of the American Farm Bureau Federation. The live-stock committee was financed by about five states, and the dairy committee is being financed by the dairy people, not from collections made from State farm bureaus. But it was the feeling of the Committee of Twenty-one that this work, if sufficiently important, ought to appeal to the fruit interests for their support and would go over in a much better way than if it were supported by donations from farmers who had no fruit interests. Therefore it is the intention that whatever financing is done shall be done by collections from fruit growers, either individually or through associations.

H. H. HARDIE: I want to give you some light on this financing proposition. Possibly I was misunderstood in my remarks. I did not want to convey the idea that it was my opinion that there were a million dollars back of the Federation of Farm Bureaus for this particular proposition. But there is back of this Committee the biggest farm organization in the world, with all its resources. For instance, they have an attorney who looks after their legal affairs who gets a salary of \$15,000 a year. They have other salaried men looking after legislation, they have other men looking after transportation. Now this fruit division of the Farm Bureau Federation will be financed by the fruit growers themselves, but they will have free access to all of the existing organizations of the Farm Bureau Federation. They will have the assistance and help of the Washington office, the New York office, and the other general offices. They have an organization. We call a meeting of the American Pomological Society and get fifty members from nearby territory. The Farm Bureau Federation calls a meeting and they get members from California to Maine. We all hope to see the time when the American Pomological Society can have as much influence or more than the Federation of Farm Bureaus, but you must look the thing in the face. At the time this thing was started we were getting \$2.00 each from five hundred people and saw no way of getting any more, and it did look to the executive committee that we could not see our way to take up this bigger proposition, and we thought if the American Federation of Farm Bureaus could accomplish it quicker than we, it would be all right. We

did not care who did it so long as it was done; the important thing was to have the work done. At the same time we did not think there was any necessity for there being a clash of activities between the Farm Bureau Federation and the American Pomological Society. There is plenty of work for both organizations if we use both of them in the best way.

R. A. SIMPSON: I would like to suggest that we make a special effort to get all the members of the committee of Twenty-one to belong to the American Pomological Society. Most of them do, but I think that is important.

THE PRESIDENT: I think the Secretary will look after that. Mr. Farnsworth and Mr. Simpson suggested that there should be some sort of a committee appointed to represent the American Pomological Society with the Committee of Twenty-one. Will you take up that suggestion for action?

W. G. FARNSWORTH: Might I offer this suggestion? At our meeting it was decided that our Chairman should call for representatives from the various associations throughout the United States, and we would like to know who to call. We want some responsible official appointed so we will know who represents the American Pomological Society. Mr. Nicols will then notify him to come to the meeting of the Committee in January.

W. S. PERRINE: I would suggest that this committee as far as possible be made a committee that already exists so there will not be a duplication.

THE PRESIDENT: That was the idea, that there should be some person delegated by this Society as representative in case the Committee of Twenty-one wishes to confer with the American Pomological Society and have it represented at this meeting.

PROF. J. C. BLAIR: It would seem a good idea to have one representative that could be called upon as our representative, and I would suggest that Mr. Farnsworth would be the proper man.

W. G. FARNSWORTH: I want to be clearly understood. I would be willing to serve, but I believe it would be advisable to have some person who is a member of the American Pomological Society but not now a member of the Committee of Twenty-one appointed to confer with this Committee.

PROF. LAURENZ GREENE: I would like to move that the

presiding officer, whoever he may be, should be that representative.

(Motion seconded.)

THE PRESIDENT: Do you mean the President?

PROF. GREENE: If he is in this country; if not, the active presiding officer.

(Motion carried.)

PAUL C. STARK: I have been listening to what has been said on this subject and I believe that everybody here who is interested, directly or indirectly, in the good of the fruit growers wishes well for the Committee of Twenty-one, because it is fundamental. It means that the fruit growers' position will be strengthened and improved, and if that is true it affects us all. I believe anyone who goes around the country and sees the lack of interest among a lot of fruit growers, in spite of the work of colleges and experiment stations, will realize that probably here is a way to handle the situation. The country is mighty big, and if there are 500,000 fruit growers in this country this Committee of Twenty-one has a big job on its hands. I am a member of the Farm Bureau Federation and am deeply interested in the work they are doing. It will affect me directly and indirectly. But there is so much to be done that in spite of all their other agencies I believe the American Pomological Society has a big place to fill. I would like to see this Society get five thousand members in this coming year. We have this work laid out before us and I think we should cooperate to the fullest extent with the Committee of Twenty-one, because their success will be our success, and I believe there is more than enough work for both organizations. I would like to see the fullest cooperation and the best results for the good of the fruit growers.

C. H. WAID: Bringing it closer home, we have the same situation within the States that we have been discussing here. We have in Ohio a fine Horticultural Society, and we have a Farm Bureau. At the last annual meeting of the State Horticultural Society we appointed a committee to consider the relationship between the Farm Bureau and the State Horticultural Society, and that committee has announced that there has been an additional committee or council appointed representing the important fruit-growing counties, and that committee is working very closely in cooperation both with the State Horticultural

Society and the State Farm Bureau. There is no clash whatever; they are working hand in hand. We feel there is a field for both and both working together they can accomplish more than can be accomplished independently. I believe the same thing is true so far as the national movement is concerned. The men who are working on this problem are men of experience, men who are thinking deeply, and it seems to me the time will come when this problem will be in much better shape than at the present. I do not see any reason why there should not be the closest co-operation between the State farm bureaus and the State horticultural societies, and between the American Pomological Society and the American Farm Bureau Federation.

PROF. LAURENZ GREENE: I do not believe there is any possibility of a clash; that is the farthest from my thought. I wish to ask this body, if the fruit growers of America (forgetting the Farm Bureau) through their local and State associations organize a national association, will the American Pomological Society be interested in having any official connection with it? An association of fruit growers only.

MR. FREDERIC CRANEFIELD: I do not quite understand Professor Greene's division. I am not at all afraid of a clash. It is duplication I am afraid of. There is no use in two organizations attempting to do the same thing at the same time. But your idea of a fruit growers' organization is not quite clear. You ask if the American Pomological Society would affiliate. That is something in the future. But my thought is that there would be duplication of effort. I do not believe there is a place for another national fruit growers' association.

WATER TRANSPORTATION FOR APPLES

M. L. DEAN,
Washington

In taking up the discussion of Water Transportation of Apples there is a factor which enters into the subject tending strongly toward the educational side of the question. The education of the matter or rather a clear understanding of the problem enters into the distribution of the product really more than it

does into the transportation. It is not a difficult matter to assemble the fruit on the western coast and embark it by water for the foreign or eastern U. S. ports. But it is difficult to make the dealers and jobbers of the East see that it is of equal advantage to him to have fruit transported to him as it is to have it delivered across the country through all kinds of weather, subject to all degrees of damage over the steel rails. There are of course some questions in connection with the diversions of what we might call "tramp cars" which might be difficult to solve but in my judgment that practice should be eliminated as much as possible and for that reason I believe the water transportation might solve some of those objections.

Previous to the recent war there was much agitation of this subject and several ships were in the process of construction for the refrigerator transportation of fruit but conditions of course immediately changed and the matter has not again come prominently before the people until within the past two years. Last season some shipments were made and the delivery was made in A. 1 condition. This has encouraged this method of transportation until this season there have been a number of boats equipped which have been moving large quantities of fruit. Some of the larger organizations in the west are contemplating the establishment of independent boat lines for the delivery of their product to the outside markets. As the fruit industry increases in the west, ample rail transportation almost seems impossible and this is one avenue whereby relief can be secured.

It is a fact that the availability of refrigerator ships for the carrying of apples into foreign ports has been a long established service, and the features of that manner of movement need not be discussed, but as the movement of apples from the West to the East Coast by water is new and not thoroughly understood, the details of such movement will bear explanation. Of course there is no radical difference between the movement of apples by water from Coast to Coast than the movement of apples to foreign ports, with the exception that the intercoastal movement comes into competition with the rail carriers and for that reason the advantages of both means of shipment should be compared.

Since the opening of the Panama Canal, steamships with common storage facilities have been available to apple shippers out of the Port of Seattle, but as yet apple shippers seem loath to

trust their apples to these ships, in view of the uncertain factor of ventilation. Ventilation in these ships is accomplished in several manners. The first is by the simple draft created by the motion of the ship. This current of air passes thru ventilators and is distributed into the hodes, passes up, and goes out, after circulating through the fruit, into the open air again. Of course the temperature of fruit, under this system, follows closely the different temperatures of the air through which the ship passes. Under this system, the record of one ship showed an average temperature of 69 degrees for the entire voyage thru the Canal. The highest recorded temperature was 74 degrees at which time the temperature of the air in the shade was 88 degrees, F., and the temperature of the water 85 degrees F.

The second manner of ventilation is by forced air—the electric fans being so arranged that the air is sucked in, or expelled thru the ventilators. This system is uniformly successful on North Atlantic shipments.

A third plan has been tried which has the merit of maintaining several degrees lower temperature than the air thru which the ship passes. This method consists of placing fans down low in the ship's hold, under the water line, next to the skin of the ship. The temperature of the air at this point is always that of the water thru which the vessel passes, and is considerably lower than summer temperatures of the air and also considerably warmer than freezing temperatures of the outside air:

It is only very recently that refrigerator steamships have been available for carrying apples from Coast to Coast. The first ship in this service left Seattle November 12th. At the time of her loading in Seattle, she was inspected by a representative of the Wenatchee Valley Traffic Association, and by a Government Fruit Transportation and Storage specialist. They inspected the ship in regard to her insulation, refrigerating machinery and manner of stowing of apples. During her voyage from Coast to Coast she will have on board a representative apple grower who will watch the temperatures from day to day. The result of this trial shipment should be available by the first of the year.

To show the elaborate equipment for refrigerating purposes, the following data of the SS Deerfield is given. The Deerfield has a gross tonnage of 7,551 tons and a net tonnage of 4,644 tons. Her length is 435 feet; breadth 58 feet; depth 27 feet. Her

refrigerating plant consists of three single York type 80 ton unit engines. These engines were constructed by the York Manufacturing Company, in 1919. Her general system is CO₂ Brine Circulating. Insulation consists of Mineral Wool and Slab Cork. Her entire system has been tested by Lloyds and found to be more than ample for the needs of the ship. Under working conditions she maintained 13 degrees F. below zero for the entire ship for a period of two weeks. The refrigerated space is divided into fourteen separate compartments in any one of which any degree of temperature may be maintained independently of any of the others. Her total refrigerated space is 413, 673 cubic feet. It might be added that the general figure for the stowage factor of apples may be placed at two cubic feet per box which would mean this ship's total carrying capacity was about 207,000 boxes of apples.

Other ships of like capacity may be furnished as the demand requires. At the present time, there are nine intercoastal steamship lines into the Port of Seattle, the majority of which would be capable of use for ventilated space. Their carrying capacity of course far exceeds any demand that the apple shippers would put upon them.

The following is the manner in which a shipment of apples will move from Yakima or Wenatchee to any East Coast port and all the incidents of the shipment are given. When space has been secured in advance aboard any steamer from Seattle, the interior shippers are notified of the date of loading of the ship, in sufficient time for them to load and dispatch cars to Seattle. The cars used for this purpose may be ordinary box cars without the equipment of heaters or other paraphernalia. For this reason, shipments may be gotten off promptly, even during extreme car shortages, for the equipment used in bringing apples to this Coast may be of such a character as would not be suitable for a trans-continental rail haul.

The only freezing temperatures to be encountered on the westward haul, would be on the eastern side of the Cascade Mountains and these would not be over a few hours in duration. Once consignments passed the summit, the mild Puget Sound climate will not endanger them. Upon arrival at Seattle, the apples may go into suitable storage facilities on a number of the

piers. Many piers may furnish ample frost proof storage facilities, and other piers can furnish cold storage room.

Special attention is called to the Spokane Street Pier, which was constructed primarily for the apple trade and has unexcelled equipment. The apples being unloaded on the wharf, and the ship having arrived, the next feature is loading from wharf to ship. This is usually accomplished by loading by hand on to small flat cars, holding about forty boxes per car, drawn by electric tractors in trains of five or six. These trains move from the storage pile on the dock to the ship's side. The ship's tackle then grabs the entire platform from the small car, which is usually called an aeroplane and the forty boxes are hoisted without further touching up and over the ship's side and lowered into her hold. From place of rest in the ship's hold, they are conveyed by the roller conveyors used in apple packing houses to the place in the ship's hold where they are finally stowed.

As each tier of apples is placed, dunnage in the form of 1-3 strips is laid along the ends of the boxes, so that the superimposed tier rests on the dunnage and not at all on the thin box boards. This dunnage extending laterally thru piles of boxes binds the whole cargo into a solid unit so that it cannot shift. The entire weight of the cargo is carried on the extreme ends of the boxes. Unloading is just the reverse of the method just described, with the exception that this being perishable refrigerated cargo, it is either discharged upon a heated pier or any cold storage warehouse, or directly to the receiver's conveyance, so that the cargo is not exposed for any appreciable length of time to either heat or cold.

The present rates for this class of service are slightly less than the thru rail rate. The rates on ventilated ships are even less. Advocates of shipment by railway contend that the diversion feature of cars upon route makes their marketing sure. However, there should be in the Eastern ports a market for fruit that would be actually consumed in such ports, wherein the perfect condition of the fruit should be a primary consideration. The receiver shall be the actual consumer of the fruit and not merely a speculative broker. Upon the regular establishment of the refrigerator service, the rates on apples should be lowered to such a point as to permit of a back haul from Atlantic Coast ports. Rates on ventilated ships now permit of this feature.

The time of transit from Yakima or Wenatchee to New York may be roughly set at thirty days. This may be relatively certain in view of the fact that a ship which is a large unit, is very costly to operate and equally costly in the matter of demurrage per day varies with the size of the ship, from several hundred to several thousand dollars per day; hence ships must move rapidly to be profitable.

This is not so imperative with the smaller unit of a railway car, which may be side-tracked, become in bad order, run into a snowbank, may be derailed or suffer numerous other delays for which there is no appreciable loss, in the nature of demurrage, to the operator.

At the present time, apples may be received with equal facility by rail or water in any port save that of New York. In the Port of New York, apples are received over the Erie Pier upon which is located the fruit auction. This pier is not available because of depth of water to ocean going ships, but other piers close by are convenient.

It is the present intention of the Port Authority of New York to construct, and construction has commenced, on a \$2,000,000 terminal, intended expressly for the receivers of perishable produce. This terminal should be available by next season. Other cold storage plants in New York, Brooklyn and Jersey City are at present available for apple shipments, but owing to the custom of selling across the Erie Pier, New York receivers are slow to accept shipments in any other manner than over the Erie Pier. However, this objection would have no valid weight with those receivers who are not ordering apples for speculative purposes, or who do not expect to divert cars in transit.

A railroad car at best is too small a unit to demand personal supervision in transit. In the summer, cars are iced. In winter, they are heated, but there is no record kept of variation of temperatures of melting of ice or of overheating by lamps, or freezing because the same have been extinguished. In contrast to this, consider the costly and extensive equipment of a refrigerator ship, which at all times, day and night, is in charge of a certified engineer, whose duty is to maintain within a degree any temperature shippers may indicate. For apples, shippers have designated 35 degrees F., and this temperature shippers may be absolutely certain will be maintained without variance during the entire

voyage. So this opportunity is open for shippers to place on the Eastern Seaboard their fruit in perfect condition.

Shipments by water carry Marine Insurance, and in case of loss thereunder it is the pride of insurance companies to adjust such losses within a period of thirty days. Claims for loss on railway are at the tender mercies of the claim department.

Consider the ship as a cold storage plant. Apple shippers may actually personally see their fruit go into such cold storage plant, in Seattle, and absolutely know that such fruit will arrive at destination in exactly the same condition in which they last saw it, hence avoiding any argument with receivers as to condition of the fruit.

Such a method of shipment warrants apple men in sending their very best and costliest fruit by water route as soon as conditions in the east are adjusted so that present objections by ill advised dealers are removed.

REPORT OF COMMITTEE TO AWARD WILDER MEDALS

Your Committee recommend the following awards:

SILVER MEDALS

1. To Doctor Liberty Hyde Bailey, President of the American Pomological Society, for his notable contributions to horticulture and his work for the Society.
2. To the Arizona Agricultural Experiment Station, Tucson, Arizona, for an exhibit of leaves, fruit clusters, photographs and dried fruit of 27 varieties of dates, in baskets and boxes.
3. To J. L. Dumas and R. T. Reid, Washington, for a collection of 20 varieties of apples of unusual excellence.

BRONZE MEDALS

1. To E. A. Riehl, Alton, Illinois, for a collection of 1 variety of walnut, 1 almond, and 19 varieties of chestnuts, the result of cross-breeding.
2. To the Fruit Products Department of Massachusetts Agricultural College, Amherst, for an interesting and instructive exhibit, showing 7 jars of jam and 5 glasses of jelly made from 10 pounds of grapes; 11 glasses of jelly and 4 jars of butter from 5 pounds of plums. An exhibit showing food value of fruit and fruit products expressed in sugar, and various uses of fruit peelings.

HONORABLE MENTION

Central Experimental Farms, Ottawa, Canada, for a collection of 53 seedling varieties of apples, mostly crosses with McIntosh or Northern Spy, developed for the purpose of securing varieties that will be of good quality and cover a long season, or show extreme hardiness.

Ohio Experiment Station, Wooster, for an exhibit of 31 flats showing 20 of the more valuable commercial sorts for Ohio; also plates of 93 other varieties of apples.

Yakima Valley, Washington, for a commercial exhibit of 30 boxes showing 6 varieties, the fruit exceptionally well grown and handled.

The California Prune and Apricot Growers, Inc., San Jose, California, for an exhibit of Sunsweet prunes in boxes, including two cases of prunes put up in 5-cent retail packages; also photographs showing the growing and drying of prunes.

O. F. E. Winberg, Silverhill, Alabama, an exhibit of kumquats, tangerines and prape fruits.

Georgia Experiment Station, Experiment, Georgia, a collection of 27 plates of pecans, including several of much excellence.

Department of Horticulture, Alabama Polytechnic Institute, Auburn, 11 varieties of pecans of considerable merit.

Clark Allis, Medina, New York, an exhibit of bottled cider of excellent flavor and neat appearance.

Food Products Laboratory, College of Agriculture, Berkeley, California, a collection of 10 fruit drinks and 5 cans of jam and fruit juices.

Certo Sales Company, Rochester, New York, samples of Certo and 62 containers of Certo jelly of various fruit flavors.

Yuma Mesa Orange Ranch, Yuma, Arizona, exhibit of navel oranges and grape fruit.

J. H. GOURLEY,
L. R. TAFT,
Committee.

PROF. L. R. TAFT: I move the adoption of this report.
(Motion seconded and carried.)

THE PRESIDENT: We will now have the report of the Committee on Resolutions.

REPORT OF COMMITTEE ON RESOLUTIONS

The thanks of the American Pomological Society are due the Chamber of Commerce of Toledo for courtesies extended; also to Mr. H. V. Buelow for contributions so generously given; also to the Order of Moose for the use of this hall. We are also indebted to the Rex Spray Company for a visit to their plant.

It is also suggested that the Secretary of the American

Pomological Society take up the matter of legislation regarding the standardization of packages in connection with this proposed bill.

Finally, we wish to record in appropriate terms our regret at the death of Mr. C. G. Patton of Charles City, Iowa, and we hope that an adequate obituary may be published in our annual report.

W. PADDOCK, *Chairman.*

(Moved that this report be adopted. Motion seconded and carried).

THE PRESIDENT: Is there anything to come before this meeting except the election of officers? Any person feel moved to express himself on any subject? If not, I will call for the report of the Nominating Committee.

REPORT OF NOMINATING COMMITTEE

Your committee after going over the membership quite carefully beg to report as follows:

President, L. H. Bailey, New York.

First Vice-President, Paul C. Stark, Missouri.

Second Vice-President, W. T. Macoun, Ottawa.

Sec'y-Treas., R. B. Cruickshank, Ohio.

Executive Committee: —

J. C. Blair, Illinois.

F. P. Downing, Indiana.

Frederic Cranefield, Wisconsin.

H. H. Hume, Florida.

F. C. Sears, Massachusetts.

W. P. Massey, Virginia.

G. Harold Powell, California.

C. I. Lewis, Oregon.

H. H. Hardie, Michigan.

W. W. Farnsworth, Ohio.

W. S. Perrine, Illinois.

Signed { W. C. REED,
M. B. DAVIS,
F. H. BEACH.

J. H. GOURLEY: I move that the report be adopted and that the Secretary be instructed to cast the ballot of the Society for these officers.

(Motion seconded and carried and ballot cast.)

The following committees for the year were appointed:

Collegiate Membership — F. G. Charles, Ohio; B. D. Drain, Massachusetts; J. W. Crow, Ontario.

Exhibits and Fairs — R. S. Herrick, Iowa.

New Fruits — C. P. Close, Washington, D. C.; N. E. Hansen, South Dakota; R. A. Simpson, Indiana.

Foreign Fruits — David Fairchild, Washington, D. C.; George Roeding, California; M. B. Davis, Ontario.

Tropical and Sub-tropical Fruits — Wilson Popenoe, Washington, D. C.; H. H. Hume, Florida; J. Eliot Coit, California.

THE PRESIDENT: Is there anything else to come before the American Pomological Society at its 38th convention?

I wish before adjourning to express my very great appreciation of the helpfulness of all the members and the promptness with which you tried to get together. I have also appreciated the spirit of good fellowship that has run throughout the convention and the desire to put the Society in a position where it can do useful work for all the people.

The Society now stands adjourned *sine die*.



SECOND
POMOLOGICAL ANNUAL
1921

(227)

CODE OF FRUIT NOMENCLATURE, AMERICAN POMOLOGICAL SOCIETY

This code aims to establish a simple and clear system of pomological nomenclature that shall be appropriate and stable. Accordingly it is urged that all persons naming new varieties of fruits choose simple one-word names that are fittingly expressive of some character, quality, place, person, or event associated with the source, time or place of origin of the variety.

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 established.

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.

I. FORM OF NAMES.

1. Names of new varieties shall be of one word preferably, but two words may be accepted. Names of existing varieties shall not be changed in such way as to lead to confusion or loss of identity.

2. The spelling and pronunciation of a variety name shall be the same as that of the person, place, substance, circumstance, or quality from which it is derived.

3. A possessive noun shall not be used.

4. Initials should not be used as a part of a variety name.

5. A name shall not be formed by the compounding or hyphenating of two or more existing names, but this does not prohibit the formation of a one-word name by the use of parts of two or more existing names. The hyphen shall not be used between the words of a name. Thus, neither Bartlett-Seckel nor Bar Seck may be used, but Barseck is admissible.

6. Such general terms as seedling, hybrid, beurre, damson, pippin, rareriipe, bigarreau, should not be used.

7. 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, and provided that names having a recognized English equivalent may be, but are not necessarily, so rendered.

8. The name of a person shall not be applied to a variety in his lifetime without his consent.

9. The name of a deceased person shall not be applied to a variety except through formal action by some competent pomological body, preferably that with which the deceased was most closely associated.

II. PRIORITY, USAGE AND DUPLICATION.

10. The name first published for a variety shall be the accepted and recognized name except when contrary to the provisions of this code; but names established by usage in American pomological literature may be retained even though they do not conform to these rules.

1. A name once used shall not be used again for a variety of the same kind except that a name once established through long usage for two or more American varieties shall not be displaced for either or radically modified only when a well-known synonym can be used in its place; or when no such synonym is available, the varieties bearing identical names may be distinguished by the addition of the name of the author who first described each, or by some other suitable distinguishing term.

III. PUBLICATIONS AND DESCRIPTION.

12. Publication consists in: (1) The public distribution of a printed name and description or characterization of the fruit; (2) the publication of a new name for a variety described elsewhere under a different name, number, or other untenable designation, the synonym being given.

13. Publication of a name may be made in any book, bulletin, report, trade catalog or periodical of public distribution and bearing date of issue.

14. But a varietal name may be established by current usage in the locality of its origin, when well known, and shall be

considered as published and have precedence over a later printed name for the same variety.

15. Complete description of a variety consists of a detailed account of the characteristics of the plant, foliage, flowers, fruit, and habit of growth, so as to distinguish it from other varieties of similar appearance.

16. The type of a variety is the fruit of the original plant; and type descriptions or illustrations shall be made from material produced by the original plant, or when this is not available, from a plant as near as possible to the original in asexual reproduction, and preferably grown in the same pomological region.

As revised December 21, 1921, by

H. P. GOULD,
U. P. HEDRICK,
W. H. CHANDLER,

Committee on Fruit Variety Nomenclature.

REPORT OF COMMITTEE ON NEW FRUITS FOR 1921

C. P. CLOSE,
Chairman

The chairman of this committee was appointed early in 1921, but it seems that no other members were appointed. Miss Magdalene R. Newman of the United States Department of Agriculture has given most valuable aid in assembling the information in this report and her help is most gratefully acknowledged by the chairman.

This committee report is really developing into a check list of all varieties of fruits ever introduced into the United States and Canada, rather than consisting of only the really new or little known varieties. This will be of immense value in the naming of new fruits and is a history of varieties.

To those who do not have the report of 1920 it is necessary to explain that these lists supplement earlier lists published in certain books or bulletins. Hedrick's "Peaches of New York", the committee report of 1920, and this report, contain all the names and information we can find on peach varieties. The same is true of cherries and plums using Hedrick's books on these fruits as standard guide lists. With grapes, Hedrick's "Grapes of New York" is used as a guide, but the hundreds of vinifera varieties introduced into California have not yet been listed in the committee reports. Ragan's "Nomenclature of the Apple", Beach's "Apples of New York", the report of 1920 and this report, contain all the apple varieties we have found. Ragan's "Nomenclature of the Pear" and these reports contain our information on pears. In the same way Card's Bush Fruits and Fletcher's Technical Strawberry Bulletin No. 11 of the Virginia Experiment Station, together with this committee's reports, include all names of bush fruits and strawberries we can locate.

With the other fruits and the various nuts there are no guide lists but the hope is to complete the lists in time.

It is understood that the committee simply reports the information it gathers and passes it along without vouching for its

accuracy or changing names which do not conform to the Society's code of nomenclature.

ERRORS IN THE REPORT FOR 1920.

A few errors crept into the 1920 report and are corrected as follows:—

Duncan apple should be *Duncan* (of Washington) as there was an earlier *Duncan*.

Ice Cream apple should be *Ice Cream* (of Oregon) as there are two other varieties by this name.

Sasha is not a crabapple, it should be listed with the apples.

Come Johnson peach should be *Cone Johnson*.

Longhina peach should be *Toughina*.

Mealing peach—In the notes the address of Fruitland Nurseries is given as Atlanta, it should be *Augusta* instead.

Silver Cross peach should be *Silver Press*.

Wharton's C. of R. D. peach should be *Wharton's C. of R.*

Dick Damson plum should be *Deck Damson*.

Ogibwa plum should be *Ojibwa*.

Prunlew plum should be *Prinlew*.

Rubol blueberry should be *Rubel*.

Earliest Ripe strawberry is the same as *Earliest*.

Grand Marie, *Maryland*, *Peerless*, and *World Wonder* strawberries are listed by Fletcher and should not have been included.

Warren strawberry may be the *Warren* given by Fletcher who lists *Lady Corneille* as *Corneille*, *John H. Cook* as *John Cook*, *Joe Crampton* as *Crampton*, and *Greensboro Favorite* as *Greensboro*.

The present chairman of this committee is being continued for 1922 and he would appreciate hearing from any one who has knowledge of any new variety of fruit.

APPLE

Ada Red: Originated by A. G. Philpott near Springtown, Washington County, Ark. Fruit medium or above, roundish; color yellow nearly covered with red and broken stripes of purplish crimson; flesh whitish, tender, fine grained, mild subacid, good. August. U. S. Dept. Agr., B. P. I., Bull. 275

- Adno*: (Provisional name), N. E. Hansen, Brookings, S. D. Received from Russia. "Very handsome, large, red, subacid, productive, late fall apple."
- Alberta*: *Pyrus baccata* x Haas, originated by the Central Experimental Farm, Ottawa, Canada. Fruit 1 6/10 inches across by 1 1/4 inches deep, round, somewhat flattened, slightly ribbed; stem 1/2 inch long; color greenish yellow with bright red cheek; flesh nearly white, juicy, slightly astringent, fair to good. September and October. Tree vigorous, productive.
- Allgold*: Seedling of Wagener, originated by Albert F. Etter, Ettersburg, Cal. Fruit of fine size, clear golden color; flesh non-fibrous, crisp, juicy, tree productive, bears a full crop every season; a good keeper.
- Angus*: Seedling of Dean x Ontario, originated by the Central Experimental Farm, Ottawa, Canada. Fruit medium or below, roundish, slightly ribbed; cavity narrow, medium depth, wrinkled; color yellow, washed with pinkish red; flesh yellow, crisp, breaking, moderately juicy, briskly subacid, fair. October and November.
- Anson*: Seedling of Winter St. Lawrence, originated at the Central Experimental Farm, Ottawa, Canada. Reported in 1910; fruit medium size, roundish, slightly ribbed, pale yellow, almost white, thinly splashed and streaked with carmine; flesh white, fine grained, tender, juicy, subacid, pleasant, flavor like Fameuse, quality good to very good. October and November.
- Aroostook*: Originated on the farm of S. S. Stiles, Mapleton, Aroostook County, Maine, about 1870. Fruit small, roundish-conical, light golden russet; flesh fine grained, sweet, good. Season to July in Aroostook County. Tree vigorous, hardy, productive. Bull. 143, Maine Exp. Sta.
- August Greening*: Originated with General Nowell, Bangor, Maine, about 1850. Fruit large, roundish-conical, dark green with reddish blotches; flesh rich, tender, juicy, sprightly acid, good. August. Tree hardy, spreading, productive. Bull. 143, Maine Exp. Sta.
- Autumn Russet*: Luther Burbank, Santa Rosa, Cal., "Medium size, fine quality, crimson."
- Barbaric*: Fruit roundish-oblate; basin wide, deeply ribbed; dull yellowish green, splashed with dark red; flesh firm, flavor somewhat puckery and not very pleasant. A cider apple but not very promising. October. Spec. Bull. 48, Mich. Exp. Sta.
- Battle*: Seedling of Wealthy, originated by the Central Experiment Farm, Ottawa, Canada; reported in 1910. Fruit above medium to large, roundish-conic; cavity deep, medium width; stem short to medium, stout; basin medium width, medium depth, color pale greenish yellow, splashed and washed with bright purplish red; dots few, yellow, distinct; flesh white, tinged red, firm, crisp, breaking, tender, rather coarse, juicy, briskly subacid, aromatic, raspberry-like flavor,

quality good. Resembles Wealthy. August to early September, just before Oldenburg.

Bayfield: Clinton Falls Nursery Company, Ottawa, Minn. Originated by T. E. Perkins, Redwing, Minn. Seedling of Malinda. "Tree is a very rapid grower bearing large red apples of splendid quality that will keep well up to May 15th." Introduced by Clinton Falls Nursery Company and Wedge Nursery Company, Albert Lea, Minn., in 1912.

Beda: Seedling of Langford Beauty. Originated by the Central Experimental Farm, Ottawa, Canada; reported in 1916. Fruit medium size, oblate to roundish, cavity medium depth and width; stem medium length, stout; basin deep, open, wrinkled, calyx open; color pale yellow, thinly splashed and washed with bright carmine; flesh yellowish, crisp, tender, juicy, subacid, pleasant, quality good; September and October.

Ben Hur: Fruit large, roundish-oblate; cavity and basin both wide and deep; color similar to a highly colored Ben Davis; flesh white, very firm, juicy, sprightly subacid, good, a better keeper than Ben Davis. Bull. 290, Ohio Exp. Sta.

Bennett: A chance seedling originating about 1883 with S. L. Bennett, Medford, Oregon, and belongs in the Winesap Group. Fruit roundish-conical, sides often unequal, large to very large; cavity large, deep, russeted; stem short to medium; basin medium size; color deep yellow, washed with mixed red and striped with crimson; flesh yellow, moderately fine grained, juicy, rich, subacid, good to very good. November to June in Oregon. From 1908 Yearbook of the U. S. Dept. of Agr.

Benzonia: Originated in Benzonia, Mich., on the farm of E. B. Judson about 30 years ago. Fruit roundish-oblate to round-conic, large to very large; skin light yellow, faintly washed with coppery-red on one side; cavity very shallow, small; stem very short, very stout; basin medium size; flesh pure white, crisp, moderately juicy, sharp subacid, good. Tree productive, top spreading. Late summer and late fall. Special Bull. 44, Mich. Exp. Sta.

Billmeyer: Originated about 40 years ago with the late J. H. Billmeyer, Hollway, Mich. Fruit large, oblate to roundish-oblate; cavity medium size, russeted; stem short, moderately stout; basin medium size; skin thick, tenacious, yellow washed with mixed crimson, splashed and striped with darker crimson; flesh yellowish, fine grained, tender, juicy, pleasant subacid, good to very good. Same season as Tompkins King. Special Bull. 44, Mich. Exp. Sta.

Blanc Mollett: A small unpromising cider apple, oblate-conic; yellow mostly covered with red and indistinctly striped; flesh very firm, dry, tough, bitter and puckery, very poor. Spec. Bull. 48, Mich. Exp. Sta.

- Blankenship Sweet*: Rose Hill Nursery, Annamoriah, West Virginia. Originated by George Blankenship, Anna Maria Flats, W. Va.; said to be a chance seedling. Fruited first in 1912; fruit very large, greenish yellow, striped and splashed with red; September and October. Introduced by Rose Hill Nursery in 1913.
- Blurton's Ince Core*: Planter's Nurseries, Humboldt, Tenn. "Large fine, one of the best fall."
- Bohlman*: Humphrey Nurseries, Humphrey, Nebr. Originated by Mr. Bohlman, 9 miles southwest of Yankton, S. D. Fruit of good size and finest quality; a good keeper; tree an early and annual bearer.
- Bow*: *Pyrus baccata* x *Pewaukee*. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit small, nearly round, yellow with faint tinge of red; flesh yellowish white, crisp, juicy, mildly subacid, good, not astringent. September and October. Tree vigorous, fairly productive.
- Braxton*: Roanoke Nursery, Roanoke, W. Va. A chance seedling originating with J. D. Smyth, Sutton, W. Va. Tree first fruited in 1910. Introduced by M. M. Havener and Sons, Roanoke, W. Va. Fruit of yellowish color, flesh juicy, subacid; very late keeper.
- Brock*: Seedling of McIntosh, originated by the Central Experimental Farm, Ottawa, Canada. Fruit large, roundish; cavity medium size, slightly russeted; stem short, stout; basin medium size; color yellow, splashed and washed with orange red; flesh yellowish, tender, moderately juicy, subacid, vinous, good. September and October. Fruited first in 1908.
- Broome*: Parentage unknown. Originated at the Agricultural Experiment Station, Geneva, N. Y. Fruit medium or above in size, roundish to oblate-conic, usually completely overspread with dark red; flesh yellowish, firm, moderately juicy, mild, subacid, aromatic, good; tree vigorous, upright spreading, rather late to come into bearing, medium productive. January and later.
- Bruno*: Seedling of Scott Winter, originated by the Central Experimental Farm, Ottawa, Canada. Fruit medium size, oblate; cavity medium size; stem short, rather stout; basin deep, medium width, wrinkled; skin greenish yellow, washed with dark orange and purplish red; flesh white, crisp, tender, juicy subacid, quality above medium. November to January. Resembles Scott Winter.
- Burton*: From M. Sharpe, Vacaville, Calif. Fruit large, roundish-angular, pale green splashed with red, fairly good. October and November.
- Burton* (of New Brunswick): Originated in New Brunswick, Canada. Fruit above medium, roundish to oblate; cavity narrow, medium depth; russeted; stem short; basin open, medium depth; color yellow, washed with attractive crimson; flesh dull white, rather coarse, firm, moderately juicy, subacid, sprightly, pleasant, fair to good.

Carlton: *Pyrus baccata* x Wealthy. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit very small; stem more than one inch long; color red tinged orange or deep red; flesh firm, crisp, juicy, rather acid, quite astringent, fair. September and October. Tree vigorous, productive, very ornamental when in bloom.

Cascade: From W. A. Robinson, Lake Side, Wash. Fruit medium to large, oblate-conic, rich yellow covered with dark red; flesh subacid, vinous, pleasant, good. Winter.

Charles: *Pyrus baccata* x Tekofsky. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit small, nearly round, slightly ribbed; stem rather long; color yellow; flesh yellowish, solid, crisp, juicy, pleasant, mildly acid, slightly astringent. Tree upright, vigorous, medium productive. September.

Chelsea: Said to have originated in Washtenaw County, Mich. Fruit same size and shape as Swaar, yellow with red dots, a long keeper. Special Bull. 44, Mich. Exp. Sta.

Cherryfield: Originated with the late Wyman B. Collins, Cherryfield, Maine, about 1857. Fruit large, roundish-conical, yellowish-green, washed and splashed on the side with crimson; stem medium length, stout; cavity moderately deep; flaring; basin small, irregular; flesh greenish white, crisp, tender, fine grained, mild acid, good. November to February. Tree vigorous, hardy, spreading, productive. Bull. 143, Maine Exp. Sta.

Chesebro-Spy: Originated as a bud sport on a Northern Spy tree about 50 years ago on the farm of C. C. Chesebro, South Haven, Mich. Fruit large, $3\frac{1}{2}$ inches in diameter, roundish; cavity broad, deep; stem medium long, stout; basin broad, shallow; skin thick, tough, solid deep bright crimson except a little greenish russet at calyx end; flesh yellowish, tender, juicy, mild subacid; quality very good. Season same as Northern Spy. Special Bull. 44, Mich. Exp. Sta.

Clemons: A rather attractive red apple of good size and good quality. In season from late fall to mid-winter. Tree hardy and productive. Originated by L. A. Clemons, Storm Lake, Iowa. Bull. 108, Iowa Exp. Sta.

Clive: Seedling of Wealthy originated by the Central Experimental Farm, Ottawa, Canada. Fruit large, roundish, cavity medium size, deep; stem short, stout; basin deep, open; color greenish yellow, washed with rich crimson; flesh dull white, rather coarse, firm, crisp, moderately juicy, subacid, good, pleasant. October to November.

Columbia (of Macoun): Originated by the Central Experimental Farm, Ottawa, Canada. *Pyrus baccata* x Broad Green. Fruit small, nearly conical, distinctly ribbed; stem medium long; color red with stripes and dots of a deeper red, juicy, subacid, pleasant, slightly astringent, fairly good. September and October. Tree vigorous, fairly productive.

- Cook Sweet*: Depot Road Nurseries, Salem, Ohio. "Very large, bright yellow, sweet, a good bearer."
- Cooley Sweet*: Originated with J. F. Cooley near Lansing, Mich. Fruit small to medium, roundish conical; cavity medium size, abrupt and irregular, inclined to Romanstem; stem very short, stout, fleshy; basin medium, abrupt, leather-cracked; skin thin and tender, rich yellow, washed and striped with dull red; flesh yellowish, juicy, sweet, good. Special Bull. 44, Mich. Exp. Sta.
- Conn*: Corinth Nurseries, Corinth, Miss. Originated in Northeastern Mississippi more than 20 years ago. Said to be a very fine winter apple.
- Coppleton*: A sweet apple, originating at Coppleton, Mich. Not described. Special Bull. 44, Mich. Exp. Sta.
- Crimson*: Luther Burbank, Santa Rosa, Calif. "Seedling of Garden Royal. Deepest almost black crimson, slightly striped yellow, delicious, mild, rich, tender, fragrant, productive. October."
- Cromer*: A seedling of Swazie. Fruit above medium, roundish, angular; cavity medium size; stem short, stout; basin medium size; flesh yellow, firm, crisp, moderately juicy, subacid, pleasant, good to very good. Late winter apple of the Ribston type. Color green thinly washed with pinkish red.
- Dale View Dessert*: Fruit medium or below; roundish or oblong-conical; color yellow, flecked and patched with russet, sometimes blushed with brownish red; cavity small; stem short, slender; basin very small; flesh yellow, juicy, subacid, sprightly, rich, good. Tree vigorous, upright. Late fall and early winter. Cir. No. 94, Ohio Agr. Sta.
- Dan* (of Kinne): Originated with P. F. Kinne, Storm Lake, Iowa. "A greenish subacid apple of fair quality." Bull. 108, Iowa Exp. Sta.
- Danville*: Seedling of Lawver. Fruit above medium, conical to oblong-conical; cavity medium size, russeted; stem short, rather stout; basin open, deep; color greenish-yellow, washed with deep crimson; flesh yellowish, tender, juicy, subacid, sprightly pleasant, good. Winter.
- Dawn*: *Pyrus prunifolia* x Simbirsk No. 9. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit small, bright red; flesh white, juicy, crisp, subacid, pleasant, good. September.
- Day*: A chance seedling originating with J. W. Day, Crystal Spring, Miss. Fruit medium to large, red striped; flesh juicy, crisp, nearly sweet, good quality. July and August in Mississippi.
- Deacon Jones*: Originated in Pennsylvania. Fruit large to very large, roundish-conic to oblong-conic, ribbed; stem short, thick; cavity shallow, narrow, prominently lipped; basin moderately deep, narrow, furrowed and wrinkled; skin thick, tough, slightly rough, waxen yellow mottled and washed with red, splashed with carmine; dots conspicuous, whitish large or small; flesh yellowish-white, firm,

coarse, crisp, tender, juicy, mild subacid, good; core very large, open. Tree vigorous, upright spreading. November to March. Bull. 364, N. Y. Exp. Sta., Geneva.

Dean (of Macoun): *Pyrus baccata* x *Wealthy*. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit too small to be of value.

Delevan: Originated in Wisconsin. Fruit medium size or below; attractive red color; flesh mild subacid, very good quality. Tree hardy and productive. Bull. 108, Iowa Exp. Sta.

Deliah: Albert F. Etter, Ettersburg, Calif., says this is a very beautiful, showy, rather large, almost white apple, briskly acid, making a jelly that is exceedingly clear and well flavored.

Derby (of Macoun): *Pyrus baccata* x *Transcendent*. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit small; stem $1\frac{1}{2}$ inch long; color bright red; flesh firm, crisp, juicy, rather acid, slightly astringent, fair. September to December. Tree vigorous, productive.

Diana: Seedling of *Langford Beauty*, originated by the Central Experimental Farm, Ottawa, Canada. Fruit medium or above, roundish; cavity medium size; stem medium length, moderately stout; basin medium size, wrinkled; color yellow, washed and splashed with attractive crimson; flesh white, tinged red, crisp, tender, juicy, briskly subacid, aromatic, good. September to November.

Dixon (of Burge): "Originated with Mrs. Emiline Burge of Ector, Texas, in 1898. Tree vigorous and upright. The fruit is clear yellow, round, subacid, excellent. July. Introduced by Jno. S. Kerr." Texas Dept. Agr., Bull. 32.

Doctor Becker: Thompson Nurseries, Waco, Texas. Originated in Colorado County, Texas. "Fine quality, sure bearer."

Dodd: Fruit above medium, oblong; cavity shallow, medium width; stem short, stout, sometimes fleshy; basin medium size; color yellow, splashed and streaked with bright yellow; flesh white, crisp, tender, juicy, subacid, pleasant, good. Winter. This is of the *Gravenstein* type and is grown on Prince Edward Island.

Donald: Seedling of *Northern Spy*, originated by the Central Experimental Farm, Ottawa, Canada. Fruit medium to large, oblate to roundish; cavity deep, medium width, russeted; stem short, stout; basin medium size, deep, wrinkled; color yellow, washed and splashed with crimson; flesh yellowish, crisp, tender, rather coarse, juicy, subacid; good. October to March.

Drumbo: Seedling of *Winter St. Lawrence* originated by the Central Experimental Farm, Ottawa, Canada. Fruit above medium to large, conical; cavity deep, russeted; stem short, stout; basin deep; color pale yellow, washed and splashed with dark crimson; dots few, gray, conspicuous; flesh white, rather coarse, tender, juicy, subacid, pleasant, good. November to February. Resembles its parent but is a better keeper.

- Early Goodwin*: The Milton Nurseries, Milton, Oregon. Originated near Milton, Oregon, on the farm of William Goodwin. Fruit large, roundish-oblong, whitish-yellow, striped and splashed with bright red; flesh white, tender, juicy, subacid, excellent. Tree vigorous, upright-spreading, productive. July and August.
- Eastman*: Seedling of Fameuse, originated by the late Charles G. Patten, Charles City, Iowa. Fruit large, roundish; cavity large, deep, somewhat russeted; stem rather slender, medium length; basin very large and deep, furrowed; skin pale yellow, heavily washed with bright red and splashed with carmine; flesh whitish, tender, rather coarse, moderately juicy, mild subacid, pleasant, good. Tree vigorous, spreading, hardy. Season just after Wealthy. U. S. Dept. Agr. Yearbook, 1912.
- Elmer*: Seedling of Northern Spy originated by the Central Experimental Farm, Ottawa, Canada. Fruit medium or above, roundish, slightly ribbed; cavity deep, narrow, russeted at base; stem slender, medium length; basin deep, medium width; color greenish-yellow, washed and splashed with deep crimson, covered with pinkish bloom; flesh yellowish, juicy, crisp, tender, subacid, pleasant, good. December to late winter.
- Elsa*: *Pyrus baccata* x Yellow Transparent. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit small, nearly round, slightly ribbed; stem 1 inch long, slender; color bright yellow; flesh fine grained, tender, juicy, rather acid, pleasant, good. August and September. Tree vigorous, productive.
- Emery*: Fruit medium size, globular, russet washed and streaked with red; stem slender; cavity moderately deep; flesh white, fine grained, rich, sweet, keeps until May. Bull 143, Maine Exp. Sta.
- Emilia*: Seedling of Northern Spy, originated by Central Experimental Farm, Ottawa, Canada. Fruit medium size, roundish-conical, greenish-yellow washed and splashed with crimson; cavity medium, deep; stem short, stout; basin medium, deep; dots white, distinct; flesh dull white, crisp, juicy, tender, briskly subacid, pleasant, good to very good. Resembles Northern Spy in color, shape, flesh and flavor. December to April.
- Ensec*: Originated on the farm of the late Nelson Cox, Proctorville, Ohio. Fruit large, roundish to roundish-oblate, irregular; skin pale yellow washed with mixed red and splashed with bright crimson, sometimes overspread with gray; cavity irregular, large, deep, russeted, often lipped; stem short, moderately stout; basin deep, abrupt, furrowed, downy; flesh yellowish, juicy, subacid, very good. Early winter. U. S. Dept. Agr. Yearbook, 1907.
- Epochal*: Arthur F. Etter, Ettersburg, Calif. "It is clear golden yellow, well flavored, has a slight suggestion of grapefruit in its flavor."
- Eric*: A Russian seedling originated by the Central Experimental Farm, Ottawa, Canada. Fruit above medium, conical, slightly angular; cavity medium size; stem medium length, stout; basin medium size;

skin yellow, splashed and streaked with crimson; flesh white, tender, tinged with red, moderately juicy, briskly subacid, pleasant, good. October.

Eurisko: Albert F. Etter, Ettersburg, Calif. Not described.

Eve: *Pyrus baccata* x Simbirsk No. 9. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit small, ribbed; color bright red; stem short; flesh yellowish, fairly juicy, pleasant, good. September. Tree slow grow and fair bearer.

Fairfield (of Macoun): Hyslop x Oldenburg. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit medium, oblong; color yellow splashed and streaked with bright red; flesh nearly white, juicy, tender, pleasant, very mild subacid, fair to good. September.

Finch: Originated with E. J. Finch, Albion, Mich. Fruit medium size, obovate; cavity shallow, flaring, green and russet; stem short, stout; basin shallow; color golden yellow, mostly covered with splashes and dots of bright crimson; flesh yellowish white, somewhat coarse, firm, crisp, juicy, sprightly subacid, very good to best. Season late summer and early fall. Special Bull. 44, Mich. Exp. Sta.

Folwell (Minnesota 237): Originated by Minnesota Fruit Breeding Farm, Zumbra Heights, Minn. Seedling of Malinda. Tree very vigorous, hardy at Zumbra Heights, annual bearer. Fruit slightly irregular, very large, roundish, greenish yellow, blushed red or nearly red; flesh tender, moderately fine grained, pleasant subacid, very good. Mid-winter — a little later than Wealthy.

Forerunner: Seedling of McIntosh, originated by the Central Experimental Farm, Ottawa, Canada. Fruit medium size, roundish, ribbed; yellow well washed with rich orange-red and crimson; cavity medium, deep; stem medium to long, stout; basin medium, shallow; flesh yellowish with red near basin, tender, moderately juicy, subacid, little flavor, quality above medium. Mid-August to late September.

Forest: Originated in Wisconsin. Fruit above medium, oblong to roundish-conical; cavity medium size, sometimes lipped, russeted; stem short, stout; basin medium size, wrinkled; color greenish yellow, washed with dull red; flesh yellow, crisp, juicy, subacid, good, pleasant. Winter. Bull. 86, Dominion Exp. Farms, Canada.

Frank: *Pyrus prunifolia* x McMahan. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit nearly medium in size, nearly round, slightly pyramidal; skin yellowish white, sometimes faintly blushed; flesh white, juicy, crisp, fine grained, subacid, slightly astringent.

Frankford: Originated about 30 years ago with the late Paul Rose, South Frankford, Mich. Fruit medium size, roundish, pale yellow, mostly covered with bright crimson, somewhat striped with dark crimson;

cavity narrow, medium depth; stem medium length, fleshy; basin very small; flesh white, very fine grained, melting, juicy, very mild subacid, very good. Tree vigorous, spreading. Season late fall and early winter. Special Bull. 41, Mich. Exp. Sta.

Galatta: Seedling of Wealthy. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit above medium size, roundish, flattened at both ends; cavity deep, open, slightly russeted; stem short, stout; basin deep, open, wrinkled; skin thick, pale yellow, washed and splashed with red; flesh white, crisp, tender, juicy, subacid, pleasant, good. Resembles Wealthy somewhat. Late August and early September.

Galton: Seedling of Northern Spy. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit medium size or above, roundish, slightly ribbed; yellow, washed with deep orange red approaching crimson; cavity medium; deep; stem medium length, slender; basin medium, deep; flesh yellowish with traces of red near basin, crisp, tender, juicy, subacid, spicy, pleasant, good. Flavor like Sops of Wine. Season late. September to November.

Garner: Seedling of Langford Beauty, originated by the Central Experimental Farm, Ottawa, Canada. Fruit above medium, oblate; cavity deep, russeted; stem medium long, slender; basin deep, wrinkled; pale greenish-yellow, washed and splashed with dark crimson; flesh white, firm, juicy; subacid, pleasant, good. October.

Griger: Fruit large, oblong, yellow washed with mixed red; dots numerous; stem slender; flesh yellowish, subacid, rather rich, good to very good, winter. Notes on new fruits U. S. Dept. Agr.

Gerald: Seedling of Langford Beauty, originated with the Central Experimental Farm, Ottawa, Canada. Fruit above medium, roundish to oblate; cavity medium size; stem short to medium, stout; basin deep, medium width; color yellow, washed with crimson; flesh white, crisp, tender, juicy, subacid, pleasant, good. November to February. First fruited in 1911.

Giant Winesap or Keep Late: Continental Plant Company, Kittrell, N. C. "Originated by a Mr. Dillard of Virginia. Similar to the famous Winesap in color and flavor, but much larger and a much better keeper. In fact one of the very best keepers of all apples."

Giffin: Originated in the orchard of Joseph Giffin, near St. Clairsville, Belmont County, Ohio, about 1872. Fruit medium to large, roundish-oblate, inclined to conic; stem short to medium, rather slender; cavity wide and deep, russeted; basin wide and somewhat shallow; skin thick, very smooth and glossy, rich bright crimson, sometimes showing greenish-yellow under color; flesh creamy yellow, rather firm, crisp, fine grained, moderately juicy, mild subacid, fair to good. Bull. 290, Ohio Exp. Sta.

Girton: Seedling of Wealthy. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit medium or above, roundish-conical, slightly ribbed, greenish-yellow or yellow, thinly washed with crim-

son; dots white, indistinct; cavity narrow, deep, russeted; stem short, slender to moderately stout; basin medium, deep; flesh dull white or yellowish, crisp, tender, subacid, pleasant, spicy, good. Resembles Wealthy somewhat in appearance and flesh. November to March.

Golden (of Macoun): *Pyrus prunifolia* x Golden Russet. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit small, round, flattened at ends; color bright yellow; flesh fairly juicy, rather sweet, slightly astringent, good. Last of August and September.

Golden Aiken: Reed Nursery Company, Hanover, Indiana. Not described.

Golden Crown: Originated by Adonijah Marks, Clifton, P. E. I. Fruit above medium size, roundish-oblong, slightly angular; cavity medium size; stem short; stout; basin deep, open; skin yellow with traces of pinkish red; flesh white, tender breaking, juicy, subacid, pleasant, good. Winter. Resembles Grimes Golden. Report of the Horticulturist, Ottawa, Canada, 1908.

Goldo: Seedling of Grimes Golden probably by Oldenburg. Originated by N. E. Hansen, Brookings, S. D. Fruit much like Grimes Golden in appearance and flavor. Tree a vigorous grower.

Gordon (of Macoun): *Pyrus prunifolia* x Golden Russet. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit small, color russety-yellow; skin rather thick; flesh yellowish-white, fine grained, juicy, pleasant subacid, good. September.

Granby: Seedling of McMahan x Scott Winter, originated by the Central Experiment Farm, Ottawa, Canada. Fruit above medium, oblate to roundish-conic; cavity narrow, deep, russeted; stem short, rather stout; basin medium size, deep, wrinkled; skin yellow, washed and splashed with attractive orange red; flesh dull white with traces of red, tender, moderately juicy, briskly subacid, fair quality. Winter.

Grant: Originated with H. N. Grant, Newtonbrook, Ontario. Fruit above medium, roundish-conic; cavity open, medium depth; stem short, stout; basin medium width, shallow, wrinkled; color yellow with trace of pink blush; flesh yellowish, tender, juicy, subacid, pleasant, good. November to January.

Hanko: Fruit large, oblate, deeply furrowed and ridged; color greenish-yellow shaded with bright red, marked with broad stripes of crimson; stem short; cavity medium size, abrupt, furrowed; basin medium deep, abrupt, furrowed; flesh greenish-white tinged red, moderately coarse, crisp, subacid, good to very good. October to April. Tree low, spreading. Bull. 10, Wis. State Hort. Soc.

Harmon (of Maine): Originated with J. H. Harmon, Buxton, Maine, about 1887. Fruit medium size, oblate, washed and overlaid with red, splashed with deep crimson, numerous large grey dots; cavity medium size; stem very short; basin wide, shallow; flesh yellowish, crisp, tender, sharp acid, good. December to February. Bull. 143, Maine Exp. Sta.

- Hayden's Favorite*: Tucker-Mosby Seed Co., Memphis, Tenn. "Hardy tree, sure bearer."
- Hayford Sweet*: Originated with C. Hayford, Maysville, Maine, about 1872. Fruit small to medium, oblate-conical, washed and splashed with crimson; stem short; cavity narrow, rather deep; basin deep, abrupt; flesh fine grained, rich, sweet but rather dry, good. October to January or later. Tree hardy, vigorous, spreading. Bull. 143, Maine Exp. Sta.
- Hancock Sweet*: Rogers Nurseries, Rogers, Ohio. Not described.
- Helen*: Fruit medium size, irregular-oblate or roundish-oblate, lemon yellow, washed with bright or dull rich red; flesh mild subacid, of fair quality. July. No. 30229 of Seed and Plant Introduction, U. S. Dept. of Agr.
- Hibkee*: Graft-hybrid of Hibernial and Milwaukee by N. E. Hansen, Brookings, South Dakota. "The fruits so far show the flesh and core of Milwaukee and the surface coloring of Hibernial."
- Hickman*: J. Van Lindley Nursery Co., Pomona, N. C. Seedling of Shockley, originated with D. W. Dickinson, Hickman, Ky. "Valuable for the cotton belt; color yellow, covered with light red; flesh yellow, of good quality; a good keeper.
- Hitchcock*: Originated by J. P. Hitchcock, Massawippi, Quebec. Fruit large, roundish; cavity deep, medium width, russeted; stem short, stout; basin deep, medium width; color yellow; flesh white, tender, crisp, juicy, subacid, pleasant, good. Winter.
- Hollow Log*: Valdesian Nurseries, Bostic, N. C. Originated in Rutherford County, North Carolina, as a chance seedling. Tree a strong grower, upright, blooms late, productive. Fruit large, deep yellow, flesh tender, crisp, juicy, spicy, aromatic. June to September.
- Holz*: Lawver x McIntosh, originated by the Central Experimental Farm, Ottawa, Canada. Fruit medium size, roundish, pale greenish-yellow, well washed with crimson; cavity medium, open, russeted; stem medium, stout; basin deep; flesh dull white, firm, crisp, juicy, subacid, pleasant but not high flavor, medium to good. Resembles Lawver very much. January to late winter.
- Honora*: Seedling of McIntosh. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit medium size, roundish to oblate-conic, yellow, well washed with crimson; cavity medium depth, russeted; stem short, stout; basin medium size, wrinkled; flesh white, tinged with red, tender, melting, moderately juicy, mildly subacid, pleasant, good. Resembles McIntosh very much. Late September and October.
- Horace*: From L. C. H. Ayers, Midway, Tenn. Fruit medium large, roundish-oblate, lemon yellow. August.
- Hoyt* (of Mich.): Originated with Jas. E. Hoyt, Roeland, Mich. Fruit below medium; greenish yellow with dark purple blush; flesh nearly white, firm, breaking, buttery, juicy, vinous, subacid, rich. Season until May. Special Bull. 44, Mich. Exp. Sta.

- Hume*: Seedling of McIntosh, originated by the Central Experimental Farm, Ottawa, Canada. Fruit medium size, roundish to oblate, slightly ribbed; suggests McIntosh in color, flesh, perfume and flavor.
- Hunter* (of Macoun): *Pyrus baccata* x Red Anis. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit small, good for jelly.
- Husband*: Seedling of Grimes Golden, originated by Jos. Husband, Chester, Ill. Fruit large, roundish, yellow washed with mixed red; dots prominent, russet; stem medium; basin and cavity regular; flesh yellow, subacid, good to very good. December to April. Notes on new fruits U. S. Dept. Agr.
- Jakway*: Originated with J. J. Jakway, Benton Harbor, Mich. Fruit as large as Tompkins King, very good quality, ripens with Maiden Blush; yellow with red stripes. Special Bull. 44, Mich. Exp. Sta.
- James*: *Pyrus prunifolia* x McIntosh. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit small, nearly round, deep red with streaks of dull yellowish; flesh nearly white, fine grained, rather acid, pleasant, slightly astringent.
- Jean Hardy*: Bobbink and Atkins, Rutherford, N. J. "Very large fruit, juicy and sweet, very fine."
- Jethro*: Seedling of Wealthy. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit above medium, oblate to roundish-conic, pale yellow washed and splashed with orange-red and carmine; cavity medium size, green; stem short, stout, basin medium, deep; flesh yellowish, crisp, tender, juicy, briskly subacid, pleasant, good. Resembles Wealthy in flesh and flavor. Late September to December.
- Jewel*: *Pyrus baccata* x Yellow Transparent. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit small, nearly round; stem longer than one inch; color yellowish with pale red cheek; flesh moderately firm, crisp, juicy, subacid, good, slightly astringent. August and September. Tree vigorous, productive.
- Josie*: *Pyrus prunifolia* x Simbirsk No. 9. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit nearly medium size, greenish-yellow, washed and striped with bright red; flesh white, fairly juicy, pleasant, slight astringency, good. September and October.
- Junco*: Seedling of Wealthy, originated by the Central Experimental Farm, Ottawa, Canada. Fruit medium, oblate, angular; cavity narrow, medium deep, russeted; stem short, moderately stout; basin deep, open, wrinkled; skin pale yellow, washed with crimson; flesh yellowish, firm, juicy, subacid, pleasant, good. December and later.
- Kelso*: McMahon x Scott Winter. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit medium, oblate; cavity deep, medium width, russeted; stem medium to short; basin open, deep;

skin yellow, washed with bright crimson; flesh dull white, tender, moderately juicy, acid, pleasant, quality fair, fair to good flavor. Mid-winter.

Kent (of Macoun): *Pyrus baccata* x McIntosh. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit small, nearly round, ribbed at calyx; stem one inch long; color dark red shaded with orange, deepest on sunny side; flesh yellowish-white, juicy, crisp, mildly subacid, slightly astringent, fairly good. September to November. Tree vigorous, productive.

Kildare: Seedling of Langford Beauty, originated by the Central Experimental Farm, Ottawa, Canada. Fruit medium or above, oblate to roundish-conic; cavity medium size; stem medium to long, slender or rather stout; basin narrow, medium depth; color pale yellow, washed and splashed with crimson; flesh white tinged yellow, crisp, very tender, juicy, sprightly, subacid, pleasant, good. August to October.

Kim: Seedling of Langford Beauty, originated by the Central Experimental Farm, Ottawa, Canada. Fruit medium or above, roundish; cavity medium size, russeted; stem short, slender to stout; basin deep, open; color yellow, washed and splashed with crimson, covered with pinkish bloom; flesh dull white, tinged red, crisp, juicy, subacid, pleasant, good. November to late winter.

King of Titus: Originated in Titus County, Texas. Fruit large; flesh yellow, subacid; tree vigorous, productive. September and October. Texas Dept. Agr., Bull. 32.

Legace: Originated with Jules Legace, Van Buren, Aroostook County, Maine. Fruit medium size, roundish oblate, washed with red and splashed with crimson; cavity rather deep, russeted; stem medium short; basin rather shallow; flesh white, tender, juicy, pleasant subacid, good. September and October. Tree vigorous, spreading, very productive. Bull. 143, Maine Exp. Sta.

Linda: Seedling of Langford Beauty. Originated by Central Experimental Farm, Ottawa, Canada. Fruit above medium, large, roundish to oblate, pale yellow washed and splashed with crimson; cavity medium, shallow; stem short, stout; basin medium; flesh juicy, briskly subacid, aromatic, good. November probably to February.

Linton: Seedling of Winter St. Lawrence. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit medium size, roundish; cavity medium size; stem slender, medium length; basin medium size; color pale yellow, thinly splashed with bright red; flesh white, tender, juicy, mildly subacid, pleasant, good. September.

Linville: Fruit medium size, roundish-oblate; color yellow or greenish-yellow almost entirely covered with rich dark red; cavity medium size, russeted; stem short, strong; basin rather wide and deep; flesh yellowish, firm, crisp, juicy, subacid, pleasant, refreshing. December to March. Tree vigorous, spreading. Cir. No. 94, Ohio Agr. Exp. Sta.

- Lipton*: Seedling of Northern Spy. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit medium size, roundish-conical, ribbed, yellow splashed and washed with crimson; dots yellow, distinct; cavity deep, open; stem short, stout; basin medium, deep, wrinkled; flesh yellow with traces of red, crisp, tender, juicy, subacid, pleasant, good. Much like Northern Spy. November probably to February.
- Lisgar*: *Pyrus prunifolia* x McMahon. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit nearly medium size, yellow covered with bright red; flesh yellowish-white, juicy, pleasant, rather astringent, rather inferior in quality. October.
- Lizzie*: *Pyrus baccata* x Herren. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit small; stem one inch long; color deep red; quality medium. September. Too small to be of value.
- Lowry*: Originated on the farm of John Lowry, Afton, Va., about 70 years ago. Has also been known as Dixie and Mosby's Best. Fruit medium size, roundish or roundish-oblate; cavity medium size and depth, russeted; stem fairly long and stout; basin medium size; skin yellow washed with mixed red and splashed with rich crimson; flesh yellowish, rather fine grained, moderately juicy, mild subacid, pleasant, good to very good. December to February. U. S. Dept. Agr. Yearbook, 1910.
- Luke* (of Canada Experimental Farm): Seedling of Wealthy. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit above medium to large, oblate to roundish-conic; pale greenish yellow washed with red; cavity narrow, russeted; stem short, moderately stout; basin open, medium depth; flesh dull white or yellowish, rather coarse, tender, moderately juicy, subacid, pleasant, good. Resembles Wealthy but is a better keeper. October and November.
- MacSweet*: Seedling of McIntosh, originated by the Central Experimental Farm, Ottawa, Canada. A good sweet apple, resembling McIntosh.
- McSweeney*: Seedling of Sweet Bough, originated by a Mr. McSweeney, Kalamazoo, Mich. Fruit large, truncate-conical or slightly roundish; clear waxen white; texture and flavor very similar to Red Astrachan, same season as Red Astrachan. Tree strong grower, exceedingly productive. Special Bull. 41, Mich. Exp. Sta.
- Madge* (of Macoun): *Pyrus prunifolia* x Golden Russet. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit small, deep red; flavor mildly acid, pleasant, slightly astringent, quality above medium. September.
- Maguate*: A seedling of Winesap, originated by the late Dr. J. Stayman, Leavenworth, Kansas, about 1866. Fruit medium to large, round or roundish-conical, rich yellow washed with crimson and indistinctly striped with dark purple; cavity regular, large, deep, furrowed, faintly russeted; stem short, slender, curved; basin medium

size and depth, furrowed; flesh yellowish stained with red, fine grained, juicy, rich subacid, very good. Season same as Jonathan. U. S. Dept. Agr. Yearbook, 1906.

- Magnus*: *Pyrus prunifolia* x *Simbirsk* No. 9. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit small, nearly round; color orange and scarlet; flesh firm, rather juicy, subacid, aromatic, slightly astringent, very good. September.
- Manitou*: *Pyrus baccata* x *McMahon*. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit small, nearly round, ribbed; stem one inch or more long; color yellow, striped with red, deep red on exposed side; flesh nearly white, juicy, sprightly, fair quality. September and October. Tree vigorous, productive.
- Margery*: *Pioneer* x *Northern Spy*. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit small, yellow, sometimes tinged with red; flesh greenish-white, fine grained, juicy, pleasant, subacid, sprightly. October to February.
- Marlboro* (of Maine): Originated with S. H. Remick, Marlboro, Maine. Fruit medium, roundish-oblate; yellowish-green, overlaid with deep crimson on sunny side; cavity medium, flaring, slightly russeted; stem slender, very short; basin very wide, shallow, plaited; flesh white, crisp, juicy, fine grained, very firm, pleasant acid, good. January to May. Bull. 143, Maine Exp. Sta.
- Marne*: Seedling of *Northern Spy*. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit above medium to large, oblate, slightly red, yellow thinly washed and splashed with crimson; dots white, distinct; cavity deep, open, russeted; stem short, stout; basin deep, open; flesh yellowish, crisp, tender, juicy, subacid, good. November probably to February.
- Martin* (of Macoun): *Pioneer* x *Ontario*. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit medium size, nearly round; color warm orange yellow, with an orange red cheek; flesh white, fine grained, pleasant subacid, sprightly. October to February.
- Mason*: Fruit medium size; in color and form it somewhat resembles *Striped June*. One of the best South Texas varieties. July. Texas Dept. Agr., Bull. 32.
- Mavis*: *McIntosh* by *Lawver*. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit medium or above, roundish, slightly ribbed; cavity medium depth to shallow; stem moderately stout; basin deep, medium width, wrinkled; skin thick, tough, yellow, washed and splashed with crimson; flesh yellowish, crisp, tender, juicy, subacid, pleasant, good. Mid-November to March. Does not resemble either parent.
- Maxon*: Said to be a delicious summer dessert apple which originated with the Central Michigan Nursery, Kalamazoo, Mich. Tree hardy and productive. Special Bull. 44, Mich. Exp. Sta.

- Maxson's Early*: Storrs & Harrison Co., Painesville, Ohio. Fruit large, pale yellow; flesh tender, tart, well flavored. Tree productive. A summer cooking apple. August.
- Mayfield* (Gibbs No. 2): A seedling of Northern Spy, originated by E. B. Gibbs, Summit City, Mich., about 40 years ago. Fruit large to very large, round-oblate; color pale yellow with reddish-brown blush; cavity medium size, deep, russeted; stem short, stout; basin broad, rather deep; flesh white, fine grained, very tender, juicy, sweet, very good. Mid-winter to late winter. Tree vigorous, spreading. Special Bull. 44, Mich. Exp. Sta.
- Mecca*: *Pyrus baccata* x Simbirsk No. 9. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit small, nearly round; color orange, streaked red and with crimson cheek, flesh mildly subacid, rather astringent, good. Tree fairly vigorous, productive.
- Medford*: Seedling of Wealthy. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit medium size, oblate, cavity open, medium depths, stem short; basin open, deep, wrinkled; color pale yellow, splashed and washed with crimson; flesh white tinged with red, crisp, tender; juicy, subacid, sprightly, pleasant, good. September.
- Melvin* (of Macoun): Seedling of Wealthy. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit medium size, roundish; cavity deep, medium width, sometimes lipped, slightly russeted; stem medium to long, slender to stout; basin medium depth and width; skin rather dull red, attractive; flesh yellow, slightly stained red, very tender, melting briskly subacid, spicy, good. Middle to end of August.
- Merlin*: Seedling of Shiawassee. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit medium size, oblate; resembles Shiawassee in shape, flesh and flavor.
- Mexico*: Cibolo Nursery, Cibolo, Texas. "A wild apple found in the Mexican mountains; a strong healthy grower, and heavy bearer of good size, fine flavored, red apples; stands our hot sun better than any other apple on our grounds."
- Meyer*: Originated on the farm of Wm. Meyer, Mears, Mich., about 40 years ago. Fruit medium size, oblong-conic to round-conic; color rich yellow, striped with bright crimson; skin waxy; cavity narrow, deep; stem short, stout; basin narrow, shallow; flesh yellowish-white, very fine grained, tender, juicy, brisk subacid, very good. Autumn. Tree medium strong, upright. Special Bull. 44, Mich. Exp. Sta.
- Miles*: L. C. H. Ayers, Midway, Tennessee. A medium large, roundish-conic, yellowish, mild subacid, summer apple of fair quality.
- Miller's Sweet*: Farmer Seed and Nursery Co., Faribault, Minn. Seedling of Oldenburg. Fruit conical, medium large, greenish-white with red cheek; flesh firm and sweet. Tree strong, vigorous with spread-

ing top, very hardy, early and heavy bearer; September to November.

Monocacy: Originated with Wm. Baumgardner, Carroll County, Md. Fruit roundish or slightly oblate-conic, sometimes slightly ribbed, medium to large; cavity medium to large, rather deep, sometimes slightly russeted; stem short, rather slender; basin medium width and depth, slightly furrowed; skin yellowish green, mostly covered with dark crimson or purplish crimson, striped and splashed with darker crimson, often overspread with mottled gray; flesh yellowish white, sometimes tinted red, moderately fine grained, juicy, mild subacid, moderately rich, good to very good. Winter. Yearbook U. S. Dept. Agr., 1912.

Montgomery: Originated by the New York Agricultural Experiment Station at Geneva. Fruit large, roundish to oblate-conic, almost entirely overspread with bright red and faintly striped with darker red, resembling Red Astrachan; flesh white, fine grained, tender, juicy, brisk subacid, good. Tree vigorous, upright spreading. September.

Moore's Blight Proof: Citronelle Nursery and Orchard Co., Citronelle, Alabama. Chance seedling. Originated at Enterprise, Miss., 40 or more years ago. Fruit large, round, slightly flattened, striped red, fair quality, very acid, good keeper. May be good for home use in the South.

Morton (of Mich.): Originated at Benton Harbor, Mich. Fruit medium size, roundish-oblate, pale yellow, striped and splashed with light and dark red; cavity medium size; stem rather short; basin narrow, abrupt; flesh crisp, tender, moderately juicy, rich subacid, very good; as beautiful as the finest Red Astrachan and a far better juicy, subacid, good. September. Bull. 143, Maine Exp. Sta.

Mottinger: Washington Nursery Co., Toppenish, Wash. Chance seedling, found on an island in the Columbia River near Umatilla, Oregon. Fruit very large, greenish-yellow, striped with red; follows Yellow Transparent in season; tree is a strong grower.

Mrs. Richardson: Thompson's Nurseries, Waco, Texas. "Fruit large, yellow."

Narragansett: Originated with Jacob H. Harmon, Buxton, Maine, in 1873. Fruit medium to large, conical, pale yellow washed and splashed with crimson, heavily overlaid with deeper crimson; cavity deep, flaring; stem short, stout; basin medium, slightly corrugated; flesh white, tender, rather dry, mild subacid, good. November and December. Resembles Mother in size and shape, but is almost as dark colored as Black Oxford. Tree very hardy and a shy bearer. Bull. 143, Maine Exp. Sta.

Nelson (of Wood): Originated with Elihu Wood, Winthrop, Maine. Fruit medium, oblong-conical, pale yellow with small gray dots; stem short; cavity narrow, deep; basin medium size; flesh tender; juicy, subacid, good. September. Bull. 143, Maine Exp. Sta.

- Niobe*: Seedling of Northern Spy. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit above medium, roundish-conical; cavity deep, medium width; stem medium to long, slender to rather stout; basin deep, medium width; color greenish-yellow, washed and splashed with dull crimson, thin pinkish bloom; flesh yellowish, crisp, tender, rather coarse, moderately juicy, mildly subacid, pleasant, good to very good. December and later.
- Nome*: Seedling of Swayzie. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit medium, oblate to roundish; cavity deep, russeted; stem short, stout; basin medium depth or shallow; skin yellow washed with orange-red; flesh yellow, tender, moderately juicy, breaking, buttery, subacid, pleasant, spicy, good to very good. Resembles Blenheim somewhat. October and November.
- Norman*: *Pyrus baccata* x McIntosh. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit small, round, bright red; flesh yellowish-white, crisp, juicy, sprightly, pleasant, trace of astringency, good. October. Tree fairly vigorous, productive.
- Northern Queen*: *Pyrus baccata* x Hyslop. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit small, fairly good but rather astringent, too small to be of value. Late August and September.
- Novelty*: Seedling of *Pyrus baccata* by Wealthy. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit $1\frac{1}{2}$ inches across, nearly round, flattened at ends; stem long, slender; skin deep red; flesh pale yellowish-pink, firm, crisp, juicy, subacid, fair quality. September. Tree vigorous, fairly productive.
- Nutting*: Seedling of Oldenburg. Originated by the late James Nutting, Perham, Aroostook County, Maine. Fruit large, roundish-conical, yellowish-green, faintly washed or striped with dull red; stem long, slender; cavity deep; basin rather large; flesh greenish-white, tender, juicy, mild acid, good. September to December. Tree hardy, vigorous, very productive. Bull. 143, Maine Exp. Sta.
- Okobogi*: "A rather attractive, striped red winter apple, above medium to below; subacid, fair to good quality. Introduced by H. M. Antidel, Milford, Iowa." Bull. 108, Iowa Exp. Sta.
- Omsel*: Seedling of Salome. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit large, resembling Salome in appearance, flesh and flavor; a good keeper.
- Onslow*: J. Van Lindley Nursery Co., Pomona, N. C. Originated in Onslow County, N. C. Fruit above medium, roundish-oblate, entirely covered with dark red, faintly striped; flesh yellow, fine quality; good keeper. Winter.
- Orsino*: Seedling of Shiawassee. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit large, resembling Shiawassee in flesh and flavor, attractive and a good dessert apple.
- Oscar*: A Russian seedling. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit above medium, conical almost oblong; cavity narrow, medium depth, russeted near base; stem medium

- length; basin shallow, medium width; color pale yellow, washed and splashed with bright crimson; flesh white, tinged red, tender, juicy, briskly subacid, fair to good. October.
- Osman*: *Pyrus baccata* x *Osimoe*. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit medium size, pale yellow, washed with crimson; flesh tender, breaking, pleasant acid, slightly astringent. August. Tree a fair grower, productive.
- Otto*: *Pyrus baccata* x *McMahon*. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit small, yellow, washed and faintly streaked with red, becoming entirely red; flesh juicy, sprightly, fair, astringent. October. Tree vigorous, fairly productive.
- Owatonna*: Clinton Falls Nursery Co., Owatonna, Minn. Originated at Medford, Minn. "A rapid grower, very prolific and hardy as an oak. Fruit large, dark red; flesh tender, crisp, subacid. Good keeper, season late." Resembles *Wealthy* in size and color.
- Oxbo*: A seedling of *Roxbury* probably by *Oldenburg*. Originated by N. E. Hansen, Brookings, S. D. Fruit medium size; flesh white, juicy, subacid. Season probably late fall.
- Peace*: Seedling of *Langford Beauty*. Originated by the Central Experimental Farm, Ottawa, Canada. A handsome apple, resembling its parent in appearance, flesh and flavor.
- Pearl*: From S. Billingsley, Greenwood, Indiana. A large sized, roundish-oblate, rich, clear yellow, subacid apple of fair quality. September and October.
- Perfect*: Supposed to be a seedling of *Baldwin*, originating with W. F. Cobb, South Turner, Me. Fruit large, roundish-conic, somewhat ribbed; stem medium length, thick; cavity acute, moderately deep, broad, often russeted, sometimes lipped; basin medium size, rather abrupt, furrowed; skin moderately thick, smooth, dull, oily, dull greenish-yellow, much overspread with dark, dull red, almost solid on well colored specimens, indistinctly splashed with carmine; flesh yellow, firm, somewhat coarse, crisp, moderately tender, juicy, subacid, good. January to May. Introduced by Rice Bros. Co., Geneva, N. Y. Tree vigorous, hardy, upright-spreading, productive.
- Perkins Late*: Clinton Falls Nursery Co., Owatonna, Minn. "The fruit is of good size, round, red, firm and juicy and will keep until May or June."
- Pensaukee Russet*: Fruit above medium, oblate-conical, slightly angular; cavity open, medium depth; stem medium length, stout; basin medium size; color greenish-yellow with red blush, heavily russeted; flesh yellow, firm, juicy, briskly subacid, pleasant, good. Winter.
- Pink Russet*: Originated in the nursery of R. B. C. Newcomb, Blissfield, Mich. Said to keep as late as *Roxbury* and to be much superior in flavor and juiciness to *Roxbury*. Special Bull. 44, Mich. Exp. Sta.

- Pinto*: Seedling of Wealthy. Fruit above medium, oblate; cavity deep, medium wide; stem short, slender; basin deep, medium width, wrinkled, color pale greenish yellow, washed and splashed with dull orange red; flesh yellowish, tender, juicy, briskly subacid, pleasant, aromatic, good. October and November.
- Pioneer*: *Pyrus baccata* x Tetofsky. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit small, nearly round, slightly ribbed; stem rather long; color yellow with pink cheek; flesh white, fine grained, firm, crisp, subacid, slightly astringent, moderately juicy, pleasant. September and October. Tree strong, productive.
- Pitton*: A seedling of Wagener, originating with G. W. Pitton, Stanton, Mich., about 30 years ago. Fruit medium size, oblate, distinctly five ribbed; light yellow, almost entirely covered with broad stripes of bright crimson; cavity medium size, deep; stem short, stout; basin medium size, shallow; flesh white, fine grained, crisp, tender, very juicy, mild subacid, very good to best. Season late fall and early winter. Special Bull. 44, Mich. Exp. Sta.
- Prince* (of Macoun): Seedling of *Pyrus baccata* x Tetofsky, originated by the Central Experimental Farm, Ottawa, Canada. Fruit 1½ inches in diameter, nearly round; calyx sometimes deciduous; stem an inch or more long; color bright red with a few pale dots and streaks; flesh nearly white, juicy subacid, somewhat astringent, pleasant flavor. Early September. Tree vigorous, very productive.
- Queen of Albemarle*: Old Dominion Nurseries, Richmond, Va. Not described.
- Rabun*: Yearbook of U. S. Dept. Agr., 1906. A chance seedling found by Mr. Andy Hamby, 13 miles northeast of Clayton, Georgia, about 1890. Fruit large, oblate, slightly ribbed; cavity large, deep, russeted; stem short, stout; basin large, deep; skin moderately thick, yellow washed with mixed red, splashed and striped with bright crimson; flesh yellowish, fine grained, breaking, juicy, subacid, good to very good; core large, oblate, open. Tree vigorous, spreading. November to March in Northern Georgia.
- Radnor*: Seedling of Swazie. Fruit medium to large, roundish-conic, slightly angular; cavity medium size, russeted; stem short, stout; basin deep, medium width, wrinkled; color greenish yellow or yellow with faint bronzy pink blush; flesh dull white or yellowish, crisp, juicy, a little coarse, subacid, spicy, good. November and later.
- Rainier*: The origin of Rainier is not definitely known, but it has been grown under various names for perhaps 35 years near North Yakima, Washington. Fruit medium size or above, usually oblong-conical and irregular, rich, yellow mottled and washed with red and striped with dark red; flesh yellowish, juicy, mild subacid, good. Tree vigorous, spreading. October to May or later, sometimes to September.

- Ramona*: Seedling of Shiawassee, originated by Central Experimental Farm, Ottawa, Canada. Fruit medium to above, oblate; cavity deep, open, slightly russeted; stem short, stout; basin medium; color pale yellow, washed and splashed with carmine; flesh white, fine grained, tender, juicy, subacid, pleasant, good. August and September.
- Red Broadwell*: Stark Bros. Nurseries and Orchards Co., Louisiana, Missouri. Not described.
- Red Maiden's Blush*: Same as Bonita.
- Red Rome*: Stark Bros. Centennial Fruits. "Red Rome Beauty is deep, dark red, indistinctly striped; large, tender, juicy; good quality and a favorite for cooking." (Solid red sports of Rome Beauty have appeared in various parts of the country. C. P. C.)
- Rcesc*: From C. W. Ewing, Mountainboro, Ala. A medium sized, irregular, roundish-conical, greenish-yellow splashed red, mild subacid apple of fairly good quality. September in Alabama.
- Ridcau*: Wealthy x Oldenburg. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit medium to large, roundish-angular; cavity deep, open; color pale yellow, splashed and washed with bright crimson; flesh juicy, yellowish, firm, pleasant, sprightly, subacid, good. Late September to February.
- Robin* (of Macoun): *Pyrus baccata* x Simbirsk No. 9. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit small, nearly round, much ribbed; stem an inch long; color yellow shaded with red; flesh very firm, juicy, subacid, slightly astringent, pleasant, good. August and September. Tree vigorous, medium productive.
- Rocket*: Seedling of Northern Spy, originated by the Central Experimental Farm, Ottawa, Canada. Fruit medium or above, roundish-conical; cavity deep, medium width, russeted; stem short, medium stout; basin deep, narrow; color yellow, washed and splashed with crimson, covered with pinkish bloom; flesh yellowish, crisp, tender, juicy, subacid, pleasant, good. October to January.
- Romney*: *Pyrus baccata* x Broad Green. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit small; stem one inch long; color dull, deep red; flesh moderately firm, fairly juicy, fairly good. August and September. Tree medium vigorous, fairly productive.
- Ruby*: *Pyrus baccata* x Wealthy. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit small and of poor quality. September.
- Rufus*: Fruit medium, roundish-conical; cavity narrow, shallow, russeted; stem short, slender; basin narrow, medium depth, wrinkled; color yellow, washed with crimson; flesh white with traces of red, tender, juicy, subacid, pleasant, good. Winter. An attractive apple of the Fameuse type, promising for Ontario.

- Rupert*: A Russian seedling. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit above medium, oblate; cavity medium size, russeted; stem short, stout; basin medium size, wrinkled; skin thick, tough, pale greenish yellow, sometimes with a faint pink blush; flesh white, tender, juicy, briskly subacid, medium to good. Earlier than Tetofsky and better in quality than Tetofsky and Yellow Transparent. August.
- Rustler*: McIntosh x Lawver. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit above medium, roundish, slightly ribbed; cavity open, medium depth; stem medium length, stout; basin deep, medium width, smooth; skin thick, tough, yellow almost entirely covered with crimson; flesh yellowish tinted red, moderately juicy, firm but tender, subacid, pleasant, above medium to good. December to March or later.
- Ruth*: *Pyrus prunifolia* x Pewaukee. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit small, nearly round, deep crimson with white dots; flesh fine grained, yellow stained red, breaking, pleasant subacid. October to November.
- Samson* (of Macoun): Oldenburg x Anis. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit medium to large; flesh crisp, moderately juicy, subacid, sprightly, pleasant. September.
- Schoolcraft*: Originated 25 years ago with Ralph Beebe, Gulliver, Mich. Fruit medium to large, round-oblate, ribbed, resembles Wagener; greenish yellow, mostly covered with broken stripes and splashes of crimson or solid red; cavity broad, shallow; stem short, stout; basin broad, shallow; flesh greenish-white, fine grained, juicy, sweet, very good. Winter. Special Bull. 44, Mich. Exp. Sta.
- Seedless*: Alpha Nursery, Alpha, Illinois. Originated in New Mexico in 1908. "The fruit is red, striped slightly with yellow. There are no seeds and many of the apples have no core. Good keeper. Tree hardy and good grower. December to March."
- Sereda*: Seedling of Harry Kaump. Originated by N. E. Hansen, Brookings, S. D. Resembles Yellow Transparent but is more regular in form and of the same season. Fruit yellow, juicy, sprightly subacid.
- Severn*: Seedling of Swayzie. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit medium size, roundish, angular, flattened at ends; cavity deep, open, russeted; stem short, slender; basin deep, open, smooth; yellow, washed with orange-red and splashed with crimson; flesh moderately juicy, tender, pleasant, good. October.
- Shishee*: Seedling of Shiawasee, originated by the Central Experimental Farm, Ottawa, Canada. Fruit above medium size, resembles Shiawasee in color, flesh and flavor.
- Shock*: From L. L. Moore, Taylorsville, N. C. Fruit medium size, roundish, somewhat flattened, whitish-yellow, subacid, fair quality. August.
- Silvia*: *Pyrus baccata* x Yellow Transparent. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit small, somewhat

pointed and ribbed; stem very short, color pale yellow; flesh subacid, not astringent, pleasant, good, early August. Tree strong, upright, fairly productive.

Smith Pippin: Fruit medium size, roundish; cavity medium size, russeted; stem short; basin open, deep, sometimes lipped; color yellowish green with red blush; flesh yellowish, crisp, tender, juicy, pleasant, mildly subacid, good. Winter.

Sonora: Seedling of Langford Beauty. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit medium size, roundish; cavity medium size; stem slender, medium length; basin open, medium depth; color pale yellow washed with crimson; flesh dull white, rather coarse, tender, moderately juicy, subacid, pleasant, good. Early September.

Sorel: McMahan x Scott Winter. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit above medium, oblate-conic; cavity deep, medium width, russeted; stem short to medium, stout; basin deep, open, wrinkled; color yellow, washed with bright attractive red; flesh white, tinged yellow, crisp, moderately juicy, subacid, pleasant, good. Winter.

Southern Beauty: Corinth Nurseries, Corinth, Miss. Originated in Alcorn County, Miss. Very much like Yates but twice as large. Winter.

Spates: Originated by a Mr. Spates, Excelsior, Minn. Resembles Jewell's Winter. Very hardy.

Spiotta: Seedling of Shiawassee, originated by the Central Experimental Farm, Ottawa, Canada. Fruit above medium size to large, resembling Northern Spy in color, flesh and flavor.

Spiro: Seedling of Northern Spy, originated by the Central Experimental Farm, Ottawa, Canada. Fruit medium size, resembling Northern Spy in flesh and flavor.

Star (of Burbank): Seedling of Baldwin, originated by Luther Burbank, Santa Rosa, Calif. "Large and even better quality than Baldwin. Yellow ground nearly all covered with deep crimson stripes and flakes. Beautiful regular form; flesh white. Same season as Baldwin, September to December 20 at Santa Rosa."

Stearns (name used previously): From C. L. Stearns, Clay, New York. Fruit medium large, roundish to roundish-oblate, greenish-yellow with red stripes, pleasant subacid, good quality.

Stickle Sweet: Depot Road Nurseries, Salem, Ohio. Flesh tender and good; good bearer; fine for apple butter.

Stork: *Pyrus baccata* x Oldenburg. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit small; stem one inch long, slender; color red; flesh yellowish, firm, not very juicy, rather astringent, fair quality. Late August and September.

Stringston: Thompson Nurseries, Waco, Texas. Very successful in Texas; fine size and quality and bears young.

- Suawnee*: Jackson County Nurseries, Winder, Ga. Fruit large, roundish oblique, pale yellowish green with russet dots; flesh yellowish, moderately juicy, mild subacid, very good; good keeper. Tree vigorous, productive.
- Summer Champion*: Originated near Lincoln, Washington County, Ark., about 34 years ago. Fruit large; yellowish-white, washed over entire surface with crimson or dark purplish stripes; flesh whitish, satiny, subacid, good. Tree strong grower with upright open head. August. U. S. Dept. Agr., B. P. I., Bull. 275.
- Summer Greening*: Supposed to have originated in Michigan. Fruit medium size, round, green and yellow, very good quality. September. Tree upright and productive. Special Bull. 44., Mich. Exp. Sta.
- Summit* (Gibbs No. 1, Great Northern): Seedling of Northern Spy, originated by E. B. Gibbs, Summit City, Mich., about 40 years ago. Fruit large, round-oblate, somewhat angular; color light yellow, overspread with bright crimson and striped with dark crimson, sometimes with solid red cheek; cavity wide, deep, russeted; stem short, stout; basin broad, deep, plaited; flesh white, fine grained, tender, juicy, brisk subacid, good. Late winter. Special Bull. 44, Mich. Exp. Sta.
- Sweet Evalina*: Fruit Grower and Farmer, Sept. 1, 1913. Seedling of White Pearmain and resembles this variety. Flesh creamy yellow, rich sweet.
- Sweet Orange*: Vaughan's Seed Store, Chicago, Ill. Seedling of the old Orange Crab. Resembles Orange Crab somewhat but is flatter in shape and lighter in color; flavor fine, delicious.
- Sweetosh*: Seedling of McIntosh. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit medium to large, rather dull in color but is attractive and a good sweet apple.
- Swan*: Frank J. Schwan & Son, Dansville, N. Y. A large size, irregular, roundish, greenish-red, pleasant subacid, late fall apple of good quality.
- Tabor*: Originated with S. W. Tabor, Washburn, Maine. Fruit medium, oblate, yellowish-green, washed and splashed with crimson; stem slender; cavity wide, flaring, furrowed; basin medium size, abrupt; flesh greenish white, fine grained, tender, rather dry, sweet, good. October to January. Bull. 143, Maine Exp. Sta.
- Teddy*: *Pyrus prunifolia* × Golden Russet. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit nearly medium, dull red with streaks and spots of a brighter shade; flesh yellowish, crisp, fairly juicy, pleasant. September and October.
- Texas King*: Fruit large, yellow splashed with red; flesh juicy, crisp, subacid; tree vigorous, productive. Originated in East Texas. July and August. Texas Dept. Agr., Bull. 32.

- Thackers*: Originated with W. H. Thacker, Benzonia, Mich. Fruit medium size, roundish-conic, yellow with dark crimson splashes; cavity medium size, russeted; stem medium length, rather slender; basin narrow, shallow; flesh whitish, fine grained, crisp, juicy, brisk subacid, good to very good. Winter. Special Bull. 44, Mich. Exp. Sta.
- Thurso*: Seedling of Northern Spy, originated by the Central Experimental Farm, Ottawa, Canada. Fruit medium or above, roundish to oblate, slightly angular; cavity medium, sometimes russeted; stem medium length, slender to rather stout; basin medium size; color pale greenish yellow, washed and splashed with attractive red or crimson; flesh yellowish with traces of red, firm, crisp, juicy, subacid, pleasant, good. September and October or later.
- Tony*: *Pyrus baccata* x McMahan. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit small, round, somewhat flattened; stem nearly two inches long; color greenish yellow, streaked and splashed with bright red; flesh yellowish-white, juicy, sprightly, subacid, slightly astringent, pleasant, medium quality. Late September and October. Tree strong, spreading, very productive.
- Traverse* (Gibbs No. 4): Seedling of Northern Spy, originated by E. B. Gibbs, Summit City, Mich., about 40 years ago. Fruit medium size, roundish, dull dark red, considerably russeted; cavity narrow, deep, russeted; stem medium long, rather slender; basin very broad, shallow; flesh yellowish, crisp, fine grained, moderately juicy, brisk subacid, very good to best. Winter. Special Bull. 44, Mich. Exp. Sta.
- Tull*: Originated by the late Abraham Tull near Tull, Grant County, Ark., about 1840. Fruit medium size; yellow washed with red, few broken stripes of crimson, sometimes with a "coppery" finish; flesh yellow with green veins, tender, juicy, fine texture, subacid, pleasant, good to very good. Tree very thrifty. Winter. U. S. Dept. Agr., B. P. I., Bull. 275
- Ulster*: Originated by the New York Agr. Exp. Sta., Geneva, N. Y. Fruit medium to above in size, roundish-oblate, green or greenish-yellow, sometimes with faint bronze blush; flesh tinged yellow, fine grained, crisp, tender, juicy, pleasant subacid, aromatic, good to very good. Tree medium vigorous, upright spreading. Winter.
- Unnard's Choice*: Tucker-Mosby Seed Co., Memphis, Tenn. Same as Kinnard.
- Venable's Seedling*: Jackson County Nurseries, Windser, Georgia. "Tree erect, vigorous and very productive. Fruit medium size; flesh tender, juicy, subacid, fine flavor. In flavor and keeping qualities it is unexcelled."
- Vermac*: Lawver x McIntosh. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit below medium size, roundish; cavity medium depth and width; stem medium length, moderately stout; basin shallow, medium width, wrinkled; skin thick, tough, yellow

almost entirely covered with rich deep crimson; flesh white tinged red with bright red core line, tender, juicy, subacid, pleasant, good with aroma of McIntosh. Early to mid-winter.

Wapella: Seedling of Dean x Ontario. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit below medium, roundish to oblong, ribbed; cavity medium size; stem medium length, slender to rather stout; basin open, deep, wrinkled; color yellow, washed with red; flesh yellowish with traces of red, crisp, breaking, juicy, quality above medium. November to mid-winter.

Wedge, (Minn. No. 297): Seedling of Ben Davis. Originated by the Minnesota Fruit Breeding Farm. Especially promising because of its large well colored and high quality fruit which keeps in common storage until spring. A strong grower, an early bearer and hardy at least as far north as St. Paul.

Western Wealthy: Originated with Chas. Bilger, Clyde, Callahan County, Texas, from seed brought from Germany. Fruit large, rich carmine. Tree vigorous and productive. Early fall. Texas Dept. Agr., Bull. 32.

Wilgar: Seedling of Northern Spy. Originated by the Central Experimental Farm, Ottawa, Canada. Resembles Northern Spy in appearance, color, shape, flesh, and somewhat in flavor but not as good as Northern Spy.

Winton: Seedling of McIntosh. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit medium, roundish-conical; cavity narrow, medium depth, russeted; stem medium to long, moderately stout; basin medium size; skin thick, tough, pale yellow, washed with crimson and orange; flesh white, sometimes tinged red, tender, juicy, subacid, good; flavor much like McIntosh. Late September and October.

Wisconsin Golden: Capital City Nurseries, Des Moines, Iowa. "Russet, high quality, long keeper. December to June."

Wolverine: Said to be an early winter variety of good size, rich color, exceedingly agreeable flavor, but lacking in juiciness. Subject to scab. Special Bull. 44, Mich. Exp. Sta.

Womack's Choice: Pleasant Valley Nursery, McMinnville, Tenn. Fruit large, yellow, ripens 10 days earlier than Early Harvest; tree strong grower and productive. In 1861, Mr. Monro Womack brought the tree from the Cumberland Mountains to Warren County, Tenn.

Woodring's Favorite: Originated as a chance seedling with James Woodring on Little Creek, Calhoun Co., W. Va., about 1902. Fruit medium to large, yellow almost covered with bright red and darker red stripes. Quality extra good. Tree productive. December to March. Introduced by the Rose Hill Nursery, Annamoriah, W. Va.

Xantho: From J. A. Cox, Wheeling, W. Va. Fruit medium to large, roundish-oblong, rich yellow; flesh sprightly subacid, fairly good. August.

Zebeba: Imported from Russia as Krimakaja Zebeba by N. E. Hansen, Brookings, S. D. Fruit very large, about $3\frac{1}{2}$ inches in diameter, globular, red; very attractive; flesh white, pleasant subacid, good cooker; season December and later.

CRAB APPLE

Alberta: *Pyrus baccata* x Haas. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit 1.6 inches wide, 1.4 inches long, round somewhat flattened and slightly ribbed; stem short; calyx persistent; color greenish yellow with bright red cheek; flesh nearly white, juicy, slightly astringent, fair to good. Tree vigorous and productive. Last of September to middle of October.

Baird Winter: Originated with Wm. Baird, Lincoln, Kansas. Supposed to be a cross between Ralls and Whitney. Fruit above medium size, uniform; dark red; flesh juicy, crisp, subacid, good. October to last of May. Introduced by the Wichita Nurseries, Wichita, Kans., in 1916.

Canadian: Texas Seed and Floral Co., Dallas, Texas. "Green striped with carmine. Flesh firm, juicy and rich. Very hardy."

Elkhorn: Seedling of Jewell x Gideon, originated by the Central Experimental Farms, Ottawa, Canada. Fruit large, oblate to roundish; cavity open, medium depth; stem long, slender; basin open, wrinkled; skin yellow, washed with crimson; flesh yellowish, crisp, breaking, juicy acid, good. September and October.

Freeman: Freeman Nursery Co., Freeman, S. D. Not described.

Gretna: Seedling of Pioneer x Northern Spy, originated by the Central Experimental Farm, Ottawa, Canada. Fruit large up to $2\frac{1}{4}$ inches in diameter, oblate; cavity deep, open; stem medium to long, stout; basin open, medium depth; color yellow, washed and splashed with crimson; flesh yellowish, crisp, breaking, juicy, briskly subacid, good. November to January.

Huges Virginia: Planters' Nurseries, Humboldt, Tennessee. "Good keeper and cider apple."

Jenkin's Crab: Gurney Seed and Nursery Co., Yankton, S. D. Fruit of size and shape of Transcendent but said to be of better quality when fully ripe being a delicious little dessert apple. Tree large and productive; blossoms said to be semi-double, two inches in diameter and very fragrant.

King: P. J. Berckmans Co., Augusta, Ga. Fruit medium size, roundish oblate, greenish yellow, acid.

Mammoth Wild Crab: Hopedale Nursery, Hopedale, Ill. In appearance the fruit is like the wild crab, even to the odor and greasy skin. It is fully as large as Ralls. Identical with *Pyrus coronaria* but many times as large.

Piotosh: Pioneer x McIntosh, originated by the Central Experimental Farm, Ottawa, Canada. Fruit above medium, roundish; cavity

medium size and depth; stem long, moderately stout; basin open, medium depth, wrinkled; calyx closed; skin yellow well washed with bright crimson; bloom pinkish; flesh yellow tinged red near skin, subacid, pleasant, no astringency, good. September. Resembles Transcendent.

Prince: *Pyrus baccata* x Tetofsky. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit nearly round, 1.6 inches across and 1.3 inches deep; stem medium length; skin bright red with a few paler dots and streaks; flesh nearly white, subacid, somewhat astringent, pleasant; calyx often deciduous. September. Tree vigorous, upright and productive.

Success: Strand's Nursery, Taylors Falls, Minn. "Very thrifty, upright grower; fruit of good color and size, mild, acid; a very promising marketing sort."

Sylvia: Fruit Grower and Farmer, Sept. 1, 1913. Seedling of Stark Florence. Originated with R. E. L. Flowers, Quitman, Ark. Said to be almost three times the size of Florence, more tender and juicy and very mild subacid. Ripens entire crop within 10 days.

Tony: *Pyrus baccata* x McMahon. Originated by the Central Experimental Farm, Ottawa, Canada. Fruit round somewhat flattened, 1.6 inches across and 1.4 inches deep; stem medium; skin greenish-yellow, streaked and splashed with bright red; calyx persistent; flesh yellowish white, juicy, sprightly subacid, slightly astringent, pleasant, quality fair; tree vigorous, spreading, productive. Late September and October.

Trail: Seedling of Northern Queen x Rideau, originated by the Central Experimental Farm, Ottawa, Canada. Fruit larger than Martha, oblate to roundish; cavity medium size; stem very long, slender; basin open, deep; color pale yellow, splashed and washed with orange red and crimson; flesh yellowish, crisp, breaking, subacid, good to very good. August.

PEAR

Bailey (of Mich.): Originated with L. H. Bailey, South Haven, Mich., about 1870. Is said to be of fine flavor, ripening October 1. Special Bull. 44, Mich. Exp. Sta.

Big Productive: Luther Burbank, Santa Rosa, Calif. Not described.

Chamness: Clingman Nursery Company, Keithville, La. Fruit medium, roundish-obovate, greenish yellow; flesh sweet, quality fair. September in Louisiana.

Clairmont: From Wm. J. Corsa, Baltimore, Md. Fruit small, globular-obtuse-pyriform, greenish yellow; flesh sweet, rich, buttery, pleasant, very good. August.

Demorest: Washington Nursery Co., Toppenish, Wash. Chance seedling originated with Mrs. Libbie J. Demorest, Tacoma, Wash. "Luscious, larger and better keeper than Bartlett."

- Douglas*: Said to be a cross between Kieffer and Angouleme, originating in Douglas County, Kansas. Fruit large, beautiful yellow color; flesh juicy, sprightly, good. Same season as Kieffer.
- Effie Holt*: J. Van Lindley Nursery Co., Pomona, N. C. Originated in Alamance County, N. C., and was introduced by Mr. L. W. Holt. Fruit large, pyriform, greenish-yellow; flesh light yellow, rich, juicy, fine quality. Season late fall. Tree vigorous, very productive. Said to succeed well in the South.
- Ely*: Originated in Sherman, Texas. Fruit small, deep yellow, good quality. Texas Dept. Agr., Bull. 32.
- Eureka* (of Dickinson): Augustine & Company, Normal, Ill. Supposed to be Seckel x Kieffer, originating with E. W. Dickinson, Eureka, Ill. Fruit medium, bright yellow with russet and bright red cheek, shape of Seckel, but 1 or 5 times as large; flesh delicious, sweet, flavor of Seckel.
- Hassler*: Originated in California, with J. E. Hassler at Placerville. Fruit large, obtuse pyriform; skin very smooth, greenish yellow with russet dots; basin large, deep, irregular; stem short, stout; cavity quite deep with stem inserted at angle; flesh, juicy, very buttery, sweet, pleasant. Season very late-winter or early spring. Cir. No. 94, Ohio Agr. Exp. Sta.
- Hosli*: Biloxi Nursery, Biloxi, Miss. Originated with Joseph Hosli, Biloxi, Miss. Supposed to be a cross between Kieffer and LeConte. Fruit resembles Kieffer, does not mellow; flesh sweet and juicy. Season about with LeConte. Tree resembles LeConte.
- Joan of Arc*: Fruit medium to large; oblong-pyriform to obtuse-pyriform; color lemon yellow with russet netting; basin broad, deep, regular; stem short, stout, inserted at angle; flesh medium fine grained, melting, juicy, rich, sweet, musky, very good. Originated in France. Cir. No. 94, Ohio Agr. Exp. Sta.
- Katy*: Seedling of LeConte, originated with the late J. T. Leyendecker, New Ulm, Texas. Texas Dept. Agr., Bull. 32.
- Lyman*: Benjamin Buckman, Farmingdale, Ill. Fruit medium size, ovate-pyriform, smooth, russeted yellow; flesh sprightly subacid, fair to good quality. September.
- Mammoth Bartlett*: American Fruit Grower, March, 1922. Originated with J. W. Robinson, Sebastopol, Calif. "They ripen at the same time, have the same flavor and are apparently the same pear as the Bartlett except for size."
- Miller*: J. Van Lindley Nursery Company, Pomona, N. C. Seedling of Kieffer, originated with D. J. Miller, Millersburg, Ohio. Fruit said to be sweet, buttery, melting, good quality, much superior to Kieffer and has russet skin. Winter.
- Morman Late*: Fruit of Kieffer type but more pyriform; dull yellowish with waxy appearance; stem very long; flavor much like Kieffer; not as handsome as Kieffer. Spec. Bull. 48, Mich. Exp. Sta.

- Parrish Favorite*: Porter-Walton Co., Salt Lake City, Utah. "Beautiful large winter pear, ripening in November and December; will keep until late spring in fine condition, retaining its deliciously captivating flavor. Always vigorous, never blights."
- Pride*: Originated with F. M. Johnson, San Marcus, Texas; introduced by Otto Locke, New Braunfels, Texas. Fruit juicy, highly flavored, ripens two weeks earlier than LeConte of which it is supposed to be a seedling. Texas Dept. Agr., Bull. 32.
- Rankin*: J. Van Lindley Nursery Co., Pomona, N. C. Originated with Col. W. H. Rankin, Guilford County, N. C. "Tree a strong grower, hardy, blights but little. Similar to Duchess and two weeks earlier."
- Ruby Wells*: Thompson Nurseries, Waco, Texas. "Of LeConte type, mellows on tree, fine table fruit." Originated in Waco, Texas.
- Theodore Williams*: Stark Bros., Louisiana, Mo. Seedling of Kieffer. Originated with Theodore Williams, Benson, Neb. "A large beautiful pear of excellent quality; tree healthy, vigorous, a prolific bearer—has stood 40 degrees below zero without injury." Flesh very sweet, juicy and fine flavored. A fall variety of green color.
- Touraine*: Fruit medium size, oblong-pyriform; color greenish-yellow without blush; basin medium size; stem long, inserted at angle; quality medium; season late. Bull. Vol. VII, No. 5, May, 1918, Calif. State Com. of Hort.
- Vanille*: Fruit small, roundish, obtuse-obovate; color yellow, with beautiful blush; basin wide; stem short, cavity very small; quality medium; season late. Cir. No. 94, Ohio Agr. Exp. Sta.
- Voorhies*: A seedling of Seckel, originated by W. G. Voorhies, South Frankford, Mich. Fruit larger than Seckel, obovate-turbinate, irregular; light yellow almost entirely overlaid with dull reddish brown, somewhat striped near cavity; cavity narrow, very shallow; stem medium long, stout, clubbed; basin broad, rather shallow; flesh whitish, somewhat coarse, juicy, mild subacid, good to very good. Tree like Seckel but more vigorous and spreading. Late fall and early winter. Special Bull. 44, Mich. Exp. Sta.

QUINCE

- Alpha*: Luther Burbank, Santa Rosa, Calif. "Produces large, handsome, light crimson blossom and extremely large orange-like, waxy, yellow fruits in the greatest profusion. It is one of the handsomest of all fruits, and always attracts attention by its large size, peculiar form, golden color and exquisite fragrance. Useful everywhere owing to its hardy vigor, productiveness and value for jelly making."
- Childs*: Originated by Luther Burbank and sold to John Lewis Childs, Floral Park, N. Y. Burbank's description: "It is the earliest quince to ripen, earliest to bear, productive, smooth, handsome, lemon-yellow, very large and cooks in five minutes." Childs' de-

scription: "Fruit larger than the largest apples, nearly round; skin smooth; flesh tender, very mild pleasant flavor, delicious to eat raw or cooked. Tree large, rank grower, bears enormously."

Elephant: Luther Burbank, Santa Rosa, Calif. "Fruit produced in the greatest abundance; good specimens a foot and a half around each way; smooth bright orange, flesh yellow, turning to a deep pink when cooked; of superior quality."

Muck: Keystone Nurseries, Lancaster, Pa. "Large and prolific."

Santa Rosa: Seedling of Rea Mammoth. Originated by Luther Burbank, Santa Rosa, Calif. "Remarkable for its great size, exquisite beauty of form, polished light lemon yellow almost white skin, productiveness, tenderness of flesh, delicious flavor and diminutive core. The fruit is fine grained and so free from the harsh acid of the old quinces that it is as good as some of the popular apples for eating raw, fully equal to the best of apples or pears when baked, stewed or canned and makes a superior light colored dried fruit. Tree unusually vigorous. September."

PEACH

Abilene: A cross between Mamie Ross and Elberta. Originated with J. M. Howell, Weatherford, Texas. Fruit large, yellow; flesh firm, good flavor, good shipper, freestone. Ripens July 15. Texas Dept. Agr., Bull. 32.

Argyle Elberta: Franklin Davis Nursery Co., Baltimore, Md. Said to be a strain of Elberta, but the fruit is of finer color, redder, of better flavor, and keeps better than Elberta, ripens four to six days later than Elberta.

Alice (of Emery): Fruit good size, freestone, Spanish type. Originated with a Mr. Emery at Arkansas Pass, Texas. Texas Dept. Agr., Bull. 32.

Anabell: A small white cling introduced by F. T. Ramsey on account of its heavy bearing habits. Texas Dept. Agr., Bull. 32.

Annabel: Austin Nursery, Austin, Texas. Originated in Texas. "One of the largest peaches we have ever seen. The color is most gorgeous red and yellow. July 10 to 20 in Texas." Said to be larger and more brilliant in color than Elberta, but is not a sure bearer in Texas.

Annie Williams: Originated in Smith County, Texas. Fruit white with red check resembling Mamie Ross, but is earlier in season; flesh yellow, flavor excellent. Texas Dept. Agr., Bull. 32.

Atzac: From G. Onderdonk Nursery, Texas. Fruit small to medium size, roundish, greenish-yellow to rich yellow, very mild subacid, fair quality, clingstone. End of July.

Atoyac: Fruit large, yellow. Texas Dept. Agr., Bull. 32.

Beall Late White: Fruit large, roundish, pale greenish-yellow, mottled and blushed with thin bright red; skin thick, tough, downy; flesh

- creamy-white stained red, red at stone, moderately juicy, fibrous, very meaty, mild subacid, good; stone free. Tree erect, vigorous, leaf glands orbicular. October. Maryland Exp. Sta., Bull. 159.
- Berks' Favorite*: Originated with O. G. Berks, Swedesboro, N. J. Resembles Stevens Rareripe. Tree hardy and productive. Season same as Iron Mountain.
- Black's October*: Fruit large, white with red cheek, highly flavored, clingstone. October. Texas Dept. Agr., Bull. 32.
- Black's September*: Fruit large, yellow, juicy, delicious. September. Texas Dept. Agr., Bull. 32.
- Blanche*: From R. Bates, Jackson, S. C. Fruit medium size, roundish, rich yellow, nearly sweet, fairly good quality, clingstone. August.
- Bloomington*: From Ray Smith, St. George, Utah. Fruit large, roundish, dull yellow, nearly sweet, clingstone. Last of September and first of October.
- Bolivian Cling*: Fruit medium to large, irregularly roundish, rich golden yellow, nearly sweet, poor to fair quality, clingstone. August.
- Bolivian Free*: Fruit medium size, roundish-oval, greenish-yellow, mild subacid, poor to fair quality, freestone. August.
- Boycett's Extra Cling*: Planters' Nurseries, Humboldt, Tenn. Not described.
- Briner*: Same as Briner's Favorite. See report for 1920.
- Buckhorn*: Armstrong Nurseries, Ontario, Calif. Fruit medium to large, roundish to oval, creamy white to pale yellow, mild subacid, good quality, freestone. July.
- Burk*: Fruit medium size, roundish, sides often unequal; suture to apex; apex rounded; color creamy white, mottled with rich red; skin thick, tough with considerable down; flesh creamy, tinted red, red at stone, moderately juicy, nearly sweet, fair; stone free. Tree erect, vigorous; leaf glands orbicular. Maryland Exp. Sta., Bull. 159. September.
- Butler*: Fruit round, sometimes lopsided, medium large; suture to apex; color rich yellow, mottled and blushed red; flesh rich yellow, tinged red, red at stone, juicy, nearly sweet, fair; stone cling. Tree vigorous, spreading; leaf glands reniform. September. Md. Exp. Sta., Bull. 159.
- Cauthen*: Seedling of Elberta. Originated by Mrs. Thomas Cauthen, Lampasas, Texas, in 1901. Fruit large, deep yellow; flesh firm, fine flavor; pit small, freestone, follows Elberta in season, and is as good as Elberta. Texas Dept. Agr., Bull. 32.
- Chas. Evans*: Thompson Nurseries, Waco, Texas. Originated with Chas. Evans, Waco, Texas. "Large, oblong, rich yellow with red cheek. Follows Elberta and is a clingstone of unusually fine quality."
- Clara* (of Onderdonk): Originated with Gilbert Onderdonk in 1906. Fruit small, sweet with slight tinge of bitterness, ripens last of May. Of Peen-To parentage. Texas Dept. Agr., Bull. 32.

- Cole*: Originated with J. R. Cole, Dallas County, Texas. Indian type. Skin dark with streaks of red. Flesh firm, juicy; clingstone. Ripens August 1. Texas Dept. Agr., Bull. 32.
- Coleman* (of Mississippi): J. Van Lindley Nursery Co., Pomona, N. C. Originated near Utica, Miss. Fruit large, yellow, freestone, ripening ten days after Smock; said to be similar to Smock.
- Columbine*: Drum Seed and Floral Co., Ft. Worth, Texas. "Very large; skin downy; dingy yellow; juicy and rich; ripe about June 20 and continues for a month."
- Connet's Latest*: Greensboro Nurseries, Greensboro, N. C. Fruit large, yellow, freestone; flavor rich, season November.
- Denry*: Fruit roundish, sides unequal, medium or above; suture beyond apex; skin thick, tough, downy, creamy color with faint blush; flesh white, moderately juicy, meaty, pleasant, nearly sweet, fair; stone large, cling. Tree erect, vigorous, leaf glands orbicular. September. Md. Exp. Sta., Bull. 159.
- DeWitt*: Fruit medium size; flesh creamy-white, firm, fine flavor, ripens August 5 to 10. Originated in Kaufman County, Texas. Texas Dept. Agr., Bull. 32.
- Dixie* (Not Dixie of Hedrick): Seedling of Elberta. Originated at San Marcos, Texas. Fruit yellow with pink cheek, two weeks earlier than Elberta. Texas Dept. Agr., Bull. 32.
- Dixon*: Originated with C. P. Orr, Arp, Texas. Fruit large, creamy-white; flesh firm, juicy, fine flavor, clingstone. Tree vigorous, prolific. July 15 to 25. Texas Dept. Agr., Bull. 32.
- Dock Harris*: Planters' Nurseries, Humboldt, Tenn. Not described.
- Double Crop*: Fruit medium, roundish, sides unequal; suture beyond apex; pale yellow mottled with heavy red almost black, very attractive; flesh cream-colored, stained red, red at stone, juicy, fibrous, meaty, sweet, spicy, good; stone cling. Tree erect, vigorous; leaf glands orbicular. August. Md. Exp. Sta., Bull. 159.
- Early* (of Burbank): Luther Burbank, Santa Rosa, Calif. "Productive home peach of surpassing beauty and excellent for home use."
- Early Smock*: Fruit medium, roundish, sides often unequal; suture to apex; rich yellow with bright and dark red mottling; flesh yellow, red at stone, melting, moderately juicy, fibrous, mild subacid, fair; stone free. Tree erect, vigorous, very productive; leaf glands reniform. September. Md. Exp. Sta., Bull. 159.
- Ellington*: Greensboro Nurseries, Greensboro, N. C. Originated with Captain Ellington, Greensboro, N. C. Said to be a peach of first class quality, ripening in November in North Carolina.
- Ensley*: Planters' Nursery, Humboldt, Tenn. "Very large, yellow, 12 peaches fill peck."
- Eva*: Willow Lake Nursery, Marshallville, Ga. Originated by Judge J. A. Edwards, Marshallville, Ga. Fruit very large, yellow with red cheek; flesh yellow, firm, rather dry texture, excellent flavor; freestone; later than Salway.

- Eva* (of Stubenrauch): Seedling of Mamie Ross by Elberta. Originated by J. W. Stubenrauch, Mexia, Texas. Fruit nearly round, mostly covered with red, size of Elberta and of similar quality but ripens several days earlier. Freestone.
- Femmonzi*: From M. Sharp, Vacaville, Calif. Fruit very large, roundish-oval, smooth, greenish yellow, mild subacid flavor, fair quality, clingstone. July.
- Finley Cling*: Thompson Nursery, Waco, Texas. "White cling; better than Gen. Lee or Chinese Cling. Ripens last of July." Originated at Waco, Texas.
- Frederica*: Fruit large, roundish, lopsided; suture to apex; light yellow, washed with heavy dark red and mottled with light red; flesh rich yellow, red at stone, juicy, fibrous, melting, rich, spicy, good; stone very large, free. Tree somewhat spreading, vigorous; leaf glands orbicular. September. Md. Exp. Sta., Bull. 159.
- Fruitland Cling*: Utah Nursery Co., Salt Lake City, Utah. Originated in Salt Lake Valley, Utah. Fruit nearly as large as Elberta; flesh firm and of excellent flavor and quality; color red; flesh dark orange color; a good shipper.
- Fulton*: Adams County Nursery and Fruit Farms, Aspers, Pa. Fruit large, creamy-white covered with red, fine market peach. Tree heavy bearer. August.
- Gardina*: Fruit medium size, white, freestone. Originated with Peler Jecker, Victoria, Texas in 1908. Texas Dept. Agr., Bull. 32.
- Georgia Cling*: Fruit medium to large, roundish, somewhat elongated, somewhat lopsided; suture to apex; white with bright mottling over most of the surface, dark blush; flesh white, juicy, spicy, meaty, mild subacid, good; stone large, cling. Tree spreading, vigorous; leaf glands orbicular or wanting. August. Md. Exp. Sta., Bull. 159.
- Gilbert*: Newton Nurseries, Newton, Miss. A seedling grown by S. B. Gilbert, Newton, Miss. Fruit large, oblong, white with red cheek. August.
- Gold Medal*: Gardiner's Nurseries, Kennewick, Wash. Not described.
- Gold Miller*: Fruit medium, roundish, lopsided; suture to apex, color rich yellow, with rich dull blush, very attractive; flesh yellow, tinged with green, red at stone, juicy, fibrous, meaty, pleasant, good; stone large, free. Tree vigorous, erect. August. Md. Exp. Sta. Bull. 159. Leaf glands orbicular.
- Golden Acme*: Utah Nursery Company, Salt Lake City, Utah. Originated near Olathe, Johnson County, Kansas. Fruit large, highly colored, beautiful; flesh rich, sweet, delicious. Tree vigorous, very productive. Season early, 10 days after Amsden. Freestone.
- Gordon* (of Tucker-Mosby Seed Co.): Tucker-Mosby Seed Co., Memphis, Tenn. Originated near Byron, Ga., has been disseminated under several other names. Fruit nearly as large as Carman; season first half of June.

- Gracc*: Greensboro Nurseries, Greensboro, N. C. Originated by Paul Edmundson, Gilford College, N. C. Fruit creamy-white with blush; flavor delicious; freestone.
- Hardison Seedling*: Planters' Nurseries, Humboldt, Tennessee. Not described.
- Harris*: Originated with J. T. Harris, Lampasas, Texas. Fruit large, white with delicate pink blush; flesh juicy, sweet. Prolific bearer. Ripens Sept. 1 to 15. Texas Dept. Agr., Bull. 32.
- Hart's Cling*: Originated with D. M. Hart, Jr., Weatherford, Texas. Fruit pinkish white, flesh creamy white, red at pit. August. Texas Dept. Agr., Bull. 32.
- Heard*: Fruit medium, roundish with sides compressed; suture three-fourths around fruit; color pale yellow with small blush or mottling of bright red; flesh white tinged with yellow, moderately juicy, very firm, meaty, nearly sweet, fair; stone large, cling. Tree vigorous, spreading; leaf glands reniform. September. Md. Agr. Exp., Bull. 159.
- Heidelberg*: Fruit medium large, round, lopsided; suture to apex; color rich yellow almost entirely blushed with red, attractive; flesh rich yellow, red at stone; juicy, fibrous, meaty, spicy, nearly sweet, excellent; stone large, free. Tree erect, vigorous. August. Md. Exp. Sta., Bull. 159. Leaf glands orbicular.
- Henderson*: Fruit medium or above, roundish, often lopsided; suture beyond apex; color yellow, mottled with bright and dark red with dull purplish stripes and patches; flesh yellow, red at stone, juicy, fibrous, meaty, mild pleasant subacid, fair to good; stone large, free. Tree erect, vigorous; leaf glands orbicular. August. Md. Exp. Sta., Bull. 159.
- Hess Seedling*: Planters' Nurseries, Humboldt, Tennessee. Not described.
- Hodgin*: E. B. Hodgin, Spout Springs, N. C. Fruit medium to large, roundish, sides compressed, smooth, pale yellow mottled with rich red, mild subacid, good to best quality, stone nearly free. July.
- Holcombe*: "A yellow freestone of medium size, has a very rich pleasant flavor." Rep. N. J. State Hort. Soc., 1915.
- Hoovers' October*: Planters' Nurseries, Humboldt, Tennessee. Not described.
- Horton*: Fruit large, roundish, lopsided; suture to apex; color pale yellow with rich deep blush, rather attractive; flesh rich yellow, juicy, meaty, nearly sweet, fair; stone large, semi-cling. Tree vigorous, spreading; leaf glands orbicular. September. Md. Exp. Sta., Bull. 159.
- Hoy*: Originated with Miss Jessie Hoy, Bonham, Texas. Fruit large, handsome, yellow, exquisite flavor, freestone, ripens with Elberta but is a better peach. Texas Dept. Agr., Bull. 32.
- Improved Muir*: American Fruit Grower, March 1922. Said to be a cross between Muir and Strawberry. Much juicier and better than

Muir and more pointed and redder. Originated by J. W. Robinson, Sebastopol, Calif.

Jack Beall: Waxahachie Nursery Co., Waxahachie, Texas. A chance seedling originating in Ellis County, Texas. "Large yellow clingstone, quality first class.

Jarrell: Fruit large, roundish, sometimes oblong, sides unequal; suture nearly or entirely around fruit; color creamy white with small dull blush; flesh creamy white, red at stone, juicy, fibrous, flavor rather bitter, poor. Tree erect, vigorous; leaf glands orbicular. September. Md. Exp. Sta. Bull. 159. Stone large, free.

John Adams: Planters' Nurseries, Humboldt, Tennessee. Not described.

Juncbcrta: Seedling of Elberta. Originated with J. F. Sneed, Tyler, Texas. Fruit large, yellow, resembles Elberta except it is a clingstone. June. Texas Dept. Agr. Bull. 32.

Kathryn: Chance seedling found by J. W. Heal, Beverly, N. J., in 1915. Supposed to be a cross between Belle and Greensboro. Fruit of good size; flesh white, quality high; flavor similar to Belle; free-stone. Tree vigorous and productive. Ripens with Carman.

Keyport Red Cling: J. Van Lindley Nursery Co., Pomona, N. C. Fruit large, red, clingstone, much like old Mixon cling but higher colored.

Kirk: Originated by J. W. Stubenrauch, Mexia, Texas. Fruit light lemon yellow with red cheek, good size, good quality, good shipper, clingstone.

Late Admirable: Fruit medium, roundish, little lopsided; suture short; color pale yellow with a little heavy red and bright mottling, dull colored; flesh greenish yellow, red at stone, juicy, fibrous, meaty, mild subacid slightly bitter, fair to good; stone very large, free. Tree vigorous, spreading. Leaf glands orbicular. August. Md. Exp. Sta. Bull. 159.

Laury's Choice: Seems to be identical with Late Crawford. Rep. N. J. State Hort. Soc., 1915.

Linthicum: Fruit roundish pointed, sides unequal, medium; color pale yellow with heavy blush; flesh light yellow, red at stone, moderately juicy, fibrous, pleasant, mild subacid, nearly sweet, good. Stone large, free. Tree erect, vigorous; leaf glands orbicular or wanting. August. Md. Exp. Sta. Bull. 159.

Llewellyn: Fruit small, roundish; suture to apex; color dull greenish, mottled with dark red and streaked with carmine overcast with grey, dull colored; flesh white, deep carmine next to skin, juicy, fibrous, meaty, mild subacid, fair; stone large, cling. Tree spreading, vigorous; leaf glands orbicular. August. Md. Exp. Sta. Bull. 159.

Lyndon Cling: J. Van Lindley Nursery Co., Pomona, N. C. Originated by Dr. L. Lyndon Hobbs, President of Guilford College, N. C. Fruit very large, handsome, yellow with red cheek; flesh brittle, juicy, very good, clingstone. Season last half of August, in Georgia.

- McKee*: Austin Nursery, Austin, Texas. "Wonderful for its striking color. July 15 to 25." Indian type inside and out, prolific.
- Mason Orange*: From B. F. Mason, Martinsville, Ind. Fruit very large, irregular, roundish; rich orange yellow, splashed red and carmine; pleasant mild subacid flavor, fairly good quality. September.
- Mays' October*: Planters' Nurseries, Humboldt, Tennessee. Not described.
- Michigan Beauty*: The Monroe Nursery, Monroe, Michigan. Fruit large, highly colored; flesh yellow, rich, quality like Crawford Late, freestone. Tree vigorous, productive. First part of October.
- Midland*: Originated with J. M. Howell, Weatherford, Texas. Fruit large, yellow, flesh yellow, freestone, ripens July 20. Texas Dept. Agr., Bull. 32.
- Mikado* (Not Mikado of Hedrick): Originated with E. W. Kirkpatrick, McKinney, Texas. Fruit bright yellow, firm, good shipper, semi-cling. Tree prolific. June. Texas Dept. Agr., Bull. 32.
- Minter*: Originated with Morgan Minter near Como, Texas. Fruit large, white with red cheek, semi-cling; tree vigorous, productive, June. Texas Dept. Agr., Bull. 32.
- Mosty's Cling*: Originated with L. A. Mosty, Kerrville, Texas. Fruit medium, deep orange covered with crimson; flesh firm, fine quality. September. Texas Dept. Agr., Bull. 32.
- Mosty's Free*: Originated with L. A. Mosty, Kerrville, Texas. Fruit medium, deep orange covered with crimson; flesh firm, quality fine, freestone; September. Texas Dept. Agr., Bull. 32.
- Motlow*: J. C. Hale Nursery Co., Winchester, Tenn. Fruit yellow, freestone, as large as Elberta but ripens two weeks later. Quality fine; tree very vigorous and productive. Originated in Winchester, Tenn.
- M. T. Cox*: Planters' Nurseries, Humboldt, Tennessee. Not described.
- Munford*: Austin Nursery, Austin, Texas. Originated by S. B. Munford, San Marcos, Texas. "A large round Honey type freestone, of high quality, almost as smooth as a nectarine; sure bearer."
- Neal Stuart October*: Planters' Nurseries, Humboldt, Tennessee. Not described.
- Newcombe*: W. E. Collins Company, Fennville, Michigan. Originated near Fennville, Mich. Fruit large, round, yellow overspread with carmine; high quality, freestone; ripens just ahead of Elberta.
- Nina*: J. Van Lindley Nursery Co., Pomona, N. C. Originated with J. C. McNeill, Hinds County, Miss. Fruit large, yellow shaded with red; flesh yellow, quality fine, freestone. Season middle of August. Between Elberta and Matthews Beauty.
- October Elberta*: Fruit medium size, oblong-pointed; suture to apex; skin thick, tough, somewhat downy, pale yellow with bright blush; flesh creamy, red at stone, juicy, meaty, pleasant mild subacid, fair; stone large, cling. Tree erect, vigorous; leaf glands reniform. September. Md. Exp. Sta., Bull. 159.

- Oklahoma*: Chipola Nursery, Apalachicola, Fla. "Tree a good grower, fruit large, juicy, fine flavor, beautiful appearance, freestone."
- Oklahoma Beauty*: Greensboro Nurseries, Greensboro, N. C. "Nearly round and is more highly colored than the Greensboro, three days earlier, and equals it in every other respect. Some specimens measure 8 inches in circumference, semi-cling."
- Oklahoma Queen*: Greensboro Nurseries, Greensboro, N. C. "Ripens one week after Greensboro; very large; white creamy ground with beautiful blush, semi-cling."
- Patison*: Crow's Nurseries, Gilroy, Cal. Originated with J. C. Patison, Gilroy, Cal., about 1900. Fruit extra large for its season which is immediately following Alexander. Flesh clear golden yellow partially clinging to the seed, fine grained, highly flavored, very good quality for an early variety.
- Persia*: Fruit large, roundish, lopsided; suture to apex; color light yellow shaded and mottled with bright and dull red, attractive; flesh rich yellow, red at stone, juicy, fibrous, meaty, rich mild subacid, very good; stone large, free. Tree vigorous, spreading; leaf glands reniform. Last of August and first of September. Md. Exp. Sta., Bull. 159.
- Philip Horton*: Originated with Philip Horton, Smith County, Texas. Fruit very large, yellow, fine flavor, cling, ripens after Elberta. Tree prolific. Texas Dept. Agr., Bull. 32.
- Pomeroy*: Originated with Pomeroy Page of Titus County, Texas. Fruit large, firm, yellow, good flavor. Tree vigorous. August. Texas Dept. Agr., Bull. 32.
- Quality* (of Burbank): Originated by Luther Burbank who says: "The best flavored of all my Crawford-Muir hybrids."
- Ranes Seedling*: Planters' Nurseries, Humboldt, Tennessee. Not described.
- Red Georgia*: Bunting's Nurseries, Selbyville, Del. Fruit medium to large; skin deep blood red; flesh red; clingstone. Tree vigorous, abundant cropper. Last of September.
- Ribroco*: Rice Bros. Co., Geneva, N. Y. "A large, handsome freestone with golden skin, covered with a bright crimson blush. Flesh yellow, juicy. Valuable for market, a good shipper. Ripens after Crawford Early."
- Richards*: C. W. Stuart & Company, Newark, N. Y. Originated in Central New York. Fruit very large, yellow with red cheek; flesh light yellow, quality excellent. Tree a heavy bearer. Middle of September.
- Robert G. Nectar*: Fruit medium size, roundish to oblong, often lopsided; suture beyond apex; skin thick, tough, considerably downy, creamy white with indication of blush; flesh creamy white, juicy, tender, fibrous, mild subacid, bitterish, poor; stone large, free. Tree erect, vigorous; leaf glands reniform. September. Md. Exp. Sta., Bull. 159.

- San Antonio*: A yellow freestone of good quality which originated in the U. S. Exp. Farm, San Antonio, Texas, where it ripens July 1. Texas Dept. Agr., Bull. 32.
- Scarborough*: J. Van Lindley Nursery Co., Pomona, N. C. Originated near Greensboro, N. C. Fruit resembles Old Mixon Free but ripens three weeks later.
- Seaton's Golden Cling*: J. Van Lindley Nursery Co., Pomona, N. C. Originated in Hinds County, Miss. Fruit medium to large, golden yellow, fine quality, very prolific, clingstone. Season middle of July in Miss.
- Smith Yellow*: Fruit medium large, shaped like Crawford Late but more pointed; suture to apex; color rich yellow shaded and mottled with bright and dark red; flesh rich yellow, juicy, red at stone, rich, spicy, nearly sweet, excellent; stone medium, free. Tree erect, vigorous; leaf glands orbicular. Last of August and first of September. Md. Exp. Sta., Bull. 159.
- South Haven*: Originated by A. G. Spencer, South Haven, Mich., about 1908. Fruit large, roundish, thick-skinned, highly colored; flesh yellow. Freestone; ripens with St. John, about the middle of August. Hoosier Horticulture, Oct. 1921.
- Stonewall Jackson Free*: J. Van Lindley Nursery Co., Pomona, N. C. Fruit very large, sometimes weighing twenty ounces; orange yellow; flesh yellow, firm, fine for canning or market. Seedling of Crawford Late and originated in Union County, N. C. Middle of August.
- Tarbell* (Not Tarbell of Hedrick): Fruit yellow; flesh very tender; freestone. Originated in Smith County, Texas, and was introduced by J. T. Whitaker, Tyler, Texas. Texas Dept. Agr., Bull. 32.
- Thorn*: Originated with J. S. Thorn, Canton, Texas. Fruit large, light yellow, firm, cling, good shipper, one of the best keepers of all of the Texas peaches. Texas Dept. Agr., Bull. 32.
- Togo*: Originated with E. W. Kirkpatrick, McKinney, Texas. Fruit medium size, red cheek, white flesh, good quality, extra early, ripening May 10 in Texas. Tree prolific. Texas Dept. Agr., Bull. 32.
- Tom Davis*: J. Van Lindley Nursery Co., Pomona, N. C. Originated in South Carolina; said to be a large yellow clingstone of very fine quality. Late August.
- Tryon*: Greensboro Nurseries, Greensboro, N. C. Fruit large, red blush on creamy skin; flavor delicious, season last of July and first of August.
- Unecda*: Fruit medium or above, square in outline but flattened on suture side and on sides at apex; suture entirely around fruit; skin thick, pale yellow with thin bright blush; flesh white, rather dry, meaty, mild subacid, flat, fair; stone cling. Tree vigorous, spreading, leaf glands orbicular. August. Md. Exp. Sta., Bul. 159.

- Utah Orange*: Utah Nursery Co., Salt Lake City, Utah. Originated near Salt Lake City about 1891. Fruit resembles Foster; quality rich; freestone; tree thrifty, productive. Follows Elberta in season and is an excellent shipper.
- Weatherford*: Originated with J. M. Howell, Weatherford, Texas. Fruit large, white with red cheek, fine flavor, freestone. Ripens Sept. 1. Texas Dept. Agr., Bull. 32.
- Winnie Davis*: Fruit medium to above, nearly round, sides often unequal; suture beyond apex; color greenish-white with purplish blush; flesh greenish-white, red at stone, melting, juicy, moderately tender, subacid, good; stone large, semi-cling. Tree vigorous, spreading, not productive; leaf glands orbicular. October. Md. Exp. Sta., Bull. 159.
- Winstone*: Same as Winstone Seedling. See report for 1920.
- Wright Nebraska*: Fruit very large, roundish or slightly flattened; suture to apex; color rich yellow, somewhat mottled and blushed with bright red; flesh rich yellow, tinged with red, red at stone, juicy, fibrous, meaty, pleasant mild subacid, very good; stone large, free. Tree erect, vigorous; leaf glands reniform. Last half of August and first half of September. Md. Exp. Sta., Bull. 159.
- Yellow Davis*: J. Van Lindley Nursery Co., Pomona, N. C. "A large yellow freestone of excellent quality; very prolific; ripens middle of August in North Carolina.
- Yellow Sandy River Seedling Cling*: Valdesian Nurseries, Bostic, N. C. Fruit large, yellow; flesh juicy, acid, valuable for home use or market. Clingstone. Said to come true from seed.

PLUM

- Advance* (Not Advance of Hedrick): A cross between the Japanese and native types. "It is the largest early plum and the earliest large plum." Ripens last of May. Texas Dept. Agr., Bull. 32.
- Alma*: Seedling of Caro, fruit large, oval; cavity narrow, abrupt; stem short, slender; suture a distinct line; skin thick, tough, yellow, thinly washed with bright red; dots few, small, yellow; bloom thin, bluish; flesh yellow, juicy, sweet, rich, good; stone cling. Americana group. Bull. No. 43, Exp. Farms, Ottawa, Canada.
- Anoka*: Minnesota Horticulturist, September 1921. Burbank x DeSoto; originated by the Minnesota Fruit Breeding Farm. "Hardy, strong growing nursery tree making a moderate sized tree in the orchard. Fruit large, dark red, medium size; flesh very firm; pit clinging; quality fair. Ripens first week in September." Promising as a market variety.
- Austrian Prune*: Scions imported from the Imperial gardens, Vienna, Austria, in 1893, by Geo. Aprill, Ann Arbor, Mich. Fruit larger than any American or Japanese variety, specimens weighing 4 to 5

- ounces; flesh delicious. Tree hardy and productive. September in Michigan.
- Beauty Junior*: Seedling of Beauty. Luther Burbank, Santa Rosa, Calif. "Very large, round, deepest crimson, superior quality, long keeper. September and October."
- Bodabrad*: Same as Austrian Prune.
- Callac*: Luther Burbank, Santa Rosa, Calif. "Very large, deep purple plum. Flesh yellow, sweet, rich, freestone. Good grower and productive. Ripe August 10."
- Cazique*: Luther Burbank, Santa Rosa, Calif. "Ripens here June 20 with the earliest plums. Large, round, purple; flesh shaded yellow and crimson like Santa Rosa, sweet, rich, delicious. About one week earlier than Santa Rosa. Productive."
- Churry*: Fruit medium size, very dark red; flesh meaty; stone almost free. Americana type. Not worth propagating except possibly for breeding purposes. Bull. 114, Iowa Exp. Sta.
- Corona*: Seedling of Caro originated at the Central Experimental Farm, Ottawa, Canada. Fruit large, oval, lopsided; cavity medium size, shallow; suture slightly depressed; apex knobbed; skin thick, tough, greenish-yellow, overspread with bright red; flesh greenish-yellow, firm, juicy, meaty, sweet, good; stone large, cling. September.
- Cranberry*: Luther Burbank, Santa Rosa, Calif. "Fruit small, one inch in diameter, brilliant rosy crimson color; flesh white, exquisitely delicious, freestone. Very productive. October 10 to November 10."
- Cremono*: Cross between Botan and Chickasaw, originating on the farm of Sam H. Dixon, in Montgomery County, Texas. Fruit large, yellow, ripens June 1 to 10. Tree vigorous, upright, prolific. Texas Dept. Agr., Bull. 32.
- Creosoto*: Originated by N. E. Hansen, Brookings, S. D. Cross between the sand cherry and DeSoto. Tree an early and abundant cropper.
- Crimson Beauty* (of Burbank): Luther Burbank, Santa Rosa, Calif. "Medium size, finest quality for home use."
- Crimson Cluster*: Luther Burbank, Santa Rosa, Calif. "Latest of all; ripening in November; enormously productive; beautiful, superior."
- Dara*: Seedling of Caro, originated at the Central Experimental Farm, Ottawa, Can. Fruit large, roundish to oval; cavity medium size; suture a distinct line; skin thick, yellow, mottled and thinly washed with red; flesh yellow, juicy, sweet, pleasant, good; stone medium size, almost free. Season late.
- Discovery*: Luther Burbank, Santa Rosa, Calif. Earlier than Climax and of same size but infinitely better in quality; deep crimson. Flesh sweet, rich, firm, rosy crimson. Productive. July.
- Douglas*: Fruit rather large, conical, yellow with purple tinge; flesh firm, flavor good. Tree upright, vigorous, hardy and productive. Texas Dept. Agr., Bull. 32.

- Easton*: Aye Brothers, Blair, Nebr. Japanese type, not described.
- Eldorado* (of Burbank): Luther Burbank, Santa Rosa, Calif. Fruit black and flat like an apple; flesh firm, pale salmon color, rich, sweet, delicious, freestone. Season early.
- Ettor*: A cross of Norman with Chabot originated by A. L. Bruce, Clarendon, Texas. Resembles both parents. Fine flavor Tree large, productive. Texas Dept. Agr., Bull. 32.
- Firmina*: Seedling of Consul, originated by the Central Experimental Farm, Ottawa, Canada. Fruit large, oval, wedge, slightly lopsided; cavity medium size; suture indistinct; skin medium thick, yellow, mottled and washed with carmine red; flesh yellow, firm, not juicy, sweet or insipid, medium quality; stone large, free. September.
- Frances*: Originated with the Texas Nursery Company, Sherman, Texas. Fruit large, yellow, handsome, ripens late in June. Texas Dept. Agr., Bull. 32.
- Gigantic*: (Provisional name) Luther Burbank, Santa Rosa, Calif. Fruit extra large, clear lemon yellow; flesh lemon yellow, sweet, and fine; nearly freestone. August 20 to September 15.
- Gill*: Fruit medium size, round, blue covered with light bloom; flesh firm sweet, rich, good. Tree strong, vigorous, spreading. Cir. No. 94, Ohio Agr. Exp. Sta.
- Hazel*: Seedling of Gloria, originated at Central Experimental Farm, Ottawa, Canada. Fruit large, roundish-ovate; cavity medium size; suture indistinct; skin thick, tough, yellow overspread with dull rich red; flesh golden yellow, juicy, moderately firm, sweet, good; stone large, flattened. September.
- Hogg*: Originated with Sam H. Dixon, Houston, Texas. A seedling of Kelsey. Fruit large, mottled, delicious flavor, semi-cling, ripens June 10. Texas Dept. Agr., Bull. 32.
- Home* (Provisional name): Luther Burbank, Santa Rosa, Calif. Fruit salmon color, half covered with pale crimson, pale thin bloom. Flesh lemon yellow, firm, juicy, sweet, very fragrant, delicious, cling. Tree a very strong upright grower, productive.
- Home Chestnut*: Luther Burbank, Santa Rosa, Calif. "Salmon skin, covered with pale crimson with numerous yellow dots. Flesh lemon yellow, firm but juicy. Good grower and regular bearer." (This may be the same as Home of an earlier catalogue.)
- Honey Prune*: Luther Burbank, Santa Rosa, Calif. Seedling of French prune. Larger than the French prune, white, semi-transparent with a heavy white bloom; flesh honey sweet, "excels all other prunes or plums".
- Hubert*: Originated with A. L. Bruce, Clarendon, Texas. Fruit large, purple; flesh coarse grained, fine flavor. Texas Dept. Agr., Bull. 32.
- Imperial Blue*: Originated by Israel Pennington, Mason, Mich. Fruit under medium size, nearly round, purplish black with bluish bloom; stem short; cavity shallow, flesh greenish-yellow, soft, delicate,

- juicy, rich, sweet; pit small. Season September. Special Bull. 44, Mich. Exp. Sta.
- Inca*: Luther Burbank, Santa Rosa, Calif. Fruit large, oval, greenish-yellow tinged crimson; flesh firm, yellow, sweet, delicious. Very productive, September.
- Joseph*: Originated with Joseph Rowley, Sr., Cummings Bridge, Ontario. Fruit very large, oval, flattened; cavity shallow, medium width; suture a distinct line; skin rather thick, yellow, mottled and washed with attractive red; flesh yellow, juicy, sweet, rich, good, quality very good for an American plum. September. Bull. No. 43, Exp. Farm, Ottawa, Canada.
- Julia May*: Originated and introduced by W. H. Perkins, McKinney, Texas. Fruit large, deep red, quality good. Ripens last half of May. Texas Dept. Agr., Bull. 32.
- Kaw*: N. E. Hansen, Brookings, S. D. *Prunus watsoni* x Wolf. Fruit bright dark red with fine white dots and white bloom. Flesh yellow, crisp, pleasing quality.
- Kilmore*: Seedling of Yosemite purple. Originated by Central Experimental Farm, Ottawa, Canada. Fruit large, roundish, slightly flattened; cavity medium size; suture a distinct line; skin rather thick, bright purplish red; dots numerous, yellow. Flesh deep yellow, juicy, sweet, rich, good; stone above medium, almost free. Season medium late.
- Kingston Sugar*: Fruit above medium size, heart shaped; cavity shallow; stem medium length, rather stout; suture a distinct line; skin rather thick and tough, green with traces of yellow; flesh yellowish-green, juicy, sweet, very good; stone medium size, cling; belongs to Reine Claude group. Bull. No. 43, Exp. Farm, Ottawa, Canada.
- Lester*: Seedling of DeSoto, originated by the Central Experimental Farm, Ottawa, Canada. Fruit medium or above, roundish; cavity narrow, shallow; suture a distinct line; skin rather thick, yellow, mostly covered with bright red, bloom moderate, bluish; dots small, yellow; flesh deep yellow, juicy, sweet, good; stone medium size, semi-cling. September. Tree very productive.
- Loring*: Minnesota Horticulturist, December 1917. Originated at Lonsdale, Rice County, Minn. Fruit over 2 inches in diameter, well colored; flesh firm, free from bitterness with a slight peach flavor; clingstone. Tree hardy productive.
- Major*: Seedling of the wild plum of Manitoba, originated at the Experimental Farm, Brandon, Manitoba. Fruit rather small, quality good, season very early.
- Mancheno*: Seedling of Cheney x Manitoba, originated by the Central Experimental Farm, Ottawa, Canada. Fruit medium size, oval; cavity narrow, rather deep; stem medium length, slender; suture indistinct; skin moderately thick, yellow, nearly covered with deep red; dots obscure; flesh yellow, juicy, briskly subacid, somewhat astringent, medium quality; stone large, cling.

- Marler*: Seedling of Caro, originated at the Central Experimental Farm, Ottawa, Canada. Fruit large, roundish to oval; cavity medium size; stem medium length, rather stout; suture a distinct line; skin thick, yellow covered with bright crimson; dots numerous, yellow, conspicuous; bloom pinkish; flesh yellow, firm, juicy, sweet, rich, good; stone medium size, cling. Belongs to Americana group.
- May Beauty*: Munson Nurseries, Denison, Texas. Abundance X an early Chickasaw variety. Originated by J. M. Funk, Denison, Texas, about 1898. Fruit large, red, same shape as Wild Goose; juicy, of best quality. Season early.
- Mound* (Minn. No. 50): Burbank x Wolf. Originated by the Minnesota Fruit Breeding Station, Zumbra Heights, Minn. Fruit large, oval, yellowish-red; flesh firm, quality fair; pit small, semi-cling; promising as a market variety. Tree hardy and a heavy regular cropper. September.
- Red Magnate*—error for Red Nagnate: Tucker-Mosby Seed Company, Memphis, Tenn.
- Rhoda*: Seedling of Cheney. Originated at the Central Experimental Farm, Ottawa, Canada. Fruit large, oval; cavity broad, moderately deep; suture slightly depressed; skin rather thin, dark red; flesh rich, orange-yellow, firm, juicy, sweet, rich, pleasant, good; stone semi-free. September.
- Sachem*: Luther Burbank, Santa Rosa, Calif. Fruit large, egg-shaped, purple; flesh rich magenta, firm, sweet, freestone. Tree vigorous and productive. An early hybrid plum.
- Sam Dixon*: Seedling of Wild Goose x Botan, originated by J. M. Howell. Fruit large, red, flavor fine, good shipper. Tree vigorous, prolific. Ripens June 10. Texas Dept. Agr., Bull. 32.
- Sebe Thomas*: Originated with A. L. Bruce, Clarendon, Texas. Fruit very large, fine flavor, resembles Six Weeks. Texas Dept. Agr., Bull. 32.
- Sumono*: Luther Burbank, Santa Rosa, Calif. Not described.
- "Sweetest" Prunc*: Luther Burbank, Santa Rosa, Calif. Not described.
- Thunder Cloud*: Luther Burbank, Santa Rosa, Calif. "Foliage has a wonderful metallic-crimson lustre. Fruit good."
- Toto*: Seedling of Wild Goose, originated with Sam H. Dixon, Houston, Texas. Fruit medium size, purple red, firm, good flavor, good shipper, makes fine jelly; tree productive. Texas Dept. Agr., Bull. 32.
- Troy*: Seedling of Cheney, originated at the Central Experimental Farm, Ottawa, Canada. Fruit large, roundish; suture fairly distinct; skin rather thick, yellowish, washed with deep red; dots numerous, small, yellow; flesh deep yellow, juicy, sweet, good to very good; stone rather large, flattened, September.
- Valleda*: Luther Burbank, Santa Rosa, Calif. Fruit large, oval, deepest crimson; flesh crimson, sweet, rich, extra fine quality, freestone. Tree vigorous, productive. August.

- White Japan*: Austin Nursery, Austin, Texas. "Roundish, transparent cream colored, finest quality, June."
- Winona* (Minn. No. 30): Triflora x Americana. Originated by the Minnesota Fruit Breeding Station. Fruit large, yellow turning red when ripe, roundish; flesh juicy, sweet, very good; semi-cling. Tree vigorous, regular and productive bearer.
- Yellow May*: Baker Bros., Forth Worth, Texas. Not described.

PLUMCOT

- Silver*: Luther Burbank, Santa Rosa, Calif. Fruit long, oval-flattened, deep silvery purple; flesh firm, deep yellow, juicy, sub-acid, flavor of finest cranberries either fresh or cooked, juice like that of strawberries. Tree vigorous, productive.

APRICOT

- Coe's Hemskirk*: Utah Nursery Co., Salt Lake City, Utah. "In size fully as large as any other variety and of better quality, a regular bearer." Said to have originated in California.
- Gold Dust*: J. Van Lindley Nursery Co., Pomona, N. C. "From Japan. Very large; deep, golden yellow and fine in quality."
- Jones*: Utah Nursery Co., Salt Lake City, Utah. "Medium, yellow with red cheek, prolific, early."
- Key*: Austin Nursery Co., Austin, Texas. Chance seedling* originated with J. R. Key, Lampasas, Texas. Fruit medium size, good quality. Tree a regular bearer. May in Texas.
- Knobel*: Crow's Nurseries, Gilroy, Cal. Originated with M. D. Knobel, San Jose, Cal. "A greatly improved Blenheim. Tree a strong thrifty grower. A better all round commercial fruit than Blenheim."
- Smyrna*: Leonard Coates Nursery Co., Morganhill, Cal. "New, kernel is sweet like the almond."

NECTARINE

- Breck*: Originated with Jos. Breck, Travis County, Texas. Said to be of the shape, size and quality of the Honey peach. Texas Dept. Agr., Bull. 32.
- Griffith*: Austin Nursery Co., Austin, Texas. Original tree on grounds of Mr. Griffith, East Austin, Texas. "Large fine yellow and red fruit; prolific, regular bearer."
- J. C. Wees*: Kavan Nurseries, San Bernardino, Calif. A chance seedling, originated by J. C. Wees, San Bernardino, Calif., about 1915. Not described.
- Red Cling*: Originated with John Burkhardt, Fayette County, Texas. Spanish type, good flavor, cling. Texas Dept. Agr., Bull. 32.
- Tough*: Originated by J. W. Stubenrauch, Mexia, Texas. Fruit nearly round, smaller than Elberta peach; skin tough, nearly covered with red; flesh quite juicy and of highest quality. Freestone.

Wilkinson: Austin Nursery, Austin, Texas. Looks and tastes like a Honey Peach; fair size; valuable on account of succeeding so far south. Fine and productive at Austin.

Yellow: Luther Burbank, Santa Rosa, Calif. "Large, crimson, rich yellow flesh. Enormous and constant bearer."

CHERRY

Black Orb: Utah Nursery Co., Salt Lake City, Utah. "Tree vigorous grower. Fruit large, round, purplish black. Flesh high colored and excellent quality. Pit small and free. An excellent variety for canning or shipping."

Cirucla: Luther Burbank, Santa Rosa, Calif. "Evergreen Patagonian Cherry, most rapid growing of all cherries. Lumber greatly prized for furniture. Very ornamental, symmetrical, upright grower; long clusters of fruits in profusion like that of *Prunus serotina*, but larger and sweeter."

Dal's Early Red: Porter-Walton Company, Salt Lake City, Utah. "Very large; deep red. Delicious sweet flavor. Ripens here the last of May or first part of June."

Early Dyehouse: Probably same as Dyehouse.

Gulford Seedling: Dubuque Nursery, Dubuque, Iowa. Not described.

Honey Dew: (Of Plumfield Nursery). Originated with J. H. Walters, Wahoo, Nebraska, as a chance seedling about 1903. Fruit large, yellow and light red; flesh firm, meaty, sweet, rich and of highest quality.

Koontz Mammoth: The Monroe Nursery, Monroe, Michigan. Originated in Northern Indiana. Fruit large, nearly twice the size of Early Richmond and about the same shape; flesh melting, firm acid; seeds small. Last of June.

Pennington: Originated by Israel Pennington, Mason, Mich., about 1858. Fruit large, roundish, heart-shaped, dark red; flesh pale, yellowish-white, sweet, vinous, rich, firm. Tree upright, very productive. Special Bull. 44, Mich. Exp. Sta.

Porter Tartarian: Max J. Crow & Son, Gilroy, Cal. Said to be a strain of Black Tartarian originated with Robert Porter, Santa Clara, Cal. Fruit is a little larger, firmer, and better shipper than Black Tartarian and does not crack with rain, nor sunburn like its parent. Tree strong, vigorous, exceedingly prolific, ripens later than Black Tartarian.

16 to 1: Utah Nursery Co., Salt Lake City, Utah. Fruit large, red; flesh rich sub-acid; tree very hardy. August.

Warren's May: Planters' Nurseries, Humboldt, Tennessee. "Early, large, succeeds well here, of Morella type."

Young's Large Black: Utah Nursery Co., Salt Lake City, Utah. "Very large; liver color; flesh very firm, fine flavor. Ripens early in July. An excellent market variety."

MULBERRY

Everbearing: Tucker-Mosby Seed Co., Memphis, Tenn. Not described but supposed to be either Hicks or Black English.

PERSIMMON

American Honey: The Munson Nurseries, Denison, Texas. "A tree of the native persimmon found wild, bearing profusely of large, clear honey colored fruit of finest quality preferred by all to even the finest Japanese kinds. It has few small seeds."

Garretson: J. F. Jones, Lancaster, Pa. A native from Adams County, Pa. Fruit small, delicious, seedless, productive.

Hyakume: Same as Hyakume.

Lambert: J. F. Jones, Lancaster, Pa. A native from Hiawatha, Kansas. Fruit very large, bright yellow, very showy, very good quality, few seeds.

Oalcame: Same as Okame.

Saburoza: Fruit small to medium, four prominent lobes beyond calyx; very dark tomato red, surface glossy, very attractive; flesh very dark cinnamon when seeded, sweet, rich, excellent. Bull. 316, Calif. Exp. Sta.

Yemoan: Same as Yemon.

HAWTHORN

Chinese Fruiting. Luther Burbank, Santa Rosa, Calif. "A very beautiful small tree bearing great quantities of bright crimson fruit as large as large olives, which is excellent for jam, jellies, etc. The foliage also is very beautiful during the fall."

GRAPE

Australis (of Burbank): Seedling of Pierce, originated by Luther Burbank, Santa Rosa, Calif. Berry very large, blue-black, quality very best, very early in season.

Bucala: Originated about 50 years ago with the late Benj. F. Meekins, Manteo, N. C. Vine vigorous, productive, leaves medium size, dark green, cordate. Cluster of fair size, round; berry large, brownish black, pulp meaty but juicy, medium flavor and quality; skin thick, tough; suited only for wine. U. S. Dept. Agr. B. P. I., Bull. 273.

Brown (Rotundifolia): (Not Brown of Hedrick.) Originated near Kinston, N. C. and was named by Mr. J. I. Brown of that place. Both vine and fruit are similar to the Scuppernong, but the fruit is sweeter and of better quality; the berry is also smaller. U. S. Dept. Agr. B. P. I., Bull. 273.

Carolina Belle: Originated with Elisha Lamb, Dwight, N. C., about 30 years ago. Cluster medium size; berry medium size; oblong, almost black with small specks; pulp fairly juicy, medium quality; skin

thin, tough; seeds small. Vine very vigorous; leaf cordate, sharp pointed at tip; glabrous, leathery. U. S. Dept. Agr. B. P. I., Bull. 273.

Christmas: Seedling of Pierce. Originated by Luther Burbank, Santa Rosa, Calif. "Enormously productive of blue-black fruit of the very best quality, the vines appearing as a mass of very large, long full clusters which retain their superior quality during cool dry weather, or if protected by rain on the vines until nearly or quite Christmas. Bunches six to eight inches long."

Clayton: Discovered by the late Col. Clayton Griffin, Swans Point, N. C. Not described. Is said to be a good variety. U. S. Dept. Agr. B. P. I., Bull. 273.

Flowers Improved: Discovered about 1869 by J. M. Shipman, near Red Hill Swamp, N. C. Compared with *Flowers* the vine is more vigorous and productive, the clusters larger, the berries more oblong and cling tenaciously to the stem. Season late. Bull. 201, N. C. Exp. Sta.

Hopkins (Rotundifolia): (Not Hopkins of Munson.) Clusters resemble those of *Scuppernong*; berry large, slightly oblong, black; flesh pulpy but soft, sweet, pleasant; skin medium thick, tough; seeds 2 to 4, large. Vine vigorous, productive; leaves large, dark green, thick, broadly cordate, irregular, dentate. Last of August at Wilmington, N. C. U. S. Dept. Agr., B. P. I. Bull. 273.

Howard: Seedling of San Jacinto. Originated by the late T. V. Munson, Denison, Texas. Not described. U. S. Agr. Dept., B. P. I. Bull. 23.

Hunt: Cross between prepotent white male x *Flowers*. Vine vigorous, productive, berry large, black, hangs on well; skin medium to thin; pulp medium, flavor excellent; cluster stems long. August Bull. 133, Ga. Exp. Sta.

Irene: Cross between black male and *Thomas*. Vine vigorous, productive; berry large, lustrous black; skin medium, quality good; season two weeks after *Scuppernong* and lasts until frost. Bull. 133, Ga. Exp. Sta.

Island Belle: Jacob Kaufman Co., Seattle, Wash. Originated with Isador Bush, Bushberg, Mo. Berry and cluster larger than *Concord*; color black, some bloom; skin tough, a good shipper, does not crack or shatter on the vine; productive, better quality than *Concord*; vine fairly vigorous; same season as *Moore Early*.

Klickitat: A European variety, earlier than *Sweetwater*. Bunches large; berry round, white, large, sweet. Vine vigorous, heavy producer, hardy at Kennewick, Washington. Is also called *Opal Rose*.

Labama: Seedling of San Jacinto. Originated by the late T. V. Munson, Denison, Texas. Not described. U. S. Dept. Agr., B. P. I. Bull. 273.

Lady James: Discovered near Grindool, Pitt County, N. C., by B. M. W. James about 35 years ago. Cluster medium size, very compact with a short stem; berry medium size, round, reddish wine color; skin

thin, moderately tough with many small pimples dotting the surface; pulp juicy, sweet, with sprightly flavor. For home use only. U. S. Dept. Agr., B. P. I. Bull. 273.

Latham: Discovered by F. P. Latham near Newbern, N. C., before the Civil War. Resembles Thomas and Lady James. Cluster compact, medium size with very short stem; berry medium size, round with prominent markings, wine color; skin thin, moderately tough, covered with pin head dots; pulp juicy, exceedingly sweet with sprightly flavor. U. S. Department Agr., B. P. I. Bull. 273.

Luola: Originated near Boardman, N. C., 30 or more years ago. Clusters medium size, rather loose; berries round, dark purplish black; pulp melting, juicy, fruity, vineless. Ripens just before frost. U. S. Dept. Agr., B. P. I. Bull. 273.

Marvel: Seedling of San Jacinto. Originated by the late T. V. Munson, Denison, Texas. Not described. U. S. Dept. Agr., B. P. I. Bull. 273.

McTavish: Bunch below medium to small, broad, compact, slightly shouldered; berry medium size, roundish, pale green, slightly tinged with purple; skin thick, tough; pulp tender, does not separate readily from seeds, juicy, sweet, slightly foxy, good to very good. Season early.

Muscabella Gordo Blanco: Utah Nursery Company, Salt Lake City, Utah. A grape much resembling the Muscat of Alexandria, but with smaller and fewer seeds, and thinner skin. A valuable raisin grape.

November: Cross between black male and Scuppernong. Vine vigorous prolific; berry medium size, lighter color than Scuppernong; quality fair; season late just before frost. Bull. 133, Ga. Exp. Sta.

Old English: Valdesian Nurseries, Bostic, N. C. Bunch medium large, well shouldered; berry light pink to red; very delicious, ripens in September in North Carolina after all other bunch grapes are gone. Vine a strong grower with large healthy leaves.

Paw Paw: Originated in the vineyard of O. W. Rowland, Paw Paw, Mich. Bunch large, compact; berry very large resembling Concord but more acid. Flavor excellent. Special Bull. 44, Mich. Exp. Sta.

Philippi: Seedling of purple Damascus x Flame Tokay. Originated by J. W. Philippi, Acampo, Cal. Bunch very large; berry very large, skin tough, quality very fine, color deep red. Fruited first in 1905.

Qualitas: Cross between black male and Thomas. Vine medium strong, very prolific; clusters medium size; berry medium to large, dull black; skin thin, pulp and seeds medium in size, very sweet, excellent quality. Season 10 days after Scuppernong. Bull. 133, Ga. Exp. Sta.

Sanbrilasco: Seedling of San Jacinto. Originated by the late T. V. Munson, Denison, Texas. Not described. U. S. Dept. Agr., B. P. I. Bull. 275.

- San Gabriel*: Seedling of San Jacinto. Originated by the late T. V. Munson, Denison, Texas. Not described. U. S. Dept. Agr., B. P. I. Bull. 273.
- Sanherbo*: - Seedling of San Jacinto. Originated by the late T. V. Munson, Denison, Texas. Not described. U. S. Dept. Agr., B. P. I. Bull. 273.
- Smith*: Originated near Albertson, Duplin County, North Carolina, about 30 years ago. Cluster medium size and roundish; berry large, oblong, bluish or deep purplish black with "guinea speck" markings; vine vigorous, productive; leaves cordate, rather thick, not much pointed. Ripens early and hangs on vine until frost. U. S. Dept. Agr., B. P. I. Bull. 273.
- Spalding*: Cross between prepotent white male and Flowers. Vine vigorous, very prolific; berry black, slightly smaller than Hunt; skin medium to thin; pulp medium to small, quality excellent. Season two weeks after Hunt. Bull. 133, Ga. Exp. Sta.
- Stuckey*: Cross between black male and Scuppernong. Vine medium vigorous, productive; berry medium to large, color of Scuppernong, not attractive, size of pulp and seeds medium, juicy, very sweet, very good quality. Season 10 days after Scuppernong. Bull. 133, Ga. Exp. Sta.
- Texas Queen*: Originated in Texas and was introduced by J. W. Tacket, Weatherford, Texas. Bunch large, compact, ripens evenly; berry almost seedless. Texas Dept. Agr., Bull. 32.
- Westbrook*: Originated with the late J. S. Westbrook, Paison, N. C. Not described. U. S. Dept. Agr., B. P. I. Bull. 273.
- White Ruby*: Pilot Point Dewberry Farm, Pilot Point, Texas. Fruit resembles Niagara, very juicy and sweet; bunch medium to large. Vine a strong grower, hardy, productive.

BLACKBERRY

- Autumn King*: Luther Burbank, Santa Rosa, Calif. "A rampant grower and quite thorny, with curious, handsome, palmate foliage and pink blossoms. The berries which ripen late in the fall, are of the largest size, and have a superior, aromatic sweet quality never found in any of the common summer varieties." Second generation cross of Lawton and Oregon Everbearing.
- Burbank Thornless Blackberry*: Originated by Luther Burbank, Santa Rosa, Calif. Fruit firm and quite uniform in size, plump, good quality; plant thornless, exceedingly vigorous and very productive.
- Cox*: Found in Erath County, Texas, introduced by F. T. Ramsey, Austin, Texas. Texas Dept. Agr., Bull. 32.
- Early Wonder*: Fitzgerald's Nursery, Stevenville, Texas. Nearly as large as Austin dewberry, very productive, sometimes fruiting in the fall.

- English*: Discovered 20 miles north of Bonham, Fannin County, Texas. Berry large, good quality; plant hardy, prolific. Texas Dept. Agr., Bull. 32.
- Erskine Park Seedless*: Said to be a sport of Kittatinny, very hardy with long fruiting season; berry very large, fine flavor, no core and no seeds.
- German*: Lennox Nursery and Fruit Farm, Lennox, S. D. Root cuttings were brought from Germany about 1909. Fruit very large, juicy, very firm, dark glossy colored; plant very vigorous, must be protected during the winter in South Dakota.
- Gray's Perfection*: Gray's Nursery, Salem, Ind. Fruit jet black and glossy, very large, oblong, very firm, flavor excellent. Plants very hardy having withstood 35° F. below zero. This may be the same as Perfection.
- Lux*: W. L. Lux, Topeka, Kansas. "Very large, late. Finest quality, never winterkills."
- Perfection*: Stark Bros., Louisiana, Mo. "Large jet black, highest quality. Productive, very hardy."
- Sensation*: L. G. Rathbun & Son, Orland, Indiana. Berry very large; plant hardy, bears full crop in summer and half crop in fall on new canes.
- Spalding*: Originated with a Mr. Spalding of Gonzales County, Texas, introduced by F. T. Ramsey, Austin, Texas. Not described. Texas Dept. Agr., Bull. 32.
- Superb*: Luther Burbank, Santa Rosa, Calif. "Highly flavored, sweet, and delicious. Larger and more productive than the Himalaya."
- Thornless Mammoth*: Kavan Nurseries, San Bernardino, Calif. "Vines are thornless, making picking easy; the berry is as large as Mammoth, but better flavor."

RASPBERRY

- Early King*: "The plants are not good growers nor vigorous. Berries of medium size, red, medium quality. Not productive. Not promising as a commercial variety. Season early."
- Everbearing Black Raspberry*: F. W. Brow Nursery Co., Inc., Rosehill, N. Y. "Will actually bear fruit from June until killed by frost. The plants grow upright, very strong and are literally loaded with fruit in all stages, from bloom to ripe fruit."
- Fillbasket*: "An English variety which has done well in British Columbia at the Agassiz Farm. Not grown in Eastern Canada." Bull. No. 94, Dominion Exp. Farms, Ottawa.
- Freseman's Black Cap*: Lennox Nursery & Fruit Farm, Lennox, S. D. Originated with A. A. Freseman, Lennox, S. D. "A large black shiny fruit of excellent flavor. The vine appears to be much hardier than any other black raspberry tested out. Great bearer."

- Henry*: Originated by Wm. Saunders, London, Ont. Berry above medium to large, roundish to slightly conical, bright to deep red; flesh moderately firm, juicy, briskly sub-acid, above medium in quality; mid-season.
- Jumbo* (of Canada): Berry large, conic, deep crimson, firm, mildly sub-acid, lacking in flavor, quality medium; mid-season. Bull. No. 94, Dominion Exp. Farms, Ottawa.
- Kewitt's Hybrid*: Wm. H. Hunt & Co., New York, N. Y. "Planted out this fall will yield next year one pint of extra large berries to each cane. Grows ten feet first season. Hardy and almost free from seeds."
- King of the Market*: Wm. Henry Maule, Inc., Philadelphia, Pa. Originated by Geo. W. Elliott, Mankanda, Ill. Introduced by Bradley Bros., Mankanda, Ill., in 1915. Plant upright, stalky and very productive. Berry beautiful light crimson, very meaty, rich, delicious. Everbearing. Fruit said to be twice as large as Ranere and a week later in ripening in both spring and fall.
- Leyerle*: John Lewis Childs, Inc., Floral Park, N. Y. Originated by Jake Leyerle of Jackson County, Illinois. Fruit bright crimson, meaty, rich in sugar, delicious flavor, very large, firm. Everbearing. Plants very stocky, upright, healthy. Not quite as early as St. Regis.
- Louboro*: Seedling of Loudon x Marlboro originated by the Experiment Station, Geneva, N. Y. Berry large, roundish-conic, light bright crimson, attractive; mildly sub-acid, rather flat in flavor, quality above medium, flesh rather soft; midseason. Plant vigorous and productive. Bull. No. 94, Dominion Exp. Farms, Ottawa.
- October Giant*: Seedling of Eureka originated by Luther Burbank, Santa Rosa, Calif. "Remarkable for its habit of bearing in October, as well as for its unusual size, measuring nearly 4 inches in circumference; bright red color; rather soft except for home use."
- Oro Noca*: Same as Oronoco. See 1920 report.
- Perfection*: King Bros. Nurseries, Danville, N. Y. Said to be a new extra early variety of great merit, hardy and very productive; a strong grower.
- Redpath*: J. V. Bailey, St. Paul, Minn. Berry a bright red, very large, firm. Plant hardy, prolific.
- Rex*: Fruit Belt (Grand Rapids, Mich.) Feb. 1920. "Everbearing; red. A picking every week from June to October. The new canes bear fruit 90 days after planting. Berries large, firm, sweet, and of delightful flavor.
- Sugar Hybrid*: Luther Burbank, Santa Rosa, Calif. Berry quite large about the size of Marlboro, dark red color, said to be the sweetest of all red raspberries. Plants tall and slender, almost thornless, productive. Hybrid of a second generation Shaffer and Souhegan.
- Thornber*: A chance seedling originating with W. S. Thornber, Clarkston, Wash. Berry very large, attractive dark red, rich flavor; plant very vigorous and hardy.

White Queen: Wm. N. Hunt & Co., New York, N. Y. Originated with Jonathan Thorne, Black Rock, Conn. Plant very vigorous with large canes and heavy foliage. Berry very attractive, very large, creamy white, exquisite flavor and aroma, sometimes very soft, not a good shipper. Season August to middle of November.

BLACKBERRY — RASPBERRY HYBRID

Humbolt (of Burbank): Seedling of an improved California wild dewberry x Cuthbert raspberry originated by Luther Burbank, Santa Rosa, Calif. Berry very large, dark crimson or dark purple covered with a silvery sheen, very acid, delicious for canning or drying, said to have both raspberry and blackberry flavor. Plants extremely vigorous. Ripens in June.

Paradox: Fourth generation from a cross of Christal White blackberry x Shaffer raspberry. Originated by Luther Burbank, Santa Rosa, Calif. "Produces an abundance of oval light red berries of good size, larger than either progenitor and of superior quality. The plant is in every respect a most perfect balance between the two species."

DEWBERRY

Chestnut: Originated with I. J. Chestnut, Keene, Texas. Berry large, sweet, firm, good shipper, ripens last of April in Texas. Texas Dept. Agr., Bull. 32.

Monroe: Austin Nursery, Austin, Texas. "A very large, long dewberry of pure southern type. Rank grower. May."

Noten: Found wild by Pierson Noten in Hornsby's Bend 10 miles east of Austin, Texas, about 1896. Not as large as Rogers. Not described.

Rogers: Said to have been discovered near Alvin, Texas, by a Mr. Rogers. Introduced by C. Falkner, Waco, Texas. Not described. Texas Dept. Agr., Bull. 32.

GOOSEBERRY

Berkeley: "Bush is a fairly vigorous grower and good bearer. Berries are very large and ripen early. An old English variety and subject to mildew." Circular 164, Calif. Exp. Sta.

Charles: Seedling of Houghton x Roaring Lion, originated by Wm. Saunders, London, Ont. Berry larger than Downing, roundish to oval, green tinged red; quality good, slightly sub-acid; season medium.

Como (Minn. No. 43): A seedling of Pearl x Columbus. Originated by the Minnesota Fruit Breeding Farm, Sumbra Heights, Minn. Berry large, roundish or slightly oblong, green, fair quality. Plant vigorous, moderately thorny, productive.

Indian Chief: Alneer Bros., Rockford, Ill. "Large, color bright red, of superior quality."

- Oregon*: Originated by O. Dickinson, Salem, Oregon. Berry larger than Downing, pale green with whitish bloom, translucent; skin tender; season rather late. Bull. No. 94, Dominion Exp. Farm, Ottawa.
- Pride of Michigan*: Peach Belt Nurseries, Bangor, Mich. Berry resembles Downing in size, color and quality, but the bush is more vigorous, healthier, hardier and more productive. Introduced by Hurlbut and Cross, Bangor, Mich., about 1916. Plants were found near South Haven, Mich., but whether they were a seedling or an old variety is not known.
- Queen Anne*: Berry medium size, roundish to oval, yellowish-green; skin thick; quality medium to good, briskly sub-acid. Bull. No. 94, Dominion Exp. Farm, Ottawa.
- Sylvia*: Originated by Wm. Saunders, London, Ont. Berry above medium, roundish, greenish more or less covered with dull red; quality good, sub-acid; season medium. Bull. No. 94, Dominion Exp. Farm, Ottawa.

CURRENT

- Boskoop Giant* (of Wilk): John Wilk, New York, N. Y. "The largest and sweetest white currant."
- Buddenborg*: Berry large to very large in medium size bunches, skin thick, black; flavor good, quality good, pleasant sub-acid, season late. Bull. No. 94, Dominion Exp. Farm, Ottawa.
- Clipper*: Seedling of Black Naples Seedling originated by Wm. Saunders, London, Ont. Berry medium to large in large bunches; skin moderately thick, black, tender; flavor good, quality good, briskly sub-acid; season medium to late; bush a strong grower and productive.
- Collins Prolific*: Fruit mostly in large bunches; skin thick, acid; quality medium; season late. Bull. 94, Dominion Exp. Farm, Ottawa.
- Cumberland Red*: Originated by C. L. Stevens, Orillia, Ont. Bunch medium in size and length; berry medium to above in size, bright scarlet; quality medium, acid; season medium. Bush strong rather spreading grower. Bull. No. 94, Dominion Exp. Farm, Ottawa.
- Eagle*: Seedling of Black Naples seedling, originated by Wm. Saunders, London, Ont. Berry medium to large in medium bunches; skin black, moderately thick; flavor briskly sub-acid; quality medium. Season medium. Bush a strong grower and productive.
- Eclipse*: Seedling of Black Naples Seedling, originated by Wm. Saunders, London, Ont. Berry medium to large in large bunches; skin black, moderately thick, fairly tender; quality good, flavor sub-acid; season early. Bush a medium to strong grower and productive.
- Giant Red*: "The bush is a more vigorous grower than Perfection; also holds its foliage better." Report Wis. State Hort. Soc., 1913.
- Greenfield*: Originated by S. Greenfield, Ottawa East, Ont. Bunch well-filled; berry medium to above in size, bright scarlet; quality above

- medium, pleasantly acid. Season medium. Bush a strong moderately spreading grower. Bull. No. 94, Dominion Exp. Farm, Ottawa.
- Kerry*: Seedling of Black Naples Seedling, originated by Wm. Saunders, London, Ont. Berry above medium to large; skin black, thick but tender; quality above medium, flavor briskly sub-acid. Bush a strong grower and very productive.
- La Conde*: Bunch well-filled; berry medium or above in size, bright scarlet; quality medium, acid. Bush a strong moderately spreading grower. Bull. No. 94, Dominion Exp. Farm, Ottawa.
- Large White*: Bunch long, usually about half filled; berry medium to large, pale yellow; quality above medium, briskly sub-acid; season early. Bush a strong upright grower and productive. Bull. No. 94, Dominion Exp. Farm, Ottawa.
- Late Victoria*: Gill Bros. Seed Co., Portland, Oregon. "Large long bunches, red fruit."
- Magnus*: Seedling of Black Naples Seedling originated by Wm. Saunders, London, Ont. Berry large; skin black, rather thick; quality good; flavor sub-acid; season medium. Bush a strong grower and very productive.
- Mercille de la Gironde*: Berry medium in size or below, bunch large; skin black, moderately thick, tender; flavor good, quality good, briskly sub-acid; season medium to late. Bull. No. 94, Dominion Exp. Farm, Ottawa.
- Newark*: C. W. Stuart & Company, Newark, N. Y. Bunch of good length, berry above medium size, red sub-acid. Bush a very vigorous grower and a great producer.
- Pack*: Utah Nursery Company, Salt Lake City, Utah. "An improvement upon Fay's Prolific, which it resembles; more prolific, however; berry larger, better flavor. Fruit does not fall off as in other varieties."
- Rankins Red*: Bunch medium to long, well-filled; berry small to medium, bright scarlet; quality medium, acid; season medium. Bush a strong upright grower and very productive. Bull. No. 94, Dominion Exp. Farm, Ottawa.
- Success*: Seedling of Black Naples Seedling, originated by Wm. Saunders, London, Ont. Berry large, skin black, moderately thick, tender; quality good to very good, sub-acid; season very early. Bush a rather weak grower, and not very productive.
- Topsy*: Dempsey black currant x (Houghton x Broom Girl Gooseberry). Originated by Wm. Saunders, London, Ont. Berry above medium to large; skin black, rather thick; quality good, briskly sub-acid; season medium. This black currant-gooseberry hybrid has foliage and fruit like a black currant. Bush a strong grower and productive.
- White Kaiser*: Bunch medium to large about three-fourths filled; berries medium to large, pale yellow; quality good, flavor pleasant, sub-

acid; season medium. Bush a strong upright grower. Bull. No. 94, Dominion Exp. Farm, Ottawa.

ELDERBERRY

Superb: Luther Burbank, Santa Rosa, Calif. "A large white flowering elder which blooms and bears fruit abundantly all summer until December. The berries are especially fine for cooking, not having the usual bitter taste of ordinary elderberries, and can be dried in two or three days, when they taste like raisins."

JUNEBERRY

Dwarf: Arlington Nurseries, Arlington, Nebr. "Grows 4 to 6 feet high; branches out from the ground like currants; resembles the common Service or Juneberry in leaf and fruit, but the fruit is larger, and in color almost black; commences to bear the second year after transplanting, and bears profusely."

Dwarf Juneberry, Large Fruited: Farmer Seed and Nursery Co., Fairbault, Minn. "Very hardy, enduring the coldest winters as well as the hottest summers without injury. It forms dense bushes and begins bearing fruit when quite young, often producing several quarts of fruit from one bush. The fruit is very sweet, of excellent flavor, and of a reddish purple color, changing to bluish black when fully ripe." Grows wild in the Rocky Mountains.

Dwarf Mountain Juneberry (Jefferson Strain): Gurney Seed & Nursery Co., Yankton, S. D. Said to be very hardy and enormously productive; plants grow 3 to 4 feet high.

HUCKLEBERRY

Large Blue: West Hill Nurseries, Fredonia, N. Y. Not described.

Ozark: Arkansas Nursery Company, Fayetteville, Ark. "Remarkable for its fine flavor. Luxuriant, very hardy, a prolific bearer and when given a small amount of attention produces regular annual crops. Will grow on most any kind of soil, and when once set, is there permanently."

STRAWBERRY

A-1: Armstrong Nurseries, Ontario, Calif. "Ripens from early to late; a sure and continuous bearer; large, dark red when ripe; exceedingly prolific."

Alaska (of Kevitt) (Per.): Seedling of Climax x Glen Mary. Originated by T. C. Kevitt, Athenia, N. J. Berry medium to large, irregular, long-conic to long-wedge shape, necked, glossy, medium to dark red; flesh rather dark red, firm, medium, juicy, mild, sweet, fair quality. Unattractive in shape and color, undesirable. Mid-season. Bull. 447 N. Y. Agr. Exp. Sta., Geneva, N. Y.

- Anna* (Imper.): Berry medium size, roundish-conical, dark red; flesh dark red, acid to sub-acid, moderately firm, fair quality, core dark red, spongy, seeds medium, sunken, midseason. Bull. 200, Purdue Univ. Exp. Sta.
- Atkins Continuity* (Per.): Berry above medium, roundish-conic to wedge, medium red, glossy; flesh whitish toward center, firm, mild sub-acid, fair quality. Plants unproductive, fruit stems short; erect. Season early. Bull. 401, N. Y. Exp. Sta., Geneva.
- Baldwin's Pride* (Per): Berry medium size, conical, irregular, dark red; seeds large, raised; flesh light red, subacid, medium firm, quality fair to good, core light red, solid. Midseason. Plants of medium vigor. Bull. 200, Purdue Univ. Exp. Sta.
- Baldwin's Pride of Michigan*: Plant vigorous, healthy; berry of same color, quality and size as Dunlap. Everbearing. Trans. Wis. State Hort. Soc., 1913.
- Big Early* (Imper.): Berry medium to large, roundish-conical, often double, fairly uniform, medium red; flesh light red, rather soft, sub-acid to nearly sweet; quality fair; core light red, spongy. Season early. Plant very vigorous. Bull. 200, Purdue Univ. Exp. Sta.
- Bridgeton Beauty* (Per.): Young's Seed Store, St. Louis, Mo. Originated with a Mr. Meyer, Bridgeton, Mo. Berry rich dark color, firm, quality excellent. Plant a strong grower, productive.
- British Queen* (of Brand): James Brand & Co., Vancouver, B. C. "Large fruits of bright color; fine flavor; main crop."
- Buckbee* (Imp.): Wm. M. Hunt & Co., New York, N. Y. Seedling of Chesapeake, originated by Tice C. Kevitt, Athenia, N. J. Berry very large, round, bright glossy red, same flavor as Chesapeake, firm and good shipper. Plant drought resistant.
- Bun Special*: O. D. Baldwin, Bridman, Mich. A chance seedling originating with E. M. Buechly, Greenville, Ohio. Berry very large, bright red, globular-oval, glossy red, good flavor and quality.
- California* (Per.): William M. Hunt & Co., New York, N. Y. Originated by Tice C. Kevitt, Athenia, N. J. Fruit large, firm, rich flavor; plants robust, very erect, very productive; mid-season.
- Chaska* (per.) (Minn. 801): (Dunlap x Pocomoke) x Brandywine. Originated by the Minnesota Fruit Breeding Farm, Zumbra Heights, Minn. Fruit large, conic, medium red, glossy; flesh dark red, firm, juicy, sub-acid, aromatic, quality best. Season moderately early.
- Colborn's Early*: E. W. Johnson & Co., Salisbury, Md. "It is as early or a few days earlier than any other variety we have ever seen. Very productive of medium sized berries that color all over; very firm, and of good quality."
- Cream*: Seedling of No. 330 x Trebla. Originated by Albert F. Etter, Ettersburg, Calif. Berry medium size, yellow, sometimes taking on light blush; flesh yellow, flavor peculiar, not an improvement on red varieties.

- Deephaven* (Per.) (Minn. 41): Dunlap x Progressive. Originated by the Minnesota Fruit Breeding Farm, Zumbra Heights, Minn. Fruit large roundish-conic, medium red, glossy, flesh light red, juicy, mild sub-acid, good. Everbearing.
- Early Elizabeth*: Michael Seed Store, Sioux City, Iowa. "Very hardy and prolific. Ten days earlier than Warfield or Dunlap; excellent quality."
- Easypicker* (Imper.) (Minn. 775): Dunlap x Crescent. Originated by the Minnesota Fruit Breeding Farm, Zumbra Heights, Minn. Fruit large, nearly round, medium red; flesh dark red, moderately firm, sweet, mild, very good, good market berry. Midseason.
- Elate*: E. W. Johnson & Bro., Salisbury, Md. Berry large to very large, well colored, uniform in shape, firm. Plant medium size, strong grower. Season late, a few days later than Gandy.
- Eldorado* (Per or semi-Per.): Fruit large, irregular, roundish to blunt-conic or wedge-shape, broad at base, apex obtuse and indented; medium to light red, somewhat glossy; flesh whitish toward center, juicy, firm, mild sub-acid, pleasant, good. Plant vigorous, very productive. Season early. Bull. 447, N. Y. Agr. Exp. Sta., Geneva.
- Elwell's Early*: King Bros. Nurseries, Danville, N. Y. Said to be very early, a heavy yielder, good shipper with exceptionally fine flavor.
- Evergreen White*: Luther Burbank, Santa Rosa, Calif. Berry very large, pure white, very good; plant large and strong, fruit stems strong, very productive.
- Famous Gibson*: Same as Gibson.
- Fendalcino* (Imp.): Seedling of Fendal x Ettersburg No. 121. Originated by Albert F. Etter, Ettersburg, Calif. Berry extra large, bright red, moderately firm, fine flavor. Season extra early and supposed to be an everbearer.
- Fern Dell*: Plant strong, healthy, very productive; berry medium to large; color and quality fair to good. Trans. Wis. State Hort. Soc., 1913.
- Ford* (Per.) (of Townsend): A chance seedling found by Grandville Brewington, Wicomico County, Md. Fruit very large, blunt-wedge to blunt-conic, attractive, glossy, medium to dark red; flesh red, firm, very juicy, mild, sweet, good. Plant vigorous, very productive. One of the best late varieties. Bull. 447, N. Y. Agr. Exp. Sta., Geneva.
- Four Seasons* (Per.): Berry very small, conic, whitish, unattractive; flesh tart, flat, poor; plants small, weak, unproductive, midseason. Bull. 401, N. Y. Exp. Sta., Geneva.
- Fred Crampton*: W. E. Collins Company, Fennville, Mich. Not described.
- General Pershing* (Per.): Seedling of McKinley, originated by W. J. Moyle, Union Grove, Wis. Fruited first in 1912. Berry large; plants strong, productive.

- Giant* (of Burbank): Luther Burbank, Santa Rosa, Calif. "The largest bush and largest berries of this class. Medium early, very large bright red berries of excellent sub-acid quality."
- Horsey* (Per.): John W. Hall, Marion Station, Md. Originated with J. C. Horsey, Somerset Co., Md. Berries larger than Klondike or Missionary, as good shipper as Klondike, beautiful bright red flesh. Plant a strong grower. Earlier than Klondike and also bears a fall crop.
- Improved Nich Ohmer*: E. W. Townsend & Son, Salisbury, Md. Seedling of Nich Ohmer. Fruit and plant similar to Nich Ohmer, but season a few days later.
- Isbell's Pride of Michigan* (Per.): S. M. Isbell & Co., Jackson, Mich. Fruit large, smooth, glossy, rich deep red, aromatic flavor. Very productive. Everbearing.
- J. B.* (Imper.): Seedling of Nettie x Aroma. Originated by Louis Hubach, Judsonia, Ark. Fruit above medium, irregular, wedge to conic, furrowed, usually necked, attractive medium red; flesh red to center, juicy, medium firm, pleasantly sprightly, good to very good. Very late in season. Bull. 447, N. Y. Agr. Exp. Sta., Geneva.
- Judith* (Per.): Mass. Hort. Soc., Trans. 1915, p. 176. Originated by Dr. F. S. DeLue, Neadham, Mass. Berry large, irregularly conic, shiny; flesh deep red and without core, firm, sweet, juicy. Very good. Season early.
- Kalicene* (Per.): Seedling of Ettersburg No. 216 x Trebla. Originated by Albert F. Etter, Ettersburg, Calif. Berry good size, heart shaped, very firm, blood red to the center, spicy and highly flavored, belongs to the canning type.
- Kellogg's Big Wonder* (Per.): R. M. Kellogg Co., Three Rivers, Mich. Berry large, very dark glossy red, flavor delicious. Plant vigorous, productive.
- Kellogg's Hercules* (Per.): R. M. Kellogg Co., Three Rivers, Mich. Said to be an extra early vigorous growing variety, producing large fruit. Has been discontinued.
- Kellogg's Perfection*: R. M. Kellogg Co., Three Rivers, Mich. Originated in 1914 by E. H. Riehl, Alton, Ill. Seedling of Rockhills No. 6 probably by Dunlap. Berry large, well formed, rich color, delicate flavor, high quality. Plant vigorous, unusually productive. Everbearing. This variety won the \$1,000 cash prize offered for the everbearer which proved nearest perfection.
- Kevitt's Jubilee* (Per.): Originated by T. C. Kevitt, Athenia, N. J. Plant very vigorous, fruit stems strong, very productive. Berry dark lustrous red.
- Kilcko*: J. B. Wagner, Pasadena, Calif. Not described.
- Komoka*: John Cannon Co., Hamilton, Ontario. "Early and heavy yielder. Fine flavor, large berries."
- Laurel Leaf*: Said to be a mild, delicious, light colored berry with white flesh, desirable for home use only.

- Laxton's Latest*: Berry medium size, wedge to long conic, glossy, light to dark red; flesh whitish toward center, juicy, subacid, poor. Plant unproductive, season late. Bull. 401, N. Y. Exp. Sta., Geneva.
- Lucky Boy*: E. W. Townsend & Co., Salisbury, Md. Fruit extra large, round, firm, sweet. Plant deep rooted, medium size, very drought resistant. Originated by Samuel Cooper, Delevan, N. Y.
- Lucky Cross*: Evergreen Plantation, New Meadows, Idaho. Seedling of Productive, originating with W. M. Freeman, New Meadows, Idaho. Fruit large, brilliant red, white center, very firm, good quality, productive. Everbearing.
- Luqe*: Originated by Albert F. Etter, Ettersburg, Calif. "The most perfect canning berry I have yet produced. Almost as solid and firm as a potato, brilliant red that never fades, and will pick without the husk as readily as a blackberry." Season early.
- Montmorency*: Augustine & Co., Normal, Ill. Berry very large, deep red; flesh deep red, rich, good quality. Very productive. Season of Dunlap.
- Nokomis* (of Minn.) (Minn. 489) (Per.): Seedling of Dunlap x Abington. Originated by the Minnesota Fruit Breeding Farm, Zumbra Height, Minn. Berry very large, conic, slightly necked, medium red, somewhat glossy; flesh light red, fine texture, slightly stringy, sweet, good, probably not firm enough for good shipper. Mid-season.
- Old Glory* (Per.): R. M. Kellogg Co., Three Rivers, Mich. Berry extra large, round, somewhat resembling Chesapeake; plant vigorous, productive, season late. Has been discontinued.
- Pasadena*: Originated by Tice C. Kevitt, Athena, N. J. Florists Exchange June, 1921. "Imperfect flowered."
- Paxton*: Jas. Brand & Co., Vancouver, B. C. "About 10 days later than Magoon; large, fine flavor."
- Perpetual* (of Burbank): Luther Burbank, Santa Rosa, Calif. "Everbearing. The most delicious and constantly productive of this new class. Medium sized berry, oval, light crimson. The plants are multiplied mostly by division as they make few runners."
- President Harding* (Per.): E. W. Townsend & Son, Salisbury, Md. Berry extra large; flesh extra firm, deep red to center, good, medium to very late in season. A chance seedling, originating with Geo. Williams, Wicomico Co., Md.
- Red Cross* (Per.) (Of Etter): Seedling of Ettersburg No. 216 x Trebla. Originated by Albert F. Etter, Ettersburg, Calif. Berry globular, glossy bright red, firm, mild, sweet, rich and delicate, not of the canning type. Plant moderately vigorous, fruit-stems long, upright, very productive. Season very early.
- Rena* (of Etter): Originated by Albert F. Etter, Ettersburg, Calif. "A type of Beach strawberry with very beautiful foliage, and an imperfect blossom that always makes a berry. The fruit is of fine

size and shape, light pink in color with white flesh. The flavor is characteristically that of the Beach strawberry."

- Richmond* (of Thompson) (Per. to semi-Per.): Berry small to above medium, oblong-conic, necked, light red, not very glossy; flesh red, juicy, firm, fair quality; plant medium vigorous, very productive. Bull. 447, N. Y. Agr. Exp. Sta., Geneva.
- Robusta*: Luther Burbank, Santa Rosa, Calif. "Everbearing. Makes numerous strong runners while bearing continuously all the season large, scarlet, oval berries of the most exquisite quality, well above the foliage."
- Scrieber* (Per.): "Of the Uncle Jim type and does not show any improvement on that variety." Spec. Bull. 48, Mich. Exp. Sta.
- Sir William*: S. W. Call, Perry, Ohio. Said to be of poor quality and a poor shipper. Has been discontinued.
- Todd's Late*: H. L. McConnell & Son, Port Burwell, Ontario. "An extra good plant maker and bears an abundant crop of large, perfectly formed, glossy red, firm berries of high quality."
- Trebla* (Per.): Originated by Albert F. Etter, Ettersburg, Calif. Fruit one inch in diameter, very red, very firm, pleasant flavor. Plant very productive. Everbearing.
- Utlander*: A cross between Heart Flush x Strideway, originated by Arthur T. Goldsborough, Washington, D. C., in 1906. Berry large, roundish, crimson; stem medium stout, hairy; flesh pink, very light color at core, medium tender, meaty, moderately juicy, sub-acid, rich, good to very good. Notes on new fruits U. S. Dept. Agr.
- Unique*: Evergreen Plantation, New Meadows, Idaho. Seedling of Productive, originated by W. M. Freeman, New Meadows, Idaho, in 1919. Berry very large, firm, highly colored, plant vigorous. Everbearing.
- Venia*: Mass. Hort. Soc. Trans. 1917, p. 143. "This strawberry is medium early, very prolific, having a long season and holding its size to the last." Originated by Dr. F. S. DeLue, Needham, Mass. This variety was awarded a silver medal by the Mass. Hort. Soc.
- Walnut Stump* (Per.): Seedling of Bubach x Minor's Great Prolific, originated by Silvanus Gordon, Sergeantsville, N. J., about 1900. Berry medium size, roundish-conic, glossy, light red; flesh well colored to center, tart, fair quality. Plant large, vigorous, productive, season late. Bull. 401, N. Y. Exp. Sta., Geneva.
- White Sugar*: Originated by Albert F. Etter, Ettersburg, Calif. Berry extra large, firm, very sweet, white, occasionally blushed. This is a novelty.
- Wilbert*: J. W. Jones & Son, Allen, Md. Berry resembles Aroma, very uniform in size and shape, lively red color. Plant vigorous, productive. Early midseason.
- Williams Improved*: H. L. McConnell & Son, Port Burwell, Ontario. Berry large, dark red, firm, good shipper, good canner. Plant strong grower, healthy.

ORANGE

- Drake*: A bud variation appearing in the grove of Tustin P. Drake, Drake Point, Yalaha, Fla. Fruit large, surface undulating, pitted, dark orange yellow, oil cells numerous, peel tenacious, aromatic; flesh yellowish, translucent, medium tender, pleasant, no bitterness; seeds medium size, plump. Notes on new fruits U. S. Dept. Agr.
- Eureka*: Teas Nurseries, Houston, Texas. "Fruit very large, as large as the largest California or Florida orange; finest quality, thin skinned, almost seedless, splendid keeper. Tree very hardy, vigorous grower, and immensely productive."
- Golden Ring*: Lake Garfield Nurseries Co., Bartow, Fla. Fruit medium size, globular, has a distinctive ring around the blossom end, deep red; flesh rich colored, juicy, sweet, very good, long keeper and good shipper.
- New Satsuma*: Fancher Creek Nurseries, Fresno, Calif. Fruit is of the true Mandarin type, but with more seeds and a month earlier. The flavor is of the best. Tree not as vigorous as Mandarin or Satsuma and has willow-like foliage making it very ornamental. Tree very prolific. Buds were obtained from the French Government Experiment Station in Algeria about 1913.
- Westmoreland*: Teas Nursery Company, Houston, Texas. This variety was formerly called Eureka and is in the report of 1920.

LEMON

- Kenedy*: Originated with John G. Kenedy, Sarita, Texas. Fruit large, highly colored, thin skin, superior acid flavor. Texas Dept. Agr., Bull. 32.

POMELO

- Ellen*: Originated with E. N. Reasoner, Oneco, Fla. Fruit large, oblate, surface smooth, lemon yellow, peel tenacious, aromatic, tissue thin, flavor tart; seeds numerous, plump, bitter. Notes on new fruits U. S. Dept. Agr.
- Patardia*: Originated with C. E. Davis, Dade County, Fla., as a sport of the Davis Seedless. Fruit medium size, round, uniform, skin smooth, waxy, very thin, bright lemon color; texture of flesh fine and tender with little rag; juice very abundant, fine flavor, slight bitterness, spicy; almost seedless. December to March.
- Pink Marsh*: This was discovered in the grove of W. B. Thompson near Oneco, Fla., in 1913, one branch only of the Marsh tree bearing pink fruit. The flesh is a beautiful pink in January and February, but later fades to an amber shade in March and April. A pink strain of the Marsh.

TANGERINE

- Trimble*: Seedling of Dancy Tangerine x Parson Brown orange. Fruit roundish, compressed, large; color deep orange red, surface somewhat rough, sometimes like King orange; oil glands small; rind

loose, thin; flesh deep orange yellow, tender, juicy, sprightly acid, excellent with pronounced bouquet. Tree vigorous, prolific. U. S. Dept. Agr., Yearbook 1904.

Weshart: Fruit roundish, compressed, about 3 inches in diameter, surface smooth, glossy, very attractive; deep orange red, rind loose, thin, oil glands medium size; texture tender, flavor sweet, very juicy, very pleasant bouquet; flesh buff orange. Tree vigorous and prolific. U. S. Dept. Agr., Yearbook 1904.

AVOCADO

Butter: Fruit large, oblong-oblique-roundish, smooth, greenish yellow; flavor mild and pleasant, quality very good. U. S. Dept. Agr. Seed and Plant Introduction No. 36,270. September.

Capac: Brought from northern Ecuador by Wilson Popenoe. Not described.

Carchi: Brought from northern Ecuador by Wilson Popenoe. Not described.

Chota: Brought from northern Ecuador by Wilson Popenoe. Not described.

Collinson: Geo. B. Cellon, Miami, Fla. Fruit weighs 1 to 1½ pounds, broadly pear shaped to nearly round, skin smooth, green. December and February. Guatemala-West Indian hybrid.

Delicious: Orchard and Farm, July, 1921. Seedling originated by Geo. Schrader, Altadena, Calif. Fruit rather small, weighing 12 ounces, pear shaped, dark purple; seed small; flesh very smooth and buttery; flavor unusually fine. March and April.

Eagle Rock: Geo. B. Cellon, Miami, Fla. Fruit large, 1½ to 2 pounds, nearly round, green, Guatemala type. February to April.

Egas: Brought from northern Ecuador by Wilson Popenoe. Not described.

Hawaii: Geo. B. Cellon, Miami, Fla. Fruit large, 1½ to 2 pounds, oblong oval, greenish purple; season June and July.

Huira: Brought from northern Ecuador by Wilson Popenoe. Not described.

Imbabura: Brought from northern Ecuador by Wilson Popenoe. Not described.

Irumina: Brought from northern Ecuador by Wilson Popenoe. Not described.

Kist: Imported from Guatemala in 1914 by E. E. Knight. Not a good variety for commercial planting, the seed is too large for the amount of flesh. California Cultivator, April 2, 1921.

Lulu: Geo. B. Cellon, Miami, Fla. A Guatemala-Mexican hybrid; fruit 1 to 1½ pounds in weight, pear shaped, green; November and December. Quite resistant to frost.

Simmonds: Geo. B. Cellon, Miami, Fla. Fruit large, weighing 1½ to 2 pounds each, broadly pear shaped, green; West Indian type. August and September.

Tamayo: Brought from northern Ecuador by Wilson Popenoe. Not described.

Thompson: California Cultivator, July 16, 1921. Original tree from a seed brought from Atlixco Puebla, Mexico, in 1912. Fruit medium large, weighing from 16 to 24 ounces, rich chocolate brown, shading to purplish tints; flesh fine grained, flavor very good; seeds small. February and March.

Winslowson: Geo. B. Cellon, Miami, Fla. Fruit weighs 1 to 1½ pounds, nearly round, skin smooth, green; seed rather large, fitting tightly in cavity. October to December. Guatemala-West Indian hybrid.

CACTUS

Bijou: Luther Burbank, Santa Rosa, Calif. "Smaller than Elegant. In flavor and form of fruit fully as good as Elegant. Hardy."

Elegant: Luther Burbank, Santa Rosa, Calif. A seedling of the New England hardy *Opuntia vulgaris* x *Opuntia rafinesquii* of the western plains. In the summer the plants are covered with deep yellow flowers which are followed by brilliant scarlet fruits 1½ inches long, ¾ inches thick, and are very good to eat. The leaves are deep green 4 to 6 inches long, 3 inches wide and ½ inch thick, almost spineless. Season spring. Plants hardy.

Quisco: Luther Burbank, Santa Rosa, Calif. Not described.

Saffrano: Luther Burbank, Santa Rosa, Calif. "Produces a large yield of superior orange yellow fruits."

Suprb: Seedling of Smith x Anacantha. Originated by Luther Burbank, Santa Rosa, Calif. "Extra vigorous plant with long, thick oval slabs which almost cover themselves with loads of very large, oval fruit, pale yellow, shaded olive green and crimson. Extremely thin skin which is readily removed from the pale amber, rich, sweet, delicious flesh. Almost seedless. Ripens first of October and remains in good condition for 4 months or more."

Whitefruit: Luther Burbank, Santa Rosa, Calif. "Produces great oval white fruits. The most delicious of all."

CERATONIA SILIQUA

Anahcim: Armstrong Nurseries, Ontario, Calif. Originated with Mr. Langenberger, Anaheim, Calif. "Tree a very strong grower, the original tree being of immense size, bears about 400 pounds of pods annually. The pods are large and rich in sugar."

FEIJOA SELLOWIANA

Andre: Pomona College Journal of Economic Botany. Fruit large, oblong to oval, sometimes slightly flattened; skin thin, rather rough, green; flesh whitish, very thick, granular, pulp fairly abundant, juicy, spicy and aromatic resembling pineapple and strawberry, strongly perfumed, very good.

- Besson*: Pomona College Journal of Economic Botany. Fruit small to medium, oval; skin smooth, green with red or maroon on one side; flesh whitish, medium thick, soft, fine grained, pulp abundant, very juicy, spicy, aromatic, very good; seeds large, rather numerous.
- Choiceana*: Armstrong Nurseries, Ontario, Calif. Fruit oblong, 3 inches long by $2\frac{1}{4}$ thick, has a banana and pineapple flavor, delicious for jelly, jam and sauce, as well as to eat fresh.
- Hehre*: Pomona College Journal of Economic Botany. Originated by H. Hehre, Los Angeles, Calif., from a seed imported from Argentina. Fruit slender pyriform, sometimes curved, large, base tapering, yellowish green; flesh whitish, finely granular; pulp abundant, very juicy, melting, sweet, lacking in aroma, quality fairly good; seeds large, rather numerous. September at Los Angeles.
- Superba*: Armstrong Nurseries, Ontario, Calif. Originated by Wm. Boyes, Torrance, Calif. Fruit large, weighing 2 to 5 ounces, round, green; flavor like pineapple-raspberry-banana. October and November.

FIG

- Carter's Choice*: Commercial Nursery Co., Winchester, Tenn. "It is the largest and finest fig we ever saw. Large, white with yellow bloom, very hardy and prolific."
- Everbearing*: Same as New Hiller.
- Martin*: Ellwood Nurseries, Midlothian, Va. "A heavy bearer of medium to large figs. Requires some protection during winter." Originated near Midlothian, Va.
- Mission Blue*: Same as Mission.

PASSION VINE

- Australian Fruiting Passion Vine*: Luther Burbank, Santa Rosa, Calif. "Hardy in the larger part of California and produces quantities of fruit the size of duck eggs, with a hard shell. Exquisite flavor."

SAPOTA

- Anaheim*: Armstrong Nurseries, Ontario, Calif. Seedling plant was brought from the state of Galisco, Mexico, and planted in Anaheim, Calif., by Mr. Langenberger of that city. Fruit large, shape of a mango, white, very sweet, excellent flavor. Tree good grower of weeping willow habit, very ornamental.
- Gillespie*: Pomona College Journal of Economic Botany. Fruit round, 3 inches in diameter; basin deep and narrow, abrupt, deeply five folded; cavity shallow, rounded or flaring; skin rather rough, pale green, much overspread with russet; flesh white, tinged pale green near skin, very good; seeds 5 or 6 short and broad, blunt, surface reticulated. Tree upright, open headed, very prolific. October to November, at Montecito, Calif.

Maechtlen: Armstrong Nurseries, Ontario, Calif. "Fruit yellow, smooth skin, of delicious peach-like flavor; very prolific."

Parroquia: Pomona College Journal of Economic Botany. Originated from Mexican seed planted by Dr. Franceschi, Santa Barbara, Calif., in 1896. Fruit oval, 3 inches long, $2\frac{1}{2}$ inches wide, yellowish green, smooth; skin thin, tender; flesh creamy white, very good; fruits usually contain 3 seeds not all of which are well developed. Tree upright, open-headed, fairly prolific. October to April, at Santa Barbara, Calif.

San Diego: Armstrong Nurseries, Ontario, Calif. Chance seedling of San Diego Co., Calif. "Round, good size; flesh yellow, firm, and of high quality. Ripens from spring to fall."

ALMOND

Dayton: Milton Nursery Co., Milton, Oregon. This may be an old variety renamed, since several trees of it were found in bearing several years ago at Dayton, Columbia Co., Washington. Where the trees came from is not known. Nut large; shell soft; kernel rich, sweet; tree vigorous, upright, hardy and very prolific.

CHESTNUT

Euphresia: Tree is very prolific, growing in the Santa Cruz Mountains of California. Not described.

Merriman: Maple Bend Nursery, Perry, Ohio. Cross between Paragon and the American sweet chestnut. Nuts very large, sometimes 3 inches in circumference. Tree very hardy, vigorous, very productive. Originated near Perry, Ohio.

Miracle: Luther Burbank, Santa Rosa, Calif. Introduced in 1915. "Will bear the first season every time just like corn or beans. The nuts which are of great size and superior quality are produced in greatest abundance right from the start."

FILBERT

English White: Crow's Nurseries, Gilroy, Calif. "Young and heavy bearing strain; nut oblong, finest quality."

Manitoba Hazelnut: N. E. Hanson, Brookings, S. D. Third generation from the native hazel of Manitoba. Plants very productive.

Noce Lunghie: Imported by the U. S. Dept. Agr. from Istria, Austria, about 1901, or earlier. Has been grown in California. Nut very large, nearly round, good quality, productive.

Pearson's Prolific: Armstrong Nurseries, Ontario, Calif. Said to be an extremely fertile variety used as a pollinizer.

True Kentish: Leonard Coates, Morgan Hill, Calif. "Finest and best flavored but lighter bearer."

HICKORY NUT

- Billau*: The Linn County Nurseries, Center Point, Iowa. "A thin shelled nut with a very full plump meat of best quality. Nut of good size and a free cracker. Native of Linn County, Iowa."
- Dennis*: The Linn County Nurseries, Center Point, Iowa. Originated in Linn County, Iowa. Nut of good size, a very free cracker, with meat of good flavor.
- Edaburn*: The Linn County Nurseries, Center Point, Iowa. "A fine, smooth nut with a very thin shell. Meats crack out very freely and are of good flavor. Native of Benton County, Iowa."
- Grupe*: The Linn County Nurseries, Center Point, Iowa. Originated in Linn County, Iowa. Said to be a superior variety.
- Kelsey*: The Linn County Nurseries, Center Point, Iowa. Nut large, thin shell; full, plump meat of high quality, which cracks out freely. Originated in Linn County, Iowa.
- Kentucky* (Shellbark): McCoy Nut Nurseries, Evansville, Ind. "Kernel very rich and sweet, nut above average in size, very white and good cracker."
- Zorn*: American Nut Journal, Feb. 1921. Supposed to be a hybrid between the Mockernut (*Carya alba*) and the Arkansas hickory, (*Carya Buckleyi* *Arkansana*). Nut like Mockernut in shape and color but much smaller; shell has small, distinctive, vertical furrows and ridges of the Arkansas hickory but is larger in size. Nut very large weighing 31 grams.

PECAN

- Burlington* (hybrid): The Linn County Nurseries, Center Point, Iowa. Originated in Burlington, Iowa, original tree very old but still productive. "Nuts of same shape as pecan, shells a little thicker, very free cracker and unsurpassed flavor. They are nearly as large as the largest Southern pecan, color of shell between that of pecan and hickory."
- Campbell*: The Linn County Nurseries, Center Point, Iowa. Original tree stands near the original tree of Witte. Said to be as good as Witte but smaller.
- Greenbay* (hybrid): The Linn County Nurseries, Center Point, Iowa. "Original tree stands along the Mississippi River and is of great age, nearly five feet in diameter, 65 feet to the first limb and over 100 feet high." Nuts resemble the Burlington but are much larger.
- Liberty Bond*: West Texas Pecan Nurseries, San Saba, Texas. Originated with this nursery company, not described.
- Luce*: Vincennes Nurseries, Vincennes, Ind. Originated in Luce Township, Spencer County, Ind. Nut medium size with moderately thin shell, very good quality. Tree productive.

- Oberman*: The Linn County Nurseries, Center Point, Iowa. About the same size as Campbell, eating quality of the best.
- Oklahoma*: Originated with L. I. Wilkinson, near Ardmore, Oklahoma. This was originally named Darden. Nut fully as large as Stuart and similar in shape with thinner shell; kernel plump, fine quality. Tree vigorous, productive.
- Sabine*: Originated in Newton County, Texas. A very large nut.
- Sherard*: Originated with John H. Sherard, Sherard, Coahoma County, Miss. Nut is good in size, color, cracking quality and flavor. Tree very prolific, first fruited in 1916.
- Twelve*: The Eagle Pecan Co., Pittsview, Ala. "A new and very promising variety of highest merit originating in Alabama. Nuts are bright and handsome, very large, full meated and of fine flavor."
- Williams* (Capt Williams): Originated by Capt. W. H. Williams, Shreveport, La., about 1898. Nut medium to large with four well defined ridges, abruptly tapered at both ends, grayish brown with few black markings near apex; shell medium thick cracking easily and separating readily from the kernel; kernel light brown; partitions medium thick; texture fine grained; flavor sweet, nutty, quality very good.
- Williams* (Dr. W. W. Williams): Originated with Dr. W. P. Williams at Waycross, Ware County, Ga., about 1903. Nut oblong, shell thin, a good cracker, quality of kernel ranks high. Tree vigorous, very productive.
- Witte*: The Linn County Nurseries, Center Point, Ia. Originated in Iowa, along the Mississippi River, 200 miles further north than other pecans of its size. "The nut is a real paper shell and a very free cracker." Said to be as large as any of the Indiana varieties. Quality and plumpness of meat not surpassed by any.

PERSIAN WALNUT

- Barnes*: Vincennes Nurseries, Vincennes, Ind. Originated in Washington, D. C. Nut of average size, quality very good.
- Ehrhart*: Seedling of Santa Barbara. Originated by D. C. Disher, and introduced by V. E. Ehrhart, Santa Rosa, California. Tree vigorous, early to begin fruiting. Nut larger than Santa Barbara, oval with round base, good cracker, kernel medium light brown, plump, pleasant and mild.
- Lady Edith*: Originated in Leroy, New York. Glenwood Nursery, Rochester, N. Y. "Bears good crops regularly. The nut of more than medium size with smooth, handsome, paper shell thickness, full meated, and of remarkable fine flavor."
- Meyers*: Introduced by F. N. Meyers from the mountains of Northern China in 1909. Fruited by Tribble Bros., Elk Grove, Calif., in 1917. Tree very hardy and productive, foliage thick and leathery. Nut very large, roundish flattened at ends, shell thin, cracking quality

excellent; kernel large, almost white, fairly plump, crisp texture, nutty and sweet, quality splendid.

Potomac: The McCoy Nut Nurseries, Evansville, Ind. "A fine nut of excellent flavor."

Solano: Originated with Mr. Hawkins, Vacaville, Calif. Introduced by Chas. Riechers in 1910. Tree very hardy and productive. Nut medium size, oval; kernel white, sweet, high quality. September.

Sorento: Introduced from Sicily in 1915. Fruited by Tribble Bros., Elk Grove, Calif., in 1917. Tree thrifty and a rapid grower, very productive. Nut medium, elongated, shell medium thin, cracking quality good; kernel light color, quite plump, sweet and nutty, very good.

Utah English Walnut: Porter-Walton Co., Salt Lake City, Utah. "Experience with this hardy type has proved that it can be grown in every section of the West suitable to apricots, cherries or peaches." Said to make a beautiful ornamental tree and to bear 6 or 8 years after planting. Nuts of good size and superior quality.

Wilson's Wonder: Bijou type. Originated by F. C. Wilson, Sunnyvale, Calif., and introduced by him in 1910. Tree very thrifty, early to begin fruiting, very productive annually. Nut extra large, slightly pyriform, being smallest at stem end, shell thin, cracking good; kernel plump, large, light color, flavor mild and extra sweet, quality extra good.

THE AVOCADO INDUSTRY IN SOUTHERN CALIFORNIA

DR. W. L. HARDIN,

*President of the California Avocado Association,
Los Angeles, Cal.*

The rapid growth of the avocado industry in Southern California forms a new and important chapter in the horticultural industries of the United States. From a few scattered trees seven years ago, the number has been increased to about 60,000 trees in orchard form. Many of these trees, however, are not of the best varieties and will require topworking. The industry is showing a healthy growth, and the number of trees is increasing rapidly. It is doubtful if any horticultural industry anywhere has ever received so much competent scientific investigation and assistance during its early stages of development as has the avocado industry in Southern California.

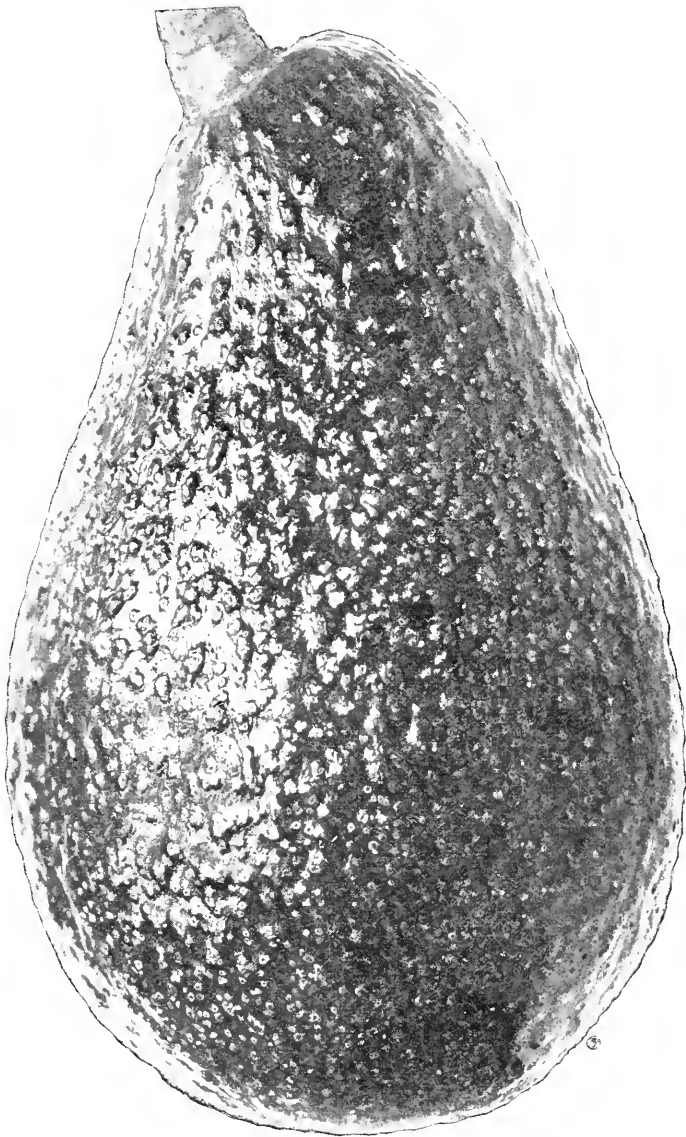
The State University has carried on extensive research on the composition and nutritive value of the avocado. It has published instructive bulletins, and introduced a correspondence course covering various problems involved in the growing of avocados. The United States government has performed a valuable work in determining the chemical composition of the better varieties of avocados at different degrees of maturity. It has sent an expert horticultural explorer to all parts of the world where the avocado grows to secure budwood of the better varieties for propagation in this country and is offering every possible assistance to encourage the growing of avocados in the United States wherever climatic conditions will permit.

The reason for this great activity and interest is to be found in the remarkable character of the fruit itself,—a fruit rich in fat, protein and mineral salts, obtainable every month in the year and requiring no cooking. The avocado has been truly called the “aristocrat of the whole fruit and vegetable world”. The high food value and other excellent qualities of this fruit put it in a class by itself. The avocado replaces meat to a very large extent

in countries where it is extensively grown. It is evidently one of the great undeveloped sources of food in this country.

The avocado has been incorrectly called "alligator pear" in many places in the United States. It bears no relation whatever to the ordinary pear. The avocado belongs to the laurel family (Lauraceae), and is related to such trees as the cinnamon, bay, camphor and sassafras. The varieties of the West Indian and Guatemalan races belong to the species *Persea americana*, while the varieties of the Mexican race belong to *Persea drymifolia*. The avocado is a native of tropical America and grows wild in large numbers in Mexico, Central America and parts of South America. The varieties grown in Southern California belong to the Mexican and Guatemalan races. Most of the plantings at present are being limited to the Guatemalan varieties, but an effort is being made to introduce larger and more satisfactory varieties of the Mexican race. The leaves of the Mexican varieties have an anise odor, and the fruit has a very thin skin. The Guatemalan varieties have thick, leathery or woody skins.

Avocadoes grow on beautiful evergreen trees which resemble somewhat the magnolia tree, and which are larger, in many instances, than large apple trees. Trees of the Mexican varieties will probably stand more cold than citrus trees, while the Guatemalan varieties are somewhat less hardy than citrus trees. The size of the fruit varies from a few ounces to several pounds, the better varieties varying from one half pound to three pounds. The shape varies from round to oval or pear shaped. The color varies from light green to dark purple, sometimes black. The avocado has one large seed. The trees do not come true from seeds. Desirable varieties are propagated by budding onto the young stock of the hardy Mexican varieties, or by top working older trees by means of buds or grafts. The varieties which are being propagated in large numbers in Southern California at present are Fuerte, Spinks, Puebla, Sharpless, Queen, Lyon, Dickinson, Taft, Linda and a few others. The government is introducing a number of promising varieties from Central and South America, but these have not been grown long enough in this country to fully establish their desirability as varieties for propagation. The hardier varieties in the tropics are selected by taking buds from trees growing on the highlands where the temperature goes down at times to 25° Fahrenheit or lower.



The avocado when properly matured and ripened is a very delicious fruit, differing from most other fruits in that it is not juicy, being neither acid nor sweet. It is smooth and buttery in consistency, and has a rich nutty flavor which characterizes it from all other fruits. The better varieties of avocados contain from 15% to 30% of fat and from 2% to 4% of protein, which are easily digested. They contain much less water than ordinary fruits. Mineral matter, which has been found in recent years to be so essential to a healthful diet, is found in the avocado in much larger quantities than in other fruits. Avocados should not be removed from the trees until mature. They are softened off the trees within one to two weeks after picking. When ready to eat they should be soft enough to spread on bread like butter. They may be eaten on bread or crackers with a little salt as the main part of a meal, or they may be eaten as a salad with a little salt or French dressing. They make an excellent cocktail and are fine frozen in ice cream. Avocados have a high food value and should be used as a substitute for meats or other heavy foods. Wherever grown in quantity they are a staple article of diet.

It is unfortunate that the high prices which have prevailed in the United States have caused considerable prejudice against the avocado. The high prices have been due to the fact that the demand has been much greater than the supply. Those who can afford it and who know something of the high food value and other excellent qualities of the avocado have been willing to pay almost any price for it. As production increases, the price, of course, will decrease. On account of the high food value, however, no one should expect the prices of avocados to go down to the prices of apples, peaches, pears and similar fruits. As the supply increases avocados will be sold by the pound on the basis of the prices of butter or a good quality of meat. On that basis the consumer will get full value for the prices paid.

It is only natural that so remarkable a fruit as the avocado and so promising an industry as the avocado industry should call forth such an organization as the California Avocado Association. This organization, which began seven years ago with a few charter members, now has nearly 500 enthusiastic and energetic members. The short history of this association shows a spirit of harmony and cooperation seldom equalled. The association has cooperated with the state and national governments in carrying

on scientific investigations on the avocado. Its members have brought in budwood from some of the best varieties in Mexico and Guatemala. The organization is making a careful study of the climatic and soil conditions best adapted to the growing of this fruit; it is making a study of the avocado industry in various other countries; it has eliminated many of the less desirable varieties; it has recently started a cooperative marketing department. In general, the work of this association covers every phase of the avocado industry. The members meet twice a year for the reading of papers and the discussion of matters pertaining to the development of the industry, and the annual reports of the California Avocado Association, in which these papers and discussions are published, are veritable storehouses of information on the avocado and the avocado industry. So important has this work been that the association has among its members representative horticulturists from all parts of the world where the avocado can be grown.

THE FACTS CONCERNING CALCIUM ARSENATE*

BY J. H. REEDY

At the outset of this discussion, it should be stated that this subject will be considered wholly from the stand point of the chemist, rather than that of the practical horticulturist. No pretensions as to expertness are made as to the strictly biological aspects of the problem. This paper is based on a study of calcium arsenate in a chemical laboratory, and is intended to be supplementary to the field experience of those who have used this insecticide; to this end, it is offered with the hope that it will give a satisfactory explanation of the results that have been obtained by the use of this material.

Capricious Behavior — During the past few years, calcium arsenate has been tried more or less extensively as a substitute for the more expensive arsenical, lead arsenate. Reports of its success have been, to say the least, conflicting. In some cases it seems to have worked satisfactorily and its users have recom-

* Presented at meeting of Illinois State Horticultural Society, December, 1921.

mended it strongly; to others, it has played havoc, "burning" the foliage, or even killing the plant itself.

This decidedly capricious behavior was found to be due to varying amounts of water soluble arsenate, which ranged all the way from 1 per cent to 8 per cent, or even 10 per cent. This water soluble arsenate seems to be the active toxic ingredient of the insecticide, and the injury to plants was traced to its presence in excess. As a result, .75 per cent of As_2O_5 was fixed as the upper limit of soluble arsenate that might be present in the material if it is to be used without injury to the plant. As a result of the enforcement of this ruling, carload after carload of rejected calcium arsenate was returned to the manufacturer, upon whose hands it is a dead loss, since there is no way of reworking the inferior product. Since the records of the manufacturer show that the material was up to specifications at the time it was shipped, the first surmise was that the decomposition of the calcium arsenate in transit was due to the action of the moisture and carbon dioxide of the air. This led to the use of air-tight containers, which seemed to improve the situation to a certain degree. However, this was not sufficient to prevent the deterioration of the material.

At the same time the manufacturers were having troubles at home, in that they were not able to "control" their methods so as to give uniform products. Using the same procedure and technique, the products of different "runs" might differ widely in soluble arsenate content. One batch might be of excellent grade, while the next one, made from the same materials and using practically identical technique, would have to be rejected.

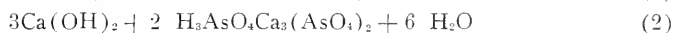
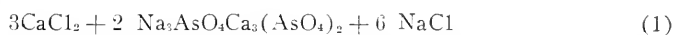
In order to understand this phenomenon, it is well to review some of the chemical relationships of the calcium arsenate industry. In the first place, calcium forms at least three well-defined arsenates, viz.:

$Ca_3(AsO_4)_2$	$CaHAsO_4$	$Ca(H_2AsO_4)_2$
Tertiary (or Tri-)	Secondary	Primary
Calcium Arsenate	Calcium Arsenate	Calcium Arsenate

The most noteworthy difference between these three salts is their solubility. The first one, while frequently called "insoluble", is not absolutely. It has a certain low solubility, which gives a concentration of soluble arsenate which seems sufficient to be kill-

ing for insects, but not enough to "burn" the foliage. The secondary calcium arsenate is much more soluble, and its use would cause serious damage to the plant to which it is applied. The primary arsenate is still more soluble, its solubility being of the same order as its analogue $\text{Ca}(\text{H}_2\text{PO}_4)_2$, commonly called "super-phosphate of lime". Furthermore, this last material appears — at least, at high temperature — to be decidedly unstable, breaking down into one of the other arsenates and free arsenic acid. That if used as a spray material for plants would be disastrous, is easily seen.

Preparation — Two general reactions suggest themselves as suitable for the preparation of tricalcium arsenate:



Equation (1), however, gives a product whose soluble arsenate content is considerably in excess of .75 per cent, and evidently does not represent the total reaction. Analysis shows that the product approximates the secondary arsenate, CaHAsO_4 . Furthermore, filter-pressing or washing is not sufficient to reduce the soluble arsenate content so as to even approach that of tertiary calcium arsenate. This leads to the conclusion that, even if it is assumed that $\text{Ca}_3(\text{As}_4)_2$ is the primary product, secondary reaction occurs, converting the product into CaHAsO_4 with practical completeness. This secondary reaction is represented thus:



Reactions of this type chemists call "hydrolysis". Equation (2) gives, under proper control, the best grade of product and represents the method generally used. The $\text{Ca}(\text{OH})_2$ is in the form of "milk of lime", and is made by thoroughly slaking pure lime, and then adding water in excess until a smooth thin paste is obtained. The arsenic acid, H_3AsO_4 , is prepared by the action of nitric acid, HNO_3 , on arsenic trioxide, As_2O_3 , (the "white arsenic" of the druggist); the resulting solution is then evaporated until the excess of nitric acid is expelled. The arsenic acid solution is introduced into the lime paste very slowly, the mixture being thoroughly stirred during the process. The amount of lime used is always in slight excess of the theoretical amount. This not only

prevents the possibility of an excess of arsenic acid, but the excess lime also tends to inhibit the hydrolysis of the calcium arsenate, which, as mentioned above, results in an increased soluble arsenate content. The calcium arsenate is formed as a white precipitate, and is separated by filtration and careful drying.

Besides low solubility, another quality required for tricalcium arsenate, if it is to be used as a spray material, is fluffiness. This is necessary for the formation of slow-settling suspensions. This fluffiness is due, to be sure, to fineness of the particles, since suspensibility depends directly upon the size of the particle. This fluffiness may be of importance in another way. Physicians are familiar with the fact that finely-divided substances are much more reactive than the same substances in coarser grain, largely due to increased surface, though doubtless the increased solubility of fine particles has something to do with it. In a similar way, fine calcium arsenate is probably much more reactive than the ordinary form, and not only goes further, but has greater "killing" power. Experiment has led to the conclusion that fluffiness is best obtained by allowing the action between the lime and the arsenic acid to take place at high temperatures — say, 80° — 90° C. Chemists recognize the fact that this preparation from hot solutions favors a certain amount of hydrolysis, but it seems that the requisite degree of fluffiness cannot be obtained in any other way.

Instability—We now come to consider how tricalcium arsenate, with a soluble arsenate content well within the limit of safety, can so change its nature as to cause all of the havoc that planters and orchard growers have attributed to it; furthermore, why one batch of the material should behave in one way and one in another.

Our explanation is that tricalcium arsenate is a metastable substance. We use the term "metastable" in the sense of unstable, only the peculiar conditions favoring the change are lacking. What is meant may become clearer by an illustration. A stick of dynamite is an example of a metastable substance. It may persist as such for an indefinite length of time, until the proper agency—the explosion of a cap—affords or provides the requisite condition for the materials that go to make up this dynamite to change into more stable forms. Chemists call these agents which initiate or facilitate the change of a substance from

a metastable state to a stable state "catalytic agents", or "catalysts". In the case of the explosion of the nitroglycerin of the dynamite, the shock of the cap is the catalyst, though other substances are known which will effect the same changes. Tricalcium arsenate appears to be instable in just the same sense, though its change to the more stable form is by no means so rapid and noisy and destructive.

Our first clue as to what might cause the decomposition of tricalcium arsenate came from consideration of equations (1) and (2) above. It will be noticed in the first equation that salt, NaCl is formed, and it occurred to us that this might catalyze the decomposition of our product. In the second reaction, however, water is the by-product, and this is a substance that, as a rule, is not regarded as a catalyst for such reactions as this. Actual experiments showed that the surmise was correct. The presence of very small amounts (e. g., .02 per cent) of such salts as NaCl, FeSO₄, and so forth, were found to increase the amount of soluble arsenate 20 to 100 fold. This salt effect explains many points: First, why tricalcium arsenate cannot be prepared by equation (1); second, why pure lime and arsenic acid must be used in its preparation; third, why the use of impure waters in making up the spray solutions have caused such marked cases of burning of foliage.

Since the decomposition of tricalcium arsenate requires water as a factor in the reaction (see equation (3) above), it is readily seen that moisture may exert a marked effect in this change. We are led to believe that one condition for the permanence of our insecticide is that it must be kept dry. On the other hand, the presence of any deliquescent substance in the calcium arsenate will keep the material moist, and may also behave as an active catalyst in its decomposition. This suggests one reason why manufacturers have had trouble. Their arsenic acid as we have seen, is made by the action of nitric acid on arsenic trioxide, and it is not easy to remove all of the excess nitric acid. Upon mixing this impure arsenic acid with the lime, some calcium nitrate, Ca(NO₃)₂, is formed. This substance is very deliquescent, and at the same time catalyzes the decomposition of the calcium arsenate.

It is a general rule that heat will favor hydrolytic reactions such as this one. This would lead us to the conjecture that cal-

cium arsenate would prove less satisfactory in the hot, moist climates of the southern states, than in the colder climates of the middle west.

Stabilization—A great many people have suggested that materials might be admixed with calcium arsenate that would inhibit its hydrolysis, or, in other words, stabilize this metastable substance. Such catalysts are called by chemists "negative catalysts".

It has been reported by certain investigators that calcium arsenate might be stabilized by the presence of a small excess of lime. If equation (3) is a "reversible" reaction, that is just what chemists would expect. It can only be said that by using lime in excess and neglecting the other influences that may condition stability, the injurious effects upon crops have not been averted. This may be due to the combination of the free $\text{Ca}(\text{OH})_2$ with the CO_2 of the air, or with impurities present in the water used in making up the spray. At any rate, the removal of the $\text{Ca}(\text{OH})_2$ by any means whatsoever would "displace equilibrium to the right" and bring about the formation of the fairly soluble secondary arsenate, CaHAsO_4 .

Another device for stabilizing this material is the admixture of cane sugar or other so-called "inert" substances. We understand that experiments along this line are in progress, though no reports are yet available. The effect of such substances might affect the arsenical sprays in several ways: it might lower their surface tension, or it might increase their viscosity; it might prevent the excessive evaporation of the water, and improve their adhesiveness to the plant surface; or it might repress the reactivity of the impurities that tend to promote hydrolysis. An attempt at appraisalment of such practice would be premature at this time.

An Italian, according to a recent report, has succeeded in preparing calcium phosphate in what is known as the "colloidal" condition by precipitation methods in such media as gelatine, gum arabic, starch, and so forth. Judging from the close analogy between arsenates and phosphates, it would be expected that calcium arsenate would assume this colloidal condition also. These colloids appear to be dissolved in the water of the solution, though it is now known that the phenomenon is not one of solution, but

of suspension, the particles being too small to be visible to the eye. Biologists have found these "colloidal solutions" to have marked physiological activity, and very probably that will be true in the case of calcium arsenate. One of our students has taken up the problem of preparing this active form of calcium arsenate, and its fungicidal properties will be investigated in the botanical laboratories of the University of Illinois. The prime question in this work is the stability of the colloidal material. If the toxicity of a given mixture does not increase upon standing, there is good reason to hope that by the use of small amounts just the correct toxic value can be obtained to kill insects without injury to the plants. The whole problem, however, depends upon stability.

Mixing with Other Spray Materials—There is one other point that should be mentioned in this connection, and that is the effect of mixing this insecticide with such other materials as lead arsenate, lime-sulfur mixture, and the like. In a bulletin from the Michigan Agricultural College, Patten and Bergen state that lead arsenate will reduce the solubility of calcium arsenate to practically nil. Others have compounded calcium arsenate with lime-sulfur mixture (i. e., calcium polysulfides). At the present it is not advisable to take a stand on either side of propositions like these, for the very reason that the behavior of calcium arsenate itself is too indeterminate for the influence of the admixed substance to be isolated. Theoretical considerations may be said to indicate that the soluble arsenate content would be diminished or repressed, owing to what is called the "mass effect"; on the other hand, we have just pointed out that the presence of salts promote the decomposition of calcium arsenate. These two influences oppose each other, and the correct answer to the problem can be known only by means of very careful analytical work with the purest materials obtainable. In the Chemical Laboratories of the University of Illinois there has just been started some work which looks to the determination of the soluble arsenate content of a solution by a very quick and accurate electrical method. It is hoped that this will throw some light on these problems.

By the way of summary, I might say:

Calcium arsenate is a metastable substance, and whether or not it will meet the needs of the practical horticulturists is a matter that they will have to decide for themselves. It is a gamble,

for a certain risk will always be involved in its use. It may turn out that the collective experience of the horticulturists of the country will vindicate its use. It will be, strictly speaking, a matter of averages. As a chemist, I would make the following suggestions as to its use if the best results are to be obtained:

- (1) The material should be as fresh as possible.
- (2) It should have been kept dry at all times previous to its immediate use.
- (3) As pure water as possible should be used in making up sprays.
- (4) In all cases, analysis for soluble arsenates should be run at the time of delivery to the consumer.
- (5) Its use will probably be more satisfactory in the milder climates, rather than the south.
- (6) The effect of combining it with other insecticides is not yet definitely known, since the action of the latter may be masked by the indefinite behavior of calcium arsenate itself.

PRODUCTION OF APPLE AND PEAR SEEDLINGS*

I. M. ORNER

The growing of apple seedlings is an important industry in the Kaw River valley. It is estimated that 90 per cent of all the seedlings grown in the United States are grown within a radius of twenty-five miles of Topeka. The commercial crop consists mainly of apple and pear seedlings. Practically all of the seed for the apple and pear seedlings is imported from France and Japan. The apple seed is supposed to be from a variety of French crab. The preparation of this seed for the market is an important industry in France and the process of extracting the seed from the pomace without crushing it is unknown to the American people. The apple seed received by growers in this vicinity is shipped from a distributing center on the Atlantic coast, and this distribution point is nearly always the city of New York. The seed arrives in large barrels packed in charcoal and is separated

* Read at the 55th meeting of the Kansas State Horticultural Society.

from the charcoal by using a fanning mill. The seed is then soaked in clear water for forty-eight hours, after which it is packed in ice until time of planting, when it is dried sufficiently to readily pass through the seeder which is used in planting the seed. An ordinary wheat drill arranged to plant rows twenty-four inches apart is quite satisfactory for planting the seed. The planting is done during March and April. The seed is covered to a greater depth than other seed of this size. This is for the purpose of keeping the seed bed moist which aids germination. As soon as the seed is sprouted the extra covering of earth is removed by a stroke of an ordinary garden rake and cultivation starts immediately.

The first cultivation is given by using a wheel hoe. Care must be taken to prevent the forming of a crust, which, when disturbed is apt to break the tap-root which prevents the growth of the young seedlings. A man will wheel-hoe about one acre a day the first time the seedlings are cultivated. A specially prepared horse cultivator is made that will cultivate half as many rows at a time as there were planted at a time with the seeder. Small mules about the size of cotton mules are perhaps the best power that can be used for drawing this cultivator. When the weeds start after the cultivation begins, weeding must also be started. Seedlings are one of the crops that will not tolerate weeds at all. Boys from the age of ten years to those of fifteen or sixteen years of age have proven to be the best weeders obtainable. The work is not very difficult if the weeding is begun at the proper time. The crop is cultivated about ten times during the season. Cultivation must be given just as soon as the condition of the soil will permit, after each rain. The crop must be weeded as often as the weeds begin to show in the rows, about three times during the growing season.

Apple and pear seedlings are usually grown on the ground which is generally prepared the previous fall by extremely deep plowing — twelve to fifteen inches. This enables the seedlings to make a long straight root, ordinarily growing down as deep as the ground is plowed. The seedlings make a part of their growth during the late fall and continue to grow up to the time of severe freezing. When the weather is favorable, the harvesting of the seedling crop begins, about the first of November. The seedling

growers have a very ingenious digger which consists of a blade of steel about ten inches wide at the bottom and bent in the shape of the letter V to which are fitted a plow beam and handles. At the bottom of the V there is welded a riser which pushes the seedlings up two or three inches in the loosened ground, this enables them to be quite easily pulled. As the seedlings are pulled they are placed in bundles of about 100 each, these bundles are tied with tarred string and lightly buried in the soil and remain there until gathered by the haulers. The bundles are taken to a cave or cellar where the seedlings have a part of the top removed, heeled in and then covered with a mixture of straw and manure to prevent freezing and are left there until they are graded. The seedlings are graded into several classes; one-fourth inch, three-sixteenth inch, two-sixteenth inch and one and one-half sixteenth inch.

The great advantage of the Kaw river soil is that there can be grown seedlings which are capable of being cut into several grafts, which form the piece root grafts for the great majority of the apple and pear grafts that are planted in the United States. Apple seedlings and pear seedlings grown in this territory are shipped to all parts of the United States and Canada where grafting is practiced. The greatest growers of seedlings in the United States have their headquarters in Topeka. Although the soil in this territory is especially adapted to the production of seedlings, it is not profitable to raise more than two successive crops of seedlings on the same ground. Several years must elapse before that piece of ground is again planted to seedlings. Land must have sufficient fertility to produce a large growth of wood for this crop. It is not unusual to dig one hundred thousand apple seedlings from an acre of ground.

The producing of apple and pear seedlings is not very complicated or difficult, and if one requires only a few thousand it will be better to have the professional grower produce them. Seeds from native apples will produce good seedlings. The great trouble is in preparing the seed so that a crop may be produced from them, and until there is some improved method for separating the seed from the pomace, we will be compelled to import our apple and pear seed.

COMMERCIAL PEACH GROWING*

J. E. KHLORE, *District Manager,*
The American Fruit Growers, Inc., Hancock, Md.

What is commercial peach growing? I sometimes think that secretaries and program committees use the word "commercial" to inform the audience that the speaker is a farmer instead of a professor, but having been duly informed that the speaker is a farmer, I believe that we should inquire a little further as to the meaning of the word "commercial." Commercial peach growing to me means growing peaches for profit. I feel sure that most of you present will agree that if this definition is not correct, perhaps a better definition would be — trying to grow peaches for a profit.

Since we are engaged in growing peaches for profit, we are vitally interested in the factors which influence the amount or extent of that profit. Fundamentally, profit is the margin between cost and selling price. I do not intend to discuss the factors influencing the cost of production, but shall confine my discussion to the factors influencing the selling price. You will agree, I am sure, that the most important single factor influencing the selling price of peaches is *quality*, and that the amount of your profit is likely to be determined by the *quantity* of high quality fruit at your disposal. This would be true if it were not for the existence of another factor which seems to have a more far-reaching effect in many cases than either quality or quantity. That factor is *supply and demand*.

Since we wish to attack this problem of securing profits in a logical manner, we must know just what we can do to grow fruit of better *quality*, how to increase the *yield* of high quality fruit, and finally having satisfied ourselves that we have done all in our power to increase our profits in this manner, we want to dispose of our crop to the best advantage.

Quality is dependent on a number of factors, but practically all of them, fortunately, are more or less under our control. *Elevation* for instance influences the color and snap of the fruit,

* Read at meeting of Pennsylvania Horticultural Association, Harrisburg, January, 1922.

gives it the life which it would otherwise not have. The *soil* influences the growth of the tree, and by its depth, tilth and fertility has an important effect on the quality of the fruit. Both of these factors can be determined or regulated by the owner. The grower is likewise responsible for the quality of the fruit as it is affected by what we may properly term cultural practices. A well proportioned pruning program, followed by the application of the necessary fertilizing elements in the correct proportions, and supplemented by thorough cultivation to insure sufficient moisture to mature the crop, all these things add to the quality of the fruit. Spraying and dusting protect the crop from the insects and fungous diseases which tend to make peach growing such a hazardous undertaking, while careful packing presents the product to the consumer in the most attractive shape. Each of these operations, you will observe, is influenced to a greater or less extent by the desires of the grower.

Subject always to weather conditions, the quantity of fruit is almost as readily determined as the quality, and we are able to a certain extent to insure ourselves from the loss attending a frost by selecting orchard sites with sufficient elevation and air drainage to minimize the hazard in that respect.

What then is the limiting factor which determines the profits from commercial peach growing? H. P. Gould, who has written a very good book on peach growing, says "That the profitableness of peach growing in any location depends in no small measure on the sequence in which the Elberta peach ripens there in comparison with its ripening period in other localities with which it comes in contact on the markets." In other words, in so far as we are concerned, the limiting factor is supply and demand which may properly be translated the "geography of peach growing."

Let us examine the peach growing areas in the eastern and southern sections of the country, and ascertain if possible what effect they have on the profits from our ventures here in the north. With the Elberta only in mind, the peach season commences about July 1st in northeastern Texas. Over a series of years, the section which comes in next is usually southwestern Arkansas, where the Elberta season lasts from July 10 to the 15th. While the Fort Valley section usually ships Elbertas from July 15th to 20th, it sometimes happens that the growers in Georgia are shipping Elbertas prior to Arkansas. The Elberta

season in North Carolina follows close on the heels of the Georgia and Arkansas season, and is over by the 5th of August. With the exception of minor shipments from southern Virginia and West Virginia the next section of importance in order of ripening of the Elberta is northern West Virginia and Maryland, where the season normally starts about August 20th and continues to the first of September. New Jersey and Delaware usually start shipping Elbertas about the 25th of August and continue until the 5th of September. The usual date of ripening of the Elbertas in southern and southeastern Pennsylvania is September 1st to 10th, although certain sections, notably that region north of Hagerstown, is somewhat earlier.

What does this mean to you as a grower of peaches in Pennsylvania? It means that from about July 10th until you start shipping Elbertas in late August, or early September, there is an almost constant supply of Elbertas from districts south of you. That in itself is a statement without much meaning, unless further analyzed. But let me show you how vital this fact is to you, even though you are not shipping peaches in carlots to the larger markets. — Although I have not had access to the government records, it has been reported that the Georgia crop last year was in excess of 6,000 cars. Most of this fruit is consumed in eastern and northern markets, and is not all confined to the large cities. I know one firm who canvassed thoroughly every town of 2,000 or more inhabitants between Johnstown and Harrisburg, and several towns east of Harrisburg in an endeavor to dispose of Georgia peaches in carloads if possible, but in less than carloads if necessary. Under normal conditions the early peaches would have been ripening in Pennsylvania at that time, and you would certainly have felt the effect of the southern competition.

But there are other ways in which your profits are influenced by your southern neighbors. All of you know that the peach market is extremely fickle, and that it fluctuates violently when there is no reason apparent to the grower. There are several reasons for this fact. The peach market is usually established during the Georgia shipping season. The appearance of worms or brown rot in Georgia peaches has had, and probably will continue to have a very far-reaching influence. Buyers who appreciate the fear of brown rot on the part of the wholesaler

and retailer are quite likely to use this fact in securing fruit at considerably lower prices from the grower.

During the past season I happened to be engaged in packing Elbertas in southwestern Arkansas. Because of the fact that the Texas crop of Elbertas was a failure in so far as carrying qualities were concerned, I knew of several buyers to remain in our packing house almost a week before buying a car load of peaches. They were afraid to buy on surface indications, preferring to wait until some of our fruit arrived on the market, in order to assure themselves that Arkansas Elbertas had no brown rot. If we had been depending on local buyers our profits certainly would have suffered.

The readiness with which the public absorbs the shipments from the south certainly has a marked effect on the price paid for the same variety from later sections. Due to the perishable nature of the fruit, the disposal of a crop of peaches, particularly where that crop is largely Elbertas, is usually a matter of days rather than weeks. Dealers are not slow to take advantage of that fact, and relying on the information gained in the crops from southern districts, use every means in their power to recoup losses and increase gains by manipulation of the crops from northern sections.

But the most marked effect of the southern grown peach, and by that I mean the peach grown in any section earlier than our own, is the residual effect on the market. Following each other so closely as the shipping seasons of the different sections invariably do, there is a sluggish period on the market almost every year. The effect is so marked, and so far-reaching as to merit our closest attention. Let me cite an example. As I have mentioned before, Georgia had an exceptionally large crop of peaches last year. The ripening period was several weeks earlier than usual, throwing the peak of the Elberta season about July 10th, on which date the first cars were moving from southwestern Arkansas. What was the effect on the f. o. b. price of the Arkansas Elbertas? The best quotation for the first two days of the season was \$2.25, but in about three days, when the bulk of the southern crop had disappeared from the midwest markets, the price began to jump about \$.25 each day, until at the end of the twelve-day season the f. o. b. price for the same quality peach was \$4.50 per bushel, while two days later on my return through

North Carolina, I learned that choice Elbertas were being quoted at \$2.50 per bushel on board the car. This difference in price in the case of the North Carolina peaches was primarily due to the fact that they were being shipped to New York, Philadelphia and Boston, at which points there were about eight hundred cars of Georgia Elbertas in storage, and the influence of the Georgia peach crop was felt as far north as New York State, because not all of them had been removed from storage when New York Carmens were being shipped.

I think you will see from what I have said that the price you will receive for your peaches is quite likely to be influenced quite markedly by concurrent shipments from districts earlier than that in which you happen to be located. How can you overcome the disadvantage arising from your location? This is not an easy question to answer, but there are certain ways in which this effect can be minimized.

Those of you who are contemplating planting new orchards or replanting old orchards, will, I am sure, pay much more attention in the future than you have in the past to the varieties which you plant. This is of vital importance.

Those of you who have large bearing orchards of varieties which conflict with Elbertas, or other more salable varieties, will take advantage of all of the information sent out by your experiment station concerning the methods of regulating the ripening period of those varieties by means of varied applications of fertilizers.

And all of you, whether you have just planted your orchard or whether it is in full bearing at this time, will, I am sure, pay a great deal more attention to your neighbors on the south and the east. You will know his varieties, his expected crop, and when that crop is to be marketed. Furthermore, you will have a daily acquaintance with the market conditions, not only of your local market, but in the large city markets as well.

You have seen how your profits are vitally affected not only by what kind of a peach you grow, and how many of them you sell but by what your southern neighbor is growing and selling. Your local cooperative association, your state bureau of markets, and all of the government agencies, as well as the State College and Experiment Station annually publish an immense amount of

valuable information dealing with this subject, but it remains for you to reap full advantages from these facilities.

The profit from commercial peach growing is two-thirds under your control, and a greater part of the remaining third can be secured by facilities already provided, presuming of course that you are on the alert.

MODERN PRUNING METHODS*

DR. J. K. SHAW,

Massachusetts Agricultural College

I am not going to give you any system of pruning trees, because I do not believe there is any definite procedure which may be set forth that is not subject to criticism. No one system will work for all varieties under all conditions better than any other system.

Before talking about pruning methods, I want to call your attention to the way the tree grows. You are all familiar with trees. You know that the growth in length of the trees is entirely near the growing tip. It follows that the head of the tree and the branches will never be any further from the ground than they are when they come out in the young tree. The growth in diameter takes place always between the bark and wood. Sometimes we get two rings, but usually only one ring during the summer.

Now the new growth that grows out of the terminal buds each year has on it single leaves arranged in regular fashion, and in the axil of every one of these leaves is a bud. I want to show what becomes of these buds. They will do one of four things. They may fail to develop at all, but die and drop off. They may make a little rosette of leaves, not growing very much, but make a rosette for a year or possibly two, and then die. Some of the buds will develop into short or long shoots, according to conditions, and these leafy shoots repeat this same history. Fourth, they may develop into fruit spurs. These make a short growth, amounting to a rosette of leaves the first year, and after that they form a fruit bud and a spur.

* Delivered at 30th Annual Meeting Connecticut Pomological Society, December 13, 1921.

The buds that fall off are of no use. Those that make leaves are of a great deal of use. The presence of these rosettes of leaves on the trees help to make the tree stocky. They fatten the trunk of the tree. You will find if you cut the rosettes off you get a very slender growth. We tried a scheme for getting just the kind of tree we wanted by taking a one-year whip, and removing the buds we did not want to grow, and leaving those we did want. When we did that the trunk of the tree was too slender. We must have these rosettes to give strength to the stock.

We certainly would want a few of these buds to develop into leafy shoots. I can't see the use for a great many of these shoots, — just enough to produce new bearing wood in the future years. Of course we want to have all the spur buds we can get when the tree comes to bearing age. We want all the buds the tree can develop into mature fruits.

Just a word more about the fruit buds. Not all the fruit buds on trees are spur buds. On the Northern Spy only a small percentage are spur buds. There are two other kinds of buds. One, the terminal shoot bud, from four to six inches long, as on the Ben Davis and McIntosh. A young tree produces more of these than old bearing trees. Then on some kinds, as Wealthy and Wagener, we have lateral buds. These are where the one-year bud instead of developing into a leafy shoot may develop a fruit bud, so that the second year after a shoot is produced we have lateral buds, particularly in young trees. Our Wealthy crop last year in Amherst was due to lateral buds. The spur buds were killed, but the lateral buds came out later and escaped the freeze.

Now with these fundamental facts as to growth and fruit bud production, let us proceed to discuss systems of pruning. In the first place, I think we have sufficient evidence to say that pruning is always a dwarfing process. The tree that is pruned will never be as large in the future as if no branch had been removed. The difference in size is not great. We have an experimental pruning orchard of 600 trees in Amherst, and there was a difference in trunk increase a year ago this summer of .18 millimeter between the smallest and largest trees, and these trees received quite different amounts of pruning. If the practice is continued it will make quite a difference in the size of the trees. The dwarfing process in itself is not necessarily harmful.

There are two ways of pruning a tree. One is by heading back, — by cutting off a one-year shoot, or by cutting back into two or three or four-year wood. The terminal buds have a strong tendency to start out when you head back in one-year wood.

The result is that next year you have two or three branches instead of one. They shade each other and shoot up for air and light. So the process of heading back in one-year wood is liable to be unsuccessful in keeping the top low, because this process causes them to shoot up perhaps as high as before.

Another effect of heading back young trees which is quite serious is the effect it has on the branch angle, that is the angle at which the branch comes out from the trunk. If you cut back a main branch, the branches will come out at a sharp angle, which will be weaker than a broader angle. This is important with the Baldwin and with the Wealthy, and not so important with the McIntosh, because it is hard to spoil a McIntosh tree by pruning, but you can spoil the Baldwin or Wealthy quite easily.

The effect of cutting back trees about to come into bearing is that it promotes a tendency for the buds either to fall into this first class, making little or no growth, or to grow out into leafy shoots; few of them seem to make fruit spurs. That is apparently the reason why heading back delays bearing. Some of the buds grow more than they ought to, and others fail to grow at all. When you thin out the top of a tree it does not have this tendency to make the tree shoot up in the air and make a dense top. The branches will be more evenly balanced, and the leaves which you have on the trees are better exposed to the light.

I do not absolutely condemn heading back young trees. I think with certain varieties it may be desirable, but I feel that there has been a great deal of damage done by too severe heading back of young trees by getting weak angles, and we are now reaping the results by having some breakage in Baldwin trees ten years old. We shall have to spend some time and money wiring up these trees this winter.

There are five more or less well recognized types toward which a fruit grower may prune a tree. One is the vase form, where we try to have the head of the tree in the form of an inverted cone. This ideal has not often been realized because the center of the tree tends to fill up. Then we have the globular tree, which is what one is likely to get when he starts out for a

vase-form tree. The strong primary branches come out all at about the same point on the trunk, and form a round or globular head on the tree. Then we have the modified leader which is very much like the globular form except that we try to separate the main branches on the trunk and keep the main leader growing straight up to perhaps six or eight feet from the ground, the branches coming out at intervals. A modification of this is the two-story tree. In this we try to get about three branches coming out and diverging, each occupying about one-third of the space around the tree, and then a foot or two above that three other branches coming out. In Virginia I saw an orchard like this, the best pruned orchard I ever saw. It had been pruned by the hand of an artist. There is also the central leader tree. The central leader extends indefinitely into the air, and has a considerable number of branches coming out at the sides. Eventually these side branches will be few.

I don't like the first two, the vase form and the globular tree, very well, because of the danger of breaking down. I presume the majority of the best growers will prefer the modified leader, which is similar to the globular tree, except that the branches are separated more. Not many men advocate a central leader tree, and those who do are apt to be rabid about it. I should choose one of the last three types, and whichever one I chose I would aim to keep the branches well separated and well balanced around the tree, and above all try to visualize what that tree will look like in ten or fifteen years, — what these little branches will look like when they are six inches in diameter. The objection to the central leader tree is that it is said to make a high-headed tree. As a matter of fact it will be high-headed for the first ten years, but as nearly as I can ascertain, by the time they get to be fifteen or twenty years old, a central leader tree is no higher than the vase formed tree. Of course when the tree has grown out horizontally until it reaches its neighbors it goes up in the air more. We hear arguments about the height of head. When you look ahead fifteen or twenty years what difference does it make whether you start the branches of your tree at eighteen or twenty-four inches from the ground. If I had a high-headed tree like Spy, I would head it near the ground. The height of the head of the mature tree will depend more upon the variety and later pruning than on the height at which the end is started.

Just a few words about pruning bearing trees. Of course everybody could cut out all dead and diseased wood, and everybody would cut out water sprouts. These ought to be cut out as soon as they come. Once in a-while you will get a visitation of blight, and when it comes it will attack these water sprouts and may cause a canker on the tree. After the dead and diseased wood is cut out, most any bearing tree will need a certain amount of thinning, letting in the light to the top of the tree. Then if the trees are getting old I think it is even desirable to do a certain amount of spur thinning. Of course you do not want to cut out fruit spurs generally. But with old trees do not prune too severely at one time. Take out not more than five or ten per cent of the top. It is important that you prune trees every year. A light pruning every year is a great deal better than letting it go two or three years. Many times a man is moved by the spirit, and goes out into the orchard and does a thorough job, and does nothing more for two or three years, when they are just as bad or worse than before. If you prune old trees severely, you must follow it up the next few years. Keep the head open so that it won't shoot out into excessive and high growth.

We sometimes hear arguments as to the time of year that pruning should be done. Usually it is done in the spring. Probably that is as good a time as any, but I see no reason why we should not prune any time during the winter if we want to.

Some experiments in Missouri seem to show that a tree will dry out less from the cut of a removed branch than it would from the branch itself, that is, pruning the tree in the fall in these experiments reduced the loss of moisture in the tree. We think that loss of moisture goes with winter-killing. This would seem to indicate that it does not do any harm to prune any time in the fall when the wind does not blow too hard. I believe the time for summer pruning is in the spring, pinching off the new shoots that start out. I am not prepared to advocate any special method of doing this. I hope in a few years I may be able to.

We hear a great deal about wound protection. In sections where there is much blister canker this is desirable, but in most cases I am inclined to question whether the application of protective material over wounds is worth the trouble. I don't know, but I am inclined to doubt it. I would rely more on thorough spraying to keep the wounds free from disease. At the same time,

if any one wants to cover the wounds with paint, I would not say he should not do it. For that purpose there is nothing better than white lead and linseed oil, with color in if you want to make it less conspicuous. Beware of ready mixed paints.

I firmly believe it is important to get good tools. You can buy good pruning shears now for \$2.00 to \$2.50. Get them heavy, so that they will stand heavy work without bending. Get them with a shape of blade that will cut readily, and with the least effort. There are two types of pruning saws, the light saw and the meat saw type. The meat saw is fine for a lazy man, and none of us want to work harder than we have to. They do a good job, and I don't know why we shouldn't use them. I don't like the two-edged saw. It is almost impossible to keep from raking the bark and making a bad wound.

INTERCOLLEGIATE APPLE JUDGING CONTEST

The Intercollegiate Apple Judging Contest was won by the team from the Massachusetts Agricultural College. But two teams were entered. A cup was given the winning team and medals were awarded the two highest men, Mr. Wood and Mr. Warren. The scores were as follows:

MASSACHUSETTS.

C. M. Wood.....	3260
E. H. Warren.....	3180
W. H. Peck.....	2906 $\frac{2}{3}$
	<hr/>
	9346 $\frac{2}{3}$

OHIO.

Earl Prather	2793 $\frac{1}{3}$
F. F. Smith.....	2696 $\frac{2}{3}$
Dale Stoltz	2693
	<hr/>
	8183

THE AIRPLANE IN FOREST INSECT CONTROL*

J. S. HOUSER,
Ohio Agricultural Experiment Station

In its final analysis, the Agricultural Experiment Station must be a practical institution, for its mission is the solving of problems of the land which contribute to more efficient production, and its workers must in most essentials be practical men in order to enjoy the confidence of those whom they attempt to serve.

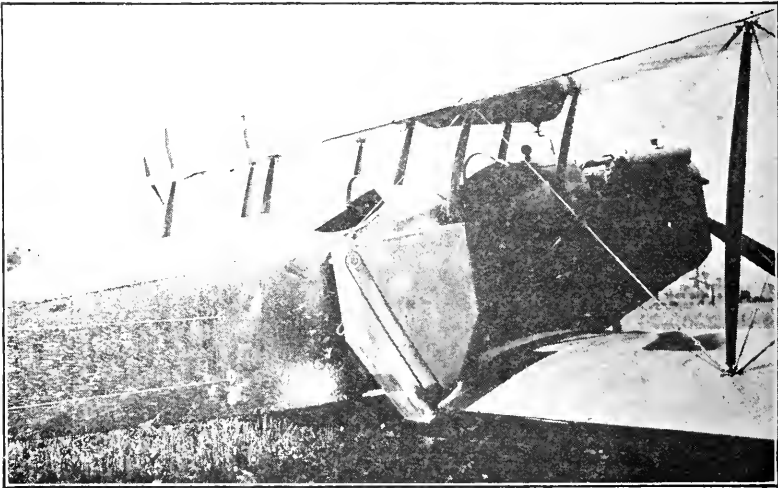
The present speaker hopes that he may have merited in the past a little of the good opinion, in this respect, of the members of the State Horticultural Society and it is with some hesitation that he stands before you today, scheduled to discuss a topic which from its very nature is more or less ethereal in character — spraying by aeroplane. He hopes that when he will have finished he will not be an outcast, for what is to be presented is a record of achievement and not a dissertation on untried theories.

In the prehistoric ages in the science of spraying a quarter of a century ago many members of this Society still clung to the inherited tendencies of their ancestral progenitors and spent the spraying season clambering about through the tops of their trees. At that time, if one of the members had appeared on the annual program of the Society and suggested that we abandon the clambering method of spraying and substitute for it the use of a thousand dollar power plant, whose fuel was an extract from the bowels of the earth and utilizing volts and amperes from goodness knows where to give it kick, he surely would have been branded as impractical. Or had he asserted that two men might apply 5,000 gallons of liquid day after day he would have been termed a waster and dreamer. What would we have said if in the discussion that followed the reading of such a paper if friend Schmitkons had arisen in his characteristically modest way and stated that he planned to use a little different method the following summer; that he was thinking some of treating his or-

* Read at meeting of the Ohio State Horticultural Society, Columbus, Jan. 31, 1922.

chard at night by blowing a new kind of dust on it; that he would probably be able to do thirty acres or so in one evening, and that he would use powerful searchlights to show the way? I will answer my own question. We would have looked solemn and tapped our foreheads and said: "Too bad, too bad, he always seemed all right until today."

The idea of spraying by airplane may seem just as far fetched now as the \$1,000 power plant sprayer or the Schmitkons blow-dust-searchlight-thirty-acre-by-night-business would have seemed at that time.



The hopper for carrying and distributing the powder. When the gate below was opened and the crank above was turned the powder was released as is grain from a grain drill. The violent air current of the propeller was sufficient to thoroughly disperse the dust.

—*Photo Ohio Agr. Exp. Sta.*

To Mr. C. R. Neillie of the Cleveland Park Department is due the credit for having first conceived the idea of using an airplane in insect control. Upon invitation by Mr. Neillie the writer assumed the responsibility of giving the theory a practical test. A cooperative project was arranged between the Ohio Agricultural Experiment Station and the Federal Aviation Experiment Station at McCook Field, Dayton, Ohio, and the field chosen for experiment was a six-acre grove of catalpas severely infested with the catalpa sphinx near Troy, Ohio.



The six acre catalpa grove, 4,815 trees, in the center of the picture was dusted with arsenate of lead in 54 seconds. A gentle wind was blowing in the direction indicated by the arrow. Note the dust passing through the grove in a dense white cloud.

The catalpa sphinx in the larval stage is a caterpillar belonging to the group of horn worms, of which the common tomato or tobacco horn worm is a familiar example. People acquainted with either of these insects will recall that they are voracious in their feeding habits, each caterpillar being capable of destroying a vast amount of foliage in a single day. The trees become infested by the gray mother moths flying to the tops and depositing their eggs in pearly white masses on the leaves, sometimes as many as 300 eggs being deposited by a single individual insect. Hundreds of thousands of the nearly full-grown larvae were present in the grove treated and at the time the work was done nearly 75% of the foliage had been destroyed.

The trees, 4,815 in number, were from 25 to 30 feet tall and had been planted for growing posts and poles.

The poison used was undiluted arsenate of lead dust.

The plane was a Curtiss J-N-6 with a hopper, which had been made at McCook Field, attached to the side of the fuselage for carrying and distributing the powder. It was an irregularly shaped flat box with a carrying capacity of a little over 100 pounds of arsenate of lead. A sliding gate was arranged at the bottom operated by a push and pull rod from the observer's seat in the plane. A revolving vane was installed in the bottom and was geared by means of sprockets and a chain to a crank above, also convenient to the observer in the plane. When the gate was opened and the vane revolved, the dust was fed out of the bottom of the hopper as grain is fed from a grain drill. Upon leaving the hopper the dust fell into the "slip stream," the violent air current set up by the propeller, and instead of dropping to the earth, was thrown into violent agitation and floated out behind the moving plane in a dense white cloud.

On the day of the trial, the plane flew to Troy and landed in a field of wheat stubble a little distance from the grove to be treated. Here the hopper was filled and the work of spraying began.

The plane flew at an altitude of from 20 to 35 feet in a path parallel to the grove and 53 yards to the windward, liberating the dust as it passed. In all, six passages were made past the grove and about 175 pounds of arsenate of lead liberated. At no time did the machine fly over the trees. As the dust was

liberated it was thrown out behind the machine in a dense whirling mass for two or three seconds, then its course was changed gradually by the wind and it was floated toward the grove. Upon reaching the edge of the grove the dust cloud continued its passage, floating through and above the trees covering every leaf as it made its leisurely progress.

After the work of dusting was completed many trees were examined and not a leaf could be found which did not bear traces of the dust which it was possible to detect with the unaided eye.

The morning following the application of the dust some dead caterpillars could be found but their wholesale destruction was not apparent until some 46 hours after the work of dusting was completed. By that time literally millions of the dead insects were to be seen in every conceivable position and place in the grove. Many were still hanging to the foliage, branches and trunks of the trees and the forest floor was so polluted with their dead bodies that not a step could be taken without crushing numbers of them. Still others of the caterpillars were to be seen writhing in their death agonies.

The most careful observations possible were taken and to the best of our judgment at least 99% of the worms were killed by the treatment.

The outstanding features of this pioneer test of the use of the airplane in dusting tall trees were: First, it was demonstrated that by properly utilizing wind currents the dust could be controlled with remarkable precision and thus deposited where desired; second, the great saving of time by the use of the process is an important item and, third, the effects on the caterpillars were most gratifying since they were fully as good as could have been expected from the use of liquid sprays.

HORTICULTURAL MANUFACTURES*

W. W. CHENOWETH,

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The slogan of the manufacturing world for the past decade or more has been "Eliminate the waste." So thoroughly is this practiced that today many large concerns find their chief profits in what was formerly waste material. Efficiency is the watchword

* Read at meeting of the Ohio State Horticultural Society, Columbus, Jan. 31, 1922.

today and large business concerns are bending every energy to raise their standards through the conservation of time, energy and materials.

For almost a half century our experiment stations, our agricultural colleges, our boards of agriculture and many other organizations have been spending time, energy and money in a concerted effort to increase the production of fruits and vegetables. Larger acreage and heavier yields have been the goals toward which all these agencies have worked. And they have succeeded remarkably well. More fruit plantations have been planted during the last two decades than in any three or four preceding. Many hitherto worthless hillsides and rundown farms of the east have been converted into flourishing young orchards. Improvement in soil management and the care given to growing plants have advanced also so that today we are producing fairly large crops of fruits and vegetables adapted to our soils and climate. Not only have we made these wonderful strides toward greater production but due to better methods of pruning, thinning and spraying the quality of our fruit is better than ever before. But with all this energy devoted to the greater production there has been a lamentable lack of a corresponding advance in methods of marketing and conservation, especially in the latter.

The farmer and fruit grower have not modeled their business after that of the so-called big business. They have been striving through greater production and through better cultural methods to off-set their losses. This is particularly true of the fruit grower. No charge of wanton waste is to be made against the farmer and fruit grower although their methods have laid them open to such a charge. They have not until recent years felt the great need of conservation. They have been content to market the best and to take their loss on the worst. But the increase of our non-producing population with their insistent demands for food is to change all this.

The growing and marketing of perishable foods is always attended with some loss. This must of necessity result under the common methods of growing and marketing crops of this nature. Fruits are highly perishable and must be used when ripe otherwise loss results. Because of the ravages of insect and disease pests and because of weather conditions and methods of handling, there is always a per cent, varying of course with seasons and growers,

which cannot because of its grade be marketed. And this in most cases is a loss. In the case of apples and some other fruits there is another grade just above the culls which under many, perhaps most, conditions would better be left off the ultimate retail market; since any considerable quantity of poor fruit on the market seriously affects the selling price of the really good fruit. Also as a rule it is an imposition to ask the consumer to buy this grade for family use.

It must not be forgotten that it costs the good orchardist as much to grow his culls and "B" grades as it does the "A" grade and fancy fruit; since in his case at least they all come from the same trees, have had the same care and they were just as expensive to harvest and handle as the fancy or "A" grade stock.

While it is practically impossible to eliminate all the waste in the fruit growing industry much of it can and will be in years to come. And just as the manufacturer has learned to convert his piles of waste materials into profit making by-products, so too the progressive fruit grower of the future is going to set about converting his culls, poor grades and surplus fruits into by-products which will then represent profits instead of losses and which will eventually wipe out the mortgage on the farm or enable him to buy the long coveted adjoining farm.

A few years ago all this was a dream, a beautiful theory which a few enthusiasts were urging upon the fruit growers and which they received with much doubt and skepticism. But today it is an established fact and fruit growers and others are seeking information along lines of conservation.

The home or farm factory as an adjunct to fruit and vegetable growing has been given sufficient trial to demonstrate very forcibly that in proper hands it is a good money maker at least under New England conditions. These factories as now operated are of two distinct types, that is they may function purely as a salvage proposition to utilize the producers low grades and excess crops or they may be operated as a pure business venture by those who produce little or none of the raw materials required depending upon their neighbors or upon the open market for their supplies.

The experiences of those who have engaged in this work show conclusively that the farm factory has some decided advantages among which the following are outstanding:

1. The best possible market for culls.
2. A larger return for the low grades.
3. Prevents waste and consequent loss to the grower.
4. That there is a substantial increase in the supply of good wholesome food.
5. The tendency is to increase consumption of fruit because of the increased supply of high grade products.
6. That it offers a good business with unlimited possibilities for development. The initial investment is small, the turn over comes quickly and that the season of work is short running generally six to eight months.

The development of farm factories in New England has practically all been made within the last half dozen years. And the greater number of factories in operation are less than five years old. During this brief period of development there has been established some twenty-five or thirty plants of various kinds and descriptions ranging from the housewife in her kitchen selling a few hundred dollars' worth of products each year to the real specialized factories having an investment in equipment alone of six to eight thousand dollars. All of these are going concerns and their business is growing. Even with an unusually short fruit crop the past season not one factory suspended operation and a half dozen or more new ones were established.

These factories represent two types viz.: general and special. In the general factories both fruits and vegetables are handled and a wide range of products is manufactured. These factories as a rule cater to the special market, many having the bulk of their orders in before the season opens. This is a good business, for once the reputation of the product is established each customer becomes a most excellent advertising medium and business develops rapidly because the demand always exceeds the supply of good "home-made" goods. A few of these factories sell through the local retail stores or through chain stores. The great bulk of products, however, manufactured in the general farm factory is sold direct to the consumer. Some have developed a special clientele who look to the factory to supply them with all the canned fruits and vegetables and manufactured products which their respective families will consume during the year. A few which modern methods of travel have made so popular through-

of our factories are conducted in connection with tea houses out the east. The traveller is refreshed with the tea he drinks, and the delicious fruit or vegetable products served him, and he is served in a room that is tastefully decorated with such attractive packages of canned foods and manufactured products that seldom does one escape without leaving an order or carrying a few packages away with him.

Most of our general farm factories are located on well traveled highways. These find their market at their door. The motoring class are as a rule looking for good things to eat and there is nothing that makes a stronger appeal than "home-made" foods. This is not a theory; it has worked out that way too often. One of our fruit growers sold from his roadside stand more than \$2,000 worth of home made fruit products during his first year. Another man operating a tea house and factory at the roadside sold \$7,000 worth of fruit and vegetable products during his third season. Others of these general home factories located in rather out of the way places have been able to build up a reputation for their products through the advertisement given by their first few customers so that today the consumers find their way to these factories and the business continues to grow.

Factories of this general type perform a distinct function and there is room for them in all our closely settled sections. Wherever there are people with a longing for home-made foods there is also a place for a small farm factory. These factories supply a large amount of high quality food to a class of trade that is willing to pay the price if the quality is right. They offer pleasant and profitable employment to those who are temperamentally adapted to this type of work. They tend to increase the price of perishable fruits and vegetables since less of these reach the local market.

The initial investment is small and may be increased as the business grows. I know one man who sold twelve thousand dollars' worth of products last year and his equipment exclusive of the basement room in which he did his work was not worth one hundred dollars. I visited a factory this fall and the operator told me that the labor income from the business this season would be a little above two thousand dollars. Exclusive of the regular kitchen utensils the investment in equipment was less

than fifty dollars. The labor income for this factory was greater than for the average New England farm with a cash investment of twenty thousand dollars according to the United States Census reports for the labor income on farms of that investment was given as being about nineteen hundred dollars.

I know of no business requiring so little capital nor such a small amount of training in which one may engage with greater certainty of success than in the business of converting fruits and vegetables into good palatable, wholesome foods. The great stress and strain comes during the first two years while the reputation is being established and during this time the operator of the factory must have an anchor to windward in order to pull through this trying time. The financial strain comes, not through purchase of equipment but in securing supplies and containers. However, the turn-over is rapid since under average conditions sales begin almost as soon as the manufacturing season opens and as most factories are operated the season is closed in late autumn or early winter, giving an operating season of approximately six months. Most of our factories have cleaned out their stock before the holidays. This leaves a long period of inactivity which is bridged over in various ways by different operators.

A new development has begun this past season which promises great things in the future. In one county about twenty-five women formed a cooperative society through which they expected to market products of home manufacture. Some made fancy articles but many devoted their time and energy to the manufacture of fruit and vegetable products. All products offered for sale must meet requirements set up by the standards' committee so that when goods went on sale there was a fairly uniform grade. These women had no precedent to guide them, they blazed a trail through unknown conditions and as a result they demonstrated that fundamentally the scheme was a good one. While these women sold only about twenty-five hundred dollars' worth of foods this year they have convinced themselves that cooperation in work of this kind has great possibilities. They have reorganized for next season's work basing their reorganization on the experiences of the past season.

Already this idea of cooperation among farm women is spreading to other sections and plans are now underway to organize three other groups in various parts of the state.

The results from this movement cannot be estimated in amount of food conserved, the amount of money earned nor in its sociological value. With respect to future development one of two things seems inevitable; either there will be a number of large cooperative organizations doing a relatively large business in food conservation or else if the spirit of cooperation fails these will be a large number of farm factories each doing a business sufficient to yield a good living for the entire family.

The special type of by-products factory limits its activities to a special crop or to a few products from that crop. Those developed so far are concerned with the apple crop. We hope, however, to see within a few years many of these factories associated with our market gardening industry. The most important products manufactured so far from the apple crop are vinegar, cider, cider jelly, apple butter, canned apples and apple jelly.

More capital is required to equip a factory of this type than in general type since the manufacture of many of these products calls for special machinery. Also the products are as a rule produced in such quantities that some system of indirect marketing must be used.

New England has always had her customs' or neighborhood cider mill where everyone who could secure the fruit or anything closely approximating fruit could have it made into cider or exchanged for cider in various stages of fermentation. The modern development of the apple by-products business coupled with the Volstead enactment are doing much to put such concerns out of business and there is slowly but surely being developed to replace them farm factories that seek to place on the market good, clean, wholesome apple products.

For example —

A small plant in southern Vermont manufactured and sold at the factory more than ten tons of cider jelly last year. A cooperative association of apple growers has canned more than 2,000 barrels of its poor grade fruit this season. Another cooperative association marketed its culls from last year's crops as bottled cider while another sold its cider to a vinegar plant. Another very significant development is that of the apple butter industry. For the first time perhaps in the history of New Eng-

land real honest to goodness apple butter is being manufactured and sold in Massachusetts elsewhere than on the campus of the Agricultural College. Of course we have always had our cider apple sauce and shaker apple sauce but these are not apple butter.

Two of our progressive fruit growers have installed small apple butter plants on their farms. These are going to be watched with much interest and their success will mark a long step in advance for the development of the farm factory in New England. To my mind there comes no doubt of the success of this venture provided the operators keep their product up to a high standard. For although practically unknown through New England, apple butter is appreciated and liked wherever it has been introduced.

It has required several years of patient, persistent arguments and demonstrations to convince our fruit growers that there are great possibilities in the farm factory. The Yankee farmer is proverbially conservative, but enthusiasm and arguments finally prevailed and the theory has become an established fact.

It might not be out of place in a meeting such as this to call attention briefly to some of the fruits as materials for manufacturing purposes.

All the small fruits offer great possibilities in the way of by-products. The experiences of our home manufacturers show that next after a few of the cheaper vegetables the small fruits yield largest profits. Jams, jellies, preserves, conserves and marmalades are all standard and well-known products and when made in a home factory by one who knows and appreciates high quality in fruit products they have a market value considerably above the commercial factory products. Also most of the fruits when canned in glass jars sell readily on the special market and the profits are such as to offer satisfactory inducement for doing this work.

Just about the time the small fruits are in the height of their season the progressive apple grower is thinning his apples. These thinnings are generally considered as so much waste. By a judicious use of this waste material the cost of many of the small fruits products may be reduced twenty-five per cent or more. This is of course an adulteration and must be so labeled

when offered for sale. But the consumer who once eats raspberry jam containing three parts raspberries and one part apple thinnings is not going to worry any about adulterants. I have yet to find any one who having eaten pure raspberry jelly and jelly made by using as much juice from apple thinning as from raspberries who did not prefer the compound to the pure raspberry. The texture, taste and quality are all improved while the food value remains practically unchanged. Apple thinnings may be used profitably as a base for all small fruit jellies, improving their quality and very materially reducing their cost.

Peaches, plums, pears and grapes offer abundant opportunities for the manufacture of by-products. Butter, jams, jellies, preserves, pickles and juices will care for tons of these fruits at prices which investigation will insure a greater return than is generally had from these fruits as fresh stocks.

No fruit crop entails such heavy annual loss as the apple crop. Reports from the Bureau of Markets show that in many seasons approximately 25% of the crop makes no impression on the market because it is not offered for sale. Ten per cent of this amount is either a total loss or fed to stock while the other 15% is made into cider and vinegar. Our experts have shown that apples are worth around 15-20c per bushel for stock feed with grain and hay at present prices. Not a very profitable way of disposing of the apple crop since Doctor Lindsey has shown that the pomace alone represents a little less than half the feeding value of the whole apple. Judging from this the stock feeding value of a gallon of cider is less than five cents. It is worth far more than this for human food either as a soft drink or in some one of its manufactured products. There are few if any of the soft drinks that compare favorably with good clean sweet cider either fresh or bottled. It is not only refreshing and nourishing but also (according to popular belief and not discredited by the medical fraternity) healthful. Sweet cider has many things to recommend it over the artificially colored, flavored and sweetened drinks sold today in such enormous quantities.

Sweet cider may be profitably converted into jelly. There are thousands of people who have never tasted this delicious relish. It is not manufactured in any great quantities because

people say there is no great demand for it. Wherever known it is appreciated and is used in considerable quantities. I have already mentioned the Vermont man who manufactured ten tons of this jelly last year. This output represented approximately three thousand bushels of culls. There are scores of communities where this business might be duplicated if only some one in the community had the vision and the energy necessary to put that vision into execution.

I must not encroach upon your time to enter into any lengthy discussion upon the relative values of the long list of apple products which might be profitably manufactured in the farm or cooperative factory from the surplus and cull apples. Suffice it to say that cider vinegar, boiled cider, apple butter, dried apples, canned apples and apple jelly are all standard products and excepting vinegar and boiled cider are valuable foods. All of these are easily and cheaply manufactured and the market possibilities have scarcely been touched.

We are going to develop methods of manufacturing and marketing within the next decade or two that will go far toward eliminating this waste of thousands of barrels of apples that occur every year. Economic conditions are going to demand of the fruit grower that he market his entire crop at a profit over and above the legitimate cost of production and marketing. He is no longer going to be satisfied to sell a part of the crop at a profit and the balance at a loss. He is going to model his business along lines of the industrial world and like them he is going to convert his waste materials into profit returning by-products.

If the far west can ship its train loads of fruit by-products into the east and middle west and continue in business year after year then the eastern fruit grower and the middle west fruit grower can so organize his business that the bulk of fruit products can be and will be manufactured at home. It is economically wrong for us to allow our own raw materials to waste and to ship their manufactured products across the continent. I have no complaint nor criticism to lodge against our far western fruit growers. I admire their skill and ability to accept conditions as they find them and because of those conditions devise ways and means to market the crops they grow.

It was the western boxed apple that made a by word of the New England deaconed apple barrel and it was this western boxed apple that virtually took the New England fruit growers' market away from him and later caused our legislatures to enact such stringent packing laws that for the past few years we have been able to compete successfully with this energetic fellow in the west. And when our large plantations of young trees grown by progressive fruit growers come into bearing we are going to make him look elsewhere for a large part of the market he has enjoyed in our section during the past ten years.

Also as the farm factory becomes better known and as its possibilities are more fully realized by our fruit growers we are going to supply our own markets with tons and tons of fruit products and our enterprising by-products manufacturers of the far west are going to find competition so keen that they will be constrained to divert much of their output to Ohio and other middle western states.

We are not going to be satisfied to manufacture our culls and occasional surplus we are going to develop plantations of the fruits which we can most economically grow for the sole purpose of manufacturing the bulk of it into food to supply the cities' teeming millions with good wholesome foods. You call this visionary? So did the Massachusetts fruit growers eight years ago. But today they are standing solidly back of a ten-year program that plans to develop the by-products industry as a legitimate and essential part of economic fruit growing.

I do not know to just what extent the farm factory idea will apply to the Ohio fruit grower because I do not know your conditions well enough; but I feel sure that there are places for scores of small factories within the reach of your larger cities where there are hundreds of families that would be glad to buy their year's supply of canned fruits and vegetables and fruit and vegetable products from a home factory if the price and quality were right and being a native born Missourian I have yet to be shown that practically every fruit producing section is not a suitable location for the establishment of a by-products industry of some sort, farm, cooperative or commercial, which will take care of the culls, the low grades and the excess crops.

PROGRESS IN CONTROL OF RASPBERRY DISEASES *

R. B. WILCOX,

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Raspberries are grown for home use over the entire State of Ohio, so are of some interest to nearly everyone, but they are produced on a large scale in only a few localities. Near the cities many acres are grown to supply local markets; in Cleveland this fresh-fruit market is supplemented by commercial use of the fruit for jams and preserves; and in a few districts raspberries are grown largely for the production of nursery stock. The total acreage of this fruit has been gradually reduced during recent years, not because of the failure of markets—the demand for raspberries is strong and the price has been high—but because yields have diminished, crop prospects have become uncertain, and the average costs of production have risen until, in many places, black raspberries cannot be grown and sold profitably at even the high prices prevailing.

Especially in those sections of the State where the industry is still extensive, diseases have made inroads on production and profits, reducing the crops, weakening or killing plants, and shortening the life of plantations, making it necessary to renew the fields after a very few years. The more common and serious fungus and bacterial diseases are probably familiar to you.

Anthracnose, which causes small spots on the shoots and branches, weakening the canes or tips and reducing the crop, is much more serious in some parts of Ohio than in others, and also does more damage in certain seasons. In many places it is probably not of sufficient importance to make control-spraying profitable. Experiments carried on in Michigan and Wisconsin indicate that where this disease is severe it can be controlled by spraying. Late reports from Wisconsin show good results from two applications, the first when two or three leaves have unfolded in the spring, using lime-sulphur, 1:10, or Bordeaux mixture, 6:6:50, to which has been added glue or gelatin as a sticker; the second application about a week before the first blossoms open, using lime-sulphur, 1:40, or 3:3:50 Bordeaux, with a sticker.

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Raspberry cane-blight occurs to some extent in most fields but this disease, too, is erratic in its occurrence from season to season and is much more serious in some parts of the State than in others. Along Lake Erie during the last three seasons the cane-blight has not been abundant, but is reported to have caused large losses in the southern part of the State. No satisfactory means of control for this disease has yet been worked out, but it is strongly recommended that plants be secured from sources as free as possible from the trouble, and thorough sanitary measures, which will be spoken of later, are very helpful in holding it in check.

Crown-gall, a bacterial disease which causes galls or swellings on roots, crown and sometimes on the canes, is widely prevalent, especially on red raspberries. It gradually multiplies and spreads in a plantation but it has seldom been observed to be a limiting factor on black raspberries in any part of the State. Here, again, no remedy or satisfactory control measure is known once the disease has made a start, but it is very important to obtain uninfected stock for planting and to set this stock on land which has not grown raspberries for a few years. The grains and grasses are, in general, less susceptible to crown-gall infection than many other crops, and should be included as largely as possible in the rotation practiced between crops of raspberries.

There are other fungus diseases which occur widely and which may, under certain conditions, cause considerable damage. With most of the troubles mentioned, it is much cheaper to keep them out of a young plantation than it is to eradicate them after they have once become established. The whole problem may be stated in a word: Get good, clean plants to start with, and then give those plants a chance.

It is extremely important that young plants be secured which are as free as possible from the diseases which can be carried in this way. This applies to the home garden as well as to the ten-acre field, for in the small patch the plants will ordinarily receive more attention and intensive care, will have a better chance for growth and high yield than in the larger field, but if they start under the handicap of serious disease they may never be productive. It is easier to recommend that clean plants be secured, how-

ever, than to actually get them. In some sections of the country these diseases are less abundant than in others. In certain nurseries more care is paid to cleanliness and control than in others. From the standpoint of sanitation and disease control there seem to be distinct advantages in the method practiced in some nurseries of cutting off all canes at the ground each winter, sacrificing the fruit crop in favor of plant production, as compared with the practice of contracting with growers who are primarily interested in fruit production. Your county agents, your experiment station, and your college of agriculture can undoubtedly give you information on these points. In the larger raspberry-growing centers the search for clean plants can be carried further by cooperation than is practicable by individual growers. It is quite possible that in some cases associations of growers may find it to their advantage to develop their own source of plants, as vegetable growers in some instances already control the production of seeds for their own use.

After plants have been secured it is equally important that they be given a chance to develop normally, to make vigorous growth in preparation for fruiting, without interference through starvation, improper moisture relations, or serious disease. They should be set in soil of suitable kind and fertility; well drained, since raspberries are intolerant of excess moisture; and which has not been planted to raspberries for at least three or four years past. They should not be set close to old, badly diseased fields, or it will be very difficult to keep them healthy. They should be cultivated and fertilized as necessary to keep them growing vigorously; it is unfortunate that we have so little accurate information on the food requirements of raspberries, but a number of fertilizing systems are in use which seem to be giving satisfactory results under their particular conditions. Finally, dead or badly diseased bushes, which might serve as centers for infection of surrounding plants, should be removed. Mature canes should be cut out as soon as they have borne their crop of fruit, and removed and destroyed. There is nothing new about these recommendations for sanitation, or cleaning up, but it is felt that they cannot be repeated too often or their importance over-emphasized. They are necessary particularly in districts where raspberry growing assumes large proportions.

It was mentioned before that one handicap under which black raspberry growers, especially the larger producers, work is the short life of their bushes and plantations. In many cases fields are cultivated for four seasons: the second summer they produce a few berries of good quality; the third season a large crop is picked; the fourth summer, diseases have made such inroads that the crop is cut, perhaps one-half, and after this harvest the bushes are destroyed. Obviously, such a program makes necessary a very high price for the few bushels which are picked from the field, and makes future prospects uncertain. Associated closely with this short productive life of the fields is a disease of quite another type from those described, one for which no fungus or bacterial cause has been found, one which is often not recognized as a disease because its symptoms are different from those previously looked for. It belongs to the group spoken of as "mosaic"

You are familiar with the "yellows" or "leaf-curl" of red raspberries, in which the bushes are stunted, fruit small and dry, and leaves curled, margins turned downward and veins of the leaves sunken. This trouble also occurs on purple-canés and on at least two varieties of blackcaps, where it is occasionally very destructive, but it is primarily a disease of the reds. However, the blackcaps have a disease of the same general type, yet distinguished without difficulty, which is widespread and causes large losses in many sections. It has sometimes been called by the growers "leaf-curl", but this name is more commonly applied to the "yellows", which also occurs at times on blackcaps, so it is not suitable. In northern Ohio the term "bluestem" has been applied most often to this trouble; but this name is not descriptive of the disease as it occurs in all places; and, furthermore, it has already been applied to another, different disease of the black raspberry which occurs in the State of Washington. Since the disease which we are discussing affects mainly black raspberries it may well be called simply "black raspberry mosaic", or if desired, for greater clearness, "bluestem mosaic".

On entering in midsummer a field where this mosaic is abundant the first observation will be that some plants or groups of plants are shorter than the others in the field. One of the effects of the mosaic is to stunt the bushes, to check their growth. Closer examination of the diseased plants will show that their

leaves are curled, not by a rolling down of the margins and depression of the veins, but by a hooking or curling downward of the midribs. This character, noticed particularly on the younger leaves, is the most common and often the earliest symptom of the disease, and when once learned can be distinguished readily from the shape of healthy leaves, or from the curling characteristic of other diseases. At a later stage, or later in the season, the leaves are often mottled with patches of lighter green, from which we get the name of mosaic. This mottling is not always pronounced. There is another symptom which occurs very constantly in certain sections; in the district just west of Cleveland it can be used as a means of identifying the trouble; it is a discoloration of the stems of shoots which has given rise to the name of bluestem. The color, a very dark shade of blue, appears in the form of dots, or short streaks like broad pencil marks, running lengthwise on the shoots, near the ground or upward to the bases of the lateral branches; these spots may be very few and scattered, or in later stages they may be numerous and crowded, occasionally giving the entire stem a dark blue color. This color will be found to be only skin-deep, the wood underneath seeming not to be injured. Unfortunately, this discoloration of the stems does not always accompany other symptoms of the disease in all sections of the country, or even in all parts of Ohio, so in some places it is without value in detecting the malady. On laterals of the fruiting canes very narrow, purplish-brown streaks can often be found.

Investigation has shown that the mosaic is a systemic disease; that is, is not confined to the curled leaves, or to the spots in the stems, but is spread generally throughout the plant as soon as these symptoms can be seen. In some cases where slightly curled leaves could be found on the tip of only one shoot, this shoot has been removed at once; nevertheless, during the next season the whole plant has developed symptoms of the disease. It has been the practice among certain growers to cut off at the ground all diseased plants when pruning the bushes just after harvest; but before winter these crowns would throw up a number of shoots with curly, mottled leaves. And, as would be expected, the rooted tips of plants affected with mosaic always produce similarly diseased bushes, so that the trouble can be carried in nursery stock. When a tip affected with mosaic is

planted it makes little growth and by August or September can nearly always be detected as "sickly", and the characteristic symptoms can be found.

An affected raspberry bush does not recover. The disease develops slowly, requiring from two to three years to kill a plant which has become infected in the field. It weakens the entire bush and consequently reduces the quality and quantity of the fruit. A plant in the early stages of mosaic will often ripen practically a full crop, but the berries will usually be slightly smaller and more inclined to crumble. The shoots may be normal in number but will be shorter, lacking in strength, and less food will be stored for the next spring's growth, so that the second season the plant will be smaller, the crop much reduced both in quantity and quality, and the shoots produced will be few and weak. These shoots may die during the following winter, having been apparently winter-killed, or they may put out leaves in the spring and make a feeble growth, but the end will soon come. Meanwhile, the disease will have been carried to healthy plants in this or nearby fields; insects are strongly suspected of being the carriers, but their guilt has not been proved.

Several consecutive plants in a row are often found showing mosaic symptoms. This seems to be due not so much to the disease having been carried from one plant to the next in the field as to the manner of planting: the man who set or dropped the plants picked up a handful of tips, several of which came from one diseased mother-plant, and he dropped or planted these one after the other in the row.

The blackraspberry mosaic is not confined to any one locality, but covers a wide territory. We know that it is very general throughout three counties in the State, and it has been reported this year from three other counties. Since much infected nursery stock has been distributed it is probably scattered generally throughout the State. It is very desirable to get more complete information as to its occurrence. Frequently a statement something like this is heard: "I can't grow black raspberries any more. I have planted them several times but they will not live more than two or three years. Of course, I only set a few bushes, but I took good care of them. We always used to grow

them without any trouble. I bought plants from the _____ nursery; do you think anything could have been wrong with them?" And, of course, no one knows what the trouble was in any particular case; it may have been one of a dozen things; but the plaint is becoming so frequent that it is significant.

As to the damage caused by the disease, it may be said that in one district, comprising about four townships, west of Cleveland, the annual loss through reduction of crop alone is probably \$15,000 or \$20,000. The loss through shortening of the life of plantations, necessitating frequent replanting, is evidently much greater than this. The failure of new plantations because of the distribution and planting of diseased stock is another source of loss. Large fields have been seen in which three-fourths of the plants showed signs of mosaic. The total damage throughout the State cannot be estimated, but it must be very large. Some districts have quite abandoned the commercial culture of black-caps.

The question is frequently asked as to whether we cannot grow varieties of berries which are resistant or immune to the mosaic. There are not many varieties of black raspberries in commercial use. Not all of these have been seen. But no variety has yet been found which shows any great degree of resistance to mosaic. Of those tested, the Hoosier, of rather recent origin, appears to be the most susceptible, and Kansas, a standard in some sections for many years, to show the greatest resistance, although exceptional fields of Kansas have been found in which the infection was as high as twenty per cent. Cumberland, Gregg, Munger, Ohio and Plum Farmer are all subject to the disease; until extensive tests have been made it cannot be said that any other variety is highly resistant. There are practical objections to a general change of varieties, or to growing only one or two sorts, because no one variety is adapted to all conditions of soil, moisture and market. Often two sorts, an early and a late fruiting, are grown on the same farm in order to extend the harvest season and to use labor to greater advantage. A fresh-fruit market is more exacting in its demands for quality of fruit than a canning or preserving factory. It is well to have a number of varieties from which to select. It would be a very great advantage if one could obtain resistant strains of these different varieties. A small

number of selections have already been made with this end in view. The results of some of these selections at present are encouraging, but they have not gone far enough to be definite. This work is important but it necessarily requires a long time, and whatever its future results may be it cannot give immediate relief in districts where the mosaic has already become established.

If we cannot buy plants *resistant* to the disease, is it possible to get stock *not infected* — that comes from districts, or at least from fields, where mosaic does not occur? Here, again, as with the other diseases, the need for clean plants is emphasized. And here, again, it has been very difficult to find a satisfactory source. It was finally decided to develop our own stock if possible. Fairly clean fields were selected; the tips produced in these fields and set out in the spring were watched, and any specimens of mosaic were removed. It was found possible to keep the disease out of new fields which were distant from old, diseased patches, but when the latter were very close the mosaic would appear repeatedly in the young fields, and could not be kept out. This brought up the necessity, for the production of clean plants, of eradicating the disease over a considerable area, enlisting the cooperation of a number of farmers. During the summer of 1921 a territory, approximately square and containing about four square miles, was selected in the village of Avon Lake, Lorain County. A survey showed nearly 150 acres of black raspberries in this territory, with a relatively low percentage of mosaic infection. All fields were examined carefully just after the pruning which followed harvest, and all cases of mosaic and yellows (curly-leaf) found were marked. In most instances these affected plants were dug out immediately. In a few isolated fields, which were to be destroyed after the next crop, the diseased plants were left standing. In a few other fields, unfortunately, the affected plants were not removed until some weeks after the inspection. In some, though not all of the fields, second inspections and roguings were made. Other diseases were not controlled, although their severity or prevalence was noted; and it may be said that most fields in the territory showed only slight infections of cane-blight, anthracnose or crown gall in 1921.

The results of the experiment at present are that on more than 130 acres of blackcaps the mosaic is, for all practical pur-

poses of fruit production, under control; and that, if all past observations and experiments are an indication, a large proportion of the fields will produce plants this coming spring which will be free from the disease. This has not been in the past an intensive plant-producing district, and only a small proportion of the possible crop of plants was provided for. Several hundred thousand tips are in the ground, however, many of which will be reset in the same area or in adjoining townships. The varieties included are the Cumberland, Hoosier, Kansas and particularly the Plum Farmer. This experiment is neither complete nor perfect; but it is felt that, everything considered, the inspected territory offers a source of plants with greater probability of freedom from mosaic than had been available, or at least than any that had been located, during the two preceding years. Active cooperation of the growers has now been secured, and it is hoped that the work will be carried on more thoroughly and completely during the coming year.

Experiments have indicated, as mentioned before, that if mosaic-free tips are set in a field which is not near any infected patch they will remain clean; also that if *infected* tips are planted under similar conditions the disease can be detected by the following fall, by one familiar with it, and by two or three careful roguings it can be eliminated. Where old, infected fields are close the problem is more difficult. Apparently, under these circumstances, careful and repeated inspection and roguing of the old fields will keep the disease under such close control there that the young fields can still be kept clean. With proper care, therefore, new fields can be developed in which the mosaic will be under control, or will be eliminated altogether.

Where the percentage of infection of old fields is very low, little difficulty has been experienced in getting rid of it entirely by roguing. But, though all indications thus far are encouraging, the method has not yet been tested out under conditions of such severe and general infection as to establish whether or not mature, very badly diseased fields can be attacked and, by thorough inspection and roguing, be rid of the mosaic. The townships near Avon Lake offer the possibility of such a test under severe conditions, for the fields are not widely separated, practically all fields in one particular district contain more or less

mosaic, while in some patches more than two-thirds of the plants are diseased. The growers of this district wish to attempt during 1922 to control the mosaic disease by inspection and roguing, but because of the size of the undertaking and the expense involved, no decision has yet been made. The success of the work would require the cooperation of *all* growers; the prompt removal of all diseased plants as soon as found! and would depend upon the ability to recognize the disease at a very early stage. Two or more inspections during the summer would be necessary. The method also needs thorough trial in a section where discoloration of the stems does not occur, and where early detection of the disease must be based upon curling of the leaves.

It is important to know the time of year at which roguing can best be done. Present experience indicates that "creepers", or plants in their first year of growth, can be rogued most effectively during August and September, following this with an inspection early in the following year—probably about June. During this second year of growth the work can best be done before harvest time because later in the season the plants make such rank growth that inspection is very difficult. In fields of mature plants the inspection is much easier and more rapid (at least in districts where the stems are discolored) just after the old wood has been removed after picking, for the symptoms of mosaic appear most prominently on the young shoots. A roguing soon after picking, followed by another a month or so later, is desirable. In all cases, of course, the work should be followed up later as necessary. After a grower learns to recognize the disease he can detect and remove affected plants with little loss of time whenever he is working in the field.

Experiments thus far have not shown any bad effects from setting a healthy tip in the place from which a plant affected with mosaic has been removed, and at present this practice is being followed by many growers, bringing back the capacity of their fields toward normal. Nothing has indicated that anything lives over in the soil that can cause the disease in a healthy raspberry.

Since the mosaic disease can be distributed by means of nursery stock it is particularly important that the nurseries rid themselves of all infection. The State Department of Agricul-

ture, through its force of nursery inspectors, is undertaking this work. The task, however, is very difficult, particularly in the many cases where nurseries do not grow their own plants, but buy them from numerous scattered growers who are equally interested in the production of fruit. Under these conditions, although those men growing plants for the nursery may clean up their fields, their neighbors may not be so careful, and sources of infection are left in the neighborhood. As has been said before, this is a problem requiring united community action.

The study of the bluestem-mosaic disease and of measures for its control is still very incomplete. This paper is merely a report of progress. And this disease is only one of the factors which have united to make raspberry growing so often unprofitable. Other troubles, including anthracnose, cane-blight, crown-gall and yellows (leaf-curl), as well as methods of culture, are receiving attention at various experiment stations. It is to be hoped that the final result will be to take away from the raspberry industry some of its present dangers and uncertainties and to place it on a more secure and profitable basis.

A MEMBER: What strength of lime sulphur would you use for dormant spray for anthracnose?

R. B. WILCOX: One to ten, adding one pound of glue.

A MEMBER: What is the insect that makes the stems break off?

R. B. WILCOX: That is the tree cricket. It does a certain amount of damage, but in most cases they do nothing for them. I believe you should cut off these branches showing the rows of holes in the latter part of May.



Monument to Johnny Appleseed at Ashland, Ohio

PRODUCTION OF APPLES AND PEACHES IN THE UNITED STATES, AND NUMBER OF TREES

The Bureau of the Census of the Department of Commerce announces, subject to correction, the following preliminary figures from the 1920 census of agriculture for the United States, with comparative figures for 1910:

APPLES AND PEACHES -- PRODUCTION AND NUMBER OF TREES IN THE UNITED STATES: 1919 AND 1909

APPLES:

Production (bushels) —	
1919	136,746,154
1909	145,412,318
<i>Decrease</i> (bushels)	8,666,164
<i>Per cent of decrease</i>	6.0
Trees of bearing age —	
1920	115,265,029
1910	151,322,840
<i>Decrease</i>	36,057,811
<i>Per cent of decrease</i>	23.8
Trees not of bearing age —	
1920	36,171,604
1910	65,791,848
<i>Decrease</i>	29,620,244
<i>Per cent of decrease</i>	45.0

PEACHES:

Production (bushels) —	
1919	51,551,251
1909	35,470,276
<i>Increase</i> (bushels)	16,080,975
<i>Per cent of increase</i>	45.3
Trees of bearing age —	
1920	65,654,921
1910	94,506,657
<i>Decrease</i>	28,851,736
<i>Per cent of decrease</i>	30.5
Trees not of bearing age —	
1920	21,623,657
1910	42,266,243
<i>Decrease</i>	20,642,586
<i>Per cent of decrease</i>	48.8

APPLES — PRODUCTION

The production of apples in the United States in 1919, according to the Fourteenth Census, was 136,746,154 bushels, as compared with 145,412,318 bushels in 1909, representing a decrease of 8,666,164 bushels, or 6 per cent. The average production per tree was 1.2 bushels in 1919, as compared with 1 bushel in 1909. The states reporting the largest production of apples in 1919 were Washington, with 21,568,691 bushels; New York, with 14,350,317 bushels; Virginia, with 8,942,520 bushels; California, with 7,842,017 bushels; Arkansas, with 7,163,619 bushels; and Oregon, with 6,921,284 bushels.

APPLE TREES

The number of trees which have reached bearing age indicates the present status of any orchard fruit. The number of such apple trees in 1920 (including all trees which were old enough to bear fruit at the time of the enumeration, even though they may not have borne any fruit in 1919) was 115,265,029, as compared with 151,322,840 in 1910, representing a decrease of 36,057,811 trees, or 23.8 per cent.

One of the most significant indications of the progress or tendency in the growing of any orchard crop is the number of young trees in the orchards which have not yet reached bearing age. The number of apple trees not of bearing age (excluding nursery stock, not yet set out in orchard locations) reported for 1920 was 36,171,604, as compared with 65,791,848 in 1910. These figures indicate a decrease of 29,620,244 trees, or 45 per cent. This decrease in the number of young trees results partly from the fact that the years just preceding 1910 were years of especial activity in the planting of orchards in several states. Thus in most of the states of the Mountain Division the number of apple trees of bearing age has increased substantially, while the number of young trees shows an enormous decrease.

PEACHES — PRODUCTION

The production of peaches in 1919 was 51,551,251 bushels, as against 35,470,276 bushels in 1909. The increase in production between 1909 and 1919 amounted to 16,080,975 bushels, or 45.3 per cent. The average production per tree in 1919 was

0.8 bushel, as compared with 0.4 bushel in 1909. The states reporting the largest production of peaches in 1919 were California, with 15,969,073 bushels; Texas, with 4,842,129 bushels; Georgia, with 4,788,718 bushels; Arkansas, with 3,340,823 bushels; and Oklahoma, with 2,947,973 bushels.

PEACH TREES

The number of peach trees of bearing age in 1920 was 65,654,921, as compared with 94,506,657 in 1910, representing a decrease of 28,851,736 trees, or 30.5 per cent.

The number of peach trees not of bearing age in 1920 was 21,623,657, as compared with 42,266,243 in 1910, a decrease of 20,642,586 trees, or 48.8 per cent.

PRODUCTION OF APPLES AND PEACHES IN THE UNITED STATES, AND NUMBER OF TREES, BY GEOGRAPHIC DIVISIONS AND STATES: 1919 AND 1909

Division or State	Apples			
	Production (bushels)		Trees of bearing age	
	1919	1909	1920	1910
UNITED STATES	136,746,154	145,412,318	115,265,029	151,322,840
GEOGRAPHIC DIVISIONS:				
New England	12,070,259	10,508,457	6,351,577	8,219,152
Middle Atlantic	21,572,855	37,864,532	17,767,602	20,302,285
East North Central	15,829,484	25,080,615	22,416,278	34,134,909
West North Central	10,821,075	21,923,470	12,502,542	31,744,757
South Atlantic	17,829,422	18,375,485	20,777,465	20,673,712
East South Central	3,334,668	13,163,180	8,238,854	12,273,277
West South Central	9,317,180	3,240,108	6,008,390	11,838,069
Mountain	9,639,219	5,718,372	6,794,675	4,614,667
Pacific	36,331,992	9,538,099	14,407,646	7,522,012
NEW ENGLAND:				
Maine	4,829,346	3,636,181	2,833,304	3,476,616
New Hampshire	1,364,001	1,108,424	721,130	1,240,885
Vermont	960,252	1,459,689	712,594	1,183,529
Massachusetts	3,187,211	2,550,259	1,218,870	1,367,379
Rhode Island	334,308	212,908	173,110	152,009
Connecticut	1,395,141	1,540,996	692,569	798,734
MIDDLE ATLANTIC:				
New York	14,350,317	25,409,324	9,636,698	11,248,203
New Jersey	1,666,400	1,406,778	1,149,776	1,053,626
Pennsylvania	5,556,138	11,048,430	6,981,128	8,000,456
EAST NORTH CENTRAL:				
Ohio	2,976,436	4,663,752	5,970,410	8,504,886
Indiana	925,624	2,759,134	3,427,816	5,764,821
Illinois	4,787,373	3,093,321	5,112,866	9,900,627
Michigan	5,834,067	12,332,296	5,583,326	7,534,343
Wisconsin	1,305,984	2,232,112	2,321,860	2,430,232
WEST NORTH CENTRAL:				
Minnesota	1,028,478	1,044,156	1,596,264	1,380,396
Iowa	1,810,443	6,746,668	2,996,469	5,847,034
Missouri	5,132,109	9,258,977	5,162,859	14,359,673
North Dakota	14,358	4,374	26,157	15,941
South Dakota	169,170	191,784	255,638	274,862
Nebraska	917,224	3,321,073	957,113	2,937,178
Kansas	1,749,293	1,356,438	1,508,042	6,929,673
SOUTH ATLANTIC:				
Delaware	606,286	183,094	816,109	429,753
Maryland	1,518,884	1,822,824	1,651,936	1,288,482
District of Columbia	1,832	2,952	1,036	1,654
Virginia	8,942,520	6,103,941	7,385,277	7,004,548
West Virginia	4,189,162	4,225,163	5,554,731	4,570,948
North Carolina	1,938,038	4,775,693	3,474,821	4,910,171
South Carolina	215,659	362,500	377,557	581,767
Georgia	416,902	895,613	1,515,505	1,878,209
Florida	139	3,405	493	8,180
EAST SOUTH CENTRAL:				
Kentucky	1,280,549	7,368,499	3,742,936	5,538,267
Tennessee	1,258,878	4,640,444	3,181,659	4,838,922
Alabama	577,356	888,396	1,044,397	1,468,436
Mississippi	217,885	265,841	269,862	427,652
WEST SOUTH CENTRAL:				
Arkansas	7,163,619	2,296,043	4,074,870	7,650,103
Louisiana	43,910	33,875	47,037	93,304
Oklahoma	1,616,933	742,182	1,417,741	2,955,510
Texas	492,718	108,008	468,742	1,138,852

PRODUCTION OF APPLES AND PEACHES IN THE UNITED STATE, AND NUMBER OF TREES, BY GEOGRAPHIC DIVISIONS AND STATES: 1919 AND 1900

Apples		Peaches					
Trees not of bearing age		Production (bushels)		Trees of bearing age		Trees not of bearing age	
1920	1910	1919	1900	1920	1910	1920	1910
36,171,604	65,791,848	51,551,251	35,470,276	65,654,921	94,506,657	21,623,657	42,266,243
2,123,730	2,094,512	479,000	406,903	993,003	723,810	324,117	572,237
6,317,053	5,819,449	4,165,302	3,201,493	8,531,072	6,056,690	2,774,568	5,759,925
7,679,120	10,610,319	2,068,604	5,120,841	6,822,476	11,035,119	3,152,383	6,972,375
4,166,067	9,724,993	1,490,078	1,643,257	3,430,106	13,265,526	1,097,175	2,582,028
8,051,972	10,064,819	7,985,330	5,571,628	16,800,861	20,583,445	6,752,891	6,137,901
3,093,230	5,386,555	3,601,149	5,775,799	6,420,558	10,312,768	2,420,517	3,865,232
1,586,694	7,224,590	11,512,788	3,279,545	11,092,849	22,284,966	3,409,730	8,734,552
723,571	6,679,166	2,227,627	940,168	1,444,215	1,695,285	155,170	1,696,111
2,400,167	8,157,445	18,018,373	9,530,642	10,119,781	8,639,048	1,447,106	5,945,882
512,217	1,045,123	2,177	2,014	5,666	5,102	2,570	3,320
227,933	207,289	39,019	23,218	81,287	57,571	23,200	35,213
254,029	219,833	904	2,221	2,915	5,492	3,978	2,187
791,771	355,868	213,139	91,756	346,260	154,592	135,426	162,114
71,375	54,560	28,771	17,704	61,125	39,342	25,366	30,795
266,405	211,839	194,990	269,990	495,750	461,711	133,577	338,608
2,932,281	2,828,515	1,262,480	1,736,483	3,038,023	2,457,187	658,868	2,216,907
811,256	519,749	1,653,223	441,440	1,936,632	1,216,476	884,067	1,363,632
2,603,516	2,501,185	1,249,599	1,023,570	3,556,417	2,383,027	1,231,633	2,179,386
2,047,687	2,438,246	617,537	1,036,340	2,924,177	3,133,368	970,183	2,092,300
929,160	1,961,974	82,266	1,174,889	860,024	2,130,298	568,046	1,145,479
1,825,586	2,548,301	456,651	1,222,570	1,006,911	2,860,120	840,909	739,358
2,051,129	2,253,072	911,798	1,686,586	2,029,839	2,907,170	772,101	991,090
825,258	1,408,726	332	956	1,522	4,163	1,153	4,148
637,187	1,571,816	370	599	890	1,571	427	3,837
767,351	1,914,325	1,891	23,180	129,939	1,090,749	61,043	283,308
1,585,823	3,624,833	1,262,723	1,484,548	2,358,925	6,588,034	716,325	1,404,429
19,694	70,023	3	35	38	90	32	604
136,082	460,547	56	148	187	1,815	316	5,259
401,788	967,133	11,471	110,180	95,629	1,188,373	40,118	263,882
618,142	1,116,316	213,564	24,567	844,498	4,394,894	278,914	620,709
308,487	263,813	227,375	16,722	464,514	1,177,402	93,336	212,117
766,264	600,685	564,111	324,609	997,086	1,497,724	285,486	805,063
1,178	29	229	3	1,208	330	238	1
2,857,007	3,435,591	681,528	243,446	1,578,253	1,585,505	783,733	780,551
1,735,126	2,772,025	706,411	328,901	2,049,862	1,424,582	651,742	1,441,188
1,994,688	1,835,337	479,218	1,344,410	1,976,756	2,661,791	1,093,993	861,042
181,101	260,044	389,734	643,040	871,976	1,336,142	335,599	349,790
806,731	822,327	4,788,718	2,555,499	8,655,051	10,609,119	3,391,851	1,531,367
1,490	3,968	148,006	114,998	206,155	290,850	116,913	156,782
1,427,408	2,106,297	459,681	1,623,379	1,671,044	2,245,402	690,483	1,110,744
1,032,490	2,117,246	1,285,441	1,579,019	2,349,656	3,163,737	690,359	1,190,727
422,646	737,689	1,083,142	1,416,584	1,544,700	3,177,331	546,024	888,866
210,686	425,323	775,885	1,156,817	855,158	1,726,298	493,651	724,896
877,376	3,940,089	3,340,823	1,901,647	3,342,387	6,859,962	988,966	2,884,927
44,175	96,544	381,863	290,623	408,178	903,352	231,909	316,132
428,497	2,060,384	2,947,973	357,644	2,881,073	4,783,825	637,664	2,574,680
236,646	1,127,573	4,842,129	729,631	4,461,211	9,737,827	1,641,191	2,958,813

PRODUCTION OF APPLES AND PEACHES IN THE UNITED STATES, AND NUMBER OF TREES, BY GEOGRAPHIC DIVISIONS AND STATES: 1919 AND 1909—Concluded

Division or State	Apples			
	Production (bushels)		Trees of bearing age	
	1919	1909	1920	1910
MOUNTAIN:				
Montana	673,716	567,054	1,059,198	696,753
Idaho	3,645,640	659,959	2,380,523	1,005,668
Wyoming	29,999	17,896	50,062	27,773
Colorado	3,417,682	3,559,094	1,777,737	1,688,425
New Mexico	939,102	417,143	687,799	542,528
Arizona	120,765	72,814	70,273	62,027
Utah	759,696	350,023	726,471	517,039
Nevada	52,619	74,449	42,612	74,464
PACIFIC:				
Washington	21,568,691	2,672,100	7,964,167	3,009,337
Oregon	6,921,284	1,930,926	3,315,093	2,029,913
California	7,842,017	4,935,073	3,128,386	2,482,762

PRODUCTION OF APPLES AND PEACHES IN THE UNITED STATE, AND NUMBER OF TREES, BY GEOGRAPHIC DIVISIONS AND STATES: 1919 AND 1909—Concluded

Apples		Peaches					
Trees not of bearing age		Production (bushels)		Trees of bearing age		Trees not of bearing age	
1920	1910	1919	1909	1920	1910	1920	1910
69,328	1,308,066	509	128	1,831	538	420	3,386
144,088	1,539,896	279,101	18,734	178,434	73,080	26,648	212,995
34,197	84,024	12	5	42	46	68	419
183,315	1,972,914	721,480	692,258	446,943	793,372	32,158	606,001
167,097	914,254	198,346	32,533	154,968	136,191	36,923	184,466
35,977	53,884	138,361	50,102	101,855	51,415	26,681	32,562
80,304	789,260	883,950	143,237	554,202	544,314	28,551	651,233
9,265	16,868	5,868	3,171	5,940	6,329	3,721	5,049
755,898	4,862,702	1,544,859	84,494	649,085	536,875	50,254	1,028,141
500,322	2,240,636	504,441	179,030	412,936	273,162	29,911	508,179
1,143,947	1,054,107	15,969,073	9,267,118	9,057,760	7,829,011	1,366,941	4,409,562

PRODUCTION OF PEARS AND PLUMS AND PRUNES
IN THE UNITED STATES, AND NUMBER OF TREES

The Bureau of the Census, of the Department of Commerce, announces, subject to correction, the following preliminary figures from the 1920 census of agriculture for the United States, with comparative figures for the preceding census.

PEARS AND PLUMS AND PRUNES — PRODUCTION AND NUMBER OF
TREES IN THE UNITED STATES: 1919 AND 1909

PEARS:

Production (bushels) —	
1919	14,204,265
1909	8,840,733
Increase (bushels)	5,363,532
Per cent of increase.....	60.7
Trees of bearing age —	
1920	14,647,412
1910	15,171,524
Decrease	524,112
Per cent of decrease.....	3.5
Trees not of bearing age—	
1920	6,052,247
1910	8,803,885
Decrease	2,751,638
Per cent of decrease.....	31.3

PLUMS AND PRUNES:

Production (bushels) —	
1919	19,083,942
1909	15,480,170
Increase (bushels)	3,603,772
Per cent of increase.....	23.3
Trees of bearing age —	
1920	20,452,293
1910	23,445,009
Decrease	2,992,716
Per cent of decrease.....	12.8
Trees not of bearing age —	
1920	9,375,268
1910	6,923,581
Increase	2,451,687
Per cent of increase.....	35.4

PEARS — PRODUCTION

The production of pears in the United States in 1919, according to the Fourteenth Census, was 14,204,265 bushels, as compared with 8,840,733 bushels in 1909, representing an increase of 5,363,532 bushels, or 60.7 per cent.

The states reporting the largest production of pears in 1919 were California, with 3,952,923 bushels; New York, with 1,830,237 bushels; Washington with 1,728,759 bushels; Oregon, with 761,063 bushels; and Texas, with 637,400 bushels.

PEAR TREES

The number of trees which have reached bearing age indicates the present status of any orchard fruit. The number of such pear trees in 1920 (including all trees which were old enough to bear fruit at the time of the enumeration, even though they may not have borne any fruit in 1919) was 14,647,412, as compared with 15,171,524 in 1910, representing a decrease of 524,112 trees, or 3.5 per cent.

The states which showed increases between 1910 and 1920 in the number of pear trees of bearing age were California, New York, Washington, Oregon, Colorado, Oklahoma, New Mexico, Idaho, Connecticut, and North Dakota.

One of the most significant indications of the progress or tendency in the growing of any orchard crop is the number of young trees in the orchards which have not yet reached bearing age. The number of pear trees not of bearing age (excluding nursery stock, not yet set out in orchard locations) reported for 1920 was 6,052,247, as compared with 8,803,885 in 1910. These figures represent a decrease of 2,751,638 trees, or 31.3 per cent.

PLUMS AND PRUNES — PRODUCTION

The production of plums and prunes in 1919 was 19,083,942 bushels, as against 15,480,170 bushels in 1909. The increase in production between 1909 and 1919 amounted to 3,603,772 bushels, or 23.3 per cent.

The states reporting the largest production of plums and prunes in 1919 were California, with 13,200,805 bushels; Oregon, with 2,151,864 bushels; Washington, with 785,920 bushels; and Idaho, with 485,325 bushels. These four states produced nearly

seven-eighths (87.1 per cent) of the total production of plums and prunes in the United States in 1919.

No separate figures can be given for plums and prunes, but the commercial production of prunes is practically confined to the four states just mentioned.

PLUM AND PRUNE TREES

The number of plum and prune trees of bearing age in 1920 was 20,452,293, as compared with 23,445,009 in 1910, representing a decrease of 2,992,716 trees, or 12.8 per cent.

The number of plum and prune trees not of bearing age in 1920 was 9,375,268, as compared with 6,923,581 in 1910, an increase of 2,451,687 trees, or 35.4 per cent.

PRODUCTION OF PEARS AND PLUMS AND PRUNES IN THE
UNITED STATES, AND NUMBER OF TREES, BY
GEOGRAPHIC DIVISIONS AND STATES:
1919 AND 1909

Division and State	Pears			
	Production (bushels)		Trees of bearing age	
	1919	1909	1920	1910
UNITED STATES	14,204,265	8,840,733	14,647,412	15,171,524
GEOGRAPHIC DIVISIONS:				
New England	194,286	233,845	220,433	296,874
Middle Atlantic	2,652,903	2,185,204	4,012,994	3,670,094
East North Central.....	1,060,522	1,623,176	2,443,010	3,560,083
West North Central.....	707,359	213,678	724,393	1,154,426
South Atlantic	1,139,048	975,162	1,506,279	2,325,714
East South Central.....	452,980	536,422	651,824	831,618
West South Central.....	1,069,231	191,518	849,737	1,045,143
Mountain	485,191	268,205	339,018	312,449
Pacific	6,442,745	2,613,523	3,899,724	1,975,123
NEW ENGLAND:				
Maine	14,291	38,964	22,525	46,683
New Hampshire	17,274	24,224	21,506	36,816
Vermont	10,360	20,763	14,352	26,315
Massachusetts	84,486	96,071	88,630	113,365
Rhode Island	10,713	12,501	13,435	16,907
Connecticut	57,162	41,322	59,985	56,788
MIDDLE ATLANTIC:				
New York	1,830,237	1,343,089	2,778,761	2,141,596
New Jersey	401,706	463,290	480,601	731,616
Pennsylvania	420,960	378,825	753,632	796,882
EAST NORTH CENTRAL:				
Ohio	157,492	374,871	616,416	899,019
Indiana	109,463	319,925	337,515	708,723
Illinois	374,925	249,365	435,707	786,349
Michigan	408,189	666,023	1,029,735	1,136,151
Wisconsin	13,453	12,992	23,637	29,841
WEST NORTH CENTRAL:				
Minnesota	265	400	1,626	2,792
Iowa	30,036	44,449	100,532	191,125
Missouri	430,828	142,547	376,208	606,973
North Dakota	83	8	486	24
South Dakota	43	162	711	1,844
Nebraska	24,617	6,700	36,926	59,285
Kansas	221,487	19,412	207,854	292,383
SOUTH ATLANTIC:				
Delaware	97,703	105,357	249,375	449,692
Maryland	287,199	367,359	305,510	540,583
Dist. of Columbia.....	919	455	517	1,045
Virginia	287,927	74,486	311,199	457,177
West Virginia	33,364	29,916	116,655	154,908
North Carolina	111,548	84,019	219,725	243,367
South Carolina	98,975	65,680	78,999	105,251
Georgia	178,181	149,667	178,070	262,982
Florida	43,232	98,223	46,199	110,709
EAST SOUTH CENTRAL:				
Kentucky	54,764	251,536	238,007	337,355
Tennessee	114,963	83,557	223,556	233,407
Alabama	162,509	100,041	115,082	142,300
Mississippi	120,744	101,288	75,179	118,556
WEST SOUTH CENTRAL:				
Arkansas	123,605	37,547	145,789	221,764
Louisiana	58,640	35,554	38,796	57,630
Oklahoma	249,586	7,450	229,468	207,271
Texas	637,400	110,967	435,684	558,478

PRODUCTION OF PEARS AND PLUMS AND PRUNES IN THE
UNITED STATES, AND NUMBER OF TREES BY
GEOGRAPHIC DIVISIONS AND STATES:
1919 AND 1909 — Continued

Pears		Plums and Prunes					
Trees not of bearing age		Production (bushels)		Trees of bearing age		Trees not of bearing age	
1920	1910	1919	1909	1920	1910	1920	1910
6,052,247	8,803,885	19,083,942	15,480,170	20,452,293	23,445,009	9,375,268	6,923,581
115,924	97,650	47,838	62,733	125,988	176,038	53,570	90,498
1,282,242	2,123,242	337,274	858,274	1,543,663	1,709,712	450,858	845,001
676,117	1,441,505	425,600	568,383	1,441,988	2,739,635	466,989	976,854
249,021	589,140	346,695	499,781	1,424,673	3,570,012	553,807	1,114,892
464,903	850,461	274,560	257,912	674,440	1,152,080	209,401	363,099
252,689	506,959	235,188	442,125	735,670	1,324,616	152,787	372,010
333,086	936,230	626,355	327,260	1,066,706	2,337,965	453,582	744,987
101,870	417,182	651,863	366,056	795,886	678,268	156,293	265,810
2,576,895	1,811,516	16,138,589	12,097,643	12,643,270	9,756,683	6,877,981	2,150,460
7,120	13,013	20,043	14,637	37,529	43,576	9,395	22,491
7,753	9,397	8,429	7,542	18,335	23,152	6,454	12,562
8,484	7,726	2,062	7,205	19,647	32,920	10,756	15,818
52,745	38,378	13,152	17,814	32,764	41,345	16,553	23,871
7,955	5,405	465	1,872	1,964	4,836	1,347	2,556
31,867	23,731	3,687	13,663	15,749	30,209	9,065	13,200
967,573	1,502,661	244,294	553,522	745,889	919,017	205,702	328,329
77,026	238,401	8,526	9,594	30,128	46,547	11,772	23,071
237,643	382,180	84,454	295,158	767,646	744,148	233,381	493,601
147,892	333,739	84,602	215,657	459,265	1,001,734	129,713	332,811
68,150	229,548	33,536	77,065	214,202	566,988	53,178	177,931
148,810	234,037	83,017	78,566	273,554	600,087	79,615	141,480
302,784	623,931	203,091	181,188	377,123	464,917	142,657	253,479
8,531	20,250	21,354	15,907	117,844	105,909	61,826	71,153
882	4,135	24,337	19,920	193,668	233,736	102,929	167,926
34,985	123,262	27,929	158,036	313,769	1,155,041	95,356	245,231
101,994	272,213	232,025	234,872	528,649	917,851	144,651	183,828
148	327	5,660	1,048	41,254	19,147	19,852	35,459
2,044	5,087	11,561	31,748	117,677	268,268	59,793	172,136
29,011	51,443	11,537	41,910	86,183	351,321	62,786	184,066
79,957	132,673	83,346	12,250	143,473	624,645	68,440	126,116
26,575	90,917	1,613	657	5,100	27,115	1,595	3,872
48,918	138,152	18,540	13,626	41,435	69,996	11,479	29,478
152	32	72	10	128	104	100	8
79,561	255,083	59,561	22,597	118,938	171,667	35,189	59,127
43,357	102,826	37,099	32,948	180,758	234,859	58,547	125,078
129,104	150,368	37,415	61,406	110,577	168,883	35,820	45,503
33,188	54,732	35,891	48,754	49,736	82,212	15,488	21,657
83,474	69,534	64,053	60,845	135,453	357,323	38,198	62,126
20,574	18,817	20,316	17,169	32,315	39,921	12,985	16,250
76,505	131,905	68,317	139,346	232,831	355,858	57,470	128,367
73,679	174,675	70,103	139,093	281,127	499,627	47,980	108,510
51,411	99,170	54,073	61,712	96,922	211,991	23,654	51,979
51,094	101,209	42,695	101,974	74,790	257,140	23,733	83,154
49,412	196,753	161,906	194,649	292,323	731,276	70,264	179,967
27,836	38,242	41,683	31,473	87,471	149,929	36,108	41,419
73,944	252,336	127,811	25,916	206,102	436,421	104,410	195,836
182,894	448,899	294,935	75,222	450,810	1,020,839	242,800	327,765

PRODUCTION OF PEARS AND PLUMS AND PRUNES IN THE
UNITED STATES, AND NUMBER OF TREES BY
GEOGRAPHIC DIVISIONS AND STATES:
1919 AND 1909 — Continued

Division and State	Pears			
	Production (bushels)		Trees of bearing age	
	1919	1909	1920	1910
MOUNTAIN:				
Montana	3,960	7,543	10,278	10,297
Idaho	47,847	42,649	75,452	65,113
Wyoming	64	16	116	178
Colorado	269,465	132,536	136,117	99,989
New Mexico	65,542	29,435	49,315	37,220
Arizona	18,201	13,289	12,359	16,351
Utah	76,008	38,654	51,812	79,355
Nevada	4,104	4,083	3,569	3,946
PACIFIC:				
Washington	1,728,759	310,804	866,634	290,676
Oregon	761,063	374,622	727,444	273,542
California	3,952,923	1,928,097	2,305,646	1,410,905

PRODUCTION OF PEARS AND PLUMS AND PRUNES IN THE
UNITED STATES, AND NUMBER OF TREES, BY
GEOGRAPHIC DIVISIONS AND STATES:
1919 AND 1909 — Concluded

Pears		Plums and Prunes					
Trees not of bearing age		Production (bushels)		Trees of bearing age		Trees not of bearing age	
1920	1910	1919	1909	1920	1910	1920	1910
1,386	12,806	9,575	8,777	24,501	21,140	4,598	15,001
20,539	76,939	485,325	179,027	552,595	302,855	80,485	98,017
239	901	3,091	659	6,827	4,564	9,091	7,475
39,979	171,367	44,944	81,539	80,027	143,921	28,055	68,525
19,423	100,201	30,047	15,528	43,766	51,257	18,042	42,351
7,716	12,852	23,786	8,420	15,713	12,196	6,795	7,898
8,479	39,901	50,677	68,249	66,914	135,619	7,508	23,388
4,109	2,215	4,418	3,857	5,543	6,716	1,719	3,155
183,346	617,754	785,920	1,032,077	875,363	823,082	309,230	122,912
214,523	795,669	2,151,864	1,747,587	2,999,480	1,764,896	1,331,606	427,609
2,178,526	398,093	13,200,805	9,317,979	8,768,436	7,168,705	5,237,145	1,599,924

ACREAGE AND PRODUCTION OF SMALL FRUITS IN THE UNITED STATES

The Bureau of the Census, of the Department of Commerce, announces, subject to correction, the following preliminary figures from the 1920 census of agriculture for the United States, with comparative figures for the preceding census.

ACREAGE AND PRODUCTION OF SMALL FRUITS IN THE UNITED STATES: 1919 AND 1909

	(Acres).	Production (quarts).
Total	1919.. 249,084	325,096,968
	1909.. 272,460	426,565,863
Strawberries	1919.. 119,395	176,931,550
	1909.. 143,045	255,702,035
Raspberries	1919.. 50,278	49,210,447
Loganberries	1919.. 3,978	12,123,062
Raspberries and loganberries.....	1909.. 48,668	60,918,196
Blackberries and dewberries.....	1919.. 46,165	39,945,078
	1909.. 49,004	55,343,570
Cranberries	1919.. 16,804	35,260,291
	1909.. 18,431	38,243,060
Currants	1919.. 7,379	7,722,817
	1909.. 7,862	10,448,532
Other berries	1919.. 5,085	3,903,723
	1909.. 5,450	5,910,470

The total acreage of small fruits harvested in the United States in 1919, according to the Fourteenth Census, was 249,084, as compared with 272,460 in 1909, representing a decrease of 23,376 acres, or 8.6 per cent.

The states reporting the largest acreage in small fruits in 1919 were Michigan, with 21,021 acres; Sew York, with 20,412 acres; Missouri, with 16,768 acres; and New Jersey, with 15,374 acres.

The production of small fruits in 1919 was 325,096,968 quarts, as compared with 426,565,863 quarts in 1909, a decrease of 101,468,895 quarts, or 23.8 per cent.

STRAWBERRIES

The acreage of strawberries harvested in 1919 was 119,395, as compared with 143,045 in 1909, representing a decrease of 23,650 acres, or 16.5 per cent. The states reporting the largest acreage in strawberries in 1919 were as follows: Tennessee, 10,876 acres; Missouri, 8,645 acres; Arkansas, 8,324 acres; and Michigan, 8,048 acres.

The production of strawberries in 1919 was 176,931,550 quarts, as against 255,702,035 quarts in 1909. These figures represent a decrease of 78,770,485 quarts, or 30.8 per cent.

RASPBERRIES AND LOGANBERRIES

The acreage in raspberries and loganberries in 1919 was 54,256, as compared with 48,668 in 1909. The production of raspberries and loganberries in 1919 was 61,333,509 quarts, as compared with a production of 60,918,196 quarts in 1909.

Raspberries and loganberries were not reported separately in 1909. The acreage of raspberries harvested in 1919 was 50,278 and the production was 49,210,447 quarts. The acreage of loganberries harvested in 1919 was 3,978 and the production was 12,123,062 quarts.

The leading states in the production of raspberries in 1919 were New York, Michigan, and Washington. Practically all of the loganberries produced in the United States in 1919 were reported from three states, as follows: Oregon, 10,198,011 quarts; Washington, 1,157,778 quarts; and California, 655,592 quarts.

BLACKBERRIES AND DEWBERRIES

There were 46,165 acres in blackberries and dewberries in 1919, as compared with 49,004 acres in 1909. The production was 39,945,078 quarts in 1919 and 55,343,570 quarts in 1909.

The states reporting the largest production of blackberries and dewberries in 1919 were as follows: Texas, 6,287,333 quarts; Washington, 3,691,065 quarts; Missouri, 2,958,006 quarts; California, 2,549,082 quarts; Michigan, 2,452,909 quarts; and Oregon, 2,139,110 quarts.

CRANBERRIES, CURRANTS, AND OTHER BERRIES

The total acreage in cranberries in 1919 was 16,804, as compared with 18,431 in 1909. The production in 1919 was 35,260,291 quarts, while the production in 1909 was 38,243,060 quarts. The states reporting the largest acreage in cranberries in 1919 were Massachusetts, with 7,096 acres; New Jersey, with 6,583 acres; and Wisconsin, with 1,805 acres. These three states produced 33,852,310 quarts of cranberries in 1919.

There were 7,379 acres in currants in 1919, as against 7,862 acres in 1909. The production in 1919 was 7,722,817 quarts, while the production in 1909 was 10,448,532 quarts. The state of New York in 1919 produced 3,321,583 quarts of currants.

The acreage in "other berries" (mostly gooseberries) in 1919 was 5,085, as compared with 5,450 acres in 1909. The production in 1919 was 3,903,723 quarts, as against 5,910,470 quarts in 1909.

ACREAGE AND PRODUCTION OF SMALL FRUITS IN THE
UNITED STATES, BY GEOGRAPHIC DIVISIONS AND
STATES: 1919 AND 1909

Division and State	Total ¹			
	Acres		Production (quarts)	
	1919	1909	1919	1909
UNITED STATES	249,084	272,460	325,096,968	426,565,863
GEOGRAPHIC DIVISIONS:				
New England	14,625	13,777	32,406,719	37,631,006
Middle Atlantic	44,466	55,243	56,924,436	90,300,863
East North Central	57,239	56,967	63,702,944	73,745,968
West North Central	35,822	35,587	37,368,041	46,275,534
South Atlantic	25,319	45,403	28,198,785	72,300,168
East South Central	20,943	18,994	23,457,806	22,182,689
West South Central	22,713	19,417	26,666,084	23,878,888
Mountain	4,624	6,765	5,050,860	10,587,207
Pacific	23,833	20,317	51,321,293	49,663,540
NEW ENGLAND:				
Maine	1,573	1,260	1,561,647	2,285,415
New Hampshire	1,071	618	753,969	998,244
Vermont	694	469	749,032	826,122
Massachusetts	9,628	9,552	27,099,119	29,260,143
Rhode Island	246	281	339,064	437,560
Connecticut	1,413	1,597	1,903,888	3,823,522
MIDDLE ATLANTIC:				
New York	20,412	22,496	25,713,901	37,857,829
New Jersey	15,374	24,069	20,148,717	33,822,987
Pennsylvania	8,680	8,678	11,061,818	13,620,047
EAST NORTH CENTRAL:				
Ohio	9,447	11,591	11,963,128	15,721,023
Indiana	7,565	5,919	6,812,972	7,424,881
Illinois	11,215	11,723	10,591,818	13,602,676
Michigan	21,021	21,419	23,946,801	27,214,659
Wisconsin	7,991	6,305	10,388,225	9,782,779
WEST NORTH CENTRAL:				
Minnesota	5,008	3,738	6,165,120	4,476,575
Iowa	7,885	7,211	8,837,293	10,344,052
Missouri	16,768	17,009	17,769,936	23,696,221
North Dakota	524	399	170,771	285,696
South Dakota	412	419	224,398	401,295
Nebraska	1,147	1,411	647,321	1,594,421
Kansas	3,578	5,400	3,553,202	5,477,274
SOUTH ATLANTIC:				
Delaware	3,915	8,687	4,362,473	14,425,209
Maryland	8,360	16,595	10,278,972	26,277,054
District of Columbia	21	12	25,789	24,109
Virginia	3,518	7,295	4,439,964	11,342,980
West Virginia	3,162	2,913	2,092,376	2,336,562
North Carolina	4,099	6,701	4,778,710	12,827,427
South Carolina	498	856	269,248	1,408,099
Georgia	842	988	625,783	1,262,155
Florida	904	1,356	1,327,470	2,396,573
EAST SOUTH CENTRAL:				
Kentucky	6,163	4,387	5,323,010	4,972,702
Tennessee	12,544	12,539	14,620,175	13,895,494
Alabama	1,477	1,232	2,125,418	1,907,193
Mississippi	759	836	1,889,203	1,407,301

¹ Includes strawberries, raspberries, loganberries, black berries, dewberries, cranberries, currants, and other berries.

ACREAGE AND PRODUCTION OF SMALL FRUITS IN THE
UNITED STATES, BY GEOGRAPHIC DIVISIONS AND
STATES: 1919 AND 1909 — Continued

Strawberries				Raspberries and loganberries		Blackberries and dewberries	
Acres		Production (quarts)		Production (quarts)		Production (quarts)	
1919	1909	1919	1909	1919	1909	1919	1909
119,395	143,045	176,981,550	255,702,035	61,333,509	60,918,196	39,945,078	55,343,570
3,353	4,432	6,319,419	11,741,829	1,374,601	1,119,007	790,102	804,595
13,909	19,202	24,065,552	43,747,240	16,328,692	19,802,119	4,608,673	9,029,897
24,258	23,604	36,133,472	39,698,906	14,714,507	16,895,570	6,721,886	10,437,862
18,147	16,433	26,048,603	26,308,539	5,616,192	5,634,788	4,422,115	12,311,990
18,058	37,280	23,497,227	63,124,937	1,694,922	2,218,296	2,829,944	6,463,811
16,038	14,253	19,673,040	17,648,063	599,320	799,212	3,128,749	3,580,336
13,136	13,917	17,690,967	19,701,936	191,458	268,809	8,722,827	3,836,925
1,623	3,115	2,158,654	5,030,445	1,495,425	3,194,610	311,525	723,167
10,873	10,809	21,344,616	28,700,140	19,318,392	10,985,785	8,379,257	8,155,047
555	698	893,740	1,626,250	279,254	154,121	242,478	153,816
366	310	489,774	638,057	131,145	86,558	90,666	75,913
275	276	428,335	615,820	177,575	85,065	113,210	56,232
1,431	2,015	3,151,371	5,518,867	468,715	376,136	251,951	307,987
90	140	116,646	326,540	47,345	32,871	6,428	17,875
636	993	1,239,553	3,016,295	270,567	384,256	85,369	192,752
4,872	6,382	8,579,593	15,945,863	11,674,978	14,751,940	1,711,546	2,509,851
5,029	8,684	8,301,893	18,767,473	2,083,925	2,143,877	2,045,521	5,456,789
4,008	4,136	7,184,096	9,033,904	2,569,789	2,906,302	851,606	1,063,257
4,172	4,706	7,165,957	8,501,065	2,773,819	4,029,480	1,481,447	2,465,407
3,401	2,574	4,277,646	3,759,132	1,251,652	1,595,921	1,087,317	1,482,909
4,985	5,410	6,901,199	8,031,824	1,945,336	1,834,337	1,365,223	2,915,473
8,048	8,051	12,585,543	14,218,768	7,657,819	8,381,943	2,452,909	3,075,954
3,652	2,863	5,203,127	5,188,117	1,085,881	1,053,889	334,990	498,119
2,768	1,873	4,111,969	2,730,099	1,516,147	1,340,469	181,183	139,741
4,472	2,917	6,606,592	5,330,105	1,428,396	1,728,547	697,449	2,733,728
8,645	9,048	12,861,820	15,171,034	1,592,556	1,563,527	2,958,006	6,391,209
93	88	47,157	66,028	39,173	60,742	2,485	3,404
227	226	141,163	238,164	30,368	60,285	1,511	6,058
754	562	451,798	654,061	89,672	263,183	35,433	501,872
1,188	1,719	1,828,104	2,119,048	919,880	616,035	645,748	2,535,918
3,503	7,194	4,056,028	12,730,265	26,801	275,871	270,560	1,403,977
7,096	14,292	8,976,057	23,611,095	723,738	959,369	517,525	1,372,164
10	11	16,882	18,709	933	700	7,097	1,700
2,446	6,606	3,803,273	10,761,381	280,228	257,322	313,873	273,551
1,066	709	840,273	812,049	607,495	648,174	594,833	803,498
2,186	5,420	3,807,598	10,313,361	29,073	37,764	936,251	2,464,065
312	815	223,745	1,337,208	4,111	4,955	40,187	64,754
665	890	505,693	1,157,472	19,479	33,928	96,852	67,285
834	1,343	1,267,673	2,383,397	3,064	213	52,766	12,817
3,112	1,553	3,194,624	2,114,929	308,406	558,529	1,778,468	2,165,547
10,876	10,761	13,130,904	12,339,584	277,344	222,331	1,200,981	1,316,100
1,359	1,167	2,024,051	1,848,537	9,833	10,546	87,695	44,954
691	772	1,823,461	1,345,013	3,737	7,806	61,605	53,735

ACREAGE AND PRODUCTION OF SMALL FRUITS IN THE
UNITED STATES, BY GEOGRAPHIC DIVISIONS AND
STATES: 1919 AND 1909 — Continued

Division and State	Total ¹			
	Acres		Production (quarts)	
	1919	1909	1919	1909
WEST SOUTH CENTRAL:				
Arkansas	9,873	8,032	12,538,205	8,965,572
Louisiana	4,052	3,587	5,342,180	6,420,207
Oklahoma	2,649	2,745	1,899,073	2,310,367
Texas	6,139	5,053	6,886,626	6,182,742
MOUNTAIN:				
Montana	386	562	338,087	766,791
Idaho	1,240	1,673	1,106,208	2,071,141
Wyoming	87	106	56,824	96,883
Colorado	1,798	2,829	2,213,619	4,294,988
New Mexico	120	66	53,750	76,532
Arizona	58	76	62,467	112,190
Utah	910	1,416	1,198,200	3,118,395
Nevada	25	37	21,705	50,287
PACIFIC:				
Washington	7,434	5,508	16,884,745	13,490,930
Oregon	8,463	5,122	18,977,822	9,348,490
California	7,936	9,687	15,458,726	26,824,120

¹ Includes strawberries, raspberries, loganberries, black berries, dewberries, cranberries, currants, and other berries.

ACREAGE AND PRODUCTION OF SMALL FRUITS IN THE
UNITED STATES, BY GEOGRAPHIC DIVISIONS AND
STATES: 1919 AND 1909 — Concluded

Strawberries				Raspberries and loganberries		Blackberries and dewberries	
Acres		Production (quarts)		Production (quarts)		Production (quarts)	
1919	1909	1919	1909	1919	1909	1919	1909
8,324	7,361	11,463,971	8,259,240	154,351	96,414	885,539	587,977
4,007	3,570	5,323,890	6,405,236	145	639	18,145	14,332
302	825	311,630	830,404	30,234	74,104	1,531,810	1,366,497
503	2,161	591,476	4,207,056	6,728	97,652	6,287,333	1,868,119
155	265	171,150	406,038	80,875	165,473	13,128	36,321
469	698	494,818	953,723	385,510	575,209	91,056	249,984
39	24	27,061	20,895	10,979	15,213	.....	149
653	1,326	944,276	1,674,923	643,678	1,650,785	76,234	227,598
25	20	14,363	35,634	6,202	10,222	8,233	10,089
20	58	17,058	95,247	677	1,550	37,040	13,808
254	719	484,792	1,832,796	364,061	758,317	115,437	184,140
5	5	5,136	11,189	3,443	17,841	397	1,078
3,087	3,283	6,377,368	7,683,774	5,757,456	3,118,720	3,691,065	2,340,779
2,812	2,941	4,159,200	5,322,040	12,022,912	2,644,948	2,139,110	915,744
4,974	4,585	10,808,048	15,694,326	1,538,024	5,222,117	2,549,082	4,898,524

FRUIT PRODUCTS OF FARMS IN THE UNITED STATES

The Department of Commerce, through the Bureau of the Census, announces the following figures from the 1920 census of agriculture for the United States, with comparative figures for the preceding census.

FRUIT PRODUCTS OF FARMS IN THE UNITED STATES: 1919 AND 1909

Product	1919	1909
Cider made on farms.....gallons..	13,365,805	32,583,998
Cider made, or to be made, into vinegar.....gallons..	6,470,060	¹ 7,246,632
Grape juice made on farms.....gallons..	2,202,848	² 18,636,225
Dried fruits, total.....pounds..	612,700,626	385,039,552
Raisins and dried grapes.....pounds..	301,035,519	169,245,101
Other dried fruits.....pounds..	311,665,107	215,794,451

¹ Vinegar made on farms.

² Wine and grape juice.

CIDER AND VINEGAR

The number of gallons of cider made on farms in the United States in 1919, according to the Fourteenth Census, was 13,365,805, as compared with 32,583,998 in 1909, representing a decrease of 19,218,193 gallons, or 59 per cent. The production of cider reported for 1899 was 55,280,199 gallons, and the decrease between 1899 and 1909 amounted to 22,696,201 gallons, or 41.1 per cent.

The number of farms reporting cider produced in 1919 was 216,617, as compared with 332,810 in 1909.

The leading states in the production of cider on farms in 1919 were Pennsylvania, with 2,532,044 gallons; New York, with 2,144,848 gallons; Maine, with 933,440 gallons; Connecticut, with 883,937 gallons; Virginia, with 804,405 gallons; and Ohio, with 708,563 gallons.

The number of gallons of cider made into vinegar in 1919, or to be made into vinegar, was 6,470,060, while the quantity of vinegar made on farms in 1909 (including some vinegar other than cider vinegar) was 7,246,632 gallons.

The only states in 1919 that reported over 500,000 gallons of cider vinegar made on farms were New York, with 1,109,794 gallons; Pennsylvania, with 948,480 gallons; and Maine, with 594,739 gallons.

GRAPE JUICE

The quantity of grape juice made on farms in 1919 was 2,202,848 gallons. There is no comparison between this quantity and the quantity of wine and grape juice (18,636,225 gallons) which was reported for 1909. The number of farms reporting grape juice made in 1919 was 30,993.

California reported 1,820,895 gallons, or 82.7 per cent of the grape juice produced on farms in 1919. Among the other states, New York produced 45,320 gallons; Illinois, 38,746 gallons; Ohio, 36,071 gallons; and Missouri, 33,671 gallons.

DRIED FRUITS

The total production of dried fruits in 1919 was 612,700,626 pounds, as compared with 385,039,552 pounds in 1909, representing an increase of 227,661,074 pounds, or 59.1 per cent. The total for 1919 included 301,035,519 pounds of raisins and dried grapes.

The number of farms reporting dried fruits in 1919 was 252,289, as compared with 137,041 in 1909.

California produced 577,041,118 pounds, or 94.2 per cent of the total production of dried fruits in 1919, and all except 35,288 pounds of the total production of raisins. Other states reporting over 1,000,000 pounds of dried fruits in 1919 were as follows: Oregon, 17,470,568; Washington, 5,378,989; Arkansas, 3,724,743; Virginia, 1,818,481; and North Carolina, 1,065,302.

**FRUIT PRODUCTS OF FARMS, BY DIVISIONS AND STATES:
1919 AND 1909**

Division and State	Total number farms	Cider		Cider M Vinega	
		Farms reporting, 1919	Production (gallons)		
			1919		1909
UNITED STATES	6,448,313	216,617	13,365,805	32,583,998	150,768
GEOGRAPHIC DIVISIONS:					
New England	156,564	38,810	3,274,452	4,705,949	27,609
Middle Atlantic	425,147	72,331	4,827,773	13,510,722	49,975
East North Central	1,084,744	39,377	2,133,353	8,614,873	25,243
West North Central	1,096,951	13,716	566,303	2,053,882	10,188
South Atlantic	1,158,976	30,323	1,760,076	2,394,776	22,442
East South Central	1,051,690	4,187	114,835	692,131	3,157
West South Central	996,088	3,152	138,841	72,145	2,355
Mountain	244,100	2,537	191,269	203,095	1,805
Pacific	234,164	12,154	358,903	306,425	7,994
NEW ENGLAND:					
Maine	48,227	11,417	933,440	939,085	9,184
New Hampshire	20,523	5,822	420,794	671,684	4,731
Vermont	29,075	6,574	394,770	651,159	4,483
Massachusetts	32,001	6,653	537,386	1,004,392	4,113
Rhode Island	4,083	926	104,125	147,645	538
Connecticut	22,655	7,448	883,937	1,291,984	4,557
MIDDLE ATLANTIC:					
New York	193,195	32,835	2,144,818	5,191,221	25,154
New Jersey	29,702	2,415	150,881	288,587	1,689
Pennsylvania	202,250	37,081	2,532,044	8,060,914	23,132
EAST NORTH CENTRAL:					
Ohio	256,695	12,751	708,563	2,889,237	7,611
Indiana	205,126	2,650	126,878	1,491,911	1,661
Illinois	237,181	10,215	672,868	678,437	7,089
Michigan	196,447	11,231	541,458	3,386,138	7,785
Wisconsin	189,295	2,530	83,586	169,150	1,097
WEST NORTH CENTRAL:					
Minnesota	178,478	585	21,143	9,044	381
Iowa	213,439	2,648	78,930	591,352	1,882
Missouri	263,004	7,856	339,794	1,065,881	5,983
North Dakota	77,690				
South Dakota	74,637	73	3,047	4,103	41
Nebraska	124,417	979	36,169	255,886	718
Kansas	165,286	1,575	87,220	128,616	1,183
SOUTH ATLANTIC:					
Delaware	10,140	1,178	66,190	36,145	931
Maryland	47,908	5,960	438,877	970,705	3,838
District of Columbia	204	4	93		
Virginia	186,242	12,680	804,405	469,651	9,413
West Virginia	87,289	3,500	194,630	248,543	2,533
North Carolina	269,763	6,616	250,517	647,152	5,436
South Carolina	192,693	123	1,518	6,692	93
Georgia	310,732	262	3,846	14,970	195
Florida	51,005			918	
EAST SOUTH CENTRAL:					
Kentucky	270,626	2,311	72,068	464,321	1,713
Tennessee	252,774	1,525	38,954	213,916	1,176
Alabama	256,099	330	3,539	12,557	265
Mississippi	272,101	21	274	1,337	13
WEST SOUTH CENTRAL:					
Arkansas	232,604	1,590	50,394	36,825	1,202
Louisiana	135,463	6	81	436	1
Oklahoma	191,988	1,408	82,449	30,081	1,069
Texas	436,033	148	5,917	4,803	83

FRUIT PRODUCTS OF FARMS, BY DIVISIONS AND STATES:
1919 AND 1909 — Continued

Production (gal- lons)	Vinegar Made on Farms, 1909 (gallons)	Grape Juice, 1919		Wine and Grape Juice, 1909 (gallons)	Dried Fruits		
		Farms reporting	Production (gal- lons)		Farms reporting, 1919	Production (pounds)	
						1919	1909
6,470,060	7,246,632	30,993	2,202,848	18,636,225	252,289	612,700,626	385,039,552
1,583,157	710,412	1,622	27,638	50,738	1,250	35,815	23,644
2,131,261	1,994,295	4,448	74,271	687,609	13,591	760,021	4,677,598
957,461	1,741,506	8,783	115,441	875,955	10,343	351,696	312,976
334,215	821,849	6,377	63,887	410,867	24,126	939,242	1,217,194
845,574	836,450	4,640	42,677	323,801	54,085	3,429,824	3,106,883
67,646	526,311	1,889	9,813	82,520	47,734	1,674,085	2,705,816
83,527	89,217	1,400	33,380	135,310	66,228	5,066,575	1,268,210
105,324	158,820	201	4,344	26,783	3,038	552,693	273,828
361,895	367,772	1,633	1,831,397	16,042,642	31,894	599,890,675	371,453,403
594,739	197,996	31	250	328	649	16,347	15,034
260,214	115,894	137	368	2,846	118	3,295	1,768
180,533	96,520	80	217	1,199	348	8,406	5,828
210,496	133,053	627	5,591	12,937	51	5,594	465
36,408	19,003	104	2,591	2,856	16	307	.....
300,767	147,346	643	18,621	30,572	68	1,866	549
1,109,794	703,384	1,524	45,320	346,973	971	374,317	4,385,978
72,987	48,665	444	17,148	233,880	54	2,132	6,323
948,480	1,242,246	2,480	11,803	106,756	12,566	383,572	285,297
279,603	483,908	2,268	36,071	264,213	2,156	46,319	65,432
54,576	431,187	1,167	9,778	130,976	894	24,409	62,196
314,592	207,242	3,025	38,746	247,951	5,030	236,830	128,376
278,752	602,697	2,117	29,205	199,030	1,098	22,250	48,328
29,938	16,472	206	1,641	33,785	1,165	21,888	8,644
11,835	5,778	40	214	4,567	566	11,675	2,853
49,270	244,473	2,757	23,334	76,092	1,652	35,189	87,421
200,321	402,518	2,968	33,671	245,656	20,793	861,912	1,102,274
.....	44	.....	.....	128	.....	.....	106
1,339	2,823	5	20	10,096	29	1,412	1,247
23,343	109,593	224	2,449	47,703	262	5,910	17,793
48,107	56,620	383	4,199	26,625	824	23,144	5,500
37,531	9,481	37	120	1,379	74	2,088	370
177,083	226,460	885	4,859	20,783	2,395	60,152	39,292
.....	5	.....	59	.....	1	5	.....
395,755	268,457	1,799	10,455	49,609	22,966	1,818,481	929,546
96,176	122,592	500	2,409	15,449	7,053	329,329	396,927
136,323	188,610	984	22,501	205,152	17,023	1,065,302	1,500,681
792	3,599	139	719	12,371	1,351	46,878	26,758
1,914	14,232	248	1,259	2,665	3,192	106,724	212,570
.....	3,019	43	296	16,393	30	865	739
41,997	309,562	827	4,068	45,138	12,979	467,882	1,593,727
23,613	191,915	727	2,924	16,576	21,222	782,603	857,903
1,895	18,217	255	2,346	12,820	7,674	231,973	201,797
141	6,617	80	535	7,986	5,859	191,622	52,389
30,727	42,770	502	8,752	75,070	38,352	3,724,743	1,193,139
20	3,521	4	14	1,205	1,495	41,497	3,198
50,275	32,887	489	9,697	16,999	8,454	460,195	45,684
2,506	10,039	405	14,917	42,036	17,927	840,140	26,189

FRUIT PRODUCTS OF FARMS, BY DIVISIONS AND STATES:
1919 AND 1909 — Continued

Division and State	Total number farms	Cider			Cider M Vinega
		Farms reporting, 1919	Production (gallons)		Farms reporting
			1919	1909	
MOUNTAIN:					
Montana	57,677	376	27,771	22,314	258
Idaho	42,106	714	45,082	10,562	505
Wyoming	15,748	26	998	612	15
Colorado	59,934	862	66,852	138,091	633
New Mexico	29,844	271	25,369	12,788	206
Arizona	9,975	39	2,437	2,771	29
Utah	25,662	192	18,033	5,347	111
Nevada	3,163	57	4,727	10,610	48
PACIFIC:					
Washington	66,288	5,771	223,314	98,050	3,162
Oregon	50,206	5,121	35,169	89,919	4,013
California	117,670	1,262	100,420	118,456	819

FRUIT PRODUCTS OF FARMS, BY DIVISIONS AND STATES:
1919 AND 1909 — Concluded

Production (gal- lons)	Vinegar Made on Farms, 1909 (gallons)	Grape Juice, 1919		Wine and Grape Juice, 1909 (gallons)	Farms reporting, 1919	Dried Fruits	
		Farms reporting	Production (gal- lons)			Production (pounds)	
						1919	1909
13,659	10,108	1	3	368	71	2,912	435
22,197	11,762	53	421	3,452	460	256,010	21,280
683	239			197	16	755	110
48,960	121,428	60	505	1,116	282	11,144	59,286
13,999	5,880	23	757	1,684	1,305	160,315	16,506
1,085	3,504	7	32	5,100	176	23,422	7,932
6,891	2,689	19	571	12,173	663	78,830	103,743
2,820	3,210	5	1,755	2,693	65	19,005	64,536
112,264	62,446	235	1,777	5,891	2,225	5,378,989	1,842,396
201,546	60,643	361	8,725	31,232	4,320	17,479,568	10,904,713
48,086	244,683	1,037	1,820,895	16,005,519	25,349	577,041,118	358,706,384

THE FIFTY LEADING AGRICULTURAL COUNTIES IN THE UNITED STATES

The Department of Commerce, through the Bureau of the Census, announces the following data from the 1920 census of agriculture for the United States.

The Census Bureau has determined the rank of the 50 counties in the United States leading in the combined value of farm crops and live-stock products in 1919. The live-stock products include dairy products, chickens and eggs, honey and wax, and wool and mohair, but not domestic animals sold and slaughtered. There is some duplication, to be sure, when the value of crops and the value of live-stock products are included in the same total, by reason of the fact that a large part of the live-stock products are derived from the feeding of farm crops to farm live stock. This combined value, however, appears to offer the best available index of the counties' agricultural production.

The 50 leading agricultural counties were distributed among the several states as follows: California, 13; New York, 7; Illinois, 5; Texas, 4; Pennsylvania, 4; South Carolina, 4; North Carolina, 3; Washington, 2; Wisconsin, 2; and 1 each for Arizona, Colorado, Connecticut, Maine, Minnesota, and Mississippi.

RANK OF SOME INDIVIDUAL COUNTIES

Los Angeles County, Calif., ranked first among all counties in the United States in the combined value of crops and live-stock products in 1919, the total value amounting to \$71,579,899. The value of crops in this county was \$61,864,479, which was greater than the combined value of crops and live-stock products in any other county. Oranges contributed slightly more than one-third of the combined value of crops and live-stock products in this county. Other important items were lemons, walnuts, and hay and forage.

Fresno County, Calif., ranked second among all counties, with a value of \$55,110,101 for crops and live-stock products, and stood third in the value of crops alone, with \$51,861,252.

Grapes made up a little more than one-half of the combined value of crops and live-stock products, with peaches, and hay and forage following in order.

Aroostook County, Me., stood third in the combined value of crops and live-stock products, with \$54,376,256, and was second in value of crops, with \$52,541,205. Potatoes comprised about four-fifths of the combined value in this county, while hay and forage was the next item in importance as regards value.

San Joaquin County, Calif., ranked fourth, with a combined value of \$41,191,240, for crops and live-stock products, and also stood fourth in the value of crops, with \$37,956,866. Potatoes, grapes, barley, and hay and forage were the leading items from the standpoint of value.

Lancaster County, Pa., was fifth in rank, with \$40,776,212 representing the value of crops and live-stock products. Tobacco, corn, hay and forage, and wheat were the most important items, in the order named.

Yakima County, Wash., stood sixth in value of crop and live-stock products, with \$34,741,710. Apples, and hay and forage were the leading items as regards value.

Other counties, with their rank according to the combined value of crops and live-stock products in 1919, were as follows: Tulare County, Calif., seventh, with \$34,036,167; Sonoma County, Calif., eighth, with \$32,300,623; Whitman County, Wash., ninth, with \$31,921,047; and Dane County, Wis., tenth, with \$29,395,753.

The 50 counties whose rank in the combined value of crops and live-stock products has been determined, are shown in the following table:

THE FIFTY COUNTIES IN UNITED STATES LEADING IN THE COMBINED VALUE OF CROPS AND LIVE-STOCK PRODUCTS: 1919

County and State	Value of Crops and Live-Stock Products		Value of Crops		Principal Products
	Rank	Amount	Rank	Amount	
	Los Angeles, Calif.	1	\$71,579,899	1		$61,864,479	Oranges, lemons, hay and forage, walnuts.
Fresno, Calif.	2	59,110,101	3	51,891,252	Grapes, peaches, hay and forage, dairy products.
Aroostook, Me.	3	54,376,256	2	52,541,297	Potatoes, hay and forage, oats, dairy products.
San Joaquin, Calif.	4	41,191,290	4	37,936,866	Potatoes, grapes, barley, hay and forage.
Lancaster, Pa.	5	40,776,212	5	32,491,556	Tobacco, corn, hay and forage, wheat.
Yakima, Wash.	6	31,741,710	6	32,458,658	Apples, hay and forage, potatoes, peaches.
Tulare, Calif.	7	34,636,167	8	30,547,311	Grapes, oranges, hay and forage, dairy products.
Sonoma, Calif.	8	32,390,623	12	17,477,370	Eggs and chickens, plums and prunes, apples, grapes.
Whitman, Wash.	9	31,921,047	7	30,824,407	Wheat, hay and forage, oats, barley.
Dane, Wis.	10	29,383,753	25	20,978,957	Dairy products, hay and forage, corn, oats.
McLean, Ill.	11	29,161,454	9	26,998,618	Corn, oats, wheat, hay and forage.
San Bernardino, Calif.	12	27,967,448	10	26,517,455	Oranges, lemons, grapes, hay and forage.
Maricopa, Ariz.	13	26,819,662	12	24,694,416	Cotton, hay and forage, dairy products, wheat.
St. Lawrence, N. Y.	14	26,809,540	108	13,582,476	Dairy products, hay and forage, potatoes.
Orange, Calif.	15	26,655,748	11	25,572,652	Oranges, walnuts, lemons, sugar beets.
York, Pa.	16	26,600,746	26	29,953,838	Corn, wheat, hay and forage, eggs and chickens.
Santa Clara, Calif.	17	26,135,980	14	23,792,684	Plums and prunes, apricots, hay and forage, dairy products.
La Salle, Ill.	18	25,828,420	15	23,694,661	Corn, oats, wheat, hay and forage.
Champaign, Ill.	19	25,619,590	13	23,800,535	Corn, oats, wheat, hay and forage.
Livingston, Ill.	20	24,153,905	19	22,199,150	Corn, oats, eggs and chickens, wheat.
Rolivar, Miss.	21	23,703,571	16	23,114,901	Cotton, corn.
Iroquois, Ill.	22	23,627,284	22	21,474,098	Corn, oats, eggs and chickens, wheat.
Anderson, S. C.	23	23,528,158	20	22,012,165	Cotton, corn.
Orangeburg, S. C.	24	23,427,879	18	22,964,976	Cotton, corn.
Robeson, N. C.	25	23,389,828	17	22,955,935	Cotton, tobacco, corn.

26	Weld, Colo.	23,203,475	23	21,198,260	Sugar beets, hay and forage, wheat, potatoes.
27	Dodge, Wis.	23,191,660	40	14,331,352	Dairy products, hay and forage, oats, corn.
28	Stanislaus, Calif.	22,728,611	47	17,149,411	Hay and forage, dairy products, barley, wheat.
29	Hartford, Conn.	22,731,488	35	18,779,160	Tobacco, dairy products, hay and forage, corn.
30	Williamson, Texas	22,324,436	21	21,306,496	Cotton, corn, oats, hay and forage.
31	Chautauqua, N. Y.	22,316,236	74	14,983,214	Dairy products, hay and forage, grapes, eggs and chickens.
32	Chester, Pa.	22,261,656	83	14,367,299	Dairy products, corn, hay and forage, wheat.
33	Sacramento, Calif.	21,981,958	27	19,846,858	Dry beans, wheat, hay and forage, grapes.
34	Pitt, N. C.	21,486,117	24	21,052,441	Tobacco, cotton, corn.
35	Otter Tail, Minn.	21,174,949	41	17,568,127	Wheat, hay and forage, dairy products, potatoes.
36	Berks, Pa.	21,447,279	71	15,222,969	Corn, dairy products, hay and forage, potatoes.
37	Eric, N. Y.	21,294,818	87	14,443,343	Dairy products, hay and forage, potatoes, eggs and chickens.
38	Sparta, N. Y.	20,887,542	28	19,556,658	Cotton, corn.
39	Ellys, Texas	20,375,681	29	19,262,474	Cotton, corn, oats, wheat.
40	Riverside, Calif.	20,253,394	33	18,934,265	Oranges, cotton, hay and forage, lemons.
41	Imperial, Calif.	20,195,367	46	17,300,734	Cotton, kafir, milo, etc., hay and forage, dairy products.
42	Fannin, Texas	20,163,821	30	19,246,092	Cotton, corn, oats, wheat.
43	Steuben, N. Y.	19,938,594	77	14,865,611	Hay and forage, potatoes, dairy products, oats.
44	Jefferson, N. Y.	19,918,631	239	10,684,123	Dairy products, hay and forage, oats.
45	Johnston, N. C.	19,842,510	31	19,229,785	Cotton, tobacco, corn, sweet potatoes.
46	Delaware, N. Y.	19,832,943	.....	7,972,256	Dairy products, hay and forage.
47	Marlboro, S. C.	19,419,921	32	19,136,190	Cotton, corn.
48	Onondaga, N. Y.	19,395,595	97	14,112,780	Hay and forage, dairy products, potatoes, eggs and chickens.
49	Lamar, Texas	19,395,636	26	18,270,287	Cotton, corn, hay and forage.
50	Ventura, Calif.	19,160,411	31	18,829,031	Dry beans, walnuts, lemons, oranges.

THE TWENTY LEADING CROPS IN THE UNITED STATES

The Department of Commerce, through the Bureau of the Census, announces the following data from the 1920 census of agriculture for the United States.

The 20 leading crops of the United States in 1919, arranged in order of value, were corn, hay and forage, cotton, wheat, oats, potatoes, tobacco, apples, barley, sweet potatoes, ryè, rough rice, grapes, peaches, kafir and milo, oranges, sugar beets, peanuts, dry edible beans, and sugar cane. The total value of these 20 crops was \$13,754,290,926, which represents more than nine-tenths of the total value of crops shown by the Fourteenth Census.

Corn heads the list, with a value of \$3,507,797,102, or almost \$1,000,000 more than hay and forage, which stands second on the list with a value of \$2,523,050,224. Cotton ranked third, with a value (including cottonseed) of \$2,355,169,365, and wheat ranked fourth, with a value of \$2,074,078,801. These four crops combined represented a value amounting to \$10,460,095,492, or 70.9 per cent of the total value of all crops harvested in 1919.

The next four crops in order were oats, with a value of \$855,255,468; potatoes (white), with a value of \$639,440,521; tobacco, with a value of \$444,047,481; and apples, the leading fruit crop, with a value of \$241,573,577.

The following table shows for the 20 leading crops both the value and the acreage — or in case of fruit crops the number of trees or vines:

VALUE AND ACREAGE OF TWENTY LEADING CROPS IN THE UNITED STATES, 1919

<i>Crop</i>	<i>Value</i>	<i>Acreage</i>
1. Corn	\$3,507,797,102	87,771,600
2. Hay and forage.....	2,523,050,224	96,121,228
3. Cotton and cottonseed.....	2,355,169,365	33,740,106
4. Wheat	2,074,078,801	73,099,421
5. Oats	855,255,468	37,991,002

6. Potatoes (white)	639,440,521	3,251,703
7. Tobacco	444,047,481	1,864,080
8. Apples	241,573,577	*115,309,165
9. Barley	160,427,255	6,472,888
10. Sweet potatoes	124,844,475	803,727
11. Rye	116,537,965	7,679,005
12. Rough rice	97,194,481	911,272
13. Grapes	95,586,021	*225,754,285
14. Peaches	95,569,868	*65,646,101
15. Kafir, milo, etc.....	90,221,046	3,619,034
16. Oranges	83,398,894	*14,397,836
17. Sugar beets	66,051,989	636,434
18. Peanuts	62,751,701	1,125,100
19. Dry edible beans.....	61,795,225	1,161,682
20. Sugar cane	59,499,467	372,938

* Number of trees or vines of bearing age.

FRUIT CROPS, NUMBER OF TREES AND VINES, 1919
(U. S. Census)

District	Counties	Apple Trees		Peach Trees		Pear Trees		Grape Vines		
		Not of Bearing Age	Of Bearing Age	Not of Bearing Age	Of Bearing Age	Not of Bearing Age	Of Bearing Age	Not of Bearing Age	Of Bearing Age	
NORTHWEST	Allen	13,639	57,187	3,458	5,446	1,112	4,218	2,591	16,169	
	Defiance	6,154	26,323	1,065	6,232	641	2,782	946	14,251	
	Fulton	11,298	60,062	6,545	14,447	1,173	43,016	1,361	15,052	
	Hancock	8,631	40,579	2,166	5,589	783	3,939	1,926	10,452	
	Henry	7,127	47,717	3,163	3,357	725	3,924	1,236	14,733	
	Lucas	23,095	48,452	19,942	49,536	1,759	10,672	9,233	208,521	
	Paulding	2,716	24,714	559	674	235	1,637	596	11,709	
	Putnam	6,692	49,316	2,071	3,204	600	3,097	1,132	13,184	
	Van Wert	5,552	59,799	1,626	2,471	342	2,697	947	9,106	
	Williams	8,420	44,019	2,071	3,256	914	4,455	1,175	7,996	
	Wood	6,779	53,136	6,193	10,633	1,356	6,415	1,060	53,380	
	NORTH CENTRAL	Ashland	8,811	44,291	5,683	13,067	759	3,069	538	5,440
		Crawford	10,539	51,138	2,747	4,788	979	4,295	1,160	13,825
Erie		27,704	60,327	27,492	97,060	3,546	16,697	20,695	648,823	
Huron		10,185	48,394	4,858	7,131	704	2,973	676	8,630	
Lorain		37,887	75,867	20,250	66,840	3,262	9,475	54,502	962,055	
Ottawa		44,937	63,708	66,413	548,737	7,764	22,825	23,731	1,051,439	
Richland		10,613	57,210	7,137	13,656	1,190	6,214	1,707	8,070	
Sandusky		20,200	49,737	9,691	23,286	2,659	6,453	850	18,498	
Seneca		10,350	52,842	3,638	6,908	731	4,797	953	15,756	
Wyandot		6,197	31,621	2,929	4,983	489	2,632	533	6,568	
NORTHEAST	Ashtabula	52,651	93,135	13,002	130,606	4,465	8,946	128,203	568,710	
	Columbiana	70,590	137,393	45,975	110,234	5,267	12,439	4,562	8,602	
	Cuyahoga	44,487	83,297	22,397	42,317	7,915	19,978	64,159	1,480,827	
	Geauga	41,716	52,255	11,551	21,073	6,719	21,057	13,708	67,700	
	Lake	47,511	53,573	19,591	97,162	8,066	26,611	93,388	761,600	
	Mahoning	28,606	75,550	19,184	45,694	3,795	8,920	3,325	5,448	
	Medina	21,567	62,253	10,600	19,935	1,919	5,456	12,425	38,800	
	Portage	22,645	80,482	10,858	18,712	2,322	7,131	4,393	14,323	
	Stark	32,451	101,346	26,652	57,623	3,938	9,733	2,096	13,455	
	Summit	29,439	59,501	30,923	31,727	5,259	6,644	5,323	40,678	
	Trumbull	15,104	94,204	9,547	37,683	1,484	7,456	1,330	9,811	
Wayne	22,421	98,560	10,699	33,498	1,596	7,890	3,338	15,306		
WEST CENTRAL	Auglaize	29	41,553	1,225	1,522	611	3,353	647	5,941	
	Champaign	3,386	31,963	2,185	3,334	640	3,469	670	2,886	
	Clark	4,171	37,513	2,411	11,715	891	5,624	473	4,263	
	Darke	10,225	66,803	3,591	3,994	1,138	6,234	1,095	6,500	
	Hardin	4,919	39,393	1,849	2,688	487	3,146	559	6,541	
	Logan	7,959	42,633	3,162	6,267	761	4,104	960	6,274	
	Mercer	8,923	51,093	2,323	3,407	675	3,535	2,631	15,177	
	Miami	1,525	46,358	2,568	2,316	625	7,868	917	3,972	
Shelby	5,774	51,525	2,022	1,952	659	4,997	402	4,530		
CENTRAL	Delaware	19,808	53,623	6,778	5,320	798	3,658	556	4,059	
	Fairfield	31,338	81,067	16,396	25,700	1,869	5,119	1,574	17,589	
	Fayette	1,782	17,464	680	2,748	284	2,977	245	2,310	
	Franklin	21,661	69,528	8,616	6,688	1,998	6,678	1,210	8,915	
	Knox	13,084	57,922	8,553	11,165	1,935	7,322	963	7,342	
	Licking	29,209	87,311	18,517	44,070	1,368	5,670	1,142	8,474	
	Madison	4,353	11,363	572	1,131	643	1,095	245	1,550	
	Marion	5,334	25,464	1,160	4,917	471	2,893	503	5,305	
	Morrow	7,184	43,454	3,717	4,295	652	4,855	609	3,099	
	Pickaway	3,456	26,982	1,263	3,067	369	1,963	418	2,585	
	Ross	35,819	104,812	15,691	35,306	1,128	4,017	103	5,698	
Union	2,375	23,790	1,016	1,280	656	2,545	382	2,794		

FRUIT CROPS, NUMBER OF TREES AND VINES, 1919 — CONCLUDED

District	Counties	Apple Trees		Peach Trees		Pear Trees		Grape Vines	
		Not of Bearing Age	Of Bearing Age	Not of Bearing Age	Of Bearing Age	Not of Bearing Age	Of Bearing Age	Not of Bearing Age	Of Bearing Age
EAST-CENTRAL 6	Belmont	33,697	107,339	21,541	72,802	2,439	9,767	5,557	38,274
	Carroll	19,787	71,340	16,394	49,442	1,060	2,897	390	3,071
	Coshocton	17,639	96,485	15,545	48,500	1,178	7,371	485	5,774
	Harrison	10,126	54,539	6,913	37,118	751	3,286	327	1,791
	Holmes	9,663	64,524	11,147	31,313	886	4,237	561	5,548
	Jefferson	25,214	60,629	12,260	53,621	1,440	2,977	1,416	5,939
Tuscarawas	26,242	92,176	17,718	61,126	2,089	6,727	1,306	9,589	
SOUTH-WEST 7	Butler	5,473	25,449	4,976	6,562	856	4,285	1,007	8,200
	Clermont	31,337	111,069	15,937	44,620	2,635	27,036	1,179	20,497
	Clinton	12,330	27,235	4,487	2,055	377	2,306	277	2,216
	Greene	8,451	33,742	3,384	3,693	772	3,851	975	4,667
	Hamilton	24,397	61,190	26,786	82,398	6,406	47,397	7,644	79,016
	Montgomery	10,639	51,561	4,782	5,684	3,161	17,352	4,663	12,721
	Preble	6,283	39,861	3,741	6,968	984	4,915	1,520	3,596
Warren	6,631	27,924	3,460	7,188	524	2,873	349	3,069	
SOUTH-CENTRAL 8	Adams	15,666	68,973	9,428	23,446	1,040	6,560	409	3,499
	Brown	11,612	55,933	6,468	8,490	1,524	3,635	492	6,658
	Gallia	109,228	175,933	12,401	43,629	798	4,285	603	2,156
	Highland	11,386	46,895	5,584	13,802	665	2,633	302	4,472
	Jackson	74,291	72,113	24,668	40,294	292	199	105	1,537
	Lawrence	25,335	377,654	54,537	125,601	1,701	5,826	365	1,867
	Pike	21,765	71,980	8,183	24,027	539	1,346	393	3,957
Scioto	43,377	72,719	16,711	33,538	1,224	2,671	1,111	5,770	
SOUTHEAST 9	Athens	39,394	126,050	11,756	68,417	1,119	5,389	1,253	5,811
	Guernsey	19,945	94,786	16,297	52,652	1,485	3,727	527	3,984
	Hocking	15,515	51,557	4,967	27,346	692	1,462	197	4,041
	Meigs	13,901	116,318	17,373	30,816	1,184	6,395	148	3,765
	Monroe	8,987	83,695	1,902	17,749	308	1,701	198	8,542
	Morgan	10,828	68,768	7,667	22,419	570	2,320	180	2,479
	Muskingum	35,399	114,316	22,192	58,883	1,182	10,616	1,686	10,973
	Noble	10,489	72,546	5,868	20,929	540	2,369	281	4,156
	Perry	12,698	62,755	10,537	26,525	1,454	3,533	2,429	4,710
Vinton	24,662	60,653	7,492	28,404	661	1,111	294	1,581	
Washington	62,194	194,373	16,423	32,174	1,228	3,680	965	4,413	
State	2,047,687	5,970,410	970,183	2,921,177	147,892	616,416	521,207	6,533,904	

AMERICAN POMOLOGICAL SOCIETY

CONSTITUTION

ARTICLE I — NAME

The name of this Association shall be the American Pomological Society.

ARTICLE II — OBJECT

Its object shall be the advancement of the science and art of Pomology.

ARTICLE III — MEMBERSHIP

The regular membership of this Society shall consist of Collegiate, Annual, Society, Life, and Institutional members.

The special membership shall consist of Honorary members, Subscribers, Contributors, Junior and Senior Patrons.

ARTICLE IV — MEETINGS

The regular meetings of this Society shall be held annually at such time and place as the Executive Committee may decide.

Special meetings may be convened upon the call of the President or by the Executive Committee on petition signed by a majority of its members.

ARTICLE V — ELECTION OF MEMBERS

Students shall be eligible for Collegiate membership on recommendation of the professor of pomology in the faculty of the institution whence the applicant registers.

Any person shall be eligible for Annual membership on payment of membership fee.

Any society of established standing shall be eligible for Society membership and may become such member on its own election.

Libraries and educational institutions may become members on their own election; such memberships shall be limited to thirty years.

Any person shall be eligible to Life membership on recommendation of a special committee appointed by the president to determine the applicant's qualifications; and may be elected to such membership on approval by two-thirds of the Executive Committee.

Honorary membership, in recognition of eminent or distinguished services to pomology, may be conferred upon any person nominated by not less than a two-thirds vote of the Executive Committee, and who receives not less than a two-thirds vote of the membership present at a regular annual meeting.

The designation of Subscriber may be conferred by vote of the Executive Committee upon any person, firm or corporation that may have contributed valuable services toward the accomplishment of a definite periodical purpose.

The designation of Contributor may be conferred, as above, upon any person, firm or corporation that may have contributed means, material or special services of notable permanent value for the advancement of the work being carried on by the Society.

The title of Junior Patron may be conferred in similar manner upon any person — otherwise eligible to regular membership, who may contribute at any one time to any of the permanent funds of the Society the sum of \$500.

The title of Senior Patron may likewise be conferred upon any person similarly eligible, who has contributed, for a like purpose, the sum of \$1,000.

ARTICLE VI — DUES AND FEES

The dues for Collegiate membership shall be one dollar for the calendar year; for Annual membership shall be five dollars for the calendar year; for Society membership shall be ten dollars, the calendar year; the fee for Institutional membership shall be fifty dollars; the fee for Life membership shall be fifty dollars.

ARTICLE VII — OFFICERS AND EXECUTIVE COMMITTEE

The officers of this organization shall consist of a president; first and second vice-presidents, one of whom shall be from Canada; a secretary-treasurer; and an executive committee which shall consist of eleven members and the officers ex-officio. The executive committee as soon as possible after election shall

choose from among themselves a Board of Managers of three who shall conduct in the absence of the executive committee the ad interim business of the Society. Six shall constitute a quorum of the executive committee and two of the Board of Managers.

BY-LAWS

1. The President shall preside at all meetings of the Society; he shall exercise a general supervision and control of the business and affairs of the Society, and appoint all committees unless otherwise directed.

2. In case of death, sickness or inability of the President, his official duties shall devolve on the Vice-President.

3. The Secretary-Treasurer shall receive all moneys belonging to the Society, and pay over the same on the written orders of the President; he shall, with the assistance of a reporter appointed by him, keep a record of the transactions of the Society for publication; he shall furnish such bond as may be required by the Executive Committee.

4. There shall be an Auditing Committee of three members appointed by the President at each annual meeting.

5. A Standing Committee on New Fruits of American Origin consisting of three members, shall be appointed by the President, immediately after his election. It shall be the duty of this Committee to report annually 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.

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

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

8. A Standing Committee on Nomenclature, consisting of three members, shall be appointed annually.

9. 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.

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

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

12. That there be hereby established a membership in this body to be known as Society Membership, which shall be open to state, Provincial and district organizations. The fee for such membership shall be, for a State or Provincial Society, ten dollars, and for a district society five dollars, the year. This membership carries with it the right and duty to appoint delegates, one for each hundred members, or major fraction thereof, and one delegate-at-large, of the delegating body, to attend and participate in the meetings of this Society.

Delegates from the above Society Members shall be entitled to all the privileges of other members of this Society; but in the case of the appointment of alternates, no alternate shall have a right to vote except in the absence of his principal, or in the event his principal elects to divide his privilege, thereby casting a one-half vote for principal and alternate.

13. There is hereby established a membership in this Society known as the Collegiate Membership which shall be open to students in Pomology in any agricultural school, college or university.

14. The voting privilege of this organization shall be exercised by these annual, society and life members in good standing, and whose dues are paid for the current year.

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 Northumberland & Durham Apple Association, Brighton, Ontario, Can.
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