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REPORT OF THE PROCEEDINGS AT THE SIXTH ANNUAL MEETING ***

DISCLAIMER

The articles published in the Annual Reports of the Northern Nut Growers Association are the findings and thoughts solely of the authors and are not to be construed as an endorsement by the Northern Nut Growers Association, its board of directors, or its members. No endorsement is intended for products mentioned, nor is criticism meant for products not mentioned. The laws and recommendations for pesticide application may have changed since the articles were written. It is always the pesticide applicator's responsibility, by law, to read and follow all current label directions for the specific pesticide being used. The discussion of specific nut tree cultivars and of specific techniques to grow nut trees that might have been successful in one area and at a particular time is not a guarantee that similar results will occur elsewhere.

**NORTHERN
NUT GROWERS ASSOCIATION
REPORT
OF THE PROCEEDINGS AT THE
SIXTH ANNUAL MEETING**



ROCHESTER, NEW YORK

SEPTEMBER 1 AND 2

1915

CONCORD, N.H.
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1916

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<i>Programme</i>	The President, The Secretary, The Editor Of The <i>American Nut Journal</i> , <i>ex-officio</i> ; C. A. Reed, W. N. Hutt
<i>Promising Seedlings</i>	T. P. Littlepage, C. A. Reed, J. Russell Smith

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WASHINGTON
Baldwin, Dr. A. E., Kettle Falls

WEST VIRGINIA
Hartzell, B. F., Shepherdstown

* **Life members.**

CONSTITUTION

ARTICLE I

Name. This society shall be known as the NORTHERN NUT GROWERS ASSOCIATION.

ARTICLE II

Object. Its object shall be the promotion of interest in nut-bearing plants, their products and their culture.

ARTICLE III

Membership. Membership in the society shall be open to all persons who desire to further nut culture, without reference to place of residence or nationality, subject to the rules and regulations of the committee on membership.

ARTICLE IV

Officers. There shall be a president, a vice-president and a secretary-treasurer, who shall be elected by ballot at the annual meeting; and an executive committee of five persons, of which the president, two last retiring presidents, vice-president and secretary-treasurer shall be members. There shall be a state vice-president from each state, dependency or country represented in the membership of the association, who shall be appointed by the president.

ARTICLE V

Election of Officers. A committee of five members shall be elected at the annual meeting for the purpose of nominating officers for the following year.

ARTICLE VI

Meetings. The place and time of the annual meeting shall be selected by the membership in session or, in the event of no selection being made at this time, the executive committee shall choose the place and time for the holding of the annual convention. Such other meetings as may seem desirable may be called by the president and executive committee.

ARTICLE VII

Quorum. Ten members of the association shall constitute a quorum, but must include a majority of the executive committee or two of the three elected officers.

ARTICLE VIII

Amendments. This constitution may be amended by a two-thirds vote of the members present at any annual meeting, notice of such amendment having been read at the previous annual meeting, or a copy of the proposed amendment having been mailed by any member to each member thirty days before the date of the annual meeting.

BY-LAWS

ARTICLE I

Committees. The association shall appoint standing committees as follows: On membership, on finance, on programme, on press and publication, on nomenclature, on promising seedlings, on hybrids, and an auditing committee. The committee on membership may make recommendations to the association as to the discipline or expulsion of any member.

ARTICLE II

Fees. The fees shall be of two kinds, annual and life. The former shall be two dollars, the latter twenty dollars.

ARTICLE III

Membership. All annual memberships shall begin with the first day of the calendar quarter following the date of joining the association.

ARTICLE IV

Amendments. By-laws may be amended by a two-thirds vote of members present at any annual meeting.

Northern Nut Growers Association

SIXTH ANNUAL MEETING

SEPTEMBER 1 AND 2, 1915

ROCHESTER, NEW YORK

The sixth annual convention of the Northern Nut Growers Association was called to order in the convention hall of Powers Hotel, Rochester, New York, on Wednesday, September 1, at 10:15 A.M., the president, Dr. J. Russell Smith, presiding, and thirty-two people being assembled.

THE PRESIDENT: Ladies and Gentlemen, Members of the Northern Nut Growers Association, the meeting will please come to order.

With an organization of this sort, the main purpose of the meeting is the dissemination of information, but it is necessary that certain business shall be conducted to keep the organization going. Some business is dry; usually the reports of our secretary-treasurer are not, and the first order of business, I think, should be to hear from our secretary-treasurer.

MR. LITTLEPAGE: I should be glad to have the floor for a moment, Mr. President. In the Congressional Library at Washington City are many very beautiful and attractive inscriptions and quotations, one of which has always appealed to me as a lawyer, and I have repeated it many times:

"Of law there can be no less acknowledged than that her voice is the harmony of the world."

Mr. President, I have noted very many times that the voice of the law is sometimes silent. It speaks only through those in authority and there should always be some emblem of authority. I therefore took the liberty, Mr. President, of having made for you a gavel from the wood of an Indiana pecan tree, where as a youth I lived and learned of this most delicious of all the nuts, and I take pleasure in presenting it to you, and if anyone doubts the hardness or hardness of the Indiana pecan, I authorize you to demonstrate both.

I am presenting you duplicate gavels, Mr. President, one of which I desire to have you turn over to your successor in office as an official emblem of his authority, to be used at future meetings; the other I am presenting to you as a personal tribute for your most excellent work in behalf of northern nut culture. This gavel I shall ask you to place among the trophies in your beautiful mountain home, where the birds sing sweetly, the sun shines brightly, and the breezes murmur softly; and where the days are made to rest and the nights are made to sleep.

THE PRESIDENT: Mr. Littlepage, not being prepared for this, and not being naturally eloquent, I am unable to make a speech. However, as a part of the way out of the difficulty, I accept this one officially with great pleasure, and personally accept the other with deep gratitude, and desire to express the appreciation of the meeting.

The pecan is calling the walnut meeting to order. Last year we went to see the pecan; this year we come to see the walnut, which, has done more than any other nut in the East.

We will now listen to the report of our secretary-treasurer.

REPORT OF THE SECRETARY-TREASURER

Balance on hand, date of last report \$7.23

Receipts:	
Dues	\$379.30
Advertisements	42.00
Contributions	42.50
Sale of report	22.40
Contributions for prizes	40.00
Miscellaneous	1.05

	\$534.48
Expenses:	
Printing report	\$233.76
Miscellaneous printing	51.80
Postage and stationery	41.09
Stenographer	2.00
Express, freight, carting	3.74
Prizes	10.00
Check J.R.S. expenses, circulars	37.30
Bills receivable	10.00
Miscellaneous	4.55

	\$394.24

Balance on hand	\$140.24

This is the best financial report that the treasurer has ever been able to transmit, and this is chiefly due to the efforts of our president who, during the year, has sent out numerous notices of, and articles about, our Association, its purposes, and the desirability of finding and propagating our best nut trees. He also offered three prizes of \$5 each for a nut contest and did the work necessary to get publicity for this contest. He sent letters to the members of the horticultural societies of Pennsylvania, New Jersey, Virginia, Maryland, and Ohio which resulted in our getting 24 new members, mostly from the state of Pennsylvania. Twenty-five dollars of the cost of this circularizing the president paid out of his own pocket. The rest was more than made up by the fees of new members. The president also had printed an educational leaflet on nut growing for distribution by Mr. Cobb with the nut trees which he sends to the schools and farmers of Michigan. With Professor Close he was on the finance committee which sent a circular letter to the members of the Association for funds to help pay for the printing of the annual report, and obtained advertisements for the report. As stated in the treasurer's report contributions for this purpose amounted to \$42.50 and advertisements brought in \$42.00.

Prizes

The Association offered last year prizes of \$5 each for the best shagbark hickory nut, black walnut and hazel nut sent in.

Something over a hundred specimens were received and the prize for hickory nut was awarded to J. K. Triplett of Elkins, W. Va. The prize for black walnut was awarded to J. G. Rush of West Willow, Pa. Mr. Rush returned his prize to be used for the purposes of the Association. No prize for hazels was awarded as only one or two insignificant specimens were sent in.

Perhaps the stimulation of this contest accounts for our being able to offer such substantial prizes for this year. In addition to the \$80 worth of prizes already announced the secretary has received from a life member, James H. Bowditch of Boston, a check for \$25 as a prize to be offered by the Association for a hickory nut under such conditions as the Association may decide. A circular announcing these prizes has been sent out to agricultural and other papers to the number of 200, the expenses of which have been borne by another member, Mr. Chas. H. Plump of Connecticut. A committee on competitions should be appointed or the direction of them delegated to some already existent committee.

Membership

Seventy-four members were added during the interval between this meeting and the last, one less than in the previous year. Since its organization 287 persons have joined the Association. We have at present 153 paid up members, 21 more than last year. There are a few members whose dues are unpaid who are active workers and will eventually pay, probably.

Four members have resigned, though none in anger, and we have lost one by death, the late Prof. H. E. Van Deman.

Annual Dues

Some way should be found out of the difficulties arising from the dissatisfaction of members who join late in the year when they receive a notice for dues soon after having once paid.

It is desirable to take in members at all times during the year. At the same time some method should be found to give the late comer something for his money. Shall membership continue to date from the calendar year? Or shall we make some change? Some societies date memberships

from the opening of the annual meeting. It would not be impossible to make memberships date from the beginning of the quarter year immediately following date of joining. This would give every member a full year at least before he would again receive a notice for dues.

It would be quite inconvenient to date each membership from the day of joining. It would not be so bad if members paid promptly on receipt of notice.

Or a rebate might be made for each month of the year elapsed before new members' dues were paid.

Meetings

No field meeting was held this year. It has been suggested, and would seem to be a favorable subject for discussion, that it might be well to hold our annual meeting late in the year in some central location, such as New York City, Philadelphia or Washington, for our business and formal program of papers and discussions, and the study of the nuts sent in, perhaps for judging any competition that might be held, if the meeting were late enough for that; and a summer meeting of informal nature at some place where nut trees with their crops growing could be studied.

Nut Journal

Our official organ, the *American Nut Journal*, has done its part well through the past year and is becoming, as it should, a very important element in the success of the purposes of this Association. Most new and old members of the Association have availed themselves during the year of the offer of membership and the *Journal* for \$2.50. In spite of the reduction of 25 cents on each membership, the receipts for dues have increased from \$273 to \$331. I would suggest that the membership fee be still further reduced by 25 cents, when combined with subscription to the *Journal*, if the editor is willing to continue the present arrangement whereby the price of the *Journal* is reduced to 75 cents when subscribed to with membership, so that the two together will cost \$2.25. Another year it may be possible to make a similar reduction. The object toward which we ought to work is membership for \$1, and membership with the *Journal* \$2. I should like to hear the opinions of the members as to the advisability of working to reduce our dues to \$1 annually.

How Members May Help

At the risk of monotony I will repeat my concluding remarks of last year and ask that each member help increase the prosperity and usefulness of the Association by enlisting new members, by advertising his business in the annual report, and by paying his dues promptly. The secretary would much rather spend his time answering questions and imparting such information as lies in his power, than to have to send repeated notices to members in arrears for dues.

The secretary will be happy at all times to learn of the plans and progress of the members.

THE PRESIDENT: You have heard the report of the secretary. There are two things to be done with it. It is, as you will notice, first a report of the year's business and, second, it has certain suggestions for your consideration. I think that as a business report we can discuss and move its adoption, amendment or rejection. After that we may take up the suggestions.

[Adoption moved, seconded and carried.]

He has brought before our consideration the amount of dues, and the question of their payment. I doubt the advisability of a lengthy discussion in this business meeting. I think it better to refer it to the executive committee. Unless I hear further suggestions, I will take that action. The next piece of business is the matter of the report on the amendments to the constitution. Professor Close and the secretary were appointed a committee for this matter, and as Professor Close cannot be here, we will hear from the secretary on the matter. (See amended constitution.)

DR. SMITH: I am now glad to announce that we have covered the necessary business ground, and now come to the real meat of the meeting. We have with us this morning Dr. Baker, Dean of the State College of Forestry, at Syracuse, who is going to address us on the subject of "The Relation of Forestry Conditions in New York to Possibilities of Nut Growing."

THE RELATION OF FOREST CONDITIONS IN NEW YORK TO POSSIBILITIES OF NUT GROWING

DR. HUGH P. BAKER, DEAN OF THE NEW YORK STATE COLLEGE
OF FORESTRY AT SYRACUSE UNIVERSITY

The forester presumes to come before your organization because he is concerned with one of the greatest of the natural resources of this and other states of the Union and not with the idea of bringing information as to details in nut culture. Possibly nut culture as a business is more closely related to agriculture than forestry. Forestry is not subordinate to agriculture in this country but co-ordinate with it. Together they will come as near solving the soil problems of the

country as is possible for man to solve them.

The forester is interested and concerned with the wild nut trees wherever he has to do with the forests or forest lands of the country. Throughout the great hardwood sections of the East there are many native nut-bearing trees, and in the proper utilization of the trees which make up the forests the forester is concerned not alone with the lumber which may come from these trees, but he is concerned as well with the value of the by-products of the forest and the influence of the utilization of these by-products upon the forest.

In view of the forester's interest in all of the trees which make up our forests, my purpose of addressing you today is to bring before you the question of the most effective use of the forest soils of this state. I shall also attempt to make some suggestions to your organization in the matter of interesting the man on the street in nut growing. This profession and the business of forestry have been passing through a period of general educational work in this country. Some of the lessons which we have learned through our efforts to interest the people in their forests may be of help to you in interesting the people both in the consumption and the production of nuts.

New York as a Great Forest State

Twenty-five years ago New York was one of the leading lumber-producing states of the Union. Today some twenty other states produce more lumber than comes from the forests and woodlots of New York. Statistics given out recently by the United States Census Bureau and the Conservation Commission of New York show that, out of the land acreage of over thirty-two millions in New York, but twenty-two millions are included within farms. This leaves something over eight millions of acres outside of farms and presumably non-agricultural. The forests of the Adirondacks and Catskills and the woodlots of the rougher hill counties in the southern and southwestern part of the state come within this vast area of eight millions of acres. Without doubt with increasing population there will come some increase in the use of what are now non-agricultural lands for the practice of agriculture, but with three hundred years of agricultural history back of us in this state it does not seem likely that there will be much change in the relation of non-agricultural to agricultural land during the next half-century.

Out of the twenty-two millions of acres of farm lands in the state but fifteen millions are actually under cultivation, leaving, therefore, from six to eight millions of acres within the farms of the state but lying idle. That is, we have a Massachusetts enclosed within our farms which is non-productive as far as direct returns are concerned. Yet there is really no waste land in New York, as every square foot of the state which is covered with any soil at all is capable of producing good forest trees. It is this great area of idle land enclosed within our farms which seems to have unusual promise in the development of nut culture in the state. There is a great deal of land now idle in the form of steep hillsides or ridges or rocky slopes upon which we may grow with comparative ease our walnuts, butter-nuts, hickories, hazelnuts, in the wild form at least.

The fact that the state is in really rather serious condition financially should be a strong reason for our association to urge upon the farmers of the state the planting of nut-bearing trees that the returns from the farms may be increased by annual sales of nuts which should in the aggregate in the next fifty years be a large sum of money. It has been estimated that the total debt of the State of New York, that is, the state, county and municipal debts, are equal to \$47 for every acre of land, good and bad. On top of this condition the legislature last year laid a direct tax of eighteen millions of dollars upon our people, and there is every indication that it will be several years before it becomes unnecessary to lay a direct tax either larger or smaller than that put upon us last year. There is ever-increasing competition among the farmers of the state as the standards in animal, milk and fruit production are ever increasing. In view of the amount of idle land and of our financial condition it seems to be an unusually opportune time for those interested in nut culture to bring before the farmers and other landowners of the state the idea of planting nut trees, the products of which will add to the annual income from the land.

The State of New York is Somewhat Ignorant of the Value of its Forest Lands

When the New York State College of Forestry at Syracuse began its studies of forest conditions in New York in 1911 it turned its attention immediately to the very large areas of farm woodlots and woodlands within farms. There has been a good deal of general information current among our people regarding the forest conditions of the state, but there is really very little accurate information except such little as the college has secured since 1911. As a first step in the taking of stock of our forest resources and especially the amount of timber in our farm woodlots and what is coming from these woodlots in the way of annual return to their owners, the State College of Forestry in 1912 began, in co-operation with the United States Forest Service, a study of the wood-using industries of the state. This study has resulted in a very comprehensive bulletin issued by the College of Forestry upon the wood-using industries of the State of New York. From these studies it was determined for the first time that New York was spending annually over ninety-five millions of dollars for products of the forest. Unfortunately for the state, we are sending over fifty millions of dollars of this vast amount out into other states to the south and to the west for timber which New York is capable of producing in amount, at least, in its forests and on its idle lands. The report shows further that New York is producing very large quantities of pine and hemlock and the hardwoods, and, much to the surprise of those interested in forest conditions in the state, it was shown that a large proportion of the hardwoods come from the woodlots in the farms of the state. This would seem to indicate that there is a real opportunity for the growing of such hardwood timber as black walnut, butternut, and hickory, not only on the idle lands of the state which are not covered with forest now, but also in the woodlots of the

farms. That is, it would not be a difficult matter to show the farmers through publications and possibly through public lectures that it would be very advantageous to them to favor nut-growing trees and to plant them where they are not now growing, both because of the value of the nuts which they produce and of the value of their wood.

If the people of a great state like New York are more or less ignorant of the extent and value of their forest holdings, how much more ignorant are they of the character and the value of a particular species which make up their forest lands. How few people are able to go into the forest and say that this tree is a shagbark hickory or that that is a butternut or that that is a red pine, and if this is the case, as you will agree with me that it is, is it not time that propagandist or general educational work be done that will bring forcibly to the attention of the wage-earners of the state that it is a financial necessity for the state to consider better use of its forest lands, so that all of the soils of New York may share in the burden of the support of the commonwealth rather than a few of the soils which are now being given up to agricultural use? The wage-earner should know also that nuts used as food are conducive to health and that possibly a more extensive use of nuts with less of meat will mean a considerable difference over a period of a year in the amount that is saved in the living expenses of an individual or a family.

It is often difficult for the forester to interest the average farmer in the planting of trees, even though those trees may add to the beauty and value of the farm or the comfort of the home buildings, but your organization will make a place for itself most decidedly if it will go to the farmer or to a group of farmers and show them that they can actually save money in the purchase of their needed lumber and wood of other kinds if they will cut their woodlots co-operatively and produce in the woodlots trees of greatest possible value and trees which will give such by-products as nuts as well as direct returns from the lumber. Just as soon as you can reach the pocket-book of the average wage-earner, it makes little difference whether it is nuts or books or clothing, they are going to be interested in a thing that will allow them to get more for the amount which they make from their day's labor.

The Association May Accomplish Much by Demonstrating the Value of Nut Trees as Trees and the Value of Their Products as Food

Many organizations in our Eastern States are becoming interested in the beautification of communities and the tremendous development in the use of the automobile is interesting even more organizations in the beautification of rural highways. It would not be a difficult thing for the Nut Growers Association to interest civic associations or women's clubs in the planting not only of forest trees alone along rural highways but a certain number of nut trees. We are literally in the age of the "Movie" and if a man who walks or drives along our highways can see as he passes the growing nut trees and the bountiful harvest which they may be made to yield, he is being convinced that not only elm and maple are of value along our highways, but that the nut-producing trees may give equal satisfaction in beauty of form and comfort of shade and at the same time yield fruit of very definite value.

Even though the fruit of the nut-bearing trees of our woodlands and highways may not give an annual return to the town or village or county it will bring immeasurable joy and possibly better health to the boys and girls of the future. In many ways the children of this country are educating their parents and it is not an impossible idea to think of the parents of the future being converted by the influence of their children to the desirability if not the necessity of growing trees and nut trees, the fruit of which will give pleasant healthfulness and at the same time aid in the saving of the daily wage and in the support of the commonwealth. I wish to emphasize this idea of considering not alone the financial return from the trees and the forests of this state. As the son of a lumberman and as a forester I am, of course, most vitally interested in the growing of trees as a business proposition, but I feel that such an organization as yours, especially, should look at this matter not alone from actual financial returns, but because of indirect benefits such as the making of outdoor people of us Americans. This can be done, I believe, to a very considerable extent by giving our people, especially the boys and girls, a purpose for getting out into the woodlot and the forests wherever they occur in the state.

The women of this state are interested vitally these days not only in their own welfare as possible citizens, but in the improving of living conditions and opportunities of our people. We should have more women interested in the work of this association and interested in seeing that the future value of nuts is appreciated by the wage-earners of the state, both because of their healthfulness and because of the possibility of cheapening somewhat the cost of living. I urge upon the organization a campaign of education, a campaign which will reach through the women's clubs, civic organizations, schools and state associations in a way that will cause the people to demand more nuts for food and more nut trees as an absolutely indispensable part of the complete utilization of both the agricultural and forest soils of the state. The agencies working for agriculture and forestry in a state like New York understand these problems, but often it remains for an organization like yours to bring these forces into active play and to produce the results for which you are working. Before you can achieve lasting results and results commensurate with the time and effort which you are putting into the organization, you must get hold of the man and the woman who spend the dollars for the living of our people.

The State College of Forestry at Syracuse Experimenting with Nut Culture

Soon after the organization of the New York State Forest Experiment Station south of Syracuse the college took up the matter of growing nut trees and of improving the quality of nuts of native species. On the New York State Forest Experiment Station just south of Syracuse, where the

college is growing a million forest trees a year, there is a woodlot of thirty acres. In this woodlot were a number of native nut trees and these have been set aside for the purpose of grafting and improving to see what can be done in helping out native nut trees of different ages and sizes.

In 1913 the college purchased a thousand acres of cut-over land two hours south of Buffalo in Cattaraugus County. At the same time it purchased one hundred and thirteen acres lying along the main line of the New York Central Railroad at Chittenango in Madison County. This past spring nut trees were ordered from nurseries in Pennsylvania and planted in the heavy soils on the Chittenango Forest Station and also on the State Forest Experiment Station at Syracuse. At the Salamanca station young nut trees are being staked so that they may be protected and cared for with a hope of developing them as nut-producing trees. The college plans, as a part of its work in the Division of Forest Investigations, to see what can be done in the way of grafting chestnut sprouts and in introducing nut-growing trees for the purpose of demonstrating that idle lands within farms may be used profitably for nut culture. The college will be very glad, indeed, to learn of any native nut trees of unusual value anywhere in New York as it is anxious to get material for grafting to native stock already growing on its various forest stations.

DR. SMITH: It was an exceedingly great pleasure to me to listen to that address by the Dean of the New York State College of Forestry. I want to assure you that his address marks an epoch. He tells us that the State of New York is going to experiment in nut growing, give place, time and money; and this is what I have been long waiting for. I shall defer my discussion until this evening, when I use the screen and lantern.

I rejoice exceedingly that the State of New York is not alone in the march of progress; the State of Pennsylvania is also in line and comes next on the program. Professor Fagan has been making a survey of Pennsylvania with particular reference to ascertaining what it has in nut trees. He will now give us a report.

PROFESSOR FAGAN: The President has caught me rather unprepared. I did not expect to talk at this time. I had our walnut survey tabulated in regard to county locations, so that you could see the results of our work in the state this past summer. This report is in my grip so I will talk only from memory.

The necessity for this work in Pennsylvania has been increasing right along. The State Experiment Station has been receiving letters nearly every week from parties wanting information in regard to the Persian walnut. The calls for information have been increasing more and more each year for the past three years.

Our people ask questions about the right kind of soils for the nuts—what varieties are best suited for Pennsylvania—how to topwork their standing black walnut—and, in fact, almost any question.

The Experiment Station does not have a nut plantation and it was thought best to study the growing Persian walnut trees throughout the state.

A publicity campaign was started through the agricultural press and our daily and weekly newspapers. In this way we have been able to learn the location of some 1,800 to 2,000 bearing trees in Pennsylvania. I tried to visit the trees this summer but time would not permit.

Trees are reported in twenty-five different counties. Erie County reported, likely, the two largest plantings. Here we have two seedling groves, at least one is a seedling grove. The seedling grove is fourteen years old and contains 250 trees. They are seedling Pomeroy trees and this year show their first real crop of nuts.

Since they are seedlings we naturally find all types and variations among the trees. We see a difference in their foliage, habit of growth, shape and size of nuts. The trees show no effects of ever having been winter-killed. The trees have always been farmed so the owner, Mr. E. A. Silkirk of North East, Pa., has been able to receive returns from his land. Grapes and berries have been grown between the trees as intercrops. The trees are planted on the corners of a 50-foot square and cover about fourteen acres.

In four different counties of the mountain section of the state, bearing trees are to be found. From these trees we hope to find something at least fairly good but above that something hardy. Some of these trees have been winter-killed to a more or less degree, but so have the common peach trees in the same sections.

The southeastern part of the state reports the largest number of trees. From Harrisburg east and south the trees become more common. In this section we find Dauphin, Adams, York, Lancaster, Chester, Philadelphia, Bucks, Lebanon, Lehigh and Berks counties. In these counties the Persian walnut is not at all uncommon. They are often called Dutch nuts as well as English walnuts.

Just north of the above section we find Northampton County reporting a large number of trees, and even in the Wilkes-Barre and Scranton section with a higher elevation the nut is growing and yielding good crops.

I asked nearly all walnut tree owners whether or not they thought the business could be developed, and in most cases they believed it possible.

I have come to more or less of the conclusion from what I have been able to see, that the business will not be developed in our so-called mountain land or upon the waste lands. The better soil should be used for the walnut groves.

As time goes on we are going to find more and more groves of the nuts being planted in our state.

I came here to learn rather than to lecture. If I can answer any question I will be glad to do so. Tonight I will gladly show you a few pictures with the lantern.

I might say that the Experiment Station plans to have a small grove in a few years; with this and co-operative work we hope to be able to give to our growers and interested people some idea of the culture and care of the Persian walnut in Pennsylvania.

DR. MORRIS: I don't like to speak so often here, but it is in the spirit of setting a pace rather than of giving expression to my own views.

In the first place, I would like to ask Professor Fagan if he has looked up the matter of the introduction of any of the oriental walnuts into Pennsylvania. According to the knowledge of the botanists, all species of plants from the northeastern Orient are better adapted to the eastern states of America than are any trees from the central or western portions of the Old World. Pacific coast plants do well in England, but not in New England as a rule.

Next I would suggest, *apropos* of the nature of the seedling orchard reported by the last speaker, that no nut tree of any sort be sold under a varietal name for propagation, excepting that it be accompanied by the statement that it is a seedling. This is perfectly proper and fair to all parties.

Going back to the remarks of Professor Baker, a number of very interesting points arose. One reason why the great waste lands of the state have not been covered with forests of nut trees is because we must leave something for the people who are to come 5,000 years after us. We must not accomplish everything in civilization this year. Be generous; leave something for others to accomplish later. Nut trees grown in forest form say to themselves: "Here are trees enough. We shall store up cellulose." Therefore the trees store up cellulose, make great trunks and timber, and little fruit. A nut tree on the other hand which is growing alone in a field says, "Here are not trees enough. I shall be fruitful," and therefore it bears much fruit. Consequently, nut trees to be grown as forest are out of the question as nut producers, but may be very valuable for timber.

In regard to setting out trees along the highways, that is a beautiful idea theoretically. I happen to see one of my neighbors in Connecticut here in the audience. He remembers when I tried to be public-spirited and set out a number of fruit trees around the borders of my place, in order that the passerby might have some fruit. What happened was that not only the passerby wanted fruit, but he wanted it early, and he brought others from a distance who wanted fruit. They broke down the trees, and also entered my premises and carried off my private supply having been attracted by my roadside bait. I wanted to beautify the highway for a mile and set out 3,000 pine trees. After they had grown to look pretty, people came in automobiles and carried them off. These people could not think of helping to set out roadside trees but when someone else had done it they came and lugged off the trees.

So long as we are in a semi-civilized state, we cannot talk about beautifying our roads, as does Germany. Germany has set an example of efficiency for the entire world, no matter what your opinion may be as to the present conflict. At the present time she is perhaps believing that she is carrying on a utility crusade. One of the German methods is to line the roadways with fruit-bearing trees, including nut trees, in such a way that the income pays the taxes for some villages. But they are under government control.

MR. POMEROY: Dr. Morris's suggestion is very good in regard to marking seedlings. Of course his office is in New York City, though his farm is in Connecticut and New York has a law which fills the bill. A customer can get a complete history of the tree from his nurseryman. If from a barren tree, he must so state. I think this state is about the only state that has such a law.

One other thing. The first big battle fought between the Germans and the Belgians was on a highway along ten miles of which stood Persian walnut trees, and I have often wondered how much damage was done to the trees.

THE PRESIDENT: I will ask the secretary to read the motion Dr. Morris incorporated in his talk.

THE SECRETARY: "No ungrafted nut tree of any sort shall be sent out under a name for propagation purposes except with the statement that it is a seedling."

MR. LITTLEPAGE: That is a matter which I imagine will come before the executive committee, and I would suggest that it be left in their hands and worked out by them. With Dr. Morris's consent I would refer this to that committee.

MR. POMEROY: Just because a tree has been grafted, why is all this necessary? The nurseryman is bound to tell from what it is taken. That is covered by the law. He need not be even a buyer, merely a prospective buyer. What I want to bring out is this. Suppose a nurseryman here in this state sells a tree,—he must have a permit before he can do it; he cannot send even a twig through the post office otherwise. I don't see if a bud is taken from a tree and put on a black walnut tree that it necessarily makes the bud that grows on the black walnut tree any better than the parent.

DEAN BAKER: I told you I wanted to raise a discussion on this subject. I really am a dyed-in-the-wool

optimist. I am willing to sacrifice some nut trees to laboratory purposes for the benefit of our young men. We want the individuals to profit by the education. This should be an educational society.

THE PRESIDENT: I will ask the vice-president to take the chair.

MR. REED: At the last meeting a committee was appointed to report on the Persian walnut, of which committee the president was the chairman, and will make his report at this time.

THE PRESIDENT: Mr. Chairman, Ladies and Gentlemen: I think you appreciate the chaos at the present moment in the status of investigation of the Persian walnut. When Professor Fagan reports that the number of trees in Pennsylvania exceeds 2,000, most of which he has not seen, this chaos is evident.

The varieties propagated in the eastern United States are experiments. I have done nothing that will compare with Mr. Fagan's work, but have found certain interesting facts.

First: I found in Maryland a Persian walnut which does not come into leaf until June. When the cherries are ripe, it is just coming into leaf; and it has borne regularly for fifteen years.

While going through the orchards at Grenoble in France, I asked a man "What is the matter with that tree?" This was on June 9th. "There is nothing the matter," he told me, "it is only coming into leaf." I want to call your attention to possibilities of a hybrid of that tree and the Maryland tree. The Persian walnuts of the Grenoble tree were of good quality, but low yield. The Maryland tree is a heavy yielder but of third quality.

In this matter of variety, I want to emphasize Dr. Morris's point of the great possibilities of the oriental walnut. Great results are likely to be attained from the introduction of these species into Pennsylvania, New York and elsewhere in this country.

Second: What is a good walnut? They may be divided into three qualities:

1. Positively sweet.
2. Neutral.
3. Those with a little bitterness in the skin of the kernel, which develops as you masticate the kernel.

Most of those which distinguish themselves for good yield here in the East are unfortunately of the third class. I have taken samples of these to commercial dealers. One of the largest walnut buyers in Philadelphia classifies the Grenobles as first class. The California crop he classes second quality but pays more for it. Most of the California quality is second class. Eastern nuts are mostly third class. I found one in New Jersey which was almost first class.

First quality apples are not grown for the market. They are consumed by the growers. They know the market would not pay for them. They sell mostly the second and third class apples. The present market for nuts is like the apple market. The nut dealer told me to send along nuts, like several eastern samples, and he would sell them, even though they were third quality. He has assured me that if he had the nuts he could sell them.

Investigate every good nut tree you hear about. Very good results may come from this. You don't know what you may learn by doing so. If you will ask about it every time you hear of a good nut tree, good will be accomplished. We are going to keep on finding these trees for the next twenty-five years. Will you help the process along?

MR. POMEROY: In the smaller towns, where the grocery men buy of the boys, if they will ask them about the trees from which they get good nuts you will locate many good trees.

MR. LITTLEPAGE: I understand in California they have been planting walnut trees for thirty to forty years but have never yet agreed on the matter of varieties. One of the very practical questions before this association is the determination of the best varieties to set. I would like to hear from some of the members on this question of varieties.

MR. RUSH: I would like to say a word about this matter. We cannot be too severe on quality. We might ask ourselves today what is the matter with the peach crop. The physical changes and conditions are responsible not only for the peach crop, but the nut crop as well. The weather has unfortunate effects on certain varieties of the walnut. So we must make allowance for weather conditions.

MR. LITTLEPAGE: Excuse me for butting in so often. I should like to ask Mr. Rush a question. I highly respect his judgment. If he were planting a walnut orchard of 500 trees in the latitude between Philadelphia and Washington, I should like to know what varieties he would plant and in what proportion?

MR. RUSH: Well, that is a question that would require a little consideration. Now we have some very good varieties. You have a very good variety known as the Holden. I would like to know

more of it. One I would choose would be the Nebo, and another originating on my place, and called the Rush, is productive and good quality and a most excellent pollenizer. We have another fine walnut in Adams County, introduced by John Garretson, from California. Then we have other types, the Lancaster, and the Alpine. Hall, in Erie County is noted for its good size, not strictly a commercial nut. Something like the Holden, Garretson and Rush Parisienne are my favorite varieties.

MR. LITTLEPAGE: I think we are getting some really valuable information now. We must plant the best varieties we have. I think we might start with Mr. Rush's list and have the varieties analyzed. I think this will be of use when we are called upon to advise people.

THE SECRETARY: If I were going to make a choice of the varieties of walnuts, I should name the Franquette, Mayette and Parisienne. Mr. Rush says that his Rush variety is practically a Parisienne. The Garretson walnuts seem to be of these varieties. These have been producing good crops of nuts. It is my opinion that at this time these are the most promising varieties for use in the East.

THE PRESIDENT: I wish to say that a tree of the Mayette variety or one greatly resembling it has been living in Pennsylvania for fifteen years and bearing crops. There is little doubt that the Mayette is the best walnut on the market.

MR. LITTLEPAGE: Well, is there anything really surprising, when you consider the origin of these trees? These varieties originally came from the Grenoble district in France. France lies north of the 42d parallel. This is the northern boundary of Pennsylvania and runs through Michigan. But France has a maritime climate.

THE PRESIDENT: If I may act as geographer for a moment, there are two things in connection with the foreign climate. The maritime climate is cooler in summer and milder in winter. Over here fungus invasion does great harm but the climate there is detrimental to the fungi and keeps them in subjection. I call attention again to that Mayette in Pennsylvania for sixteen years, as a matter of fact, not theory, an achievement on which we can act with some certainty.

The hour for adjournment has come. This afternoon at 1:30 we have been invited to visit nut trees in the neighborhood in automobiles kindly loaned for the occasion. Tonight at 8 we meet here again.

THE SECRETARY: I want to say a word in regard to Mr. Baker's remarks. The purpose of this association is chiefly educational, but in order that we may be educational, and in order that we may give the man in the street some definite information, in response to his inquiries, we ourselves must first investigate these matters, such as the question of varieties. This is a point that appeals to me particularly. People ask me what nuts to plant, and how to plant them. We must advise them. One thing that we may tell them is that it is advisable to plant about the grounds high priced, grafted nut trees. It is not advisable to plant high class, grafted trees along fences or roads. They will usually do badly or fail. Grafted trees require careful attention and proper treatment. The proper thing to do along fences and roadsides is to graft the native nut trees already established there, or to plant native nuts abundantly in order that later we may have established nut trees to graft.

Adjournment at 12:30 P.M.

WEDNESDAY EVENING SESSION

The evening session was called to order at 8:40 P.M. by President Smith. The total attendance of the evening was approximately one hundred.

The evening was devoted to two stereopticon lectures, the first being slides by Professor Fagan, illustrating the lecture of the afternoon on the "Nut Survey of Pennsylvania."

This was followed by an illustrated lecture by Dr. J. Russell Smith, President of the Association.

NEW TREE CROPS AND A NEW AGRICULTURE

PRESIDENTIAL ADDRESS

DR. J. RUSSELL SMITH, UNIVERSITY OF PENNSYLVANIA

We have all heard of the scientist who made a discovery and exclaimed, "Thank God! This can't be of any possible use to anybody!" This useless aspect of science in a world with so many possibilities of service does not appeal to me. I hope that science and service and utility may go hand in hand.

The conservation of natural resources, the creation of new ones is a topic which combines the qualities of science, service and utility.

Of all our resources the soil is the most vital. Most of the others have some possibility of substitution, but for the soil there is no substitute. The forest burned to destruction can rise

again if the soil remains. Some examination will show that the most vital part of the whole conservation matter is the preservation of the soil, and that soil conservation is 99 per cent the prevention of erosion. Soil robbery by unscientific agriculture can go to its most extreme lengths and reduce the soil to the depths of non-productivity; but scientific agriculture can, by the addition of humus and some fertilizer, soon restore such soil to high fertility. In these conditions of exhaustion the loss to fertility by soil leaching is small, because of the non-soluble character of the earth particles. Thus experiments at Cornell have shown that in the average foot of top soil from rather unproductive farms in a low state of production, there was plant food sufficient for 6,000 crops of corn. We have all seen a single thunder shower remove from a hillside corn field the fertility adequate for the making of a hundred crops of corn.

American agriculture is peculiarly soil destructive. Three of our greatest money crops—corn, cotton and tobacco—require that the earth shall, throughout the summer, be loose and even furrowed with the cultivator, which prepares the ground for washing away, and by its furrow starts the gully. The second factor in this peculiarly destructive agriculture is the fact of our emphasis of rainfall in summer. Third in the list of factors of destruction is the rainfall unit, the thunder shower, which dumps water, hundreds of tons per hour on every hillside acre. A little examination of the facts and careful inclusion of the time element will show that the old-world saying, "After man the desert" is quite as true in the United States as in Europe and Asia, where it has been so fearfully proven in the seats of ancient empire.

This soil resource destruction from erosion leads to the destruction of other valuable resources. We appear to be upon the eve of an epoch of waterway construction and experiment. The greatest injury to waterways is channel filling by down-washed mud. Pittsburgh has been praised highly for the energetic action of her Chamber of Commerce and citizens in appropriating money for the careful survey of drainage basins above the river, with the idea of obtaining knowledge preparatory to the building of reservoirs to check floods. They have forty-three reservoir sites, and the early construction of nineteen of these reservoirs is recommended.

A part of the reservoir plan, however, is that the land above it shall not be cultivated; otherwise the erosion from the tilled fields will promptly fill up the reservoirs, as the present condition of many eastern mill dams so emphatically attests. The carrying out, therefore, of the Pittsburgh reservoir plan necessitates the exodus of hundreds of thousands of farmers and the restriction of many farming communities to forest or a new type of agriculture.

We cannot spare all this land from tillage. But fortunately, there are other ways of using it. Land east of the 100th meridian may be divided into three classes: First, which in the absence of better estimate covers one third of the area, is hopeless for agriculture because of hills and rocks. This is mostly now in rather poor forests. The second class, also covering one third—by the same estimate—has been cleared for agriculture, but is so hilly and eroded as to be in a low state of fertility and production. The third class, the remaining third of the land, is suited to the plow and should be plowed and cultivated much more intensively than it now is.

For the first and second classes of land we need a new type of agriculture, the crop-yielding trees. Our agriculture, which depends so largely now upon those members of the grass family which we call grains, is the result of accident, not the result of science. At the dawn of history man had practically all of these small grains, which have probably resulted from the selection and seed saving of the primitive woman, as the race came up from savagery into agriculture. This primitive woman in selecting plants for her garden and little field, did not pick out the best of nature, or the most productive, or the ultimately most promising; she picked annuals because they gave the quickest return. And man has left alone and practically unimproved for all these thousands of years nearly all the great engines of nature, the crop-yielding trees, such as the walnut, hickory, pecan, acorn yielding oak, chestnut, beech, pinenut, hazel, honey locust, mesquite, screw bean, carob, mulberry, persimmon, paw-paw, etc., because their slow growth has deterred us from any attempts at improving them. We have depended upon and greatly improved the quick growing grains, which spend most of their short life in putting up a frame work which promptly perishes; whereas the tree endures like a manufacturing plant. Further than this, most of the grains have a period of crisis, during which they must receive water or the harvest is almost a failure. Thus corn must within a short period receive moisture, or it is too late to produce even husks.

Yet trees are the great engines of nature. The mazzard cherry tree, growing wild throughout the southeastern United States, often yields twenty bushels of fruit. Fifty bushels and upwards are often obtained from the mature apple trees. The walnut yields its bushels, the persimmon breaks with fruit.

Europe shows us an agriculture making considerable use of crop-yielding trees other than the ordinary fruits. Mr. C. F. Cook, of the Department of Agriculture, is the authority for the statement that Mediterranean agriculture began on the basis of tree crops, and there are now about twenty-five such crops in the Mediterranean basin. The oak tree furnishes five, cork bark, an ink producing gall which enters into the manufacture of all our ink, the Valonia, or tannin-yielding acorn, which is an important export from the Balkan states; the truffle worth several million dollars to France; and lastly the acorn. In the Balaeric Isles, I am informed, certain acorns are more prized than chestnuts and the trees yielding them are grafted like apples, and the porker is turned out to make his living picking up acorns where they fall, and enriching his diet with a special kind of fig grown in the same way for his use. We Americans are too industrious; we insist upon putting a pig in a pen and then waiting upon him. The pistachio, the walnut, the

filbert and the chestnut are all important tree crops in parts of the Mediterranean countries and many American travelers have probably seen the chestnut orchards of France and Italy, which I have found by examination are able to make the rough and unplowable mountain-side, bristling with rocks, as valuable as the level black prairies of Illinois.

The natural objection may be raised that the utilization of so much hilly land in fruit and nut-yielding trees will give such supplies of new food that people will refuse to use them. The above objection is well founded; but swine, sheep and poultry eat what is given them. I have an example of a farmer of Louisiana, who planted a hillside to mulberry trees. The mulberries held the ground in place by their roots and dropped their black harvest to the ground through three months of summer, and the hogs gathered them up and converted them into pork worth \$12 an acre, without any effort on the part of the owner. The mulberry area in the United States is probably close to a million square miles. Over most of the region south of Mason and Dixon's Line the persimmon is a hated tree weed; yet it stands by the millions in fields and fence rows, fairly bending down with a full crop of fruit every other year, which is much sought after by the opossum and other wild animals, and eaten when possible by the American porker from September, the end of the mulberry season, until March, for the persimmon has a habit of dropping its fruit through the long winter period. The oak whose acorns probably made the pig what he is, is almost neglected in America; yet for ages the Indians of the Pacific coast have made their bread from acorns of two species of oak, one of which is now gathered by the farmers of California, put into their barns and bought and sold as stock food. The beechnut and the hickory nut are rich and much prized swine food.

Legumes, of which there are many species, can be grown between nut-yielding trees to maintain the fertility of the soil through the nitrogen gathering nodules upon their roots.

As it often seems desirable to cultivate trees of this character where possible, the tree crop agriculturist is above all others able to adjust his crop and the one device that permits the tillage of hilly land—terracing. Terraces interfere with machinery which is so increasingly essential in the cultivation and harvesting of the present crops. But terracing interferes least of all with the tree crop agriculture, because the trees can stand in the terrace rows and make a fortunate combination of the heavy yielding tree crops and the soil preservation through terracing.

We have an interesting example of tree crop productivity in Hawaii, where the agaroba was introduced from Peru in the last century. It has now spread until it covers considerable area with forests, and information from the Hawaiian Experiment Station is to the effect that it is now the mainstay of the dairy industry of the island. The annual crop of four tons of big beans to the acre can be and is ground into a highly nutritious meal food selling at \$25 a ton, an agriculture which, for ease of operation and richness of return, puts Illinois to shame, for, in addition to the \$100 worth of animal food, there is a ton of wood per acre every year.

The tree crop agriculture seems to hold the possibility of letting the worst third of our soil (Class 1 as mentioned above) become as productive as the best land (Class 3), while (Class 2) the hill land can probably be doubled in productivity. This is a goal well worthy of much endeavor on the part of the plant breeder.

Tree crops offer equal possibilities for the arid land. The grains with their period of crisis are an uncertain dependence on land of such uncertain rainfall as exists in the United States west of the 100th meridian. This is attested by the fact that some of this land has been settled three times and abandoned twice to the wreckage of hundreds of thousands of private fortunes. Yet the tree with its far-reaching roots and ability to store energy can survive in much of this area where grains are so very uncertain. The mesquite, yet a tree weed over much of this area, has one species which produces a nutritious seed that has been used for bread stuff by unknown generations of Indians. The screw bean, a legume, with a nutritious seed, grows from El Paso to the Imperial Valley; while the broad leafed honey locust, with a seed closely akin to that of the carob, or St. John's Bread, will also grow over wide areas in the arid southwest. Five varieties of the small but productive wild almond have been found by a Government botanist growing upon the shores of Pyramid Lake; while Frank Myer, Plant Explorer of the Department, brings back from Turkestan accounts of wild almonds producing good fruit on mountain slopes with a rainfall of 8 inches a year. These productive plants, several of them legumes, adjusted by nature to this region, with allied species in other continents, seem to hold before the plant breeder the possibilities of hundreds of thousands of square miles of Western orchard ranges of high productivity, rather than the present would-be grass-ranges of low and declining productivity.

I believe that the development of a tree crop agriculture offers one of the greatest possibilities in constructive conservation of natural resources. Individuals cannot be depended upon to do it. The work is too slow. A man might by decades of work create species that would be, if fully utilized, worth a hundred million dollars a year to a state like Pennsylvania; yet he would be unable to realize personal gain from the results, provided he had secured them. Institutions must do it. It is like the Geological Survey and the Census Bureau and Agricultural Experiment Stations, which depend upon appropriations. The appropriations depend upon the realization of the importance of the work. There are interesting examples of similar work already in operation, of which the following might be mentioned: The Agricultural Experiment Station of Arizona has started a twenty-four-year series of experiments in breeding the date palm. In North Dakota, where the blizzards kill nearly all the ordinary fruits, an experimenter has done much work in the breeding of hardy strains of apple, cherry and other trees.

Then followed a display of lantern slides showing scenes from Spain, Portugal, Balaeric Islands, Sicily, Corsica, Italy, Algeria, Tunis, France and southern and central United States. This collection of pictures revealed a surprising amount of tree crop agriculture already worked out but needing wider application.

The meeting adjourned without discussion of either lecture at 10 P.M.

THURSDAY MORNING SESSION

The third session of the convention was called to order at 9:50 A.M. with the president, Dr. J. Russell Smith, in the chair. The opening attendance was twenty-eight persons.

THE PRESIDENT: Owing to the fact that business needs to be predigested, we have decided to postpone the amendments to the constitution until this evening's session. We think it will take but a short time to discuss them. Resolutions, informal discussion on seedlings, the chestnut, and similar topics will also be brought up at that time. This morning's session, therefore, will be devoted to the intellectual, rather than the business end.

I know of no subject in which there is greater possibility of securing knowledge than the question of nuts for the north. A few years ago a friend of mine wrote me he had bought some land, and was planting native walnuts in the fence corners to be topworked with English walnuts. I wrote him, recommending oranges instead, telling him he would lose less money. I was basing this advice upon my own bitter experience. The accumulations of nut knowledge in the last few years and the trees now growing on my own place show how ridiculous was my position of a short time ago. This morning I think we are likely to have somewhat similar surprises in a paper by Dr. Morris. He will give us information on the hazel nut, giving his experience with the European varieties.

NOTES ON THE HAZELS

DR. ROBERT T. MORRIS, NEW YORK CITY

The hazels are descended from an ancient and honorable family. Impressions of leaves found in the Upper Cretaceous rocks of the Yellowstone Valley cannot be distinguished from those of the leaves of our two American hazel species of today.

The hazels belong to the *Cupuliferae* or oak family. Our American species are only two in number, although there are many varieties of the species. The one which is most prized, *Corylus americana*, is found over a wide range of territory and abundantly in many places between Canada and the southern extremity of the Appalachians, and from the central Mississippi valley to the Atlantic coast.

This species bears nuts of excellent quality for the most part, but of rather small size and thick shell, excepting in individual plants. The common American hazel, while valuable for hybridizing purposes, will probably never be cultivated to any great extent, because of its habit of growth.

The characteristic life history in the Eastern States is as follows: A hazel plant bears a few nuts in its third year, a fairly large crop in its fourth year, a heavy crop in its fifth year, a very few nuts in its sixth year and it dies at the seventh or eighth year of age. Meanwhile, the plant has been sending out long stoloniferous roots which have surrounded the original plant with a chaplet of progeny, each one of which follows the life course of the parent.

One hazel plant when left free to its own devices may increase in this way rapidly enough to drive cows out of a pasture lot. I have trimmed off stoloniferous roots experimentally from a number of hazel plants, for the purpose of throwing all of the strength into the original stocks, hoping, thereby, to prolong their lives. This, however, appears not to be effective, as the stocks died at their appointed time.

Like many other wild plants, not yet subjected to processes of cultivation, the common American hazel does not respond very readily to cultivation, and too much attention on the part of the horticulturist leads into confusion.

Some years ago I expended about six weeks in making a study of fruiting hazels and examined many thousands of bushes in Rhode Island, Connecticut and eastern New York state, including Long Island.

In the regions visited, the native hazels are so abundant as to be considered a pest. Out of all the bushes examined, I saved but three for purposes of propagation. The best one of these for size, quality and thinness of shell, I have named the Merribrooke, and young plants of this variety will be sent to any member of the Association who wishes to cultivate them. Bushes of this particular

wild variety have had a reputation among the boys of the locality for more than a hundred years, according to legends of the neighborhood. I have recently budded specimens of this variety upon stocks of the Byzantine hazel, in the hope of prolonging the life of an individual plant beyond its normal seven or eight years.

The other American hazel, variously known as the beaked hazel, tailed hazel or horned hazel, was named *Corylus cornuta* by Marshall (Arbustrum Americanum 37, 1785). Consequently, that is the name by which it should be known instead of the name *Corylus rostrata* which was bestowed subsequently. This hazel has a much more northern range than the common American hazel and I have seen it in Labrador and in Ontario nearly to Hudson's Bay. On the Pacific coast it is said to reach a height of thirty feet. Although spreading by stoloniferous roots like the common American hazel, these roots are shorter, and it does not extend rapidly enough to dominate the situation when growing in competition with the common hazel.

The nuts, while very good, and sometimes of large size with comparatively thin shell, lack quality, a very important element in any nut. It is probable that this tailed hazel will be valuable for adding hardiness to hybrids with the European and Asiatic hazels, when the time comes for horticulturists of Canada to make fortunes from their hazel orchards.

In Europe and Asia and in the northern parts of Africa several species of hazels are extremely important commercially, sometimes furnishing the chief source of income for large districts, very much as wheat or corn make special crops over large areas in this country.

These foreign hazels have not been raised successfully in our country, excepting very recently on the northwest coast. The reason for failure depends almost wholly upon the presence of a blight, *Cryptosporella anomala*, which belongs to our native hazels. In the course of evolution, host and parasite have come to be peers of each other, and consequently this blight does not menace our native hazels very seriously. Introduced species, with the exception, perhaps, of the Byzantine hazel, appear to carry a protoplasm which has not learned to resist the attacks of the blight. All organic warfare is fundamentally enzymic in its nature, and it is possible that through process of natural selection some of the foreign hazels would eventually become securely established in this country, without aid from the nurseryman.

As a matter of fact, the hazel blight is very easily managed. Not knowing this at first, I allowed almost all of my exotic hazels to become destroyed, and a number of nurserymen told me of having given up the problem as hopeless. Recently I have learned of the ease with which the disease may be controlled, and now feel very comfortable in its presence.

The blight is of slow development and chooses the larger hazel stems for its battleground. All that one notices at first is a depression of the bark extending in the long axis of a large branch. If one observes more closely, he will find spore-bearing pustules occurring as little round elevations upon the depressed part of the bark. The blight proceeds slowly, and I pass about for examination specimens from two hazel limbs. In the smaller one the blight has been two years under way, and in the larger one three years. These patches of blight were allowed to grow experimentally. Meanwhile, I trimmed out all other blight areas of the bark with my jack-knife. This is very readily done. If one will look over his hazel bushes once a year and simply whip out the few slices of bark carrying the blight, it is done so easily and quickly that we now need to have no fear whatsoever for the future of hazel culture in this country.

If the members of the Association will examine these *Cryptosporella* specimens which are passed about, and if they will dispose of the blight according to directions, I feel that the hazel question involving a matter perhaps of millions of dollars worth of investment has been settled.

Among the foreign hazels which will thrive in this country the Byzantine hazel, *Corylus colurna* is by all means the most beautiful. It makes a tree as large as the ordinary oaks, and in Hungary I have seen a trunk three feet in diameter at a short distance above the ground. I have been told that a single tree of this species will sometimes bear about twenty bushels of nuts at a single crop. This presumably refers to the nuts in their large involucre mass,—say four or five bushels of husked nuts. The wood of these species is hard, takes a high polish and is valuable. The tree itself is strikingly beautiful as the members will observe this afternoon when examining the Byzantine hazels which Superintendent Laney will show us in one of the Rochester parks.

This species of hazel in some of the localities about the Black Sea is said to form almost the entire source of income over large districts. The nuts are not large, as a rule averaging about like those of our common American hazel in size, quality and thinness of shell. Grafted or budded stocks may be made to bear large thin-shelled nuts. I am using this hazel at present for grafting stock for choice foreign species and varieties of other kinds, and for the American hazel, although it may be that the American hazel will not respond well to so large and vigorous a stock in the long run. Nuts and nursery stock may be obtained through French nursery firms.

The reason why the Byzantine hazel has not been planted widely in America as yet, is because we have not advanced that far in civilization,—people have not happened to think about it. We must leave something for the people who are to come five thousand years after us, and not think of all good things at once.

The Byzantine hazel appears to be quite free from the blight and this, perhaps, is due to its thick corky bark, which is in itself an attractive feature. In some individuals the corky bark stands out in ridges almost like that of the corky elm. The beauty of the European and Asiatic hazels, in general, makes them extremely desirable for ornamental purposes in parks and in dooryards.

One of the most attractive is the purple variety of *Corylus avellana*. In many parts of Europe this is held to be desirable for its nuts, but in Connecticut it is prone to flower so early in the season that the elongated male catkins are caught by frost. I have seen elongated catkins in a warm week at the end of February. A very desirable variety of *Corylus avellana* is one of which I now show specimens. The section of the branch which I pass about carried four large nuts yesterday but I find that one of them has disappeared, and it is probable that last night in the sleeping car a squirrel got in when the porter was looking the other way.

The specimen represents a seedling individual among a lot presented to me by Prince Colloredo Mannsfeld of Bohemia nine years ago. This particular shrub is rather homely, with small unattractive leaves and big bony branches, but it bears heavily of large thin shelled hazels of the highest quality, and the sort which are now bringing fifty cents per pound in the New York market as green hazels. It blossoms very late in the spring. I have not as yet given a name to this individual bush, but as Professor J. Russell Smith caught my description of it and speaks of it as "the bony-bush" we will allow his nomenclature to stand if members of the Association wish to call for any of the wood for grafting or budding purposes. *Corylus avellana* in its many varieties is the chief European hazel which gives us the cobnuts and filberts of the market, and it is the one which will probably be most widely introduced into this country. The name "filbert" is a corruption of "full beard" and is properly applied only to those nuts in which the husk extends beyond the nut. The shrubs of this species commonly reach a height of about fifteen to eighteen feet, with a spread of the same dimensions. Trimming by the horticulturist allows of the development of a larger bearing surface, very much as it does with peach or apple trees.

In some parts of Europe this species serves for hedge fences, indicating the practical ideas belonging to an older civilization. In this country we make hedge fences of worthless osage orange, privet, or honey locust which steal nourishment from the soil, add little to the beauty of the landscape, and give us no return whatsoever. Such a typical American way of doing things will be changed when we stop to think. Stopping to think is rather a painful process and gives us many jolts, but it has its rewards. When we replace our worthless hedge plants with hazels which yield heavy annual crops of valuable nuts we shall have made one step forward.

A fine hazel is the *Corylus pontica*. The shrub in itself has beauty, and it bears nuts sometimes as large as those of the average shagbark hickory. The kernel is of good quality, but the shell is so thick that these nuts are chiefly attractive to squirrels and to men who are out of work. I do not know the origin of the nut which is known in the market as the Barcelona hazel, but I imagine the plants bearing this nut are derived from the *Corylus pontica*. (Specimens of branches and nuts of various species and varieties of hazels are now passed about in the audience.) The nuts are beginning to ripen in this first week in September.

Hazels do not come true to parent variety from seed, and consequently valuable stock is propagated by budding, by grafting or by layering.

Personally, I find that the hazel is rather easily budded, although layering is the method for propagation of choice varieties most often employed in Europe. The hazels have comparatively few insect enemies, but mine are sometimes attacked destructively by the elm beetle and by the larvae of two species of saw flies which are also found upon the elms. It is a rather curious fact that the insects should recognize a similarity between the leaves of the hazels and of the elms, which are somewhat alike in general appearance, although the trees are of widely different descent.

It brings up an interesting question, if the flying parents of the parasites from the elm are attracted by the appearance of the hazel leaves, or if they are attracted by the odor or other characteristics. Occasionally the exotic hazels are attacked by various leaf blights but not to any troublesome extent so far as my experience goes, up to the present time. The chief predatory elements which we shall have to meet when raising hazels are squirrels, white-footed mice and the neighbors' children.

W. C. REED: May I ask, Doctor, what you bud the Byzantine on?

DR. MORRIS: I am budding other things on those for stocks. I bud our American hazels and European hazels on the European and Asiatic trees.

MR. RUSH: Do you know anything of the quality of that nut?

DR. MORRIS: It is the chief hazel in parts of northern Turkey, and of excellent quality. Hazels form a source of income for some localities like the wheat or corn in other parts of the world, or the olive, as Dr. Smith told us last night.

MR. HOLDEN: Do they get these trees from seedlings?

DR. MORRIS: Yes, so far as I know. The nuts are called Constantinople nuts.

A MEMBER: What kind is it that blooms in the fall?

DR. MORRIS: I don't know any but the witch hazel which blooms in the fall; has a small yellow flower, but is not a true hazel. Catkins form upon all hazels in the fall, but these do not really blossom until springtime.

A MEMBER: I would like to ask if the Byzantine hazel is attacked by blight as are the others?

DR. MORRIS: No; none of my trees have been attacked by blight at all as yet.

W. C. REED: What method of budding do you find most successful?

DR. MORRIS: I have usually used the ring budding. It is not very difficult.

PROFESSOR HEDRICK: Are there any East Asia hazels that thrive in this country?

DR. MORRIS: There are specimens in the park here at Rochester that you will see this afternoon.

PROFESSOR HEDRICK: Our experience with Asiatic hazels is very satisfactory.

MR. MCGLENNON: A friend of mine here has some specimens that he would like to present.

DR. SMITH: We will ask Mr. Vollertsen to describe the specimens himself.

MR. VOLLERTSEN: They are from a private place of G. H. Perkins on East Avenue. They have never failed a year since 1886. Unfortunately we have no name for them, except that this one was always called John Jones. It has certainly proved a good strong hardy variety.

Then we have another one, a long one, which has never been named, and I am not able to say exactly what it is. Last year they were exceptionally well filled. This year there are not quite so many on them, although a goodly number. They have never failed a single year.

I have one little variety which was given me by Dr. Mann, on Alexander Street. The limbs are practically hanging down with the nuts. They are ready for market now, falling out.

I have here some purple hazels which have always borne fruit and no other hazel in the vicinity is as good. It has sometimes two crops in a year. These are really beautiful specimens. This little early variety should be passed round and have special attention. I have given this variety no name, but for over thirty-five years it has borne good fruit every year.

DR. MORRIS: If you are in doubt as to the name of a variety, I think Mr. Laney will find a way for getting you the name for almost every variety that is found in the markets.

THE PRESIDENT: Mr. McGlennon asks that the gentleman advise us how he has propagated them. We went through Mr. McGlennon's beautiful orchard yesterday.

MR. VOLLERTSEN: We have been using an ordinary way of budding. An ordinary seedling can be used to good advantage for grafting. I have found in grafting in winter they do not seem to grow as well. In our fall layering we naturally get a larger plant.

THE PRESIDENT: Do we understand that these hazels that have borne for twenty-five years are European hazels?

MR. VOLLERTSEN: Yes; European hazels. I have had them under my care since 1886, and never noticed any blight.

A MEMBER: Can't you explain to us, with one of your specimens, your method of spring layering?

MR. VOLLERTSEN: In layering them, we practically don't cover them at all for the time being. They are merely pinned down.

DR. MORRIS: Do you cut the bark?

MR. VOLLERTSEN: Not on them. After they have grown some we cover them up. We find this a very successful way. We get younger and smaller plants in the fall lay.

THE PRESIDENT: I should like to ask Dr. Morris a question. In this native hazel, does it keep on spreading under ground?

DR. MORRIS: One single plant, planted in a pasture lot and not interfered with will in a few years occupy practically that whole pasture lot. In my part of the country this is true; how is it with you, Dr. Deming?

A MEMBER: Going back to the blight, will this tackle any size limb?

DR. MORRIS: It usually does not come until your hopes are at top notch, and then it drops in on you. It does not attack the smaller twigs at first, but may finally extend to them.

A MEMBER: Are any of your hybrids a success?

DR. MORRIS: There are none in bearing as yet. Byzantines are little, if any, larger than American hazel nuts, excepting from selected trees. Pontines are much larger. Both plants make a remarkably vigorous growth.

THE PRESIDENT: Do I understand that this Merribrooke hazel, put in the middle of an acre will fill the acre?

DR. MORRIS: I believe this is true. I don't think it is an exaggeration. The wild hazel is a nuisance in Connecticut.

THE SECRETARY: I know they will cover a very large space, but I cannot tell how they get there.

THE PRESIDENT: The point I am trying to get after is this, not the exact extent of spread but the method of propagation. Can we get a sprout from a good tree, and then have it go on sprouting

indefinitely?

DR. MORRIS: Yes, that is true.

A MEMBER: In your experience are fungicides useful in handling the blight?

DR. MORRIS: I have not used them. I have talked with nurserymen who did, and they say the blight got the best of them just the same. They left the matter with employees, who did not give proper attention. This was perhaps because they did not know that a small jack-knife was better than a spraying outfit for the purpose.

A MEMBER: Once on, will it stay?

DR. MORRIS: Yes, until the blight area has circled the limb.

A MEMBER: What is the difference between the cobs and the filberts?

DR. MORRIS: The cob nut is generally a round nut. The filberts are longer nuts. "Filbert" is a corruption of "full beard," and refers to the involucre extending beyond the nut.

DR. SMITH: We may now proceed to the next number on the program, if the hunger for hazel knowledge abates. Members of this association have topworked pecans, hickories, etc. I followed the instructions of members of this association in my work and have had some success. Some workers report splendid success mixed with very great failures, so we may be encouraged to the very top notch, and the next spring we come back feeling very different. Last fall I was as large almost as a beer barrel with the gratification that followed the setting of 100 English walnut buds. I have adopted the motto "Blessed is he that rejoices early, or he may not rejoice at all." In March there were about ten or twelve alive. In June about nine were alive, and now these also have failed to grow. Last year I knew just how to bud walnuts. This last Fourth of July I was very humble.

For some reason or other we have not all the facts. We can propagate splendidly one year, and the next year we have a fall-down. Mr. Roper, of one of the pioneer nurseries, said he had 2,000 fine live walnut buds last fall, and had but 500 this spring, and not one of them grew. While the technique seems to be simple, there seems to be something lacking in our experience. I will ask Mr. Littlepage to give us his confessions first.

MR. LITTLEPAGE: The proposition of topworking is one of the schemes where art beats nature. In the fight in Congress over the oleomargarine bill some years ago, one member who favored it, said in support of his contention, that nature always beat art; and one of his opponents immediately referred him to a picture gallery near, where pictures of the statesmen were exhibited, as a proof that art sometimes beats nature. In top working, art improves upon nature.

The first thing to be considered is what is topworking, and then the logical question, why topworking. Possibly this should come first. If an individual is dissatisfied with his friends and neighbors, he must put up with them; he cannot change them. But if he is dissatisfied with a nut tree, it is his own fault if he does not change it. It can be top worked. He does not care to top work maples or oaks. We only top work to get something better than we have. The trees, of course, that interest us specially in top working are the nut trees. We have seedling pecans, seedling walnuts, seedling hickories, and seedling chestnuts. Down at the mouth of Green River in Kentucky are nearly two hundred acres of wild pecan trees. So far as we know there are only two trees in that orchard worthy of propagation. Of thousands of trees there we have propagated only two varieties. These trees are now too large to top work, but had it been possible 150 years ago to go in there and select the desirable nuts, and topwork all the other trees with these, there could have been a great orchard there now of the highest quality nuts.

Topworking consists in cutting off the top of some undesirable seedling and replacing it with scions or buds from some desirable variety. It is just the same as any other grafting or budding process. Almost any size tree can be topworked but, of course, the larger the tree the more difficult the operation. A young tree, from two to five inches in diameter, can be sawed off four or five feet above the ground and topworked by grafting from two to four scions on it, by the slip bark process. If the tree is larger than five inches in diameter, it is better to go up to the first branches, saw off part of them and proceed just as if each branch were itself a small tree. If the tree is a large tree, with a number of branches or prongs, it is best to work part of them one year and leave the remaining branches to maintain the root system. It would probably kill a large tree to cut the whole top off at one time. I have seen trees, two feet in diameter, successfully topworked. It sometimes happens that the scions placed in the tree, in the spring, for some reason or other, do not grow. The tree then sends up nice green shoots that later in the season can be budded into just as if they were small seedlings. The wild black walnut trees, growing around the fields and hills, can all be very easily topworked to the English walnut by the slip bark method. The scions must be dormant and the tree starting into active growth.

The wild hickory, wild pecan and wild black walnut trees, offer the best field for profitable work along this line. We have topworked a great many hickories to pecan, but we do not expect permanent satisfactory results. The experience of the pecan on the hickory is not very satisfactory. The hickory is a dense, hard wood, that has a short growing season, and matures its nuts early; the pecan is of the coarser, faster growing wood, whose nuts grow until late in the fall. This inconsistency of the growing habits of the two trees prevents the pecan top on the hickory from producing normal crops of nuts. The pecan topworked to the pecan, however, is a

perfect success and there is no reason why the wild hickories of all descriptions cannot be successfully and profitably topworked to the better varieties of the good shagbark hickories. I believe that there are great opportunities in the state of New York for successful nut culture by utilizing the wild black walnut trees and the hickories. I have seen hundreds of English walnut trees growing around Rochester, some of them bearing perfectly wonderful crops of walnuts. I am surprised that the people in this section have not availed themselves more of the opportunities along this line. If the farmers in this section would take up nut growing as a side proposition and set five or ten acres of nut trees on each farm, they would soon find that these nut trees would be producing them more than all the balance of their farms. We hear a great deal today about the back to the farm movement, but my opinion is that for everyone who is going to the farm, ten are leaving it, and the reason for this is that the heavy operating expense of the annual crops, such as corn, wheat and potatoes, etc., lay such a heavy toll on the farmer that farming is not profitable. The requirements of time, labor and money in producing these crops are so great that it discourages many farmers. I have made the statement to some of the farmers in my part of the country that they must produce alfalfa or go broke. I believe that alfalfa and tree crops will be two of the greatest factors in the rehabilitation of the farm, especially the nut trees, for the reason that nut trees do not require the same high degree of care, spraying, pruning, as do apple and peach trees, nor are the products as perishable. A crop of nuts can be harvested and stacked up in barrels, and boxes, in the smoke house, the barn or in a flat car and go to the market tomorrow, next week or next month.

Recurring to the advantage of topworking, however, it meets the objection that is often raised by those who say they have not time to wait for the nut trees to grow. Of course, this is a perfectly foolish statement; they are going to wait anyhow; it is simply a question as to whether they wait for something or nothing, and trees grow into maturity in a surprisingly short time. A few years ago, when I was setting out an orchard of nut trees, a neighbor of mine came over and looked very doubtfully with a trace of pity in his expression and said, "When do you expect all those trees that you are setting to bear?" I replied, "I am not sure, but I do know that they will bear a long time before those trees that you are not setting." Topworking, however, gives quick results and enables one to take advantage of the long-established thrifty root systems of the wild black walnuts, hickories and pecans growing in economic spots, around the fences, corners, creeks and hillsides.

MR. JONES: In all our grafting we cut the cleft; we don't split it. The slip bark method is better in some cases.

MR. PRESIDENT: What is the size limit for the slip bark method?

MR. JONES: Anything less than two inches we would cut.

THE PRESIDENT: Will Mr. Jones tell us about budding with cold storage wood?

MR. JONES: The cold storage buds would take better, but you would have more loss in their failing to grow. In other words, a much larger percentage of buds set with the current season's growth, will grow in the following spring. I would not recommend either method alone. By grafting in the spring and then budding, first with cold storage and later with the season buds, you would have three chances.

THE PRESIDENT: Have you budded any cold storage wood before this year?

MR. JONES: We have done more or less of it for six or eight years, and it has been successful. Anyone with very little experience can use cold storage buds.

THE PRESIDENT: Mr. W. C. Reed, have you any additions that we ought to know?

MR. W. C. REED: Mr. Jones' method and views in regard to cold storage buds agree with mine exactly. Last year I put in on July 30th quite a number of English walnut buds that were held in cold storage. In the fall we seemed to have almost perfect stands from these buds, but they are still lying dormant. Buds of the season's growth put in about three or four weeks later gave better results, although our success last year was very poor. We seemed to have a fair stand on quite a number of varieties, but this spring they refused to grow. I lay much of this trouble to the extreme cold we had in November. This killed many peach trees that were from six to eight years old, and I think it injured many of the walnut buds. I found the buds that started best were those nearest the ground, where they were protected by a little grass.

In regard to the topworking of the English walnut, several of you have seen my trees, the three trees along the highway in a ditch where they catch the wash where they have made 9½ feet growth. I am sorry to report that two of these trees are entirely gone, killed by the cold spell, and the other is about half alive, but I was not in the least discouraged by that loss. In September the rains commenced, following the extreme drouth and started a second growth, and the freeze caught them November 22d as full of sap then as they were in September, when you were there.

Other trees that I had topworked had made a moderate growth, and were not injured in the least. They made a good growth this season, and should be quite fruitful next year.

The Pomeroy trees in the bluegrass pasture had made only a moderate growth, and went through the winter in good shape.

I had three trees of the Rush, probably twenty-five feet high. They were injured a little, some of the growth killing back a third of the way, and one or two buds were killed entirely.

In regard to topworking pecans, I have not done much of this, but our success has been very good with what we have tried. I find them much easier to work, as far as the bud starting in the spring is concerned. Some varieties, however, do not start readily. With the Major, Green River, and one or two other varieties, we can use wood five, six and eight years old, and have it come out all right. I find, however, that the current season's growth, cut from two-year-old trees, well developed, will give you at least double the growth in the nursery the first year that older or dormant wood will.

THE PRESIDENT: Some apple experience of mine is a close match to the killing that Mr. Reed just reported. The season of 1912 was a very dry one. All September it rained frequently and heavily. The trees waked up and grew with such speed that many of them made a sappy growth where they had been manured, and a very cold spell early in the winter killed 100 of them. Others across the road were uninjured.

MR. W. C. REED: In regard to grafting in the nursery, this spring my experience has been somewhat varied. In grafting we started about April 10th; the first grafting was almost an utter failure. On May 1st it improved. On May 9th we set 900 and have 75 per cent growing today, some higher than my head. Set with wood some of which would run three-fourths inches in diameter.

LADY DELEGATE: My sister has on her place 200 or 300 black walnut seedlings. What would you advise her to do with these? They are in all ages and stages of growth, from one to ten years.

MR. LITTLEPAGE: That is a very broad question to answer. I should topwork them to the Persian walnut. I should topwork all of them on the chance that future developments would leave them the proper distance apart. The walnut transplants very easily, except that the larger the tree, the more danger of loss. Trees of that size ought to be worked very nicely.

Assume that this is your tree, and that you have sawed off the top. Here is your scion from your desirable tree. It is to be cut on one side only, and there is considerable art in making that cut true. Then with the knife split down the bark on the stock a little way and shove the scion down between the wood and bark, the cut side next to the wood of the stock (demonstrating), and cover with waxed cloth. Then apply grafting wax to the cut surface, and cover all with a paper bag for two or three weeks. There should not be more than two buds on a scion. Don't leave too many. One bud is better than three, but you may leave two buds. This scion must be kept entirely dormant until used. Any time after the bark will slip readily is the proper time to graft, and you will then get a high percentage of success. Keep your sap circulating to the top by putting two or three scions around the top of the stock. This method of grafting is a very simple operation when you know a few little fundamental facts about it. The kind of wax or cloth is not particularly important. Mr. Reed and Mr. Jones and Mr. Rush have had much experience in this work.

MR. PARISH: In doing this, shall we put in a little air hole?

MR. LITTLEPAGE: No. In from ten days to two weeks tear a little hole in the paper bag. Next time be careful, for it may be full of wasps. The purpose of that paper sack is to keep the water off the buds. This is essential.

MR. PHILLIPS: I had about 300 trees planted in 1911, black walnuts. In 1913 I budded them according to the Oregon method. I failed to make any of these grow. In 1913 I cleft grafted and a great many of these started, but they all failed to live. I wonder wherein I failed.

MR. LITTLEPAGE: No one can tell why a particular scion does not live. I had scions from a very fine hickory and I put them in cold storage. The wood was in perfect condition. I grafted perhaps 100 of these scions as I have described. I have four trees growing out of the 100 grafted. In handling the wood I got fungus on it probably. That may be one reason why it failed. There may be other reasons. If the scions were not dormant that might explain it.

MR. W. C. REED: I think it is very important that walnut grafting wood should be cut before severe weather in the winter, though I don't think it ever grows cold enough to hurt pecan wood. You need not worry about pecan wood, but in the case of the walnut it should be cut before extreme cold weather and put in cold storage. I cut some last year after the extreme cold snap in December and we threw it practically all away this spring. It is useless. You are throwing away your time to use it.

MR. JONES: I don't think we had any wood that was not injured during the cold winter of 1911-12. Out of about 2,600 grafts set we had two grow.

QUESTION: What do you mean by cold storage?

MR. W. C. REED: I have been storing all of our wood in ordinary apple cold storage plants. Pack it in damp moss or excelsior. Paper line your boxes well, and nail them up, and leave them there until you are ready to use them. I have put wood in in November and taken it out in good shape in August. Pecan wood can be held the year round.

THE PRESIDENT: What can you tell us, Mr. White, that has not yet been covered?

MR. PAUL WHITE: About all I would care to say about topworking would be to ask a question. They

claim that the pecan topworked on the hickory, only bears for a few years, and then stops. What would be the result in the case of the English and black walnuts? Might there not be some danger there?

THE PRESIDENT: I have made considerable investigation of this. I have found several English walnuts topworked on black walnuts, one done eighty years ago down in Maryland. The tree is reported to have borne twenty-five bushels of nuts. I think there is good explanation for the pecan-hickory trouble. A hickory grows for a short time in early summer and does not grow much, but a pecan grows twice as much. Therefore the hickory roots cannot feed the pecan top enough to make both vegetation and fruit. We are, in this city, in a very unusual place. Not only is it the center of a great wealth of seedling Persian walnut trees, but we have in the parks a great tree collection under Superintendent Laney. This is a very fine and notable collection, including American and foreign trees, some of which we will see this afternoon.

Adjournment at 12:12 P.M.

Photographs of the convention were then taken on the steps of the City Hall.

THURSDAY EVENING SESSION.

Convened at 8:20 P.M., Dr. Smith presiding.

Attendance about twenty.

A Nominating Committee was appointed, consisting of Messrs. Littlepage, C. A. Reed, J. F. Jones, Webber, and Teter.

At this point was given the address by C. A. Reed.

AN APPEAL TO OWNERS OF HARDY NUT TREES

C. A. REED, NUT CULTURIST, U. S. DEPARTMENT OF
AGRICULTURE, WASHINGTON, D. C.

Ever since the colonists first established themselves in the Western Hemisphere, nut trees have been planted up and down the Atlantic Coast. One of the species oftenest included in such planting was a walnut, a native to Persia which, with Romanism, had spread across Europe and the channel into England. In the Old World it had variously been known as Jove's nut, under the supposition that it had once been the food of the gods; Royal nut, meaning King nut; and by other common names which would be interesting to discuss but which are not pertinent in this connection. In England it had been known merely as the "walnut," but in the New World, in order to distinguish it from the walnut found here, it was called the "English" walnut. In the trade today it is commonly known by the Old World name, other walnuts being distinguished from it by prefixing their common names, as Eastern, California, Mexican or Japanese black walnut, etc. However, being a native of Persia, it was long ago decided that the correct name of this nut should be "Persian" walnut, and not "English" walnut. As such it has now been referred to in scientific publications for well towards a quarter of a century.

Subsequent to this rather limited and scattered planting on the Atlantic Coast, by perhaps three hundred years, the Persian walnut put in its appearance on the Pacific Coast. According to Bulletin No. 231 by the University of California, it is probable that occasional trees were planted in that state long before the discovery of gold in 1848. Following that date, planting became much more general, but usually with hardshell strains and always with seedling trees. From these early trees the crops were never of great importance. In 1867 Mr. Joseph Sexton of Santa Barbara, planted a sack of walnuts bought in the markets of San Francisco, which he had reason to believe had been grown in Chili. Of the resulting trees some were very good, others mediocre, and some worthless. Later on, nuts from the best of these trees were planted, and second generation seedlings produced. In this way the famous Santa Barbara Papershell type of walnut was evolved. With it developed an industry which among the tree products of southern California is now second only to that of the orange. In 1910, the census takers found that in the year preceding, the crop of walnuts of southern California, which, by the way, came almost entirely from four counties, was valued at more than that of the total crop of all other nuts grown in the United States put together.

Four years after Mr. Sexton of southern California had planted this sack of walnuts from San Francisco, Mr. Felix Gillet of Nevada City, in northern California, began the introduction of French walnuts both by seed and scions. Out of his efforts and those of others who subsequently joined him, developed the walnut industry of northern California, which now bids fair some day to equal that of the lower part of the state. The famous French varieties of Franquette and Mayette were introduced by Mr. Gillet, and from seedlings of his growing evolved the Concord, the San Jose, and no doubt the Chase varieties.^[1]

A nut which probably has received equally as much, if not more, attention at the hands of experimental planters in this part of the country is the chestnut. Just when the introduction of

foreign strains began, history seems to have failed to make clear; but according to Powell^[2] general dissemination in the Delaware section began with introductions by Eleuthers Irénée du Pont de Nemours, made at about 1803. It is said that some of the original trees planted at that time near the present site of the du Pont Powder mills by Mr. du Pont, still survived when Mr. Powell recorded their history in 1898.

The spread of both European and Japanese chestnuts and their general trial throughout the Eastern States has been narrated at former meetings of this association. The chestnut blight, discovered on Long Island in 1904, after it had apparently gained several years' headway, and which now seems fairly certain to have been introduced from Japan, has so monopolized the attention of orchardists, foresters, landscape gardeners and others interested in the chestnut that for the time being little is being done with it, other than to study and discuss this disease. What the final outcome will be no one can predict, but it is not improbable that our pathologists will discover some practical means of control, or that a natural enemy to the blight will appear. Nor is it unlikely that immune strains of chestnuts, either native or foreign, will replace our present groves and orchards, in case other efforts fail.

Another nut which has received a large degree of attention at the hands of the planters and upon which hopes have been built from time to time is the hazel, or filbert. Here again, history seems to have failed us, for as yet the writer has been able to learn but little regarding the early introductions into this country. In his *Nut Culturist*, published in 1896, Mr. Fuller (A. S.) reasoned that at that time plants of the European hazels must have been grown in the gardens of this country for at least a hundred years. Writers on pomology make little reference to this nut, but according to Mr. Fuller, nurserymen's catalogs listed hazel varieties all through the early part of the last century. It was believed that the hazel promised much for the gardener and the general planter who wished for early returns. The species seemed capable of readily adapting itself to cultivation, and being a shrub rather than a tree, it required little space. It could be cultivated along with other garden products at little additional expense for labor. Being an early bearer it doubtless appealed strongly to the normal American demand for quick returns.

Nevertheless, this nut met with its mortal foe in the way of a native fungus which in a great many sections has proved entirely too much for the European species. Where once this species was well represented up and down the Atlantic Coast, few of its representatives are now to be found.

Some early attention in these Eastern States has been paid to the almond, another foreign species. It is supposed that this nut is a native of the Mediterranean basin. Just when it was first tried on the Atlantic Coast is not known, but of the nuts thus far mentioned it has proved to be the least promising for the Eastern section. Sometimes said to be "as hardy as the peach," it has been found to be the most exacting in its requirements of soil and climate of any important nut now grown in this country. Except with certain of the hardshell varieties, no almonds are now known to be in any sense successful east of the Rocky Mountains. According to Wickson (E. J.) in his *California Fruits*, the almond is known to have been introduced into California previous to 1853. At that time efforts to build up an almond industry on the Pacific Coast began to assume a somewhat serious air. After a half century of trials and more or less persistent effort by the California planters the culture of this nut has developed into the third most important nut industry in the United States. As for the time being, the growing of Persian walnuts centered in southern California, so did the growing of almonds in the Sacramento Valley of northern California.

During the whole of this period of early American nut growing history, little attention in any part of the country was paid to the native nuts. However, in the southeastern part of the United States there existed a large portion of the country to which no choice species of nut trees were either indigenous or had been introduced. Necessity, curious interest, and, more probably intelligent purpose, prompted sea captains, plying from West to East Gulf Coast ports, Easterners returning home from visits in the West, Westerners visiting in the East, and no doubt nomadic bands of Indians, to carry pecans from the Mississippi River and beyond, to the coast of Mississippi, to Alabama and the South Atlantic States, where they were planted as seed. For fully a century the species gradually spread over the plains sections of the eastern Gulf and South Atlantic States. In 1846, according to Taylor (William A.) in the Yearbook (Department of Agriculture) of 1904, a Louisiana slave succeeded in grafting a number of pecan trees. So far as can now be learned, really intelligent interest in pecan culture began with that date, although history records no further successful propagation of the species until about 1882 when William Nelson began to propagate this variety in his nursery near New Orleans. Soon afterwards, C. E. Pabst of Ocean Springs, Miss., and E. E. Risien of San Saba, Texas, joined in the pioneer work. The late Col. W. R. Stuart of Ocean Springs soon took part by giving publicity to the early varieties. Gradually, but steadily, choice varieties developed, were propagated and were disseminated. Orchard planting followed, but did not assume great importance until since about 1905. The orchards, therefore, were still too young at the time the last census was taken to have been in bearing to any extent. However, the crop of pecans from the native forests and from single trees left standing in the open space where the forests had been cleared is shown by the census reports to have been the second most valuable of American nut crops in 1909.

In quantity, the production of cultivated pecans is still slight in comparison with that of the wild product or with cultivated walnuts and almonds of the Pacific Coast. Just now, however, a great many of the orchards, planted this century, are beginning to bear and not improbably the production of cultivated pecans will soon eclipse that of the forest product, and before long will overhaul the lead now held by the Persian walnut.

Thus, briefly, has been the separate history of the principal nuts of this country. Collectively, the history of American nut culture has been as follows: Nuts from foreign countries which have been under cultivation for centuries have been more inviting than have the native and undeveloped species, and so have received the major portion of attention in America. Then too, human nature has shown itself in the greater interest taken by nut planters in foreign nuts instead of those near at hand. It is in sections remote from their place of origin that many of the leading nuts have attained their greatest degree of perfection. Thus, the average pecan of the Atlantic Coast is distinctly superior to that of the western Gulf; the Persian walnut scarcely known in Persia is best known in France and in southern California.

Progress has been slow and not concerted. Seedling trees have been planted under the firm conviction that they would come true, or because methods of propagation other than by seedage were not understood.

The Persian walnut orchards of California from which today the bulk of the production is being realized, are of seedling trees. However, the Californians have learned their lesson and today are replacing their orchards with budded stock as rapidly as possible. They have found that while the Persian walnut, which for centuries has been grown from seed, will reproduce itself fairly true to type, it does not repeat true to variety. Every tree, no matter how carefully its parentage may have been guarded, is unlike any other. The seedlings differ in traits of vigor, hardiness, susceptibility to disease, time of beginning to bear, productiveness, and longevity, and the nuts vary in size, form, thickness of shell, ease of cracking, and in kernel characteristics.

The people of California have also found that in many ways, Persian walnut trees on their own roots are less desirable than are those budded or grafted on the roots of some black walnut.

The earliest pecan planters likewise set seedling trees, partly because no others were available, but more largely because of a supposition that such seedlings would come true. Later on, planters chose grafted trees of large varieties, irrespective of others' merits or demerits. Today, the orchards of both seedling trees and illy-selected varieties are being topworked at great expense of time, labor, and money.

In the northern and eastern part of the United States, the situation until very recently has been one of practical standstill. Efforts with foreign nuts have resulted in our being but little ahead of the starting point of a couple of centuries ago.

The great majority of the Persian walnut, chestnut, and hazel trees which have been tried have failed us; some have even brought fatal or near-fatal diseases to us.

At first thought, we would feel compelled to abandon all further efforts with the foreign nuts; but not all that have been tried are guilty of offence or failure. Here and there, from New England to Michigan and from Maryland to Missouri, we are finding occasional nut trees either in groups or standing singly, which because of their age, vigor, productiveness, and quantity and quality of nuts, appear to be fit foundation stock for the varieties so much needed in this part of the country. A number of such are being propagated by the nurserymen and, as the members here present know, are being disseminated.

The present great need is for knowledge regarding the location of other such trees, not only of the foreign species, but of the natives as well. The Northern Nut Growers' Association and the Federal Department of Agriculture at Washington together are seeking to find Persian, Japanese, or black walnut, Asiatic, European or American chestnut, European or American hazel, and native butternut, hickory, pecan, chinquapin and beech trees of more than ordinary merit. Upon the locating of, and the propagation from such trees, as new varieties, apparently depends the future of nut growing east of the Mississippi and north of the Ohio and Potomac Rivers.

The appeal therefore is made to the owners of hardy nut trees that they drop a postal to the Department of Agriculture at Washington, D. C., stating that they desire a mailing box and frank for sending in a few specimens of the nuts which they believe to be of more than average merit. The only expense necessary to incur will be in the price of the card, and in the trouble of collecting and packing the nuts. Before mailing, the package should be plainly marked with the name and address of the sender, and a note should be inclosed giving information regarding the location, ownership, bearing habits, etc., of the tree from which the nuts were obtained.

If more convenient, the nuts may be sent to this association, which in any case will be apprised by the Department of all new varieties of apparent merit which may be brought to light.

However, no one should anticipate a great fortune as the result of any nut tree of which he may find himself the owner. It is not possible for a variety to be of especial value, no matter how promising the parent tree may appear to be, until it has established proof of its adaptability and merit in other sections remote from that of its origin. Except in rare cases it has been only after a variety of any kind of fruit has become well known by many who have tested it and spoken for it that it has become popular or in great demand.

Therefore, all there will be "in it" for you, if you chance to be the owner of a nut tree of merit will be the thanks of this Association and posterity and the probability of having the variety named in your honor.

MR. LITTLEPAGE: I should like to drop a word about the *American Nut Journal* published here at Rochester, N. Y. I would like to ask all the members of the Association to make as much effort as they possibly can to get new subscribers to the *Journal*. I don't own any stock in it, but I am talking purely in the interests of nut culture. Without a magazine nine tenths of our work would be entirely useless because it would be lost to the public. One of the duties of the members should be the support of the organ which puts forth the information for which this organization stands.

THE PRESIDENT: Methods of propagating pecans, hickories and walnuts have been discovered and used, at times, for a century. I know of a man who grafted them twenty years ago in New Jersey, but he left no records of his methods. The *Journal* helps us to keep these records.

This association has a great variety of contributors. We have with us men who work on the exceedingly practical end of propagation. W. C. Reed is a combination of the student and the propagator.

HISTORY, DIMENSIONS AND CROP RECORDS OF PARENT NORTHERN PECAN TREES, AND NOTES ON THE OBSERVATION OF PROPAGATED TREES

W. C. REED, VINCENNES, INDIANA

Varieties

In considering varieties of the northern pecan, there are many points to be estimated, such as size, thinness of shell, cracking quality, quality of kernel, growth of trees in nursery and bearing records. The latter is perhaps most important. What we want are trees that will give us a fair crop annually; next would be the cracking qualities. If they crack easily and come out of the shell with a large percentage of whole meats the size does not make so much difference, for ultimately the value of a variety will be gauged largely by the number of pounds of whole meats a bushel, or a given number of pounds, will produce. I would therefore place prolific bearing and cracking qualities as the two most important points to be considered in selecting a variety worthy of planting.

Crop Records

In considering crop records of the different northern varieties; we have no grafted or budded trees old enough as yet from which to make comparisons, and in considering the crops of the original trees it is well to keep in mind that many of these trees are located in the native forest without cultivation, without proper sunlight and with a poor chance for the full development of the tree; also it is well to remember that scarcely two trees have the same surroundings and conditions, and that it is not often that the owner is able to secure the entire crop from any one tree, being located in the forest where a large part of the crop is carried off by others. With these conditions it is often impossible to tell what a certain tree may yield, except by comparison with former crops. In giving you these yields I am giving my own knowledge so far as I can, and then information and estimates from the most reliable sources at my command.

Indiana

This variety is perhaps the best known (owing largely to its name), and has not failed to produce at least a partial crop annually for the past fifteen years. Since it has been under close observation, which has been about seven to eight years, it has usually borne from 100 to 300 pounds. Often a large part of the crop has been stolen. Crop 1912 about 200 pounds; 1913, 250 pounds; 1914, I am confident would have been 300 pounds. The owner secured 125 pounds; balance carried off by others. This year, 1915, is almost a failure; just a light sprinkling of nuts; was full of blooms but owing to heavy cold rain, failed to pollenize. The tree is located in a cultivated field, circumference of tree is 5 feet, height about 60 feet, spread 50 to 60 feet.

Busseron

This is almost identical with Indiana, and the owner tells me has borne as many as seven bushels to twelve bushels at a single crop. The tree being very tall, the entire top was cut out of it a few years ago and it is just now commencing to bear again. The lower limbs, however, of older wood that were left, have borne annual crops. In the nursery this variety has shown a tendency to very early bearing; most one year trees, spring 1914, set full of catkins, and one tree produced 16 well-developed nuts. These, however, dropped during the extreme drouth of August. The past spring most Busseron trees in the nursery again set full of catkins and at the present time we have one tree, coming two years old from bud, bearing one nut that is full grown and looks as though it would mature during the next thirty days.

Several other varieties have set full of catkins in the nursery row but have not developed any pistillate blossoms. The Busseron has furnished much propagating wood and at the present time there are, perhaps, more trees growing in the nurseries of this than of any other northern variety. Crop of 1915 promises to be fairly good.

Niblack

Crop of 1912, 100 pounds; crop 1913, about 50 pounds; crop 1914, 225 pounds; crop 1915, I would estimate at 100 pounds. This tree is very deceiving; the top is rather open and the nuts are usually scattered all through. The crop of 1914 was not considered heavy until after it was gathered. The past spring this tree bloomed very full, but owing to wet, cold weather when in full bloom did not set well. Size of tree 18 to 20 inches in diameter; 50 to 60 feet high with 40 feet spread, and is located in a cultivated field.

Posey

Crop of 1914 was 125 pounds saved; this tree is about the same size as the Niblack, located in the edge of a cornfield near heavy timber, being far from any house. A large part of the crop is often stolen; the crops of 1911 and 1912 were not so heavy, perhaps 50 to 75 pounds. It usually bears a fair crop, however, but I do not consider it a heavy cropper like the Indiana or Niblack. Its large size and splendid cracking qualities, however, will make it a popular variety and it may prove to bear much better on budded trees under cultivation.

Butterick

This giant tree stands out in the open field, measures 14 feet in circumference, 90 feet spread and perhaps 100 feet high, and usually bears from 5 to 7 bushels. The owner tells me he has owned this tree for forty-four years and that it has not missed more than two or three crops during that time and that the former owner told him he owned the tree for fifty years and that it was a good sized tree when he bought the farm and bearing regular crops.

Major

Crop 1912, 160 pounds saved, and from what information I can get this tree usually bears 100 pounds or more; tree about 3 feet in diameter, 120 feet high and 60 feet to first limb. Owing to its height and size it is very hard to get much of an estimate in regard to the crop it may carry until after it is gathered. Being located in the dense forest a large part of the crop is often carried off.

Greenriver

Tree is located in the same grove with the Major, is about 3 feet in diameter, 35 feet to first limb, crop 1912 reported 260 pounds and has not missed a crop in twelve years. Have had no report for 1915.

Kentucky

Crop 1912, 4½ bushels; since that has borne good crops, but do not know the exact amount, but fair crop this year. The owner says it has only missed two crops in twenty years.

Warrick

This tree bears very regularly, but owing to the fact that it has been cut so severely for propagating wood has not made any heavy yields the past few years. The old wood has heavy crop this season.

This practically covers the named list of varieties for the Indiana pecan belt. I might say, however, that most of the native trees are bearing a very good crop of pecans this season in our country.

Observations on Propagated Trees

The Busseron has shown a stronger tendency to early bearing than any other variety. The Major and Greenriver seem to be the best growers in the nursery, with very heavy foliage. The Posey makes a very stocky tree but seems to be one of the most difficult to propagate.

Southern Varieties

The summer of 1914 we had the Stuart, Delmas and Schley. The first killing frost was a severe cold snap; mercury dropped to 10 above zero, November 22d. Foliage on these perfectly green as well as the nuts. The Stuart seemed to have about matured fruit although foliage was green. Husk on nuts had burst open ready to drop. The fruit which looked to be ripe, however, when cracked, the kernel looked plump, but when cut open was found pithy and more like a piece of cork.

Stuart tree bearing this season nuts at present, September 1st, only half grown, while Busseron alongside in nursery row is full size. The northern varieties usually mature ready to gather October 1st; the Indianas in the jar on the table were gathered September 28th last year.

High Land versus Low Land. Pecans in High Land

There have been a number of articles written by men well posted claiming that the pecan will not bear or thrive except on the cultivated bottom lands of our valleys and streams. The writer wishes to disprove this erroneous idea. It is not borne out by facts. On the farm of W. J. Coan of Bruceville, Knox County, Ind., there are a number of pecans planted from ten to fifteen years ago. Part of these trees are on bottom land and part on high land. This high land is heavy clay underlaid with considerable hardpan. The writer visited these trees two weeks ago and has photographs showing four trees in a group that were planted fifteen years ago that have borne

for the past six years, each crop getting better. At the present time I would judge they are bearing at least one bushel to the tree. A single tree in the barnyard has not made the growth owing to the compact soil around it. However, it has borne quite heavily, commenced bearing at nine years of age from seed. The trees on the bottom land are not as large and have not borne half as many nuts as the ones planted on high land. This is Mr. Coan's report and he says that were he planting again he would plant entirely on high ground. The trees shown in these photographs are located on perhaps the highest elevation in Knox County, Ind. There are a number of other trees near the writer's home planted on high land 150 feet above the river, back from three to six miles, that are large trees, measuring 18 to 24 inches in diameter and bearing regular crops. Heavy clay land seems to push a stronger and more vigorous growth than does the more loamy, darker soil. I submit here a number of photographs taken August 10 of pecan trees in the nursery row, budded one year ago, showing a growth of from 4 to 6 feet, many of them 5 to 7 feet and some 8 feet high and still growing rapidly. These were budded on four-year-old pecans.

Propagation

We have tried all known methods of propagating the pecan with varied results; one of the methods you do not want to try is the Edwards method. While it may be a success in Texas, where it originated, it is a miserable failure in the North. Grafting above ground is done after the sap is well up, and gives fair results. However, best results have been obtained by the patch bud method on seedlings three to four years old. Good strong seedlings, well-ripened buds cut from the scion orchard or from trees two years old in the nursery have given best results—in some cases, as high as 85 per cent stand the past season.

MR. JONES: Mr. Rush had a Stuart bearing last year in south-eastern Pennsylvania. The nuts were not very large but they matured fairly well. I am more encouraged than ever that the Indiana variety will be safe for use in Pennsylvania.

MR. REED: I think that if the Stuart bloomed as early as the others it would be all right, but it is about two weeks later.

MR. LITTLEPAGE: I don't believe in the Stuart very much: I have better pecans myself, hardy in the north.

THE PRESIDENT: I wish to corroborate Mr. Reed's point about the success of the pecan on high land. One man is, I believe, responsible for that widely circulated statement that the pecan will grow only on alluvial land. I have travelled a thousand miles in investigating that fact, and found it a fallacy. Some of the biggest pecan trees I have ever seen were growing at 900 feet elevation down in Georgia. This was on clay hills. I have seen the same thing in Raleigh. That alluvial soil business is a hoax.

This ends the intellectual side of our program.

Business meeting.

Meeting adjourned *sine die* at 10 P. M.

WALNUT OBSERVATIONS IN CALIFORNIA^[3]

L. D. BATCHELOR, UNIVERSITY OF CALIFORNIA, CITRUS
EXPERIMENT STATION, RIVERSIDE, CALIFORNIA.

The walnut industry of California is just entering a transition period from the planting of seedling groves to the established plantings of grafted trees. Just as other seedling fruit trees, such as the orange, apple, peach, almond, etc., have been eliminated, so too, the seedling walnut groves of California seem doomed to be replaced by clonal varieties. In many ways this industry is as much in its infancy as the apple industry of New York was sixty-five years ago, when varieties first began to be propagated in a commercial way by grafting and budding. This readjustment in the walnut industry is well started, and, although it is likely to be gradual in its evolution, and wisely so, the change seems nevertheless certain. There are but a very few seedling trees for sale at the present time by the progressive nurseries, and, in fact, only a very few such trees have been set out in groves during the past four or five years. The demand for grafted trees has been brought about largely by the wide range of variation in walnut seedlings as regards their productivity, commercial value of the nuts, season of harvest and ability of the trees to resist the walnut blight.

In view of the very recent propagation of the walnut by grafting, which has extended over only about ten to twelve years, it is reasonable to expect that the majority of the varieties thus propagated so early in the development of the industry are only partially suited to the needs of the walnut grower. The nuts from many of these grafted varieties fall considerably short of the commercial standard for high-grade walnuts. Some of the heaviest-bearing sorts, such as the Chase, Prolific and El Monte, produce nuts that cannot be sold in the very best grade of the commercial product. On the other hand, the Placentia, which produces one of the most nearly

ideal commercial nuts, is not a heavy-producing variety, especially in the northern walnut sections, and is quite as susceptible to walnut blight as the average seedling tree. Again, the Eureka variety, which seems to successfully avoid the walnut blight during many seasons by its lateness in coming into bloom, is a very moderately yielding variety in the southern sections. The above examples are only a few of many that might be cited to show the short-comings of most of the varieties of walnuts now being propagated.

The wide range of climatic and soil conditions makes the eventual propagation of quite a large number of varieties inevitable. While the coast regions are bathed in fog nearly every morning during the growing season, the inland valleys experience an extremely dry climate with high maximum temperatures. Walnuts are being grown at the present time on soil types varying from the extremes of sand to heavy clay loams. Many of the future varieties must be especially adapted to some one of these particular environments if they are to stand the test of time.

Many of the present seedling groves are of uncertain origin and represent greatly varying values. No doubt some of these groves are the progeny of especially selected trees known to have considerable merit. On the other hand, it is very apparent that many of them are the result of a great demand for seedling trees when the industry was in its infancy twenty or thirty years ago. At that time without doubt, great quantities of walnuts were planted without due regard for their parentage. Again, there is a wide range of variability among the individual trees of any grove, as variations in type of tree, blooming season, character of foliage, resistance to disease, productivity and character of the nuts.

Type of Tree

The tree types vary from the upright, sturdy individual to the more or less spreading, weeping types which droop nearly to the ground under the burden of the crop. The upright, vigorous growing type is well exemplified in the Eureka. On the other hand, such varieties as the Prolific have a spreading, bushy habit and an almost semi-dwarfness characterizes their growth.

Blooming Season

It is not unusual to find the blooming season in an ordinary seedling grove extending over a period of from a month to six weeks. A few individual trees leaf out and blossom with the first signs of spring. Then the great majority of the trees in the grove come out in full leaf. But there are frequently trees still leafless after the nuts on the early individuals are of the size of a marble. This variation in the blooming season has considerable economic importance in relation to the harvesting and marketing of the nuts as well as the avoidance of diseases and frost which may be more prevalent during certain periods in the spring.

Foliage Characteristics

The character of the foliage varies from the broad-leaved types, whose foliage somewhat resembles that of the horse-chestnut, to the narrow-leaved varieties whose leaves have a tendency to curl up like the foliage of the Winesap apple. The broad-leaved types are much more densely foliated and this factor has considerable bearing on the problems of sun-scald on the twigs and trunks of the tree and the exposure of the nuts to this injury. For this reason, the densely foliated varieties may prove best adapted to the inland valleys, where the difficulties of sun-scald are most prevalent. The more sparsely foliated types often appear to have less blight on the nuts and leaves because of their exposure to the sunshine.

Disease Resistance

Probably one of the most important limiting factors in walnut production in California, and especially in the older walnut sections, is the bacterial disease commonly known as walnut blight. The inroads of this disease have caused a very heavy dropping of the nuts during many seasons of the past, and although a great deal of time and scientific effort has been devoted to the control of the trouble, there is no satisfactory known means for the prevention of walnut blight at the present time.

It is a well-known fact that in the vegetable kingdom closely related species suffer in different degrees from the attacks of the same parasite. This difference in resistance is often as marked among different varieties of the same species as between the species themselves. The absence of blight is not necessarily an indication of immunity. There is a great deal of difference in the amount of blight prevalent at the present season in the different walnut growing sections. Again, the immunity from blight of a particular tree for one season may be followed by more or less prevalency of blight on the same tree the next season. The degree of resistance must be tested out through a number of years before any variety can be pronounced resistant to this disease. The observations must also be carried out in different localities as certain varieties seem to behave differently on different soils and when growing under different climatic conditions.

Some varieties seem to avoid the blight the majority of the seasons but really have little or no resistant qualities when the seasonal conditions and the growth of the plant happen to coincide with the most favorable time for the spread of the disease. An example of this is seen in the Eureka variety the present season. While this variety has maintained a reputation during a majority of seasons for freedom from blight, during the present year the Eureka is badly diseased in certain sections of Orange County. This may, perhaps, be explained by the prevalence of damp, cloudy weather for about a week or ten days during the first of May when this variety was in full bloom. In one grove under observation the trees were thought to have lost at least 50 per cent of

their blossoms soon after blooming. At the present time on these same trees, 32 per cent of the nuts are afflicted with more or less blight. To be sure, some of these will likely mature, but the appearance of blight on nearly one third of the crop shows that this variety has very little resistant power against walnut blight. Its freedom from disease in the past has no doubt been due largely to its dormancy during the most favorable weather conditions for the spread of blight.

The field for the selection of blight resistant varieties must necessarily be in the badly blighted sections. A tree with only 10 per cent blighted nuts in an orchard having an average of 70 per cent to 80 per cent may really be more resistant to blight than a variety which appears to be positively free from the disease when growing among trees which are only 15 per cent to 20 per cent blighted. In making observations and selections, therefore, it is quite as important to know the amount of blight on the surrounding trees and the grove, as a whole, as it is to know the prevalence of blight on the selected individual. The extreme variation of different seedling trees in their susceptibility to this disease is well illustrated in some of the following observations which were made the present year. The percentages which follow the varieties named were determined by counting at least 100 nuts on a tree just before the blighted nuts began to drop. In a seedling grove in the Whittier district about 300 trees were examined and 100 nuts counted on each tree. The individual trees varied from 2 per cent to 85 per cent blighted nuts, while the grove as a whole averaged 25 per cent. There were at least a dozen or fifteen trees in this grove which were blighted less than 10 per cent, although some of the nearby trees were blighted as high as 60 per cent or 70 per cent.

Another seedling grove in Orange County which was counted in the same way, averaged 47 per cent blighted nuts during the second week in June. In making this determination 105 trees were examined. In this same grove, there were, however, at least three trees which averaged less than 6 per cent blighted nuts.

It is interesting to know that the Placentia variety, growing within a stone's throw of the aforementioned seedling grove and under identical cultural conditions, was blighted to the extent of 71.9 per cent on the same date.

Observations of the Prolific (Ware's) in the vicinity of the above mentioned grove, showed less than 1 per cent blighted nuts on the trees and practically none of the nuts have dropped to the ground at the present time, yet in the past this variety has not had a reputation for disease immunity. The original Chase tree was observed during this time and showed a percentage of 37 per cent blighted nuts. These examples are given neither in support of any particular variety nor to discredit others, but are noted merely to call attention to the wide variation, and this variation is a great source of encouragement in our endeavors to produce a disease resistant variety.

Of course blight immunity is not the only factor to be considered in selecting a variety of walnut. A profitable yield of good commercial nuts is the real test of the superiority of any variety. A very heavy yielding tree with a small amount of blight may prove more profitable than a light yielding variety that is totally immune to this disease.

The production of a medium grade nut which would grade only as a seedling No 1, might prove more profitable if the tree is at least partially blight immune than the production of such a high grade nut as the Placentia with its susceptibility to blight. These things must be considered and weighed carefully by the growers who are planting walnuts in the blight sections. The various areas where walnut blight is not a factor might profitably sacrifice heavy production to superior quality.

From our present knowledge it is very apparent that the disease resistance of individual trees varies considerably from year to year and under different soil and climatic conditions. The thorough testing of resistant varieties will require considerable time.

Nut Characteristics

The character of the nuts is as variable as the trees themselves, not only in the exterior appearance, but in the character of the meats as well. The ideal commercial nut should be of medium size, about one and one-eighth to one and one-half inches in diameter, of regular oval form somewhat elongated, with smooth surface, and light brown color, and uniform for these characters. The cracking quality of the nuts is quite as important as their exterior appearance. The nuts should be well sealed so they will not crack open in shipping. The shells should be thin but strong, so the nut may be easily opened and the whole meat taken out intact. The pellicle surrounding the kernel should be light tan colored or silvery brown with a glossy waxed appearance attractive to look upon. The meat should be smooth, and plump, averaging 50 per cent or more of the total weight of the nut, and with a mild, pleasant flavor, free from any astringency.

The shells vary all the way from extremely rough and unattractive specimens to the smooth commercial type, as the Placentia, while the color of the meats varies from dark brown to nearly white, and so on through the other characteristics mentioned.

In the selection of varieties the walnut breeder is exceptionally favored by the occurrence of large areas of seedling trees. According to the 1910 census there were in the neighborhood of one and a quarter million seedling trees growing in California. With this almost unlimited material for selective use, it seems indeed reasonable that many varieties will be selected in the future which are better adapted to the demands of the industry than some of those now being propagated. By means of hybridizing methods it is also hoped that some of the desirable unit

characters of the varieties now in cultivation may be recombined into more nearly ideal varieties for future generations. The fact that walnut breeding is necessarily a long-termed, expensive problem has made it rather unattractive to the practical breeders. Such work will depend largely upon public or specially endowed institutions for its support.

PRUNING THE PERSIAN WALNUT

J. G. RUSH, WEST WILLOW, PA.

Pruning is as old as horticulture itself, but the Persian walnut has escaped this treatment thus far. Practical experience, however, in growing these trees for fruiting, shows the great importance of systematic pruning. It is a common occurrence to see a young tree with straggling and irregular growths. Very frequently we see that growth takes place on part of the tree only, leaving the other part undeveloped, which would throw the tree very much out of balance in course of time. Pruning should begin early in the life of the young tree and as soon as it leaves the nursery the pruning shears should be in evidence.

There are two important objects in view in proper and systematic pruning. First is form, with a well balanced head. Second, to increase productiveness by having more lateral branches properly distributed all over the tree. As a matter of course productiveness will follow.

It is a singular fact that a misfortune can sometimes develop into a blessing. Last year, 1914, was an unfortunate one in that an early and late drouth caused poor bud development, and, of course, they were not in a condition to withstand our usual winter weather.

In the spring of 1915, as soon as bud development took place, I commenced to prune. I cut off all weak branches to a strong bud and sometimes went over the trees a second time in order to insure that the work should be well done. These trees referred to are mostly three years old and at that age the pruning should be done very systematically.

It is a mistake to have a tree three or four years old in bearing. You will have branches from 2 to 4 feet long without any laterals, quite differently from other fruits, as the apple, peach, pear, etc. If these long branches are allowed to remain you will find that the terminal buds will develop nuts and weigh down the branch. But with proper management the life and productiveness of the tree can be improved by pruning. A branch 3 or 4 feet long should be cut back one half. Of course great care must be taken where the cut is made, for the future welfare of the tree.

I have a very fine five-year-old Hall variety on my side lawn that shows the neglect of proper pruning at the right time. The branches are entirely too long and drooping. In order to overcome this defect I will have to cut back to two-year-old wood and force the dormant buds for the future tree.

There is another great advantage in the proper method of pruning the young Persian, that is, that the finest kind of bud wood becomes available.

You will please remember that in pruning the walnut we are not pruning for color as with other fruits.

The tree should be as round headed as a Norway maple, and if some of the limbs should show indications of weakness by crowding then cut them out for the benefit of others close by.

REPORT ON NUT GROWING IN CANADA

G. H. CORSAN, TORONTO

Not being able to meet with you this September, as I have to go down to the State of Mississippi, I send this paper to your president whose paper on the Garden of Eden we all read in the *Country Gentlemen* of July 7, and so much admired.

Progress has not been made on my place sufficient to warrant my inviting you to Toronto next convention, but I will say that the year after next I will certainly have something worth seeing. But Dr. J. H. Kellogg of Battle Creek, Mich., extends an invitation to you to hold the next convention at the Battle Creek Sanitarium where nuts and nut preparations are used exclusively in the place of meat and fish and fowl. Here at Battle Creek on Dr. Kellogg's private grounds and on the Sanitarium grounds may be seen Colonel Sober's Paragon chestnuts, Mr. Pomeroy's English walnuts and Mr. Reed's grafted pecans, as well as some grafted persimmons of named varieties. In my statement in the *American Nut Journal* last May or June I mentioned that all the grafted persimmons sent from Washington were winter-killed. I find on returning in August that the Early Golden is very much alive. Twelve other varieties have been planted to see what this winter will do to them. The persimmon is exceedingly interesting to us northern nut growers because where it will succeed the pecan will also, without a doubt. Now I also find that my

statement in the same paper that the grafted pecans sent by Mr. Reed were winter-killed was an error, as only certain trees failed to grow above the graft. Those that are growing are the Major, Busseron and Indiana, the Busseron showing most decidedly better than the Indiana, both here and at Toronto. All pecans lived, both here and at Toronto, if I include those that sprung up below the graft. Out of thirteen varieties that I experimented with at Toronto, Major, Posey and Niblack were the only ones that lived well above the graft and showed no winter-killing. Others were more or less winter-killed. Kentucky, Mantura, Appomattox, Luce and Greenriver showed no desire to live in the north. Mr. Pomeroy's English walnuts showed a most distinct dislike for Toronto, but all forty-eight are doing well here and are being cared for.

Colonel Sober's Paragon chestnuts showed the most determined attempt to not grow the Paragon part of the tree, and an equally determined mind to grow good and strong below the Paragon part—may this part yield good trees! I have three or four Paragons left out of 135 trees. Pecans grew as many as four feet both here and at Toronto this summer.

Of the new trees sent from Washington two specimens of *Castanea Crenata* (from the north Island of Japan), six specimens of *Castanea Mollissima* (almost blight proof, from north China) all are thriving.

Juglans regia sinensis lived to the tip through the winter and budded out strong from the top, as did *J. cordiformis*—may it always be so.

Re Dr. Deming's question as to the farthestmost northern pecans I said Charles City, Iowa. Now these forty trees were planted twenty years ago and are all alive and yield crops, but the nuts are small as they are seedlings. Write Mr. Charles D. Patten *re* how his trees are doing and their history. He has been asking Mr. Reed for scions of better trees.

I have five types of soil to grow my trees in, stiff clay, rich gravel, quicksand and humus, light sand and silt or bottom land, well drained. I have no sour, undrained spot on my fifteen acres.

APPENDIX

PRESENT AT THE SIXTH ANNUAL MEETING OF THE NORTHERN NUT GROWERS ASSOCIATION

Henry T. Brown, Rochester
Mrs. McLean, Rochester
Rev. A. C. Crapsey, Rochester
Prof. Fairchild, University Rochester
Chas. E. Bunnell, Rochester
S. W. Taylor, Stamford, Conn.
Herbert E. Ingram, 432 4th Ave., New York
Dr. J. W. Jackson, Dansville, N. Y.
Martha Rush, New Providence, Lancaster Co., Pa.
Edna Mylin, Willow St., Pa.
Paul White, Boonville, Ind.
J. G. Rush, West Willow, Pa.
J. F. Jones, Lancaster, Pa.
John S. Parish, Eastham, Va.
Thos. P. Littlepage, Washington, D. C.
Dr. and Mrs. Wm. C. Deming, Georgetown, Conn.
Ralph T. Olcott, Rochester
Dr. Robt. T. Morris, New York City
Dean Baker, Syracuse, N. Y.
E. R. Angst, Wilmington, Del.
H. L. Grubbs, Fairview, Pa.
M. E. Wile, Rochester
Harry R. Weber, Cincinnati, Ohio
Frank A. Bailey, Rochester
E. E. Streeter, Rochester
C. K. Sober, Lewisburg, Pa.
W. C. Reed, Vincennes, Ind.
M. P. Reed, Vincennes, Ind.
Dr. J. Russell Smith, Swarthmore, Pa.
Mr. and Mrs. C. A. Reed, Washington, D. C.
Carl J. Poll, Danville, Ill.
Walter C. Teter, New York City
Jas. S. McGlennon, Rochester
Conrad Vollertsen, Rochester
H. L. Reynolds, Canandaigua, N. Y.
Prof. and Mrs. F. N. Fagan, State College, Pa.
Jas. Rissew, Macedon, N. Y.
J. C. South, Rochester

R. L. Fitzgerald, Rochester
H. M. Brown, Fairport, N. Y.
Nellie Doty Butts, Barnards, N. Y.
H. Goodall, Spencerport, N. Y.
John Rick, Reading, Pa.
W. A. H. Reider, Reading, Pa.
Adelbert Thompson, East Avon, N.Y.
Mr. and Mrs. A. C. Pomeroy, Lockport, N. Y.
Daniel Pomeroy, Lockport, N. Y.
Howard Pomeroy, Lockport, N. Y.
C. C. Laney, Rochester, N. Y.
John Dunbar, Rochester, N. Y.
E. B. Holden, Hilton, N. Y.
Mr. and Mrs. B. S. Abrams, Charlotte, N. Y.
Henry Hohener, Rochester, N.Y.
Dr. Charles Forbes, Brick Church Institute, Rochester, N. Y.

PROGRAM FOR AUTOMOBILE TRIPS SEPTEMBER

1ST AND 2D, 1915

The program below is intended as a guide only. It may be necessary on account of conditions to vary this. It is therefore highly important that all automobiles follow one another along the lines later designated in this sheet.

On the afternoons of September 1st and 2d, we propose to drive in automobiles to the various trees of interest in the immediate neighborhood of Rochester. The limit of the trip on September 1st will be Hilton, N. Y. The present plan is to visit the trees in the following order:

- 1—230 Saratoga Avenue, Persian Walnut seedling;
- 2—Kramer, Emerson Street and Lake Avenue, Persian Walnut (This is the parent tree of the Thompson Grove seedlings at East Avon, N. Y.);
- 3—Riverside Cemetery, Hybrid Hickory Laneyii (tree named after Mr. Calvin C. Laney, Superintendent of Parks, Rochester, N. Y., by Dr. Sargeant of the Arnold Arboretum);
- 4—Westgate farm, Stone Road, Persian Walnut seedlings and filberts (nuts for the seedling trees and filbert bushes imported from England);
- 5—W. H. Anderson and Wm. Twitchill, Ridge Road, seedling Walnut (of these one tree 105 years old);
- 6—Hilton, N. Y., Holden trees, from which the Holden Walnuts originated;
- 7—McGlennon Nursery, Denise Road, filbert plantings, two years old;
- 8—Clifford Avenue, between St. Paul Street and Clinton Avenue North, seedling Walnuts;
- 9—Spiegel Park, seedling Walnuts;
- 10—Culver Road and Parsells Avenue, Hybrid Walnut and Butternuts.

(End of trip September 1st, 1915)

September 2d, 1915

- 1—Gregory Street, McGlennon Nursery, filberts; 2—Highland Park, Hazel; 3—West Brighton, Mrs. W. J. Miller, seedling Walnuts; 4—Golah, N. Y., King Nut Hickory; 5—Seedling Walnut grove, Adelbert Thompson, East Avon, N. Y.

All automobiles intended to convey members of the Association will have a sign "Northern Nut Growers Association." All cars will follow a pilot car, which will be plainly marked. There will be one relief car, which will be plainly marked, and will carry no passengers except in emergency. In the event of any break-down in an automobile, the emergency car will immediately pick up the passengers of the one delayed, and transfer its sign to the delayed car. The delayed car, after repairs, will act as a relief car in its place.

The start of both trips will be made from Powers Hotel at 1:45 P. M. All members are requested to be on hand promptly, as the several stops will consume considerable time. Unless delay in starting is provided against, the trip may be prolonged beyond a comfortable limit.

Local Committee

Ralph T. Olcott
Supt. C. C. Laney, Park Dept.

Asst. Supt. John Dunbar, Park Dept.
M. E. Wile
Mrs. W. D. Ellwanger
James S. McGlennon
W. Robert Bruce
John Hall, Secy. W.N.Y. Hort. Soc.

EXHIBITS

Corylus cornuta	Beaked Hazel	Branch	Dr. R. T. Morris
Corylus avellana	European Hazel	Stem showing blight	Dr. R. T. Morris
Corylus colurna	Byzantine Hazel	Branch	Dr. R. T. Morris
Corylus avellana	Purple Variety	Branch	Dr. R. T. Morris
Corylus pontica	Pontine Hazel	Branch	Dr. R. T. Morris
Corylus avellana	Var. Barcelona	Branch	J. G. Rush
Corylus americana	Var. Rush	Branch	J. G. Rush
	Long Hazel		Joseph Risseu, Walworth, N.Y.
	Round Hazel		Joseph Risseu, Walworth, N.Y.
Hicoria ovata	Var. Taylor	Nuts	Dr. R. T. Morris
Hicoria ovata	Var. LeFevre	Nuts	J. G. Rush
Hicoria ovata	Plate	Nuts	Miss Ruth N. Reeves Newark, N.Y.
Juglans regia	Var. Alpine		Miss Ruth N. Reeves, Newark, N.Y.
Juglans regia	Var. Nebo		Miss Ruth N. Reeves, Newark, N.Y.
	Rush		Miss Ruth N. Reeves, Newark, N.Y.
	Hall		Miss Ruth N. Reeves, Newark, N.Y.
Juglans hybrid	supposed J. regia X cinerea		Miss Ruth N. Reeves, Newark, N.Y.
Juglans regia	Var. Holden spec.		E. B. Holden, Hilton, N.Y.
Juglans cathayensis		Foliage	Park Board, Rochester
Juglans rupestris		2 clusters, 4 nuts each and foliage	Park Board, Rochester
Juglans sieboldiana		cluster 7 nuts and foliage	Park Board, Rochester
Pteryocarya stenoptera	False Walnut	Foliage	Park Board, Rochester
Castanea sativa	Var. Paragon	Branch with one very large bur	J. S. Parish, Eastham, Va.
Castanea pumila	Common chinquapin	Branch with cluster of nuts	Dr. R. T. Morris
Castanea pumila	Southwestern chinquapin	Branch with nuts	Dr. R. T. Morris
	Panel with general collection of pecans, hickory nuts and walnuts, W. C. Reed, Vincennes, Ind.		
Juglans nigra	Var. Rush	Nuts	J. G. Rush
Juglans regia		Branch	Mrs. B. S. Abrams, Latta Farm, Charlotte, N.Y.

RESOLUTIONS

PASSED BY THE NORTHERN NUT GROWERS ASSOCIATION IN
SESSION AT ROCHESTER, N. Y., SEPTEMBER 1 AND 2, 1915

No chestnut stock should go out unless it is thoroughly sterilized by some satisfactory method and tagged by proper authority to show that fact.

States that are still clear of the blight are advised that effective quarantine is desirable to delay, for a time at least, the spread of the blight. Four infestations of chestnut blight have been found in Indiana in July and August, 1915. This fact, and the continued spread of this fatal fungus, are some of the reasons for this recommendation.

Nut trees may and do sometimes come fairly true to type but they do not come true to variety. Consequently our association does not approve of the sale of seedling trees under variety names; and this association further recommends to all journals that they take no advertisements for nut trees if such trees are not sold under conditions that clearly comply with the provisions of this resolution.

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FOOTNOTES

- [1] Bulletin No. 231 by Prof. Ralph E. Smith of the University of California, is authority for this history of walnut introduction into that state.
- [2] G. Harold Powell, Bull. XLII, Delaware Agricultural Experiment Station, 1898.
- [3] Paper No. 21, Citrus Experiment Station, College of Agriculture, University of California, Riverside, California.

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