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Proceedings at the Eleventh Annual Meeting

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\*\*\* START OF THE PROJECT GUTENBERG EBOOK NORTHERN NUT GROWERS ASSOCIATION  
REPORT OF THE PROCEEDINGS AT THE ELEVENTH 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  
ELEVENTH ANNUAL MEETING  
WASHINGTON D. C.  
OCTOBER 7 AND 8,  
1920**

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## OFFICERS OF THE ASSOCIATION

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Weaver, William S., McCungie  
Wilhelm, Dr. Edward A., Clarion  
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SOUTH CAROLINA

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TEXAS

Burkett, J. H., Nut Specialist, State Department of Agriculture, Clyde  
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WASHINGTON

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WEST VIRGINIA

Brooks, Fred E., French Creek

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Lang, Robert B., Racine, Box 103  
Patchen, Dr. G. W., Manitowoc

\* **Life member.**  
+ **Honorary member.**

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## 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 nutbearing 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, a secretary and a treasurer, who shall be elected by ballot at the annual meeting; and an executive committee of six persons, of which the president, the two last retiring presidents, the vice-president, the secretary and the 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.

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### ARTICLE VII

*Quorum.* Ten members of the association shall constitute a quorum, but must include two of the four 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.

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# 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 either with the first day of the calendar quarter following the date of joining the Association, or with the first day of the calendar quarter preceding that date as may be arranged between the new member and the Treasurer.

## ARTICLE IV

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

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# PROCEEDINGS AT THE ELEVENTH ANNUAL CONVENTION OF THE NORTHERN NUT GROWERS ASSOCIATION

Washington D. C. October 7 and 8 1920

The Association was called to order at 10 a. m. Thursday October 7th by the President, Hon. William S. Linton, of Saginaw, Michigan, in the auditorium of the New National Museum.

THE PRESIDENT: It has been something of an effort for me to reach here at ten o'clock in order to meet the obligations of the program as it was only a few days ago that I was in lower California very near the Pacific Ocean in old Mexico. As I turned about to come back toward the East the thought came into my mind that I must be in Washington D. C. at the annual meeting of the Northern Nut Growers Association at ten o'clock on Thursday morning October 7. Traveling over three thousand miles I was fortunate enough to get here just two minutes before the ten o'clock hour so the connections you will see were close. The paper that your president is to present comes at a later place on the program so we will proceed with the business session at once. The first thing on the program is the report of the Secretary and Treasurer.

## RECEIPTS

	Dec. 1, 1919 to Dec. 31, 1919	Jan. 1, 1920 to Sep. 30, 1920	Total	Balance
Balance on hand date of last report, Dec. 1, 1919:				
Special hickory prize \$25.00,				\$156.53
Life membership \$25.00, For regular expenses \$106.53				
From annual members including joint subscription to the American Nut Journal	\$ 25.25	\$368.10	\$393.35	
From annual members including joint subscription to the American Nut Journal	\$ 25.25	\$368.10 9.00 25.00	\$393.35 9.00 25.00	
Reports				
Contributions for prizes:		25.00	25.00	
Contribution for special hickory prize		57.60	57.60	
Bulletin No. 5				

\$ 25.25      \$484.70      \$509.95      509.95

—  
\$666.48

**EXPENDITURES**

American Nut Journal, their portion of joint subscriptions	\$ 22.00	\$ 98.00	\$120.00	
1919 Convention	8.75	137.68	146.43	
Printing Bulletin No. 5		63.50	63.50	
Clasp envelopes for Bulletin No. 5 and for reports		30.20	30.20	
Stationery, printing and supplies		116.45	116.45	
Postage, express, etc.		46.04	46.04	
Prizes 1919 contest (not all sent out before Oct. 1)		13.00	13.00	
Special hickory prize Eugene J. Clark, Ludlow, Mass.		25.00	25.00	
Advertising 1920 Nut Contest (not all paid before Oct. 1)		30.60	30.60	
Advertising 1920 Nut Contest (not all paid before Oct. 1)		30.60	30.60	
	—	—	—	
	\$ 30.75	\$560.47	\$591.22	591.22
	\$ 30.75	\$560.47	\$591.22	
Balance on hand Oct. 1, 1920				591.22
Special hickory prize				25.00
Life membership				25.00
For regular expenses				25.26
				—
				\$666.48

Verified by [Pg 14]

C. P. CLOSE,  
C. A. REED,  
Auditing Committee.

The above are records of receipts and expenditures for 10 months and are about 82% of those for the period covered by the previous report, 2 years 3 months. There has been an earnest attempt to carry on the work of the Secretary-Treasurer in a more aggressive manner than before. A bulletin aiming to give up to date information on nut growing, Bulletin No. 5, has been issued and has gone well. While it has been sold, no attempt has been made to make money on it but simply to make it pay its way and apparently it is going to do that and assist in spreading information about the work of the Association.

Sixty-six new members have joined the Association since the date of the last meeting, making 476 since organization, of which we have 199, and of whom 277 have dropped out. A few former members have joined since the date of the last report which apparently accounts for the strange fact that increase in membership (128 to 199) is greater than the number of new members.

Following out the plan outlined at the Battle Creek Convention, the work of the Secretary-Treasurer has begun to be divided, the undersigned taking the duties of Treasurer and the Nut Contests and Dr. Deming taking the Conventions and the work of the Secretary proper until the expected action of the present convention shall formally divide the work of the Secretary-Treasurer and create the offices of Secretary and Treasurer.

Respectfully submitted,

WILLARD G. BIXBY,  
Secretary-Treasurer.

THE PRESIDENT: This is a very good report, complete in every detail, and unless other action is desired, it will be received and recorded in the minutes of the meeting.

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Mr. Reed, you are chairman of the committee that had in charge the tree-planting bill in order that it might be made uniform throughout the country. Have you a report to make?

MR. REED: Mr. President, the committee members have been over that individually but have not had an opportunity to discuss it together. If a full report can be had a little later I think that would be more satisfactory. So far as I have been able to go into it the law seems to about cover the ground. I could not make any suggestions as to how it could be improved. I happen to know that the author of the bill, who is our president, has been called upon by several other states to discuss such a law for those states, and I think he is in the best position to tell us if there are any holes in it. If we can have the consent of the house we will defer a full report until we can discuss the matter with our president and with our committee as a whole.

THE PRESIDENT: We will take that course unless there are objections.

The communications received by the acting secretary will be filed and printed in the proceedings. If there are no vice-presidents present who are prepared to make reports that order will be passed. At this time should come the appointment of committees but I think it would be well to defer that business until we can consult as to the membership of the committees. The next in order will be some remarks by Mr. Littlepage about the proposed afternoon excursion.

THE ACTING SECRETARY: The speakers are Dr. Van Fleet, Mr. Littlepage and Professor Close. I have here the resume of Dr. Van Fleet and I think that it would be better perhaps to read the report of Dr. Van Fleet at once as it may have some bearing on the remarks of Mr. Littlepage and Professor Close.

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## CHESTNUT WORK AT BELL EXPERIMENT PLOT

DR. WALTER VAN FLEET, GLENDALE, MARYLAND

Our breeding work with chestnuts began as far back as 1894 when pistillate blooms of the Paragon variety, then a novelty just coming into use, were dusted with pollen from a native sweet chestnut bearing good-sized nuts. The Paragon stigma were protected from the influence of other pollen by bagging and gave a good set of fruits. The idea was to improve the quality of the Paragon nuts even at the expense of size. The resulting seedlings were grown at Little Silver, New Jersey, and rapidly ran up into good-sized trees, coming into bearing twelve years later. In fruit and tree characters they proved a complete blend of the parent species, the nuts being double the size of the wild parent and of sweet, rich quality. The trees were very shapely and bid fair to become extremely productive but a year or two later were all attacked by the dreaded blight or bark disease, then spreading from its original starting point in Long Island. The work of destruction was very rapid and by the third year all were hopelessly crippled, but a few individuals continued to send up suckers as late as 1916.

The success of this pollination experiment encouraged the writer to attempt breeding the dwarf early-bearing chinquapin with the large-fruited foreign varieties in the hope of securing hybrids with nuts of fair size and good quality that might come quickly into bearing. As the chinquapin does not naturally grow in Northern New Jersey, and plants were rarely offered by nurserymen, recourse was had to growing them from seed and a quantity of newly collected nuts were furnished by a friend in Washington in 1899. It required three years time to bring the seedlings into fruit and it was not until 1903 that a start was actually made in the work of hybridization. A selection was made of a compact dwarf bush that bore very sweet nuts of a good size for the species and gave promise, which was later fulfilled, of becoming very prolific. The male, or staminate tassels were carefully removed each day before maturity and, to ward off undesired foreign pollen, a cloth tent was used to cover the bush in addition to bagging many of the flowering branches. Pollen for crossing was secured from Paragon and Numbo, of the European species, and of several named varieties of Japan chestnut including Parry's Giant, Killen and Hale, and in addition a few blooms were intentionally fertilized with pollen from local sweet chestnut trees. Nearly one hundred hybrid seedlings resulted from the work in two succeeding seasons, some of which came into bearing in 1908, just as the *Endothia* blight began to invade New Jersey. The hybrids between the chinquapins and native and European chestnuts were quickly infected, but those with Japan varieties appeared far more resistant. All work with the susceptible native and Europeans ceased, but crosses with Japans and the Chinese chestnut, *Castanea Molissima*, have been continued until now there are over eight hundred in existence. In late years we have used the Southern creeping chinquapin, *C. alnifolia*, as a seed parent to some extent, as it appears more resistant than the common species, *C. pumila*, though it cannot be considered immune. The southern chinquapin is hardy in the North, bears good-sized, sweet nuts for its type, but is very late in ripening.

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The Rush chinquapin, and other large-fruited, tall growing varieties have also been used to some extent. The resulting hybrids make handsome trees of rapid growth and bear profuse crops of very attractive nuts, but are greatly injured by blight. As experience accumulated it was found that the extreme caution used in the earlier trials to keep out foreign pollen were scarcely needed and that merely covering the pistillate blooms as soon as they could be distinguished with cotton batting is all that is necessary, and also that hybrids may be produced with considerable certainty in open pollination if the tree or branch is kept entirely free from staminate tassels and the selected pollen is promptly applied as soon as the stigmas become receptive.

Quite a number of chance or self-pollinated seedlings from choice hybrids have been raised in the hope that their good qualities might be perpetuated and the trouble and expense of grafting largely obviated but, as with most other hybrids between distinct species, the seedlings lacked sufficient uniformity to be of especial value. A few individuals turned out superior to the parent but on the whole degeneracy, from the nut-producers standpoint, appears among seedlings of hybrid chestnuts.

In 1909 the unfruited chinquapin hybrids, 68 in number, were transferred to Arlington Farm, Virginia, and two years later Bell Experiment Plot was established near Glendale, Maryland, largely for the purpose of developing blight-resistant varieties of chestnuts as far as this can be

done by breeding and testing of wild forms. There are now over 2000 hybrids and seedlings of species at Bell ranging from one to ten years of age. Of the original trees planted at Arlington about 20 remain. They have formed handsome trees twenty feet high with tops almost as wide in diameter and have borne many profuse crops of nuts mostly of good quality and from three to six times as large and heavy as those of the parent chinquapin. All have been attacked by blight, the most promising one only this spring, after thirteen years of resistance to this virulent disease. All the hybrids carrying blood of native or European chestnuts were quickly killed, but those with the Japanese species as a pollen parent are still growing vigorously and bearing well, though considerably disfigured by blight.

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Of the various species used the native sweet chestnut, *Castanea Americana*, and the European, *C. vesca*, appear entirely useless in breeding for disease resistance, as the hybrids are destroyed by the blight fungus as soon as, or even before, they reach bearing age. The tall, or tree, forms of native chinquapin, sometimes grouped under the botanical name of *Castanea arborea* but which appear to be only natural hybrids between the sweet chestnut and the bush chinquapin, may also be regarded as useless for the purpose. The hybrid progeny show slight powers of recuperation but, in our plantings, do not sufficiently recover to make useful trees. The Rush chinquapin sometimes resists infection under natural conditions for several years but quickly succumbs when attacked, but its hybrid seedlings develop practically no resistance. The common bush or dwarf chinquapin, *Castanea pumila*, widely distributed over the Atlantic States, is not as readily infected by blight as the chestnut, many individuals under cultivation and in the wild resisting attack for an indefinite time, while the creeping species of Florida and South Georgia, *C. alnifolia*, appear practically immune in nature but succumb to artificial inoculation with the blight virus. The smooth bark and shrubby forms of these dwarf chinquapins probably account to a very great extent for the limited damage caused by blight under natural conditions.

Next in degree of resistance comes the woolly-twigged Chinese chestnut, *C. molissima*. There are established at Bell Experiment Plot over nine hundred Molissima trees grown from nuts collected near Tien-Tsin, China, in 1911. These trees in their eighth year of growth have borne excellent nuts, rather larger than those of our native species, in some quantity for three successive years though, owing to extensive locust injury last season, there is practically no crop this year. The trees average twelve or more feet high and are thrifty growers when not too greatly afflicted by blight. No summary of disease injury has been taken, but probably over 80 per cent of the trees show infection many of which are making attempts to heal which are often very successful. This species is native to Eastern China and has long been accustomed to the *Endothia* fungus, developing in the course of time a very considerable degree of resistance to it. From present appearances the Chinese chestnut may be grown in orchard form with no greater loss from disease than the pear from its particular form of blight. It hybridizes well with the Japan chestnut and both of the dwarf chinquapins, but this progeny is not yet sufficiently developed to warrant judgment.

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*Castanea crenata*, the familiar Japan chestnut, appears everywhere to show greater blight resistance than any other species that has been tried out and is therefore the most hopeful parent to be used for developing a useful race of disease-resistant hybrids and cross-breeds. It has the further merit of bearing very profuse crops of large nuts at an early age, but they are often lacking in quality, being usually harsh to the taste in the raw state though palatable when cooked. A few varieties bear well-flavored nuts, but these appear to be hybrids with our native species and are notably less resistant to blight. Pure Japan varieties grown from imported nuts are rarely injured by blight, and by many are regarded as immune, but those grown from nuts produced in situations exposed to the effects of native pollen are occasionally attacked and even killed outright by the *Endothia* fungus. It has considerable power to transmit its resisting qualities to its hybrids with the chinquapins, and a few individuals among the latter appear to retain resistance to such a degree that we may yet find among them some of the best nut-producing chestnut varieties of the future.

From the purely horticultural standpoint these hybrids between chinquapins and chestnut species must be considered as most striking successes. If this terribly destructive disease, probably the most virulent that afflicts any tree in the temperate climate, could be controlled there would be little need to look further for varieties suited for commercial and home culture, some of which can be as readily grown as peach trees and come into bearing as young. As the situation stands we must search further for individuals that combine good cropping capacity with practical disease-resistance.

At this writing the most promising outlook appears among selected seedlings of pure *Crenata* blood, or hybrids of this species that have again been pollinated with resistant Japan varieties. There are at Bell many seedlings of both these types of great attractiveness and promise.

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Five successive generations of selected *Crenata* seedlings have been grown since 1904, quite a number producing their first nuts the year succeeding germination. This unusual precocity is no indication of merit, as it tends to stunt the trees. The most promising individuals seldom bear until three or four years old by which time the trees have attained fair size. No high quality has yet been attained among the nuts of the pure strains, but it is quite evident where there is a dash of chinquapin blood. The nuts are, however, large, attractive and excellent for cooking or roasting, and moreover, ripen uniformly in September and early October, practically without the aid of frost. As opportunities for natural infection lessen from the dying out of our stands of native chestnut the Oriental chestnuts and their hybrids will be more extensively planted and may experience little difficulty in combating disease. Owing to the readiness with which

seedlings can be grown abundant new varieties will arise in time, even though they do not now exist, that will meet all reasonable requirements of the planter and it is to be anticipated that the production of edible chestnuts will at no distant day be placed on a stable basis.

Aside from its usefulness as a nut tree the value of our stand of native chestnuts, though already half destroyed, can scarcely be estimated. Every one knows the ease with which a healthy chestnut woodland reproduces itself by sprouts and the extreme value of its timber for posts, telegraph and telephone poles, for furniture and for tanning extracts, now made from both bark and wood. We scarcely have a forest tree as useful, but if some natural handicap, not yet in sight, does not stay the spread of the blight fungus, our much valued chestnuts appear to be doomed. A few small colonies of diseased, but living sweet chestnut trees, numbering scarcely fifty, have been located in New York City parks and neighboring localities in Long Island, carrying infection at least eighteen years old, where the accompanying stands have completely vanished. This affords the single ray of hope amid the otherwise complete destruction marking the spread of blight. In the hope that the marked resistance shown by these scarred veterans can be transmitted seedlings have been raised and scions established at Bell from the most promising individuals, and on this slender chance for perpetuating this prized species in its native habitat we must, for the present, rest content.

Recently there has been brought to light in the interior of China a chestnut species that may restore our timber production of this most desirable wood if it should prove immune to disease. Unlike other Old World chestnuts, which form relatively small trees, this species, known as *Castanea Vilmoriniana*, grows eighty to one hundred feet high with a straight, symmetrical trunk well adapted for all timber uses. The nuts, according to the scant herbarium material that has reached this country, are of little consequence, except for propagation as they are only slightly larger than those of our wild chinquapins. This species is now established at the Arnold Arboretum near Boston, Massachusetts, and scions worked on *C. Molissima* stocks are now vigorously growing at Bell Experiment Plot, making fine upright shoots. The reaction of *C. Vilmoriniana* to blight has not been tested owing to the scarcity of material in this country, but it is fervently to be hoped that the species will resist the disease. No infections have occurred in several years exposure either at Boston or at Bell. Should the much desired resistance be established rapid propagation of the species by seed and scions, and an extended test for forestry purposes, would be in order.

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The breeding experiments at Bell must be regarded as about the only constructive attempt in existence to replace a most highly prized nut and timber that is being swept from the face of the earth. Unless unforeseen natural conditions should stay the ravages of blight our chestnut stands will vanish, most likely within the view of the present generation. Although our progress in finding and developing blight-resistants is not as striking as might be hoped something has been accomplished, and the idea of salvaging useful nut and timber chestnuts from available material and developing better ones than now exist should not be abandoned.

THE PRESIDENT: Unless other action is desired this interesting paper will be received and recorded in the proceedings.

MR. T. P. LITTLEPAGE: Mr. President, Members of the Association. I will attempt in a few words to give you some suggestions about your afternoon rambles. There will be a special car assigned exclusively to the nut growers on the tracks at 14th St. and New York Avenue at 12:45, which will take you to Bell Station where you will see Dr. Van Fleet's roses and chestnut orchard. A short walk from there is the old place of Judge Gabriel Duvall, a former Associate Justice of the United States Supreme Court, member of Congress and a great friend of Thomas Jefferson. The unpublished manuscripts of Jefferson show that he took to Judge Duvall a bundle of "paccan" trees, as he called them. Jefferson was one of our great horticulturists and gave the first complete botanical classification of the pecan. Those three big trees that Jefferson gave Judge Duvall are growing out there today and from them are scores of other small trees. I was very much surprised when I read these notes of Jefferson and in looking through Washington's dairy about the same time I read where he said that Thomas Jefferson gave him a bundle of "paccan" trees. Now those of you who are to visit Mount Vernon on this trip look and you will find that three of the most beautiful trees there are pecan trees. Two of them this year have nuts on them one with a rather full crop and one with a light crop. They are undoubtedly the western or northern pecan. They show that in the character of the nuts and bark. When Jefferson was over in Paris he wrote to his friend Hopkins to send him a box of pecans and told him to send them in sand. Those of you who are going to Paris next summer look around and you may find some of Thomas Jefferson's pecan trees. It was perfectly apparent that he wanted those nuts for planting.

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After visiting at Bell Station we will take the car up to my place where there really is not much to see. I have thirty acres there of northern pecan trees, twelve acres two years old and they run all the way up to six years of age. Most of the six-year old trees this year set pecans which dropped off about the middle of the summer. They were all full of catkins. One Busseron tree had fifty pecans on it and a number of Major and Butterick trees had pecans but I do not believe they stuck. I had a Stuart which had a sprinkling of pecans on it and they also fell off. I can show you how not to grow trees. Some of them had no care whatever and some had pretty fair care. You can see dead chestnut trees up there showing that the blight is as bad as Dr. Van Fleet says. We find where they stand in the woods for ten years surrounded by trees with the blight and do not blight and the next year die. So the fact that a tree stands in a nursery row and does not blight does not indicate anything. The only hope we have is the work Dr. Van Fleet is doing.

THE PRESIDENT: Upon the same subject we will be glad to hear from Professor Close.

PROFESSOR CLOSE: I will just take a few minutes in telling some of the things I have been trying to do at home. My work is necessarily on a very small scale. I am away from home so much of the time that some things I start I cannot follow through properly. In grafting, for instance, I get the grafting done as I can do it from time to time in the spring and then I have to leave on a Government trip and am not at home to take care of the growing grafts as I would like to be. While my extension work for the Government is primarily connected with fruit I look into nut work as much as possible. Dr. Van Fleet has given me a number of hybrid chinkapins and this year three of them have fruited for the first time, one being of fairly good size. I have a couple of Japan walnut trees and the surprising thing is that although they were planted in 1910 they are fruiting this year for the first time. Usually those trees begin bearing very early. They have grown rapidly, are probably twenty feet high and have a breadth of equal distance but have been disappointing in that they have been so late in fruiting.

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MR. LITTLEPAGE: Do they winter-kill any?

PROFESSOR CLOSE: No, they have not winter-killed at all. One was supposed to be a heart nut but both are Sieboldianas. I think the most satisfactory and interesting thing I have is one of these large filberts or hazel nuts. It is a pretty good size for an eastern-grown nut. This is a seedling from New Jersey. I received the scions four years ago and was successful in having three or four of them live and last year they produced for the first time, three years from the graft. They are well filled and of pretty good quality. I have them grafted on some bushes of European type secured from a nursery about 1910, and which until grafted did not fruit at all. After the grafts began blooming last year these bushes have been producing nuts of small size. While the nuts are small they are right interesting.

In connection with the blight resistant chestnuts I will say that last Friday I visited Mr. John Killen of Felton, Delaware. Some of you know that Mr. Killen has been working with nuts for a good many years and has many very interesting things there. He finds that the blight has taken everything except his Japanese seedlings and here (showing specimens) are specimens of two of the Japanese seedlings. This you see is a very large nut. I presume the tree must be twenty years old or more. It is productive and he says it is commercially successful, which means that it blights a little but not very seriously. He has another seedling, a smaller one, that is up to the present time absolutely blight proof. He has planted twenty-five or thirty pounds of these nuts for growing trees for sale and he believes that the seedling from this parent tree will be absolutely free from blight. You will be interested to know that up to the time I was there last Friday he had shipped seven hundred pounds of chestnuts and was receiving twenty-five cents a pound wholesale.

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MR. LITTLEPAGE: What is the variety?

PROFESSOR CLOSE: They are all seedlings. In fact all of his varieties are dead. He has nothing but seedlings.

MR. LITTLEPAGE: Has that been called to Dr. Van Fleet's attention?

PROFESSOR CLOSE: Not that I know of. I doubt if Dr. Van Fleet has seen this blight proof one. I will be glad to tell him about them when I have an opportunity. Mr. Killen has one Japan walnut tree that is interesting. It must be 25 or 30 years old. I do not know where he got it. One limb we measured extends out 36 feet. The limbs on the other side of the tree are not quite so long but the tree is nearly 70 feet in diameter. Two years ago he sold the crop for \$54.00, and he thinks he will get more this year. He has contracted the crop to a nurseryman. Mr. Killen has quite a number of seedling Persian walnuts and some of them, perhaps all, blight more or less. He is very much exercised over the blight. He worries more over this than he does over the chestnut blight.

MR. LITTLEPAGE: Does the blight attack the nuts or the twigs?

PROFESSOR CLOSE: Both but mostly it attacks the nuts. At Beltsville 4 miles north of College Park there is one of the best seedling walnuts I have run across. It fruits every year and sometimes a part of the crop is injured by blight.

MR. POMEROY: The husks turn black?

PROFESSOR CLOSE: Yes.

MR. POMEROY: That is not blight; that is a fly injury

PROFESSOR CLOSE: Mr. Killen thinks that this year he partially controlled walnut blight with Bordeaux spray. One particular tree stands near where the spray tank was filled and one side of it was sprayed every time the spray rig passed it. The nuts from the sprayed side were really better than those from the other side.

Just below Dover, Delaware, at Woodside, I was at Mr. Sam Derby's place last Saturday and found something very valuable in the line of Persian walnuts, I think one of the best I have seen at all in the East. One particular tree was purchased for a Franquette but it is not. It probably is a Mayette seedling. Some of the men who tested the samples think this was one of the most desirable they had seen in the East. Mr. Derby bought about a dozen trees eight or nine years ago from some nurseryman. The trees are not alike in shape and size of nuts. They evidently are from the same bunch of seedlings but were sold for Franquette and Mayette. They are probably

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all Mayette seedlings.

Now, coming back to College Park, four years ago Mr. Littlepage was good enough to give me some pecan scions which I grafted into a seedling tree in a neighbor's chicken yard. The grafts practically all lived and last year, three years from the graft, about a dozen Major nuts were produced. These are probably the first Major pecans produced in Maryland. This year the Busseron and Major grafts bloomed but we had so many late frosts that the blossoms were killed and now there are only two Major nuts on the tree. My own trees are not old enough to bloom except one Mantura which bloomed this year but did not set fruit. I presume it was largely due to the late frosts.

In the fall of 1910 Professor Lake gave me some buds of Persian walnut and I put three buds into a young black walnut tree. During the following February we had a drop in temperature to 25 below zero, something almost unknown in this section of the country, but two of the buds lived through it. After growth started in the spring I cut one out and the other grew into a tree which produced three nuts in 1915. My area for nut trees is small so I am planting pecans, black and Persian walnuts, and hickory twenty feet apart with the idea of keeping them pruned. I have ten varieties of pecans and several of walnuts. Between these I have chinkapins and hazelnuts. There are eight or ten varieties of hazels and about sixty seedlings for grafting later on.

MR. LITTLEPAGE: Did the young pecan trees bloom.

PROFESSOR CLOSE: Only the Mantura and it must be about ten years old.

MR. LITTLEPAGE: What kind of bloom?

PROFESSOR CLOSE: Both kinds.

DR. MORRIS: Which hazels are these?

PROFESSOR CLOSE: They were undoubtedly European.

DR. MORRIS: I think that is a very important point. Some time ago I said that our wild hazel drove the cows out of the pasture. It is a worthless weed with us in Connecticut and it is an important thing for us to transform our hazel pasture lands that are full of thickets of this weed over into good bearing propositions. I grafted a lot of hazelnut bushes with European scions. There are Chinese hazelnut trees that grow to be more than a hundred feet in height and six feet in trunk diameter. The Jacquemont goes to one hundred feet, and the Colurna frequently grows to fifty feet. I believe it is going to be a very important matter to top work these large kinds of hazel trees which do not send runners out from the root and which are not inclined to send large suckers up from the stock. So the kind of stock upon which hazels are to be grafted is a very important matter for nurserymen. But we can also use the worthless pasture bushes profitably.

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THE PRESIDENT: In order that we may keep the business of our program up to the minute we should complete the naming of the Nominating Committee. In order to quickly bring it about and in order that all may have a voice in the matter I would suggest that five be nominated from the floor for the positions, that the nominations then close and that the Secretary cast the ballot for the members of the nominating committee.

The names suggested were: Mr. Olcott, Mr. Littlepage, Dr. Morris, Mr. Reed and Professor Close.

The nominations closed and the Secretary cast the ballot for the above named persons.

THE PRESIDENT: We still have a few minutes and might take up the proposed changes in the constitution that were suggested at the Battle Creek meeting almost one year ago. I will request Mr. Bixby to state to you what the proposed changes are.

THE SECRETARY: At the meeting at Battle Creek last November notice was given for proposed changes in the constitution, as follows.

At this meeting it was voted that Article IV, OFFICERS, be presented to the members at the next meeting for the purpose of voting on a change to read:

There shall be a President, a Vice-President, a Treasurer and a Secretary, who shall be elected at the annual meeting; an Executive Committee of six persons of which the President, the last two retiring Presidents, Vice-President, Treasurer and Secretary 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 VII. QUORUM, to be changed to read:

Ten members shall constitute a quorum but must include two of the four elected officers.

By Laws:

Article III. MEMBERSHIP—All annual memberships shall begin either with the first day of the calendar quarter following the date of joining the Association, or with the first day of the calendar quarter preceding that date as may be arranged between the new member and the Treasurer.

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THE SECRETARY: I make a motion that the changes in the constitution as read be acted upon now.

PROFESSOR CLOSE: I second the motion.

MR. FOSTER: May I offer a suggestion in connection with the proposed change. It is relatively an immaterial one and I presume will be included. As a member here from the District of Columbia I think the District of Columbia should be included with the states.

THE SECRETARY: I think that has been done. Grouped among the states appears the District of Columbia.

THE ACTING SECRETARY: That is, you would have the words "District of Columbia" inserted in connection with state, dependency or country?

THE SECRETARY: I accept that.

The change in the constitution, as recommended, was carried.

MR. LITTLEPAGE: As we have another minute or two there is one matter that we might dispose of. There was a committee appointed once upon a time on incorporation. It was thought by some of the members that if this association were incorporated, making it thereby a perpetual, tangible organization, it might be to its advantage. There might be some man who would be good enough to bequeath some funds to the Association for investigational work. As we are just a voluntary organization without any particular responsibility, it was thought by some that an incorporation would be desirable. I was appointed as a member of the corporative committee. The committee consisted of Mr. Webber of Ohio, and I do not recall the other member but Mr. Webber and I had several conferences. It seems to me that perhaps the best and most feasible way would be to incorporate under the laws of the District of Columbia. The code of the District of Columbia provides for incorporations of this kind for educational, scientific and benevolent purposes at a very nominal expense. For commercial corporations they must, of course, have a capital stock and ten per cent of it must be paid in in cash, but there is no such requirement under the code of the District of Columbia for scientific and benevolent corporations. There is a provision in the code for an incorporation of this kind by having the proper articles drawn up, setting forth the purpose of the organization, its line of work and its membership, naming for the time being three trustees, two of which at that particular time must be residents of the District of Columbia, and filing those articles with the Recorder of Deeds. It is approved and that becomes the charter. The Association is then a body corporate with all of the rights and privileges of any other organization of that kind.

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A great many organizations have been formed in the District of Columbia under that provision of the code. It seems to me about as simple and as comprehensive as any of the laws of any of the states, and about as free from any burdens or obligations of reports or matters of that kind. If it is the sense of this meeting, and I think you have quite a representative membership here, that this organization be so incorporated I shall take pleasure, after this meeting, in drafting proper papers, presenting them to some of the members for signature and perfecting a corporation.

THE PRESIDENT: That seems to be an excellent suggestion.

DR. MORRIS: I move that this recommendation be adopted.

MR. FOSTER: I second the motion.

The motion was carried.

The convention adjourned at 12 o'clock.

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## **AFTERNOON EXCURSION OF THE NORTHERN NUT GROWERS' ASSOCIATION**

**OCTOBER 7, 1920, 12:45**

The members of the Northern Nut Growers' Association, in convention at Washington, D. C., October 7, 1920, made an excursion which included visits to the thirty-acre bearing northern pecan plantation of T. P. Littlepage; Dr. Walter Van Fleet's Government Station for the production of blight-resisting chestnuts and chickapins and other new hybrids, at Bell Experiment Plot, Glendale, Maryland; and the old Jefferson pecan trees at Marietta. The following notes were taken at points along the route:

DR. VAN FLEET: These are hybrids between the chinkapin and the Japan chestnut showing the blight even after thirteen years immunity. We do not do anything to check the disease at all.

There is a Japan variety said not to take it but you see how it affects it. It girdles it and the new wood builds it up. The tree is doomed. It is gone now but it has made a tremendous attempt to recovery. You see the new growth that has tried to come out there trying to bridge it and make it up. Of course even that is hopeful. In view of that we feel justified in breeding. The Chinese resist it much better. They take it more readily but they resist it far better. The efforts at self-bridging are quite successful.

This is one of the hybrids we have at Arlington. The parent tree got along for thirteen years without a sign of blight. By artificial inoculation we have given it the disease but it does not get it



in the trunk. This is a Chinese chestnut seven years old and has had three crops. We took the most virulent virus and made a few inoculations and with absolutely no care the wound is closing up. The tree is apparently quite healthy. This is the Chinese Molissima, not of real good quality. These are only seven years old and have already borne three very good crops. The nuts are somewhat larger than the wild native and ripen about six weeks earlier.

There are 1,100 trees here and I think about a hundred have been killed outright and probably 75 per cent of them show infections but there are a few individuals that do not seem to get it. It seems almost impossible to inoculate them. We are letting the disease run its way purely through elimination. It is only those that can stand it through a series of years that are supposed to be worth anything at all.

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Probably no species is immune from it; I do not think we can use the word "immunity" in connection with it.

The party then visited the old Jefferson place at Marietta, and viewed the immense pecan trees which were given to Judge Duval by Thomas Jefferson. Thence to Mr Littlepage's plantation.

MR. LITTLEPAGE: These trees are set 100 by 120. The Butterick is a good grower. There is a great difference in the growth of the cultivated and the uncultivated ones. I would quit working about the first of August. The first of August here they are growing actively.

Question: Is that the habit of the pecan to set a crop and then drop off?

MR. LITTLEPAGE: Yes, young trees will do that. This is a typical Busseron. They were all sprinkled with nuts; this tree had fifty nuts on this spring. There are some caterpillars on the Stuart. This is the work of the caterpillars on the Stuart. It set a number of nuts. This Greenriver is a little larger than the Major. It is one of the prettiest nuts, one of our medium sized northern pecans. The Greenriver grows in a forest in the Green River district in Kentucky. This is the first transplanted pecan tree this far north that has grown nuts.

DR. MORRIS: In two or three years you will have a crop on them.

MR. LITTLEPAGE: That is a Major, they grow like the Cedars of Lebanon. You don't see a winter-killed twig on a tree. They were full of nuts this spring.

MR. MORRIS: That is so thrifty and so hardy that it might have some species of hickory in it.

MR. LITTLEPAGE: The Stabler black walnut is much better than the Thomas. All black walnuts are reasonably easy to propagate. I have them all around over the farm; I stick pecans around the fences, or wherever I have a space. This chestnut is a European variety. It bears a big striped nut. It tastes a little better than the sweet potato.

DR. MORRIS: It is good for cooking. It is the same as the Marron.

MR. LITTLEPAGE: They are the Indiana hazels, and this is an European filbert.

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## EVENING SESSION

**THURSDAY OCTOBER 7 1920 8 P. M.**

The convention was called to order by the President, Mr. Linton, at 8 o'clock.

THE PRESIDENT: The presentation of the next speaker will be made by Mr. Littlepage.

MR. LITTLEPAGE: I want to take just one or two minutes in introducing Mr. Reed, the next speaker on the program. The Department of Agriculture, as we all know, is an aggregation of many of the very brightest men in this country. Those of us who are here in Washington know that at times it is sadly in need of organization. It is perfectly apparent to anybody who has judgment enough to make observations that there is a great deal of very valuable material down there going to waste for the lack of organization. Perhaps it will always be so. I do not know. Institutions are not perfect because the individuals constituting these institutions are not perfect. The Department of Agriculture is, taken as a whole, a most wonderful institution. I do wish, however, that the Department officials would not always wait until they think they know exactly all the facts about a thing before they publish it. I sometimes wish they had enough nerve to say: "Now, this is what we found out today. We may change our minds tomorrow and if we do we will tell you so," the same as any other honest citizen. Why in the world they collect all the data they do, file it away day after day, month after month and year after year, and publish it after it is of no use to anyone on this earth, I never could figure out! I know it is a difficult problem because if the Department of Agriculture should say today that Winesap apples grow beautifully on Maryland hills some fellow would promptly capitalize that and go to selling the Maryland hills, the water underneath, the air above them and everything around them for the modest sum of ten times what it was worth. So that is the other side of it. It makes it necessary for the Department of Agriculture, of course, to be cautious. I know, however, that you all think as I do because you have said so to me but you do not all have the nerve to get up here and say as I do that the Department of Agriculture ought to give us more of these data; that they ought to give it to us for what it is worth today and in this lifetime, leaving it to us to have a little common sense to know that what they say must be taken as they say it. However, I did not get up here to say all of those things. My purpose is to introduce the speaker.

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Now, I happen to know a great deal about Mr. Reed's work. I know that he is one of the most active men in the Department and one of the men who has, as much as anybody in the Department of Agriculture, the confidence of those of us who know about the project that he is working on. Mr. Reed has more work in the Department of Agriculture than he can do and I have been trying to lay out some additional work for him. For example, we have found in Southwestern Illinois a larger pecan than any propagated in the North. I saw it in a bunch of Schleys which is the premier pecan of the South. It was larger than many of the Schleys. We don't know anything more about the pecan but I would like to know about this and several others. That is one little job that comes under Mr. Reed's supervision and he ought to have more time and more help. As a matter of fact everybody in the Department thinks he should have more money for his particular project. Those of us who are interested in nut work think the nut people should have more money. The Department was very fortunate in receiving Mr. Reed who came from Michigan. I have talked to him many times and I have never found him yet to make a statement about anything in the nut world that he could not back up. In an illustrated lecture of this kind you have the good fortune to get a great many data that you cannot get in any other way. I wish the whole country that has an interest in these matters could hear it. If I could think of anything else good to say about Mr. Reed I would say it. He is entitled to it. (Applause.)

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## NUT CULTURE IN THE UNITED STATES.

C. A. REED, Washington, D. C.

We are annually importing into the United States from \$30,000,000 to more than \$52,000,000 worth of nuts. In this country, production is of leading importance with but three species,—the Persian (English) walnut, the pecan, and the almond. Of these together, we are producing in the neighborhood of \$26,000,000 worth of nuts. In addition to these three species, two others now bid fair to become of considerable importance within the next decade. These are the filbert of the Northwest and the Eastern black walnut. In the Northwest, the filbert is receiving intensive attention at the hands of a considerable number of skilled horticulturists. The species is making rapid strides and in a short while will probably rank fourth in importance with reference to the extent to which it has been developed horticulturally. Possibly because of the extent to which it is common over the United States, the black walnut might properly now be rated as fourth as that nut has as great, if not a greater, range and is of interest to more people in this country than is any other one species of nut. It remains, however, to be seen how rapidly it will be developed by the pomologists.

The view before you is one which some of you have seen before. It was taken in the famous Vrooman orchard of Persian walnut trees at Santa Rosa, California. This is the largest and most noted orchard of Franquette variety in the country. It is from this orchard that scions have been obtained for the propagation of a great part of the Franquette orchards in this country.

In the Willamette Valley of Western Oregon, the walnut has received a large amount of attention during recent years; its development there has made rapid strides, and in the better soils, the trees grow rapidly and ordinarily bear very well. The photograph before you was taken in February, 1920, in an orchard near Hillsboro. It was situated on low but rich land and I regret to say that it was practically wiped out of existence by an unusual cold spell occurring from the 12th to the 15th of December in 1919. During that spell, the temperatures went down in some points of the Willamette Valley to 24 degrees below zero. As nearly as could be told at the time the picture was taken the trees were all killed to the snowline which was from a foot and a half to two feet above ground. The owner has since reported that he cut the trees down to that line.

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To some extent, the Persian walnut is grown in the eastern part of the United States. It was introduced here long before it was on the Atlantic Coast, but this side of the Rocky Mountains, it has nowhere become of great commercial importance. The photograph before you was taken in 1911. It shows a seedling orchard of twenty-three Persian walnut trees in Bucks County in the northwestern part of Pennsylvania. The orchard then appeared to be in first-class condition with no sign of winter-injury, but so far as we have been able to ascertain, the trees have never borne important crops of nuts.

This tree before us is the parent, or original tree of the Nebo variety from Southern Lancaster County, Pennsylvania, a variety first propagated by Messrs. Rush and Jones. It is one of the old historical trees of that section, and while the nut it produces is very good in many respects, for various reasons, the variety is no longer being propagated to great extent.

This is the parent Rush tree, another variety now not propagated as much as formerly, but one which, nevertheless, is a good sort and regarded as being well worthy of planting about the home grounds in sections of the eastern part of the country to which the species is adapted.

The Persian walnut is evidently quite at home from the eastern shore of Maryland up through Delaware and New Jersey to Long Island and lower Connecticut. From this strip west inland to well toward York and Harrisburg in Southern Pennsylvania, it is by no means uncommon. To some extent, it is grown in Western New York and close to Lake Erie in Northern Ohio. There are

some trees in Eastern Michigan and a very few in what is known as the Niagara Peninsula of Ontario, but with few exceptions, the crops they bear are uncertain.

The tree before us is the parent of the Aurand variety named in honor of Mr. Geo. D. Aurand of Lewistown, Mifflin County, Pennsylvania. The gentleman in the foreground is Mr. Aurand in the act of examining a split in the bark caused by winter-injury. This trouble is fairly prevalent over a great part of the east.

Leaving the walnut industry for the time being, we will take a fleeting glance at the pecan industry. The greater part of our pecan crop comes from wild trees in the Southwest. The view before us is typical of Texas scenes especially in such towns as San Saba, Brownwood and others where nuts are brought from the country in wagon loads much the same as are cereals in the northern states. Pecan orchard development has taken place almost wholly in states east of the limits of the native range. In sections to which the pecan has been indigenous development has been very slow. The greatest and most extensive development of any section happens to be in Southwestern Georgia.

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The view before us was taken in an orchard of Frotscher trees in Thomasville some 20 miles north of the Georgia-Florida state line. The trees were planted in 1905, set fifty feet apart, and last spring, because of crowding, the alternate trees were removed. The lower limbs had begun to die and the nuts from the lower branches had, for several years, been inferior in both size and filling quality.

The trees in the orchard before you were three years planted when photographed. This is an orchard in the Albany district of southwestern Georgia. It is in the immediate Albany district that more pecan planting has taken place than in any other one district of the whole South. It is possible to go from Albany in most any direction and to pass through orchards on both sides of the road with rows of pecan trees extending as far as the eye can see in each direction.

There is more or less, of a prevailing idea that the pecan is a California product but it is the exception rather than the rule to find thrifty and productive trees in that state. The tree before you is one which bore enough nuts during a recent year to bring \$125 in the market, at 20 cents a pound.

Coming considerably nearer home, we find the parent tree of the Butterick variety situated on the Illinois side of the Wabash River a short distance below Vincennes, Indiana. The range of the pecan, as the most of you probably know, extends well up into Iowa along the bank of the Mississippi River and also into Central Illinois along the Illinois and other rivers and north to Terre Haute, Indiana, along the Wabash. The Butterick has been regarded as one of the most promising northern varieties. Reports which seem to be fairly well authenticated are to the effect that this fine tree has since partially died because of having its roots cut in the digging of a ditch.

Two years ago, Dr. J. B. Curtis (who is present in the audience) and myself spent a week's vacation in Eastern Maryland. At Easton we were greatly surprised to find what we agreed was the largest planted pecan tree we had ever seen. During the past summer, this tree has been photographed and its measurements taken: It has a girth measurement at breast height of 15 feet. Its spread is 129 by 138 feet. Its height was estimated at approximately 135 feet. It is not one of the largest pecan trees of the country as larger trees are not uncommon in many sections from Southern Indiana, south and west to Texas but they are native and not planted trees. We know this to be a planted tree as there are no native pecans in the state of Maryland. This tree bears with a fair degree of regularity. We are told that in 1917 it yielded approximately twelve bushels of nuts which, although small, were exceedingly good and a delight to the children of the whole neighborhood.

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Taking up the almond industry, the view before you is of interest because of historical reasons rather than otherwise. It is one of the few remaining large orchards planted by the late Mr. A. T. Hatch known as father of the principal varieties of California today. Mr. Hatch planted several hundred acres of almonds in the vicinity of Suisun about midway between Sacramento and San Francisco but cold winds from San Francisco Bay prevent almond trees in that section from being commercially productive, and as result, the section has been abandoned as an almond center. Nevertheless, this picture is of interest because it was in these very orchards that were originated the famous Hatch varieties, the Ne Plus Ultra, Nonpareil, I. X. L. and the Drake. A great part of this orchard has since been topworked with prunes.

Almond orchards in bloom afford some of California's most beautiful sights during February. The two trees in the foreground are typical specimens of I. X. L. while in full bloom. The almond begins bearing at about the same age as does the peach; at 5 or 6 years from the time the trees are planted, they begin to pay a little more than the cost of up-keep, and at 8 years, they are regarded as being in full bearing.

This scene was taken in one of the oldest orchards in the state of California. The trees were planted in about 1870. The picture affords a typical illustration of one of the methods of harvesting. The nuts are being thrashed or "knocked" from the trees to heavy canvas sheets spread upon the ground which are drawn from tree to tree by horse power. The nuts are loaded loose in wagons or in sacks and taken to some central plant where they are run through hulling machines and the nuts separated from the hulls after which they are spread out in trays and left in the sun to dry. At that season of the year, there is practically no danger of dew or rain and, after being exposed for several days and nights during which they are frequently stirred, they are

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taken to the nearest exchange point, bleached and put forth into final shape for the market.

A very important factor in the success of almond production is the honey-bee. Bee keepers shift their hives from orchard to orchard during the blossoming period making a profit out of the honey and at the same time charging a rental to the orchard owners. The bees, of course, attend to the matter of interpollination.

In some sections, it is necessary to equip the orchards with smudge or fire pots which are kept filled with crude oil and fired at the moment the temperature goes down to below the freezing point during the blossoming period. In one district these pots were this last year fired again and again but after all the temperature went down to a point such that a great part of the crop was lost. We are told that it is possible to raise the temperature 26 to 34 degrees. It is tedious work and a dirty job. The oil is placed in the pots in the daytime and the firing usually takes place in the latter part of the night, very often after 5 o'clock in the morning.

We come now to the filbert industry. One of the reasons why filberts were planted in the northwest was because the native hazels grow there with great vigor. This picture shows a typical stool of the native hazel as it is commonly seen in the western parts of Oregon and Washington. Not infrequently it attains a height of 30 or 35 feet and when trained to single stems, the trees not infrequently develop trunk diameters of from 6 to 8 inches.

The Mr. Vollertsen of the Northwest is Mr. A. A. Quarnberg of Vancouver, Washington. In 1893 Mr. Quarnberg read an article by the late Professor H. E. Van Deman in which the latter urged the experimental planting of the filbert in the Northwest. Mr. Quarnberg ordered two trees of the Du Chilly variety from Mr. Felix Gillett, a Frenchman and then proprietor of the Barren Hill Nurseries, Nevada City, California. These were planted in February of 1894 and are believed to have been the first trees of that variety shipped to the Northwest. They are so close together that they are considerably crowded but still they have done fairly well, bearing in some years as much as 45 pounds together.

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This is a view of the first filbert orchard planted in the Northwest. It consists of three hundred trees mainly of the Barcelona and Du Chilly varieties obtained from Mr. Gillett in January of 1901 by Mr. Quarnberg and planted by him for a neighbor, Mr. John E. Norelius.

In this connection, it is interesting to note that the Barcelona variety had already become fairly well established in the Northwest when Mr. Quarnberg first introduced the Du Chilly to that section. The picture before you is of one of the oldest Barcelona trees that has come to my personal attention. It shows a tree in Portland measuring 45 inches in circumference one foot above ground. It is perhaps the largest filbert tree in the United States. When visited during the past September, the limbs were bending down with nuts and an estimate was made that it would have from 50 to 70 pounds of mature nuts.

The tree before us was another Barcelona of good size. In 1919 it matured a crop of 45 pounds of nuts. However, unfortunately it was caught by the cold spell already referred to and the tree about half killed. It stands in a low place in an orchard of some fifty trees and was one of the most seriously affected.

Returning to the East, we have before us a picture of an Italian Red filbert tree in the orchard of Messrs. Vollertsen and McGlennon north of Rochester, New York. It is a young tree not over two years old. Each terminal has a cluster of nuts. Mr. Vollertsen is observing it closely and thus far regards it favorably.

Mr. J. G. Rush of West Willow, Pennsylvania has brought out a native hazel which offers considerable promise to nut planters. It is a remarkably prolific variety and the nuts are both large and thin-shelled. This picture illustrates something of its heavy bearing tendency.

We come now to the black walnut. One of the first varieties propagated was the Thomas. This picture is one of several hundred grafted trees of that variety owned by Mr. E. A. Riehl of Godfrey, Illinois. As here shown, they are very prolific and these hundred trees grown mainly on hillsides and untillable lands are furnishing Mr. Riehl with a very fair income. On the whole, the Thomas is a good variety. It cracks much better than does the average black walnut but still there are some others which are a shade better in the matter of cracking quality. The picture before you shows the parent tree of the variety first known as Rush but later changed to Herman in order to avoid confusion of names with the Rush Persian walnut. This variety has been propagated to some extent but according to recent accounts, the parent tree has been cut down. The tree now before you is the parent of a well known variety, the Stabler. It is situated in Montgomery County, Maryland, some 20 miles from the city of Washington. Reports have it that this tree bore 30 bushels of nuts in one mythical year, but the present owner states that the maximum yield of any year since he has known the tree has been 10 or 11 bushels of hulled nuts. The variety is being propagated by several nurserymen and trees are available for planting.

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Another variety now being propagated by the nurserymen is the Ohio, the parent tree of which is some 20 or 30 miles out of Toledo in the state after which it was named. This picture, (showing seven nuts) illustrates a remarkable tendency on the part of young grafted trees to bear at an early age. This tree in the nursery of Mr. Jones of Lancaster, Pa., was grafted in May and photographed in September one year following. Of course early bearing is not wholly desirable but in a way it will refute the common belief that black walnuts are necessarily tardy in coming into bearing.

Col. J. C. Cooper, McMinnville, Oregon, President of the Western Walnut Growers Association has on his home grounds two black walnut trees grown from nuts obtained in the East which were 6 years old when this picture was taken. Each of these trees which you will notice are from 20 to 30 feet high bore approximately a peck of nuts during the year when photographed.

The native butternut is a species which has been quite neglected by our horticulturists but through the efforts of Mr. Bixby, a few varieties have been brought out and are now being propagated by the nurserymen. In spite of its thick shell, the flavor of the butternut is preferred by many people to that of any other nut on the market. It is our most hardy species of nut tree. It grows as far north as Maine and Nova Scotia. Two or three recognized varieties are being propagated. Probably those which will soonest be available for dissemination to the public are the Aiken from New Hampshire and the Deming from Connecticut.

One of our most decorative native trees is the American beech. As fine a specimen as is often seen is this one not far from Easton, Maryland photographed during the past summer. It is an enormous tree and very productive. It is one of forty or fifty trees on the grounds of one of the numerous large estates of Eastern Maryland and was planted, so we are told, in 1830. The lady giving this information said that her mother had the trees dug up in the forest by slaves and hauled to their present location in ox carts. Now, ninety years later, they form a magnificent avenue of trees. Fine crops of nuts are borne each year. The nuts are small and most too tedious to extract from the shell to be useful for human consumption, but they go a long way in the finishing off of the turkeys and other poultry in the fall.

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Another species of nut which is quite neglected is the Japanese walnut. It has been on trial in this country for perhaps fifty or seventy-five years. It has indicated its adaptability to a wide range of the country; it succeeds on a great variety of soils and it is both hardy and early to come into bearing. It has this disadvantage, however,—the nuts are small; but in flavor the kernals can hardly be distinguished from those of the butternut. Very often it forms a most attractive tree and it should be used to a much greater extent than it is on home lawns.

In Michigan, hickory and black walnut trees have been used along the highways as avenue trees for a considerable period. In Pennsylvania occasionally the Persian walnut is used as an avenue tree. One of the beauty spots along the roadway of Lancaster County is this stretch of roadway under the spreading branches of Persian walnut trees. Senator McNary of Oregon thought so well of the beauty of the filbert that he induced his brother to plant several trees on his lawn in the city of Salem. It is no exaggeration to say that there are no prettier trees in the city than are these before you.

To a considerable extent, nut raising is being combined with the poultry industry in the Northwest. The poultry raisers claim that some kind of trees are essential to furnish shade in the poultry yards. They say that fruit trees are not desirable for the reason that at harvest time the chickens not only pick and ruin the fruit but themselves get internal disorders. Nut trees, they argue, fit in very well, as the chickens cannot hurt the nuts nor the nuts the chickens. Furthermore, the trees in chicken parks salvage a great deal from the chicken manure which would otherwise be lost. The use of nut trees in this way is a practice which it would seem could well be introduced to good advantage in the eastern states.

Among the ornamentals, it is difficult to imagine a species which could more effectively be used than the pecan. The picture before you was taken of a comparatively young tree perhaps 30 or 40 years old on the home grounds of a private citizen near Easton, Maryland at practically our own latitude. It is a most beautiful tree.

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Rightly used, the black walnut is also one of our most effective species in the landscape. The picture before you is of a tree 51 years old. It stands in front of the home residence of a sister to United States Senator Charles L. McNary of Salem, Oregon. When photographed, this tree measured 10 feet, 6 inches in girth at breast height. It would be hard to imagine a more noble and graceful nut.

Along the roadways of California, we not uncommonly find the native black walnut used as an avenue tree. It is very refreshing and cooling on a hot day to drive under trees of the sort illustrated in the picture before you. This avenue of trees is along the Lincoln Highway less than a mile west of the University grounds at Davis.

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THE PRESIDENT: The next speaker on the program will be presented by Dr. Morris.

DR. MORRIS: They say that a biographer unconsciously writes his autobiography. That is not tautology. Some one writing of the late Frank N. Mayer said: "The plant hunter and explorer is the unsung Columbus of horticulture." Our next speaker was the one who wrote that in Mr. Meyer's biography. We all recognize it as autobiography. Emerson tells us that every successful institution is the lengthened shadow of one man. There were heroes before Agamemnon and botanists before Dr. Fairchild, but with the beginning of the new century there came into existence the development of a new idea, that of exploration in foreign countries for the purpose of bringing to us their valuable plant products. It was one of those things which we may say makes the whole world kin because the economists tell us that basically the food supply is fundamental to all subsequent human activities. Dr. Fairchild organized the machinery of

exploration for purposes of introduction into this country of valuable plants from foreign lands. There is perhaps at the present time no one who serves better as peace maker than does the one who gives the world more food. From the economist's standpoint the food supply subtends all advances in civilization. Now the hour is late and we all know what Dr. Fairchild has done. Any remarks on my part are made because they belong to the form of polite procedure rather than because of need for telling of things which Dr. Fairchild has accomplished.

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DR. FAIRCHILD: Ladies and Gentlemen of the Northern Nut Growers Association. When I face men and women who are doing things in agriculture I feel a peculiar degree of embarrassment. I do not know why but I suppose it is because what I have done, what little I have done in bringing in these new things, has never enabled me to get to the bottom of any of the things that I have brought in. In other words I feel that I am in the presence of a number of men who know down to the very smallest minutiae the business that they are engaged in. Now I do not know these minutiae about plants. I wish I did. There is nothing more fascinating in the world than to take one crop and learn to know it "down to the ground." It is coming to be one of the greatest things in the imagination of man, this grappling with the fundamental problems of agriculture which are wrapped up in the varieties of the plants that we grow. I have had a very severe education in that matter of varieties and I want to congratulate you as a body of men and women who are individually going to find out what these best varieties are.

I suppose that the talk that Mr. Reed and I had in a bamboo grove out in Chico., California, when we were trying to find out uses for the bamboo and Reed said: "Well, the pecan and almond growers want to knock the nuts off their trees with these bamboo poles," is what led up to this talk, and I want to thank Mr. Reed for the opportunity to show slides of a few of the new plants which we are working on in the Department of Agriculture.

We brought in so many of them, (47,000 different kinds) in these 22 years that the office of Plant Introduction has been in operation that Mr. Reed suggested that the nut growers would like to have thrown on the screen pictures of the nuts of foreign countries. I said that we did not have any. Then I began to dig into our own literature, project reports, experimenters cards, correspondence and the other recording machinery that we have and I found that we had a good many. I want to make it perfectly plain to you that what I am going to do tonight is simply to open a door and show you the possibilities of some of these foreign nuts. There are a great many more that we have not succeeded in landing on the shores of America, and if any one of you will come to my office on 13th and F streets I will throw all the correspondence and photographs on the table and let you look through it.

It has been said that the Department's work is badly organized. Yes, it is badly organized. But I do not know how you are going to very well organize with a small body of men a group of projects every one of which is a life job for a man, especially when you cannot get the men, and when you do get them they do not stay on the job for life. So there is the great difficulty. Mr. Littlepage has hit the nail on the head. The Department of Agriculture is not well organized but it is not an easy thing to organize experimental work on at least 150 different kinds of industries with the money and the men we have. The fact that the investigations require the men to be on the land close to their work and that we are all in city buildings, is a great handicap. We have scarcely a tree or shrub or plant of any kind that bears on our work within two or three miles of the Department of Agriculture building. We need the land. We need a great many more men, and we need more money.

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I landed in Greece in 1901. In Athens I saw them selling on the streets these pistache nuts which I opened with my fingers. The kernels are a brilliant green. I had never seen them before. I had heard of them. They were sold around the streets by the Greek peddlers and called pistachios. The pistache or pistachio industry is one which I wish some young, energetic man of seventy would take up. I say 70 because it requires a young man of seventy to take up one of these nut industries, the boys of 26 are too old. Some young fellow of seventy should go into the pistache industry and find out what there is in it and develop it into a great industry. The American Consul in Palestine told me six or eight years ago that there was no plant culture in all Palestine that paid so well as a pistache orchard. Trees have been known to yield as much as 40 to 50 dollars apiece. The Grecian pistaches are different from those of Tunis and Algeria and others of the Mediterranean countries. There are a good many different varieties.

This picture shows a piece of praline made of pistaches. This is sold on the streets of Athens and compares very favorably with our pralines made in New Orleans from the kernel of the pecan.

Mr. Chisholm, who was connected with the Consulate in Athens and who spoke Greek very well, took me out and showed me what these pistache trees looked like and when I found this miscellaneous lot of grafted pistache trees I made an arrangement to purchase the whole collection and send it to this country. I had great difficulty in getting the American Consul in Piraeus to help me ship them. I could not wait indefinitely and it took a good while to have them dug and packed. I asked him if he would send them and he said he was very busy. I told him this was a matter which concerned the people of the United States and if he did not have time to do it I would telegraph to the Secretary of Agriculture and tell him that the Consul in Athens was too busy to ship these plants. Finally he consented to ship them and this was the first shipment of grafted pistache trees to arrive in America. They were badly grafted, badly packed and badly prepared and I think only one of this whole collection survived and is now growing in the Gallespie grounds at Montecito, California.

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Mr. Kearney ought to be here tonight and Mr. Swingle and Dr. Rixford. These three men have

given more attention to the pistache than I have. Mr. Kearney was studying the date palm industry of Southern Tunis and in connection with it he made a study of the pistache industry of the desert region of the coast of Tunis. This picture represents an Arab standing beside an old pistache tree that probably is forty or fifty years of age. It represents the pistache in its winter dress. They are deciduous trees. They plant one male tree to about twenty females. We have had a great deal of difficulty in propagating these pistache trees. We have five different species of stock on which to grow them, and we ought to learn all the best varieties in the world. But unfortunately some of the best varieties in Sicily are infested with a moth which lays its eggs in the twigs just below the leaf scar and it is impossible for the entomologist to detect these eggs without destroying the buds. That apparently trivial circumstance has made it impossible for us to get these cuttings in from Sicily without sending a trained horticulturist there for them. We never have had the money to send a man there who could do it, a man who had had the necessary experience. As a consequence we have not as big a collection of these pistache varieties as we ought to have.

These men in the photograph are getting the scions for Mr. Kearney, and I am glad to say that these particular scions which they cut are now growing in California. Mr. Kearney also on this same trip visited the Duke de Bronte estate on the slopes of Mount Etna. It was an estate bequeathed by the King of Italy to Lord Nelson, who was made the Duke de Bronte and it is still the property of the Nelson family. Mr. Beck, who was the manager for this estate and with whom we have had correspondence for nearly 18 years, gave us perhaps more information than we have gotten from any other foreign source on the cultivation of the pistache. The Trabonella, which was one of the best commercial varieties, came from the Bronte estate on the slopes of Mount Etna, where pistache growing is a paying industry. In Europe the nuts are very largely used, outside of the Mediterranean region for making the pistache ice cream because of the green color in the seed itself, and in the Mediterranean region both the yellow and green varieties as we are coming to use them in this country, as table nuts. The highest price is paid for the green pistache nuts which are used in ice creams and confectioneries. Here are two Sicilian horticulturists, one of them holding a bundle of bud sticks. This Trabonella variety is now growing in America. We have collected pistache nuts from many parts of the world. A very interesting man by the name of Jewett who became acquainted with the late Ameer of Afghanistan procured for us the Afghanistan pistache. I got in correspondence with him through the Consul in Calcutta. Through a mistake made in sending some of this correspondence direct instead of to Calcutta it nearly cost him his life. I did not know the conditions there and asked Jewett in my letter what the possibilities were of sending an Agricultural explorer there. The letter fell into the hands of the Ameer and aroused his suspicions. Jewett was one of the two English speaking persons at that time in the country. One Sunday morning my door bell rang, and Jewett came to my house in Connecticut Avenue with two big saddle bags filled with seed sent by the Ameer. This collection of pistache seeds with its Afghanistan label composed part of the collection of seeds. Very few of the seeds grew however and the seedlings, which like many nut trees do not come true to seed, have not produced any varieties of particular value.

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A year ago I had the pleasure of making a motor tour through California. I went to see Leonard Coats, one of those real pioneers of 65 or 70 years of age, who has perhaps done as much for California horticulture as any other one nurseryman, and he took me up into his orchard on the hill side overlooking his nursery where no drops of rain had fallen between the months of March and October when I was there and where they only have 22 inches of rainfall anyway, and I found growing there this collection of pistache trees which we had sent him about ten years ago. The nuts are borne towards the ends of the branches. The tree is able to withstand any amount of drought and as I sat there and he told me how prohibition had wiped out the vineyards of the surrounding country, how the Italians had deserted them and gone back to Italy, I could not help feeling that in this beginning on his hillsides we had the possibility of covering those thousands of acres of hillsides which exist in California today, from which the grape vines have been taken out, with a nut crop of the very first importance. These little beginnings are really the most interesting things in life. I read in the paper today that this is the ninety-fourth anniversary of the first railroad in America and my mind went back to a conversation I had with Edward Everett Hale when he told me that his father was the first man to bring over an English locomotive to America. What do you suppose was the principal objection that the people had to railway exploitation in this country? They could not see how two trains could pass each other on the same track. So his father brought over from England a little model switch and put it down in his parlor and took people in there and showed them that two trains could pass if one ran off on a siding. That story of Edward Everett Hale has helped me to understand why it is that most people hesitate to go ahead into any new industry always seeing some impossibility in its development. I could probably prove to you beyond a shadow of a doubt that not a single one of these nut trees I am showing you tonight could ever be made a success. Notwithstanding that they are successful.

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This is one of the Sfax varieties from Tunis growing in our plant introduction gardens at Chico. We had to establish gardens where we could grow these trees and send out the young plants to growers and in these gardens we have test nurseries or test orchards as we call them where we grow these fruits. This is an Assyrian variety brought in by old Dr. Fuller who spent some time as a missionary in Asia Minor and became convinced of the importance of the pistache industry, and has been one of the pioneers in these small beginnings. This is a six years old tree. This is 15 years old a seedling tree near Fresno. It has borne a good many crops of fair sized pistache nuts as large as the Trabonella, the Sfax, the Tunis and the Aleppo and those forms which are going to be the real pistaches of the future in this country. The pistache in fruit is a most interesting sight. The nuts are pinkish. They have the pinkness of the peach, almost, without the fuz and they

are covered with a thin skin which is taken off usually with the fingers. The nut inside has a texture that makes it very attractive. When they are first gathered it is very difficult to crack them with the fingers but if they are put in the oven and roasted they open up and leave a little suture into which you put your thumb nails and pry the ends open.

This picture gives you some idea of the yield of the pistache. It is a fair yielder, as much as fifty pounds of nuts having been borne by eight or nine year old trees. Ours have not done as well as that. The price of course ranges like the price of all other nuts. They sold last year for 75 cents a pound here in Washington. The kernels sell for \$1.50.

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This gives you a good idea of the pistache fruit with its outer shell, the nut and the green interior. If any of you are going to California and do not like the idea of taking up hazel nuts, walnuts and pecans, if you will take up this industry we will help you all we can. It will grow in Arizona, New Mexico, and we have records of them growing in Arkansas. They will stand a temperature below zero. Trees have been known to live through several winters even in Southern Kansas.

In all these investigations we have found the stock problem is very important. Here we have the *Pistachia atlantica* which has much smaller seeds. It is this that we are using most commonly as a stock for the pistaches that are being grown in California. Frank N. Meyer brought back from China the seeds of the Chinese pistache, the hardiest of all pistaches, a tree which has been almost hardy even as far north as Washington and central Kansas. It is not only a nut tree but a magnificent ornamental tree and grows to a very large size. We have used it as an avenue tree leading to our plant introduction gardens in Chico because it colors up so beautifully in the autumn and the spring. In the spring the tips of these leaves and branches are a brilliant pink and in the autumn it turns a gorgeous scarlet. It is destined to be one of the best landscape trees of California in our opinion. It grows to be centuries old.

Frank Meyer standing beside a tree which has stood three centuries at least. Imagine what pleasure he would have had had he only lived to walk under this great avenue in his old age.

The question of congeniality between the true pistache and the Chinese pistache is shown here. We rather jumped to the conclusion, when we found that the ordinary pistache overgrew the Chinese pistache, that perhaps it was not so good a stock as we first thought, but I notice, looking back at my photograph taken in Greece in 1901, that the regular stocks used by the Greeks for the pistache are overgrown in the same way by the true pistache. We have much larger trees than these now in Chico and as the Chinese pistaches are very old and large trees we have come to the conclusion that in all probability the pistache will be successful on this Chinese stock.

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I was walking through a market in Hong Kong in 1902 and I saw a few bushels of nuts that I had never heard of or seen before. The nuts looked like acorns but when I picked them up I found them as hard as hickory nuts. I cracked one of them with a brick and it was almost as hard to crack as a hickory nut. It was unmistakably an acorn, I thought, and I bought a bushel of the nuts and sent them to this country. It is called *Pisania* by botanists and it has many of the characteristics of an acorn. The kernel of this nut comes out whole and for that reason it would be very easily cracked by mechanical means. It has a sweetness which does not suggest an acorn. It does not remind you of the acorn. It is a commercial product in Southern China shipped down the West river and it seemed to me well worth while trying to grow it in the United States. We have had a great deal of trouble with it. We did not find the right place for it at first. It was hardy here in Washington, even, for a few seasons but the temperature at seventeen, eighteen and twenty below zero finally killed it out. It is now growing down in Mississippi.

Here is a photograph sent me from Honkong, the only one I have of the tree as it appears on the hills of Honkong. This tree which is now 11 feet tall on the place of Mr. Joe Williams at Langdon, Mississippi, is one of the few that is now growing in the United States. There is one in Southern California. It probably would be perfectly hardy along the Gulf coast. Just how good a bearer it is going to prove I do not know but it is very interesting even to register the fact that the plant is established in the Southern States.

The *Macadamia ternifolia*, or Queensland nut, is not quite so well known in Queensland as I thought it was. A very brilliant young man from Australia, by the name of Johnston, passed through my office the other day and I showed him the photograph of the *Macadamia* and to my chagrin he did not know much about it, although he was a very good botanist and a very keen man. He said "We do not pay much attention to these things over there." That is really characteristic of many of the foreign plants that we have brought in. They are not developed in their own countries any more than some of the fruits which we have in this country are not developed by us. Mr. Littlepage and I are going out in a day or two to see if we can find some larger papaws. Now the papaw has been just as badly neglected by the Americans as the *Macadamia* by the Australians and it may be that the only way to get the papaw developed is to send it to some other country and get them to develop it. We do not always develop our own possibilities.

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This is a tree grown in Avon Park, Florida. It interests me very much because it looks as if it would be a good bearer, is suited to the sandy lands of southern and central Florida, seems to be quite hardy and is a beautiful nut. It will vie with any other edible nut that I know of. This tree is in the Royal Palm Gardens in Palm Beach. The trees were brought in by us about 1905 or 1906.

This is a tree in Cuba where it is perfectly at home.



This gives you an idea of the character of the nut in a bunch. This is the nut. The shells when opened are as attractive as anything I know of. This is a very thick walled variety. We have much thinner walled forms that have come from Hawaii where it is now being grown. The dark part is a maroon brown and the lighter part is a brilliant creamy yellow. Altogether it is an extremely attractive nut, an excellent eating nut and has very good food qualities. We have had them analyzed, and all the data are at the disposal of you gentlemen at any time you wish to consult our files.

One of the first pieces of foreign work I was asked to do for the government was to get and import the hard-shelled almonds of Spain. Most of you have eaten the Jordan almond and I imagine most of you think it comes from California, but there are very few Jordans grown in California and, so far as the investigations go which I have been able to make in California in co-operation with the candy manufacturers, I have discovered that the California growers are not growing the best almond in the world. That the IXL and the Nonpareil and other almonds are not considered sufficiently good for such men as Lowney to use in the manufacture of their almond candies was a surprise to me. And the reason? In the first place the skin of the kernel itself is too thick, the nut is too brittle and it has not the flavor of the imported nut. I was shocked the other day to read from cover to cover a bulletin on the subject of Almonds, and to find that not one word was said of flavor. It had to be a good cracker; but the marketable qualities did not take into consideration the question of the *flavor of the kernel, its hardness or the thickness of skin.*

This picture on the screen was taken in southeastern Spain. These are the almond crackers of Spain and a poorer lot of people I have never visited in my life. The little children, not over four years old, instead of playing as ours play, carry around with them in their hands little bundles of wheat straw which they braid with their hands as they play, making sombreros which are shipped to the Argentine. It is a very poor country where these grow. The soil is very thin and very dry and these almond trees grow on the hillsides. It was with an unpleasant feeling that I took these cuttings from southeastern Spain, and brought them to America. I got them from the trees that were bearing these almonds, they were budded in California and we know where the trees are growing in California from these buds.

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This is a view in one of these hillside plantations of southeastern Spain with two of the almond growers.

This is a view in the plains region near Valencia showing both the hard shelled almonds and the soft shelled ones. The soft shelled are those which are easily cracked with the fingers while the hard shelled have to be broken with a hammer or an instrument. It is these hard shelled almonds that we have been interested in getting.

I have not kept in touch with this almond situation as I would have if I had been a specialist on almonds instead of spreading my energies out over the whole field and it is time someone really got into the almond business. I once traveled fifty miles from Bobadilla, Spain to the next railway station between solid walls of seedling almonds in bloom. No American has ever been to these seedling orchards to see what they are. It should be possible to find in those rows that are now 25 years old late flowering varieties which would be adapted to the conditions in California or early flowering varieties which would cross pollinate the Jordan almond. But we have not had the extra man with which to do this and carry out the other things we have been obliged to do. The interesting thing about this Jordan almond is that it behaves differently in our country than it does over in Spain. You notice how smooth each one of these almonds is. There is no sharp keel on the Spanish grown Jordan almond at all. It is smooth all around. Here are the almonds grown in California from the scions which I brought in. You see how these "keels" are developed and the nut has also become more pointed. We have not had an opportunity to investigate this thing thoroughly, but I am convinced that this is an environmental effect. Dr. W. A. Taylor has suggested that the fact that the Jordan flowers before any other variety comes out may mean that the California nuts are the result of self fertilization and this self fertilization may be the cause of their different shape and texture. Either that or the bud wood which I brought over from Spain was not representative of the Jordan variety although I picked it from trees that were bearing these nuts and I saw the nuts and they were typical. Of course it is possible that on the bud stocks which I brought over there was this hereditary tendency to produce these keels. However, we have made importations of the Jordan almond since then with the same result. One of these was grown in California in the desert region and one in Niles where John Rock, the great pioneer horticulturist of California, had his orchards. Both of them behaved in the same way. I sent some of the best kernels from these imported Jordan almonds to Mr. Lowney, the candy manufacturer who imports large quantities of Jordan almonds from Spain, and he reported that he could not use them for his candy manufacture because they were too hard and the skin too tough.

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One of the most interesting experiences of my life was in 1903 when I visited a French barber in a little town called Nevada City, California, in the foothills of the Sierras. He had come over to this country without a penny and had set up a barber shop in this little mining village of Nevada City. He had saved from his fees for cutting people's hair and shaving them, \$3,000. He had bought a piece of barren hillside which everybody laughed at him for buying; and he sent an order for \$2,500 worth of nut trees and fruit trees to a nursery firm in his old home in France. He did this without even having an irrigating system with which to irrigate those plants when they arrived. He told me with tears in his eyes how he had worked night and day, carrying buckets of water to save this collection of plants when it arrived from France. When I visited Felix Gillett in his plantation there, which he called the *Barren Hill Nursery*, I felt that I had never seen a more delightful spot in my life. It was a kind of a paradise which he had built up by his love for plants

and his wonderful knowledge of the varieties which he handled. He certainly was one of the great experts of this country in the nut and fruit industry, particularly the nut industry. It is his collection of hazelnuts which Mr. Reed spoke of as having found its way into Mr. Quarnburg's hands. In fact I was at Mr. Quarnburg's place a year ago last summer and learned that he got his first start from this little French barber in the mountains of Nevada.

This is Felix Gillett standing beside the first Jordan almond tree in America. The difficulty with the Jordan tree in this section was that it flowered too early and too few crops were produced. We have tried a good many sections for the almond and one of the problems, in my opinion, is the development of stocks for it. Here is the IXL on one of Meyer's Chinese stocks (*Amygdalus davidiana*). It does very well on this stock in the region of San Antonio, Texas. But the future of this almond business ought to have been told you by Meyer after he came back from his trip in Western China. These bushes are of the Tangutian almond, a little bush almond; growing occasionally 15 or 18 or 20 feet in height and hardy. It was Meyer's plan, had he lived, to find some place in Southwest Colorado in which to breed hardy almonds that would cover those hillsides with a food producing plant. I believe had he lived he would have done that for we have gotten together already for the breeders a number of forms of great promise. Mr. Wight of the Office of Pomological Investigations is now in California doing breeding work, and I hope his life will be spared so that he can produce a practical bush almond. My object in throwing this photograph on the screen is to show you a hillside covered with a food producing plant which has never yet received the attention of human beings, and yet if studied might lead to the production of an entirely new type of almond which will probably grow as far north as the Dakotas.

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Jumping from the Dakotas to Florida I want to introduce to you the Candle Nut or Kukui nut of the Hawaiian Islands which is growing in the sandy regions of the tropical belt of Florida. If you will read the literature you will find that it is referred to as a cathartic, resembling in this respect the castor bean. The problem is whether the candle nut as grown in Florida is poisonous or not. Prof. Simpson is growing in his yard in Florida a tree of this Kukui nut and has eaten these nuts for years, and he just sent me a couple quarts of them from his tree and I have tried them on my friends with no injurious results whatever. The thing to look out for is this fetish, this superstition of poison. This is a very hard-shelled nut, very oily and resembles somewhat the Brazil nut. If a market can be made for it, and there does not seem to be any reason why there cannot, there is no reason that they cannot be grown and they will be grown in southern Florida. That country which in 1898 was a wilderness is now developing very rapidly as a region of homes and what they want is plants that they can grow down there that they can live upon.

On the left is one of these trees which has a good many nuts on it. It is in Miami, Florida. This is a branch of one of these Kukui nuts in Miami.

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This is probably the least known of any of the nuts. It is the Yeheb nut. It belongs to the order of Leguminosae and they tell us it is so sweet, having between 21 and 22 per cent of sugar, that the native Arab will desert his dates and rich diet, which is the ordinary diet of that region, and take to the Yeheb whenever it comes into fruit. This Yeheb shrub grows in the deserts of Italian Somaliland and ought to succeed in our southwestern country. During the war there was attached to the Italian Embassy the Italian Explorer Captain Vanutelli, who had the distinction of having been captured by a savage chief in Abyssinia and bound for over two months to a black Abyssinian slave. When I spoke to him about this Yeheb nut he said, "Yes, I have eaten it. It is a wonderful nut. Some day I will get you some of it." When the shipment came there were two tons of nuts and I was a little surprised to say the least. They were brought on camel back over the deserts. During the war they took eight or nine months to get to Washington and when they arrived they were all dead. Notwithstanding many attempts this nut is not grown in the United States but we will have it. It is very thin-shelled, the kernels come out whole and have a very sweet, delicate flavor.

You have just come from Dr. Van Fleet's chestnuts. You know that this is the Chinese chestnut (*Castanea mollissima*) which Meyer found in China. Dr. Van Fleet would probably tell you this is not the way to prune them if you want to increase the chances of these Chinese chestnuts withstanding the bark disease. You are probably familiar with the fact that Meyer discovered over in China on this species the original chestnut bark disease which has destroyed our chestnuts in this country. He found that this variety was highly resistant but not entirely immune to the disease. Dr. Galloway, who is handling the propagation and distribution of these Chinese chestnuts, for our office, wishes to have it understood that in the distribution of these which we will make in the spring we desire to have them sent out in blocks; we would rather not distribute these Chinese chestnuts in single specimens but would be very glad to consider offers from people who have a quarter or a half of an acre that they want to plant. We want to get some idea of the behavior of this species as an orchard crop.

This illustrates the way, as I understand it, that Dr. Van Fleet thinks the trees should be treated, on the left; the way they should not be treated on the right. They seem to be much more susceptible to the disease when pruned up in this neat orchard fashion.

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One of Meyer's photographs taken at Fanshan, northeast of Peking, where he found the chestnut bark disease. This is the way the trees appeared. This gives you some idea of the size of Chinese chestnuts which he got. Those back on the hills are all Chinese chestnuts on rather poor soil as he explains in his description of the photographs.

This is an orchard of Chinese chestnuts as planted by the Chinese on the richer soils of the low lands which show larger trees. Even when full sized they do not compare with our American

chestnut but are old enough to show you that they have not been killed by this bark disease.

These trees show signs of the disease but that they have a high degree of resistance is apparently beyond dispute. This shows the black scar near the top which Meyer diagnoses as the remains of the chestnut bark disease.

The scar there in the crotch of this chestnut tree indicates the degree of resistance of this species. Just how it is going to behave here in America no one can tell but that it would be possible to grow orchards of these Chinese chestnuts with the care which you exercise in growing pears or even peaches I think is a pretty safe guess.

Meyer remarks that this tree is probably a century old and with signs of this disease on it. Here is one that he marks as between two and three centuries old.

This, gentlemen, is the newest arrival in this country coming from East Africa near Zanzibar. In Curtis's magazine there is published an account of this nut after Mr. Playfair a British subject who had lived on the island of Zanzibar. This is one of the most curious and most interesting nuts that has been brought to our attention.

It is borne by a climbing vine the stem of which sometimes reaches six or seven inches in diameter. The fruit is between two and one-half and three feet long and eight inches in diameter, and bears between 250 and 264 of these large seeds about the size of chestnuts and with a delicate flavored. In 1884 this Mr. Playfair sent some of these nuts to England, but we have just discovered them so to speak. They will probably grow in our tropical possessions and we must not overlook the fact that after all there is a distinct drift in our agriculture towards the development of that part of the globe which has been so overlooked by horticulturists in the past. It is not at all impossible that some of you who are here in this audience today will buy that Playfairia on the markets.

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I thank you very much indeed for your attention.

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THE PRESIDENT: The hour is late. What Dr. Kellogg may have to say I know will interest you all greatly but it might better be said tomorrow when we are fresh and the attendance will probably be larger than it is this evening. If there is nothing further to come before the meeting tonight we will take a recess until 9:30 in the morning.

The convention adjourned until 9:30 a. m. Friday, October 8.

MORNING SESSION FRIDAY OCTOBER 8, 1920

The session was called to order by President Linton at 10 o'clock.

THE PRESIDENT: I wish first to beg the pardon of the membership of the Association for the little time that I have been able to give to the preparation of this particular paper. To illustrate how limited that time has been, starting from Michigan prior to our meeting yesterday I had less than twenty-four hours to get to Washington. It was necessary that I should call a meeting together at a little town in Michigan where the regular train did not stop. In order to get that train it was necessary to send a man to buy a ticket to that particular point and as he climbed off that train I climbed on. The conductor thought we should be held up for a conspiracy for stopping a train of that character. On reaching Detroit there were a few minutes between trains. After landing in Buffalo I found that there were fifteen minutes to make connections, and after getting on that train I found our good Brother Pomeroy aboard and he had some fine drinks and other things from his home farm so that it was really the midnight hour before I could commence on this document.

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## PRESIDENT'S ADDRESS

HONORABLE WILLIAM S. LINTON, SAGINAW, MICHIGAN

LADIES AND GENTLEMEN:

I well realize that it is an extreme honor that has come to me in having been named as your President, conferring the privilege also of presiding at this important meeting, your Tenth Annual Session. It has been my lot for almost three score years to mingle largely in civic affairs through organized efforts, for man's betterment along many lines. But with all this experience I do not recall any single group, or undertaking of greater possible and probable value to the people of this country and especially the next and all future generations than the purpose for which we gather today. It is of such vast importance that earnestly and enthusiastically we find foremost in the work, "the best equipped, most intelligent, progressive and successful Agricultural Department" of any government on earth. We are signally honored by the co-operation of one of the most important members of the President's Cabinet, the Secretary of Agriculture, assisting in our program by the presence of leading officials of his staff, all endeavoring in every possible way to supply excellent sustaining foods to mankind, and to add from many choice products of field or

of forest, to the joy and comforts of living.

The particular line of effort in which this organization is enlisted is worthy of at least some time and thought upon the part of all persons interested in promoting the welfare of the community, state or county in which they live. Those who will do their share, and there are thousands of them if the subject can be properly presented, can add largely to the food supply of the nation, and provide real delicacies for every table in the homes of the poor as well as in the mansions of the rich. It would be but a few years before we would have in size, and quality the aristocrats of the nut family, in walnuts, hickory nuts, butternuts, even beech nuts, the same as in fruits we have the Bartlett pear, the Northern Spy apple, the Naval orange, the Crawford peach, or the Brighton grape.

Work of inestimable value is being done by our membership in propagating improved varieties that will be rich and lasting in results. We cannot, however, afford to halt for this development of species as our own time is too short, but we can cause to be planted millions of seedlings out of which will come many choice varieties of the future. We would have had them now had our forefathers realized what could be accomplished along this line and the necessity for doing it.

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Therefore I would urge with all earnestness that the work be not further postponed, but that we bend every energy to bring about an awakening in this matter that will cause general activity throughout the entire United States. There are several ways of doing this, any one of which should bring results. The only question about any of them being, who can spare the time necessary for this work. My pleasant acquaintance with the members of this Association proves you all to be one hundred per cent Americans, standing well up in your business and professions, and leaders in the civic life of your communities. These excellent points to your credit, really deter each and all from giving time throughout the year to the Association's work and permit only the annual gathering and the events connected therewith that are largely spasmodic only in action and effort.

The Association should be made large enough and strong enough financially to provide a Secretary with proper clerical assistance and fair compensation for work well done.

From fifty to two hundred members can be easily secured in every state in which the Northern nuts grow. Officials of government, States, counties and cities are ready to join in the movement. Road builders, owners of cut-over and other lands only need to have their attention called to what can be accomplished and the great majority will unite with us. The work of the American Forestry Association has promoted our cause also, and the establishing, and naming of historic trees throughout the land can well be made a feature of our plans. Only a day or two ago a Michigan paper carried the following item:

#### **MOUNT VERNON WALNUT TS THRIVING IN INGHAM**

Mason. Sept. 26.—Summit R. King, a pioneer of Mason, who was present when the Republican party was born "under the oaks" in Jackson county, has evolved a plan for raising historic trees in Ingham county.

In 1906 he visited the tomb of Washington at Mount Vernon and while there gathered some black walnuts from a tree on the grounds. He planted those and his trees are now in bearing.

He has placed a quantity of the nuts in the hands of the county school commissioner, Miss Daisy Call, to be given to the rural schools that the grounds may be beautified with trees planted in memory of George Washington.

Why not have Mount Vernon walnuts thus distributed throughout the Union. Every school boy and girl in the land would be delighted to get them for planting.

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The supply would not equal one hundredth part of one per cent of the demand for them. Then select throughout the country other special or historic trees of various kinds or varieties of nuts and still I am sure the supply would not begin to equal the demand. Long ago I began to arrange for nut crops from some of these historic trees, planted by Washington at his beautiful Mount Vernon home, now the Mecca for prince or pauper and all those millions who love the freedom of glorious America.

Those nuts will be planted in the parks and on the grounds of the people of my home city this very year by the children of our schools who are now in their moulding being taught to revere the name of the father of our country.

This very act of patriotism will cause thousands of boys and girls to have fixed in their minds for youth or age the value of planting the useful trees that will in later years produce food of the very best character for the human race. Carry this message into every city, village and school district and the good work will be duplicated thousands of times and then the movement in which we have so earnestly engaged will have brought forth fruit in great abundance so that even the great majority of those living today, and certainly the generations to come must give this organization and its founders great credit for real and lasting benefits that will prevail for centuries to come.

We all desire at this very important period in our existence as an Association, to strengthen our forces and enlarge the scope of our work. To do it at once let me suggest the early choosing and naming of live vice-presidents in every state that may be united with us in membership; also a

general committee on legislation. This committee can do much the coming year when legislatures throughout the country will be in their regular session, to cause the adoption of laws similar to the Michigan Statute known as the Penney Act, which provides for the planting of nut and other food bearing trees along the public highways.

It is one of the most progressive enactments in recent years and its good features should be adopted by every State, and the Federal Government as well, by applying its provisions to National highways also.

In conclusion I wish to thank each and every officer and member for uniform courtesies and favors extended to me throughout the year. My only regret being that official duties, extended traveling, and other unforeseen demands upon my time have prevented me from giving the close personal attention to every detail of the Northern Nut Growers Association business that it otherwise would have been my great pleasure to have done.

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My gratitude is cordially extended to each and every member.

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MR. B. G. FOSTER: Mr. President and Fellow Members: I realize that children should be seen and not heard and I am merely a child in this organization. At the same time I believe under modern conditions children are being more and more heard and the older people are being put more and more in the background. So I am going to take the liberty of making a few remarks particularly with reference to the president's address. This is my first attendance at a meeting of the Northern Nut Growers' Association and I have profited very greatly by it. I have become very much interested in nut culture. In a small way I am stumbling along and learning something of the work and the development of this industry. At present it is merely a fad with me but I do not know but what it may become something more as I get into it. I have been particularly impressed this morning with the address of the president. There were one or two suggestions that he makes that I wish to refer to. I think it is an excellent suggestion to get the children interested in nut culture through historical nut trees if nuts can be secured from such trees and delivered to different school authorities.

Another is the question of having a representative from every state. I would like to inquire from the secretary if some such provision has been adopted.

THE ACTING SECRETARY: We have always had a list of state vice-presidents which you will find in each one of the reports. Those state vice-presidents have been selected because of their being the most active members in each particular state but they have never been especially active more than to turn in some communication about their work. I have never been able to get any of them to make any special campaign for new members.

MR. FOSTER: Then, as I understand it, the president's idea is to urge these vice-presidents to take a more active interest in the affairs of the association.

THE PRESIDENT: That is the point I desire to make.

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MR. MORRIS: When the constitution of the United States was drawn up it was said to be "insanely ideal." We do not have to stretch our imaginations this morning to the point of a question of our sanity when our president's compositions are put before us. His paper seems sanely ideal. There is only one thing that interests a child more than history, (unless it is Sunday school), and that is a dollar bill. Now if we are going to approach the children let us introduce the pragmatic side of giving the child an object lesson showing where the planting of a nut tree will bring a return in dollar bills that will ripen along with the leaves every autumn instead of just leaves alone. We should have in connection with various educational institutions a few object lesson trees. It seems to me that this is a responsibility of the state. A number of responsibilities have been put upon the state in the past and a number of responsibilities have been put upon the educational department in every state. So many of them, in fact, that hardly any legislature will stand without hitching when there is a question of diversion of "pork barrel" funds away from river and harbor appropriations toward education. We can show that very much larger river and harbor requirements will follow if our children raise so much of this great new feed supply that we have more things to transport. The question may be taken almost seriously from that point. In fact if you give further consideration to the matter it seems to me that this statement of mine, made somewhat in the spirit of levity, is like many other statements made in the spirit of levity. It has a basis in real fact. The development of that basis I will leave to your imagination.

MR. MCGLENNON: In regard to Dr. Morris' remarks relative to the financial consideration, that appeals to me with peculiar force and I think we can very materially provide for it in an enlarged membership. For some time I have been giving very serious thought to the subject of enlarging the membership of the Northern Nut Growers Association. I think quite a substantial gain was made last year and I believe that a very large gain can be made this year. I think we ought to have a membership in the neighborhood of a thousand anyway. I believe we can increase it this year to at least 500. Probably I am particularly fortunate in having a source of supply of membership that perhaps the rest of the members have not, through the L. W. Hall Company. This company is handling our improved filberts and is getting a large number of orders and the people who have received plants during the past couple of years seem to be very much pleased with them. In many instances they have already borne fruit. The Hall company has received

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splendid letters in regard to them. In the fall and in the spring the Hall company sends out a large number of catalogues. This fall they will send something like a thousand, in the spring from five to seven thousand and in each of these catalogues the literature of the Northern Nut Growers Association can be included. We experimented a little last year along this line and I believe Mr. Bixby will bear me out in saying that there was quite a tangible response. I got a few members in and about Rochester through friends but I believe that I can almost guarantee at least a hundred members myself this year and probably more, particularly through the medium of the Hall agency. But, as Dr. Morris says, or practically said, there is nothing in this world that talks louder than a dollar so I thought I would come here prepared to back up my position and to guarantee at least 25 members for this year.

There is another matter to which I think we ought to give serious consideration and that is the matter of the American Nut Journal. It is the only nut journal, as I understand, in the country and I believe there is an inestimable future for it if we seize our opportunity or enable Mr. Olcott to seize his. At this time, I believe, he is not getting the support that he ought to have from this Association and the other nut associations of the country. He is a very able man, at one time the editor of the Post Express in Rochester, the classiest paper in Rochester, and we have some classy ones there, he is an educated man of large experience and very versatile and it seems to me he ought to have substantial support. So I came here with a certified check for 25 memberships to the association and 25 subscriptions to the American Nut Journal as a guarantee of good faith. I believe I can add 75 more.

There are some other things that I think we ought to give consideration to and that is the work that is being done by Dr. Deming and Mr. Bixby. I think these men should have special and substantial support, real support, money support, so that they can do things as they ought to be done at the time they ought to be done. I think we are selfish in asking these men to give so much of their time and attention and money to the affairs of this association without giving them better support. If we have more members we will have more money and more members will bring more members. This propaganda will be spread far and wide. The interest in nut culture is growing by leaps and bounds. I think this is the time to strike as a scientific organization. I think the Northern Nut Growers' Association is the most scientific of all of the nut growing associations. That is something of a guess, of course, but if they were put to the test I believe it would come out on top. Anyway put me down for the very best efforts that I can render to the end of building up membership and financial support of this association. It seems to me that with men like Deming, Bixby, Morris, Littlepage, and others whom I could mention, the scientific and practical ends of this association are being pretty well taken care of. We meet here in association and it is very lovely, something of a mutual admiration society; we go away and are likely to forget until it is about time to get busy with another meeting. Now it seems to me we ought to be busy all the year doing something so that when we come to the meeting like this we have something to report in the way of membership and money. That will make possible these plans that Dr. Morris suggested. I was unable to hear the president's address but it seems to me that more attention should be given to the matter of finances of this association and the membership.

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I just want to add a remark or two in regard to Mr. Vollertsen who is going to read a paper on the filbert. We have found, and we certainly believe, he and I,—and he knows more than I do because he is on the ground all the time—I look after the sales end of it,—we have found that several of our smaller varieties of nuts are, in our estimation, decidedly superior to some of the larger varieties. While we believe that the consumer is going to give first thought to size he will be making a mistake if he passes by some of our smaller varieties which are splendidly filled, filled to capacity, very rich, and thin-shelled. I do not want the smaller varieties passed by.

MR. JONES: I think the nurseries would be glad to co-operate in the getting of new members and it has occurred to me that they might like to donate trees to new members or plants or something that would attract them. That might be worked up with the secretary if it would be any great attraction for getting new members.

THE PRESIDENT: I think that is a very good suggestion.

THE SECRETARY-TREASURER: Mr. McGlennon spoke of the amount of time that the secretary had to give to the work. I can speak from experience and I can speak frankly because the secretary and the treasurer are different persons, although the office of the secretary treasurer has not yet been officially divided. The treasurer is supposed to have not much to do and the secretary to get the bulk of the work. While the finances of the association at the present time are not such that we can recommend the paying of a salary to the secretary, yet there should be a salary paid to the secretary sufficient so that he could employ someone to relieve him of a good portion of the detail which comes on him. I know by experience what that is. I would like to ask the association to authorize the treasurer to pay the secretary a salary not exceeding \$500 a year. That is what it ought to be or whatever portion of that the finances will permit for this purpose. In offering that I do not want the secretary to think that he must begin to spend the money right away, because it is not in the treasury, but I have a lot of faith that we will get more money and will be enabled to pay that. So I want to ask your authority to do it.

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MR. OLCOTT: I would like to second that motion and also to endorse what Mr. McGlennon said, and Mr. Jones, in regard to new members. I think that is one of the things we need as much as anything right now and that we can get them if we go after them. I know that our secretaries, both Mr. Bixby and Dr. Deming, have done a great deal of work and that it takes a great deal of work to get new members. There are a good many other things on the schedule for the treasurer

and secretary to do besides that. We have a system of vice-presidents for each state and one of my recent ideas has been that he might form the center for an increase of membership in his particular state through co-operation with the secretary of this association. If we do not keep after this matter after we adjourn we shall be just about where we are now a year from now. It is activity that counts. I am sure that if we provide for a salary for the secretary we will get busy and provide for that salary, so I make the motion that the treasurer be authorised to pay \$500, or any portion of that amount that the association can afford, to the secretary.

DR. MORRIS: I second the motion.

The motion was carried unanimously.

THE ACTING SECRETARY: You will notice that, in the question box, question number 12 is in relation to roadside planting of nut trees. More people, it seems to me, are interested in the roadside planting of nut trees than in any other one phase of nut planting. I get many questions about what is desirable to plant on the roadsides and many suggestions that the Association particularly interest itself in encouraging roadside nut planting. Therefore it seems to me that it would be advisable that this association should appoint a committee which should consider all the factors concerned in roadside planting of nut trees, and should draw up a bulletin which can be sent out to officials and people who make inquiry and to all people who are interested, giving them exact and specific information on the subject of road planting in each state, considering each state separately and suggesting what nut trees had best be planted in that particular state.

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MR. JONES: I think Dr. Deming's suggestion is a good one but I do not like the idea of waiting another year. I think we ought to do that right now. There is a big opportunity for producing new varieties. For instance, get each state to take up planting of the very best nuts they can get and then plant the seedlings on the roadside and we will get new varieties that will be better than anything we have now. If you plant common nuts you will get common nuts but if you plant fine nuts while you will still get a large number of ordinary nuts you will get some that will be fine and some that will be better than anything you plant, if you plant enough of them. I think that is the greatest opportunity we have in roadside planting.

THE ACTING SECRETARY: I think this is the proper course to follow, that the committee appointed should have power to issue a bulletin without waiting for the next convention. I would like to see our president at the head of the committee.

MR. JONES: I would like to see them get the nuts this year. There is a good crop of nuts this year, black walnuts, hickory and other nuts.

THE ACTING SECRETARY: I move that a committee be appointed by the president, the number to be determined by the president, and our president, Mr. Linton, to be the chairman of the committee, to consider the compilation and issue of a bulletin on roadside planting of nut trees.

MR. BIXBY: I second the motion.

The motion was carried unanimously.

MR. POMEROY: You will find this argument probably will be used by some that the trees will be destroyed by automobile parties and children hammering the nuts off with sticks and stones. I have a few nut trees planted along the roadside now that are in bearing. They have been in bearing, some of them, six or eight years and they are within forty feet of a school house with a large attendance of children. I have had no trouble at all with the children gathering the nuts or tampering with the trees. Of course they take a few—I would take them if I were in their place,—but none of any consequence. Automobile parties passing along there seldom bother them—although they are worse than the children to tell the truth. You will hear that argument, that a food producing tree along the roadside will be injured by travelers.

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DR. MORRIS: Mr. Pomeroy's remark relates either to one of two things, to bad nuts or good children. We will not have that feature throughout the country at large. It is an important point, however, but if this is to be committee work it seems to me that perhaps Mr. Pomeroy and others might offer their testimony at the time there is a committee meeting for bulletin purposes and we ought not to go on with this discussion at this time.

THE PRESIDENT: The next thing on the program is an address by Dr. William A. Taylor, Chief of the Bureau of Plant Industry, on "The Place of Nut Trees in our Northern Horticulture."

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## THE PLACE OF NUT TREES IN OUR NORTHERN HORTICULTURE

WM. A. TAYLOR, WASHINGTON, D. C.

We are somewhat inclined in America to consider none but the big things worth while.

We like to do the big things and the quick ones. To organize billion dollar corporations; grow billion bushel wheat crops; to have the swiftest motor boat or auto; to receive the largest income per man, per year, or per acre. Concentrating our attention on cap sheaves and superlatives

rather generally we very easily lose sight of features less conspicuous though highly important.

Such an one is the rational development of nut culture in our Northern States. Since the scouring of our chestnut forests by the Asiatic chestnut blight has practically eliminated that nut from consideration for orchard planting in the infected territory until resistant varieties yielding good crops of nuts of acceptable quality are obtained or developed, we can hardly say with assurance that we have any nut of proved adaptability in sight which is worthy of planting on an extensive scale for its crop alone, on productive agricultural land in the Northern States.

Along the southern fringe of "the North" as in Delaware, Maryland, southern Ohio, Indiana, Illinois, and Missouri exception in favor of the hardy varieties of pecans should probably be noted but in the light of present knowledge orchard planting of the commercially important almond, Persian walnut, and pecan must be left to the Pacific Coast and in the South.

This fact has been so generally recognized that we have been inclined to give up all thought of attempting nut production in the North merely because large scale operation is not attractive. There is much ground for belief that this view is erroneous and that there is need for localized planting.

If the world war taught any economic lesson to civilized men which they should remember and act on, it is that low cost food reserves should be provided against possible exigencies. They are not needed every year but when needed their value can hardly be estimated. Only to a limited extent can such reserves be accumulated out of the production of our ordinary cereals and commonly cultivated crops. Potential reserves in the form of fruitful nut trees can be established at relative light initial investment or of continuing care and labor on almost every farm and by many a roadside in much of our farming territory. Black walnut, butternut, shag bark, shell bark, beech and other hardy, long-lived native trees can be established at low cost in large numbers for beauty, shade, and food production. Nor should the possibilities of Persian walnut, Japanese walnut, and native hazel be disregarded in favored sections.

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While none of these are entirely free from plant diseases or insect pests, they are, when once established, capable of maintaining themselves fairly clean and sound with little expenditure for spraying or other attention during the growing season when the peak load activities of the farm are on. Why should not their planting receive more attention and encouragement from our horticultural and other rural societies? For rough land and roadside planting they are decidedly more practical in most sections than any of our fruit trees, substantially all of which require spraying and tillage to maintain productiveness, or in fact to avoid becoming nuisances by harboring pests to contaminate the commercial orchards of the neighborhoods. While much has been said in America in commendation of the roadside planting of fruit trees so common in portions of Europe, and while there are possibilities of useful development along this line, most American efforts in this direction have proved disappointing because of the impracticability of giving the trees the care and attention they require. While often promising at the start they have quickly become infested with San Jose and other scales, borers, blights and rots which can only be prevented or controlled by systematic and thorough remedial measures, rarely possible on rough lands, in fence rows and on roadsides.

If this type of nut culture is sufficiently promising to be worth while, do we not need to attack its problems from a somewhat different angle than has become our custom with the trees which are to be grown under intensive cultural conditions at high maintenance cost, such as more and more characterizes our orcharding?

It has seemed to me for some time that in this field we need to return in our study of varieties and strains of nut trees to the standards and ideals of the earlier and ruder period of American Pomology when rusticity of tree, including storm endurance, freedom from troublesome diseases and insect pests, as well as productiveness and dessert quality were the primary consideration next after satisfactory productiveness and quality of crop.

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This and other like societies might well devote much effort to the securing of performance records of promising individual nut trees, whether wild or grown by man, with a view to locating those which, whether bearing nuts of the largest size and finest quality or not, possess the inherent ability to bear regular crops of fair quality under the rough and humble conditions of the average fence row or roadside of the region to which they are adapted. Can a more alluring and fascinating field for search throughout the growing season be suggested or one more likely to interest the growing army of nature lovers, whether dwellers in country or town?

Once located and proved worth while through a sufficient period of cropping such trees, especially of black walnut, could be made available through nursery propagation for rapid dissemination for experimental planting throughout the areas of their probable adaptability.

Do not understand me as in any sense discouraging the continuance of painstaking experimentation with a view to finding or developing varieties suited to orchard planting in those scattered, favored spots where conditions make success reasonably probable. My point is rather that in our northern states by far the largest potential production of nuts is through waste land utilization and dual or triple purpose planting, such as nuts and shade and in some cases ultimate yield of highly valuable timber.

In short, widespread recognition of the importance of nut-tree planting as a side line. This deserves attention during the next few years because of the practical certainty that as our nationwide development of permanent highways proceeds, roadside trees planting on a large



scale is sure to follow. When undertaken it should be on a solid foundation of experience especially with regard to the climatic adaptation, soil and drainage requirements, varietal characteristics, such as habit, vigor, pest resistance, and productiveness, all of which are fundamentally important where the use of the land for a century or more is involved. What has been said with regard to highway planting is still more important with regard to the planting of the farmstead where ill-suited trees become a source of grief rather than of satisfaction.

Side-line planting of nut trees in our northern states is practically sure to develop on a large scale during the next twenty-five years.

How can the essentials to its rational development be most promptly and accurately determined and most effectively disseminated among the people?

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DR. MORRIS: Apropos of side line planting, Mr. Jones some three or four years ago gave me a very handy little orchard saw. He said that when I went around the orchard on Sunday morning before church time if I had this saw with me I would find something to do. Well when I have this saw in my hand before church I find so much to do that I cannot go to church. Now if we take up tree planting as a side line it is going to be the little cap that will fire off the big gun. I think we may safely urge side line planting of nut trees believing that men who take up the side line will be drawn into putting them out on the very best land they have.

THE SECRETARY TREASURER: Dr. Taylor said "if the trees were suited to the climatic conditions." I would like to ask him about that. I get many requests from people from various parts of the country as to what trees would succeed in their sections. As a matter of assistance in the future I would like to ask Dr. Taylor how he would go about finding that out.

DR. TAYLOR: Mr. President, my first step I think would be to put that question to my neighbor who had been there longer than I, who had had his eyes open and who had had opportunity to observe. There is great risk in undertaking to project into investment propositions theoretical considerations with respect to particular varieties of trees. Our guide, our only guide, must be actual, observed behavior of the trees that we have under consideration. Of course we can draw some broadly general lines. We do well in a matter of this character to draw those lines rather conservatively and make clear that he who passes beyond the line does so at his own risk. He does it deliberately experimentally rather than upon what you might call an investment basis. The important thing, it seems to me at this stage is to observe and record the facts with respect to the trees now growing. That, of course, is particularly true with regard to the native trees which, without doubt, must take the lead in side line planting throughout the northern states. That is to my mind the important thing. Trees exist in large numbers. They need to be located and studied not merely observed on one bright sunny afternoon when everything tends towards satisfaction and optimism, but through the eyes in a way that will make available not only to the observer but to the rest of us the facts in regard to those trees.

THE PRESIDENT: The next number on our program is Tree Planting for Definite Purposes, by Charles Lathrop Pack, President of the American Forestry Association. Mr. Pack has notified us that he is unable to be present, but has forwarded his paper.

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## **GREATEST POWER PRODUCING ENGINE IS THE NUT TREE—MAKE NUT TREES YOUR MIDDLE MAN IN FIGHTING FOOD COST**

CHARLES LATHROP PACK, PRESIDENT, THE AMERICAN FORESTRY ASSOCIATION

On every hand we hear the call for power and more power. Every scientific genius in the world directs his attention to increasing power units in the struggle for world trade on which we are entering following a World War. Business calls for quicker transportation and the motor world answers with master motors; railroads are being or have been electrified; water power developments are being pushed in many parts of the country. The business world calls for more power and the aeroplanes answer with the delivery of mail and soon we are told it will enter the strictly commercial field. But what of man? What is being done to make him stand up under this terrific strain; this keener competition? What of the food that must keep him going? What of products that must be put before him with the middle man standing between?

A nut bearing tree is the most powerful engine in the world if its fruits be properly used. If the people of the United States could have nut bearing trees for their "middlemen" in the fight to bring down the High Cost of Living it would come down quickly.

Nuts are the most important of all tree crops because they are the richest natural food substance known. A nut is Nature's supreme effort to pack as much nourishment as she can into the smallest possible space for the nourishment of the future young plant. That some people are aware of these food values is evidenced in the nationwide tree balloting now being conducted by the American Forestry Association for the selection of a national tree. In this voting nut bearing trees are in the lead. Many nuts contain as much musclebuilding food as rich cheese, a third more than beef steak, twice as much fat as cheese, five times as much as eggs. Chestnuts contain 70 per cent of starch, nearly as much as the best wheat flour and four times as much as potatoes.

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Peanuts and hickory nuts are three times as nourishing as beefsteak. When you think of it that way it hardly seems to be the thing to casually munch triple extract of beefsteak from a street nut stand or after a hearty dinner. Say a fifty-pound bushel of black walnuts costs two dollars. It yields 12½ pounds of meats whose fuel, or food value is 37,500 calories. The same number of calories in beefsteak at fifty cents a pound would cost more than fifteen dollars. A bushel of hickory nuts at three dollars yields as many calories as sixteen dollars' worth of round steak.

Out in Kansas the other day a single walnut tree stump, grubbed out on the banks of a creek in Geary County brought the farmer \$250. When the call of war came we found we had to hunt for black walnut to make gun stocks and aeroplane propellers. In some towns in Ohio, citizens cut the walnut from their streets so high was the price offered for this wood. So let us make trees, particularly nut bearing trees, the memorials or the proper setting for memorials to the men who offered their lives to their country in the World War. Let us line our highways with trees and make them Roads of Remembrance. In this way the trees will impress their value upon millions of our people. Put these trees where they can spread the message of production and beautification combined. Take their seeds and pass them on to other places where the message will be spread still further.

Michigan is planting apple trees along a Victory Highway. Tourists will pick those apples some day. That is just what Michigan wants them to do. Michigan wants the tourists to carry the fame of Michigan's apples to the southern tip of Florida and to the northern tip of Montana. Why do not your members of this Association of nut growers follow the example of Michigan by planting nut trees along the highways of the state they represent. The American Forestry Association is glad to co-operate with anyone who wants to spread the message of the tree. The people of this country have a responsive ear to campaigns of education. The American Forestry Association's call for memorial tree planting has demonstrated this. Trees are being planted by the American Legion, the Service Star Legion, schools, church congregations, all sorts of organizations and individuals throughout the country. The tree is the one thing with its ever renewing life symbol that meets the requirements of a memorial. The tree is the memorial the individual can erect, care for and protect. Then just consider what the tree gives the planter in return—an affection that only comes from the bosom of the earth, to which the loved one for whom the tree was planted, has returned.

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You gentlemen are missing a great opportunity if you do not get squarely behind the American Forestry Association and help it spread the message of the tree, Nature's masterpiece and greatest gift to man, and in doing so urge the value of planting trees that produce food wherever such trees can give better service than those which do not produce food.

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THE PRESIDENT: The next number on our program is A Nursery of Improved Filberts, by Conrad Vollertsen, of Rochester, N. Y.

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## A NURSERY OF IMPROVED FILBERTS

CONRAD VOLLERTSEN, ROCHESTER, N. Y.

Again I have prepared a paper on the growing of Improved European hazelnuts, but through practical experience perhaps a little more positive in my statements.

It is well known, a well established fact, that our common native American hazelnuts both *Corylus rostrata* the beaked hazel, and *Corylus Americana* the American hazel in their present state of appearance are for various reasons not very well adapted nor desirable for cultivation, particularly *Corylus rostrata*, a very slow growing variety with unusual small and hard shelled nuts, so small and hard that even the rodents of field and forest refuse to gather and eat them. The only value I can see in this variety is that it may prove to be a good pollenizer. *Corylus Americana* is a better grower with nuts a little longer than the preceding variety, but a short life plant and therefore not even fit to use for stock to graft on and should never be used for that purpose. There is in fact by both varieties lots of room for improvement, which only could be gained through scientific hybridization and which we hope will be realized to a certain extent at least in a comparative few years.

It is true a few better varieties of the American type like the Rush hazel and one or two others have been discovered or produced, but even they do not favorably compare with the better European varieties and the consequences are: If we want to grow hazel-nuts, we are at the present time and until such time has arrived, when through scientific hybridization substantial improvements over the present state and condition of our native hazel-nuts has been gained, actually compelled to rely on some of the European varieties, compelled to grow and cultivate a large assortment, from which to select the proper varieties for the different sections of our country.

I therefore have chosen as a title to my paper The Growing of Improved European Hazel-nuts in Nursery and Orchards in the State of New York and other Eastern and Northeastern States. I have chosen this title, because it indicates that a nursery of European hazel-plants is in existence

and that orchards are planted, which is really equivalent with growing of European hazel-nuts for commercial purposes, otherwise there would be no need of such nurseries and no need of hazel-orchards.

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I have alluded to this very subject in an earlier paper, but was at that time not as convinced of the final success as I am today.

We have since not only experienced a very severe and constant winter but a winter in a great many ways rather peculiar and unusual with early and heavy snowfall, which prevented in some sections of the eastern states the freezing of the ground in spite of the bitter cold. We have since seen another season of buds and blossoms and balmy breezes passing away never to return and a season of harvesting our fruit is rapidly approaching its end, but, ladies and gentlemen, during this now vanishing and for some sections of our country rather peculiar season, great opportunities were offered the close observer to study and investigate the different problems concerning the growing of European hazel-nuts in the northeastern states of our country.

Let us hope that not all of these opportunities and chances offered us have passed unobserved, but that some of those perplexed questions of filbert or hazel-nut growing in the east have been solved. To me this past season, though somewhat unusual, was very interesting and above all very instructive to growers of hazel-nuts.

It is my opinion that the peculiarity of this season has wonderfully aided to solve many of those unanswered questions about the growing of European hazel-nuts for commercial purposes in the Eastern States. Through practical experience and close observation throughout the whole season it certainly has convinced me beyond the slightest doubt in my mind that some varieties of European improved hazel-nuts properly selected for the different states or parts of the Eastern States can be profitably grown for commercial purposes. It will of course require time and work to find out the right and proper varieties for the different sections of our country. For Western New York I could select eight or ten varieties from my nursery that would prove A No. 1 for that part of the state of New York, probably a number of the same varieties would do equally as well in parts of adjacent states, but of that we are not sure until actual planting has been done and thoroughly tried out. The question now is how and where can we obtain the necessary varieties of hazel-plants, as the importation of most kinds of nursery stock, including all nutbearing trees from foreign countries is at the present time very much restricted, practically prohibited. To my judgment there is but one way out of this, if we want to grow hazel-nuts of foreign origin.

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We are under the existing circumstances, as stated before, simply compelled to grow our own plants. And this is being done. And to prove that it can be successfully done I will try to describe and demonstrate the method I am using or employing in my nursery for propagating the hazel- or filbert-plants. I still adhere to layering as the best method of propagating the hazel, large numbers can be produced in a comparative short time, if sufficient stock-plants are at hand; and plants on their own roots have many advantages over grafted or budded stock, as there is no wild growth to combat with, so deceiving and aggravating to the people who plant hazel-nuts and liable to choke or kill the growth or bud, that eventually nothing but the wild stock will remain.

The general assertion or claim, that grafted or budded hazel-plants are more productive, more prolific, than plants on their own roots does not hold good to all varieties, as I have both grafted plants, as well as plants on their own roots of bearing age and have so far not been able to see any difference in bearing, now in the size of the fruit or nuts, but would like to have it strictly understood that this opinion of mine, gained through experience and observation in my nursery only should not be taken as final, as I only have a few grafted varieties to watch and to compare. In fact I have every reason to believe that grafted hazel-plants of some varieties, will be more prolific and bear more regular, but have had so far no proof of it, but will do more grafting of other varieties to establish the fact more positive and report the result later. For the buying public at the present time, plants raised from layers on their own roots should be preferable and layering as a method of propagating the hazel-plants resorted to until the general public gets more and better acquainted and familiar with the growing of hazel-plants.

The layering of hazel-plants in my nursery is done from imported stock or parent-plants planted on ordinary farm land thoroughly worked and well manured 12 feet apart each way. Two year old plants are selected for such planting, they are allowed to grow about two seasons before we layer them, which would be about in the autumn of the second year, at that time there should be besides the ordinary growth of the original plant, some fine young shoots growing from the root, which could be, if go desired, layered together with other branches of the plant, but is not always advisable, neither is it necessary, as the plants selected for parent stock should be well branched and well able to furnish wood enough for the first layering without those one year old shoots.

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I will now try to show to you, as an illustration and at the same time try to explain the reason why they should not be layered, simply because they are there. It is all well and good to layer them, if the scarcity of wood of a choice variety demands every branch obtainable and they will grow all right, but will never produce as nice a root as layers from a two year growth. These are the young so-called one-year-old shoots I have referred to, really just this season's growth, perfectly straight without any laterals. Now in layering them a little opening long enough for the branch and about 3 to 4 inches deep, the same as for layering other branches should be made in the ground and the young shoot or branch carefully bent and placed in the opening and well anchored or fastened before the ground is filled in again, otherwise our changeable winters may heave and loosen them, we will then at the best of it eventually grow but one plant from each of such shoots and generally poorly rooted at that, that is a root rather long and crooked not very easy to plant

and still harder to dig, very much like this specimen a layered one year old shoot, just taken from a parent plant.

We cannot improve much on this awkward root as it is impossible to shorten the bend in layering them, but we can improve on them, if we allow the one year shoot or growth another season to grow, we will then at the end of the second season have an altogether different branch before us, a branch in appearance about like the one I have here. You will notice the terminal bud of the last year's growth has made a growth of about 12 to 15 inches during this second season, besides that, you will see from 4 to 7 fine laterals all of them including the growth from the terminal bud fit for layering and all of them will bend easily and can be placed almost perfectly straight in the ground, which will invariably insure finer and better rooted plants and more of them, than a one year growth can produce, as is shown in this specimen from a two-year-old branch I have brought with me, this demonstration plainly shows that there is nothing lost in waiting two years with the layering of young branches, as our reward will be more and better plants possibly a little smaller, but better growing plants than the longer layers from a one-year growth, besides that, a branch with 4 to 7 laterals can be layered about as quick, as a one-year growth, as the same opening in the ground made for one layer is fully sufficient for 6 or 7 on a two-year old branch. All layered branches or little shoots should be cut back to about 3-4 eyes above the ground and remain in the ground about one year, the earth around the parent plants and between the layers must be well worked throughout the whole season and if necessary mulched with half rotten manure. After the layers are well rooted, they should be taken up, cut apart and properly trimmed and planted in the nursery row, where they remain until large enough for market or orchard planting. There is but very little pruning of the young hazel-plants necessary until they are planted in the orchard. I will therefore not dwell on the subject of pruning just now, but will leave the propagating and growing of the hazel or filbert-plants in the nursery and try to make a few remarks about the hazel or filbert orchard. I should perhaps have mentioned the growing of seedlings for stock to graft or bud upon before I begin my talk on the hazel-orchard, but as there is but very little to be said about it, I may as well refer to it right now.

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It is very difficult at the present time to import the ordinary wild hazel (*Corylus avellana*) from Europe for grafting purposes. We therefore are obliged to raise our own stock. This can well be done by sowing the seed or nuts or by layering of European varieties, we are in possession of. I have among my imported varieties several of which the fruit or nuts are too small and not at all satisfactory for commercial purposes, those varieties I am layering with that point in view to use them for stock to graft upon only. Such stock can also easily be grown from seed or nuts. It has for me so far not been necessary to grow seedlings, as I had stock enough from layers to graft upon, but have found any number of seedlings on my ground from nuts dropped from the plants and not gathered or destroyed by mice or squirrels so I know the seed or nuts will readily grow. Nuts can be sown in the fall quite successfully providing they are safe from mice, otherwise they should be stratified and kept from freezing during the winter. I will leave this subject now and call attention to the hazel or filbert orchard. If the planting of such an orchard is planned, the soil and location should be well considered. Ordinary farm land well worked and fairly well manured and not too wet will answer the purpose, providing it is an open piece of land well exposed to sun and air, as the hazel-nut requires both and a good deal of it in order to perfectly mature its' fruit.

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In planting the orchard, three or four varieties should be used on account of better pollenization and plants about three to four years old planted. Varieties that naturally grow more conical or pyramidal shaped could be planted about 12 feet apart each way, but the more spreading varieties like the Lamberts and others I would advise to plant 15 feet apart each way, as part of the land between the rows can well be utilized for low growing crops for several years to come and thereby prevent the waste of land. It is not necessary to plant an equal number of each kind, if three or four varieties are chosen for the orchard, we may select say two very prolific kinds and add a few plants of other varieties to mix in for pollenization, which will fully answer the purpose. Before going any further with my talk on hazel or filbert orchards, I should emphatically recommend the thoroughly working and preparing of the ground, as it is a very essential part of the operation and a necessity to the final success. It is a mistaken idea that a hazel orchard will take care of itself, the ground should be well cultivated and kept free of grass and weeds. Barnyard manure or other fertilizers should be resorted to whenever the ground shows a necessity thereof, neither trees or fruit can be grown successfully on poor and exhausted soil. All filberts or hazel plants are naturally inclined to produce a number of suckers or young shoots grown from the root, they should be removed as soon as they appear, it will stop when the plants grow older. Standard trees with a short stem say 10 to 15 inches should be planted in the orchard, if such plants could be had. It should be our aim to try to grow and prune them with that point in view to raise such plants, as they are then easily taken care of. This actually brings us to the operation of pruning our hazel plants, which is in every way quite an important part of the growing of hazel nuts. At the time of planting all plants should be cut back, the same as is done to any shrub or tree when newly planted, but after that the hazel being more a shrub than a tree should be pruned every year with the center well kept open all the time, all weak and unnecessary wood or branches in the middle of the plant should not be cut back but entirely removed, also the young growth of most of the branches should be removed to just below the terminal bud of the previous years growth, as I will show you on a branch I have brought with me.

If we will treat the plants in our hazel orchards as herein described we should not experience any difficulty in raising a fairly good crop of nuts, if the proper varieties are selected. Insects have so far not troubled in the least, a few tent caterpillars appeared in its season, but were soon

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destroyed by birds. We should not allow our hazel plants to grow too tall, 12 to 15 feet should be the maximum height, after that the tall growing branches should be greatly reduced, or gradually removed, as there is generally young growth enough to take their places.

During the severe winter of 1919 and '20 most all catkins or staminate blossoms above the snowline in our nursery were frozen, also part of the wood of a few varieties were more or less frozen, of which due notice has been taken. They will be closely observed during the coming winter. Only a few of the staminate blossoms that were well covered under snow developed perfectly and the result was a very small crop of nuts on most of the varieties, but all the varieties had some, even those more or less frozen plants. It plainly shows that but a very few catkins are necessary for pollenization, even over a wide area. There will be failures caused by climatic or atmospheric disturbances in our hazel orchards as well as in all other orchards which we cannot control nor prevent, but that should not discourage us as long as the prospects of fair crops are otherwise all right, the selecting of varieties, the proper pruning of our plants, the control of insects and the location of our hazel orchard is all in our power and should, if properly exercised, almost guarantee a fair crop and insure a fair profit from each acre so planted, providing the proper varieties are selected. Before coming to a close with my paper it seems to me justice is not quite done to the hazel proposition if I would not mention the beauty and pleasure thereof, the beautiful appearance of an hazel orchard and the pleasure and enjoyment it affords us, not from a financial point of view only in gathering the nuts, etc., but from other sources as well. No other orchard will in a comparatively short time appear more like a natural grove than the hazel on account of its characteristic compact growth and dense foliage, so attractive and inviting to our song and other insectivorous birds for hatching and rearing their young, the constant warbling of the different birds from early spring until late in summer, the building of their nests, the feeding of the young, all affords endless pleasure and enjoyment to the close observer. Now October is here, quietness reigns in field and forest, also in the hazel orchards birds are silent, a number of them departed for warmer climates, others ready to leave us, butterflies and other insects have disappeared, nuts have been gathered, and the leaves are falling, death, decaying and destruction seems to be dominating all around us, but our hazel orchard, though remarkably changed, still retains a certain part of its former beauty as the little catkins the staminate blossoms now become more conspicuous, an ornament to any catkin bearing tree throughout the winter, and a pleasure to look upon. There is no reason for discouragement, nature is not dead, only at rest, where we see death and destruction, nature in reality celebrates a new beginning.

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The close examination of our hazel orchard at this time will fully convince us that vegetation is still alive and active. Examine the leafless limbs, notice the beautiful staminate blossoms, notice back of the falling leaves the life, the thrifty little bud, a sure and positive promise of a coming spring with the early pistillate hazel blossoms, a great consolation and a great source of pleasure and enjoyment to all. Why not combine profit, beauty and pleasure? Why not plant a hazel or filbert orchard?

MR. JONES: I would like to ask Mr. Vollertsen if he has tried layering the two years growth and rooting the one year branches thereon instead of layering the one year growth. The one year shoots would no doubt make larger plants at one year but you get a larger number of plants by layering the two years growth and rooting the branches.

MR. VOLLERTSEN: I have found that these smaller plants will be better plants.

MR. JONES: What About rooting these and then transplanting. Don't you suppose you gain by rooting those and transplanting in a year.

MR. VOLLERTSEN: If these were all apart each and every one would make a good plant. I know from experience that they will grow faster a great deal faster than these long roots. There is a plant that has been planted one year from a layer. It is a one year growth. This is a two-year.

THE SECRETARY: I would like to ask Mr. Vollertsen if the soil makes a difference in the way in which they grow. That is if a sandy soil or a clay soil is better adapted.

MR. VOLLERTSEN: Well I must say if we had sandy loam the plant would grow better and it is more easily worked. Too heavy a soil is not so good.

PROF. CLOSE: I would like to ask Mr. Vollertsen what method of grafting he prefers and just when he would like to do it; if he has any choice of time and also the method of budding and the method of treating the bud.

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MR. VOLLERTSEN: We really should have the common European variety to graft on. Though these are a little small we do graft on them and they do grow well.

PROF. CLOSE: Do you whip graft or cleft graft?

MR. VOLLERTSEN: Either way they grow easily.

DR. MORRIS: I would like to make one remark. I have grafted hazels using the paraffine method from April until September, every month between April and September and have had them grow. The ones I grafted in September were winter killed but up to the sixth of September we have had them pull through the winter.

THE PRESIDENT: I do not desire to be placed in the bragging class but as a Michigander several things have been brought to my notice very recently that cause me to take pride in Michigan. As I landed in the fine central station in Washington it occurred to me that a senator from Michigan,

James McMillan, had caused the old railroad stations in the District of Columbia to be cleaned out and the fine new depot established in place of them. For his good work one of Washington's parks bears his name. The plans for the new Union Station were prepared by Mr. Spencer, an engineer from Michigan. Passing the Senate Office building I realized that another Michigan Senator, Senator Charles E. Townsend, was at the head of the national road movement in the United States, being chairman of the Committee on Post Offices and Post Roads, fully in accord with the tree planting plan that we have mapped out to be carried on on the public highways throughout the United States. Picking up the program showing what our work might be at this convention, I find five Michiganders noted thereon, a fair proportion of the program. Picking up the morning paper, if you please, you will find that Michigan has been advanced in population beyond the other states. You will find that our city of Detroit has passed a number of other great cities, going from tenth place to fourth, becoming one of the four cities of the United States with a million inhabitants. So you see we have a prosperous state. And we have good men in Michigan that have helped to make it so. Going into a railroad station in a Western city within the past two or three weeks this occurred. The morning paper had stated that the candidate of a great political party to the presidency of the United States was on a train that had been ditched, that the engineer had been severely injured and a number of others on the train; that the distinguished candidate himself had been badly jarred and might possibly have been injured. An hour or two after this first report came from this accident the news boys were calling on the streets: "Extra, extra." Naturally we thought it would be a continuation of news relative to this railroad accident and immediately I purchased a paper. What do you suppose its heading was? In great type three inches high: "Henry Ford has reduced the price of automobiles." Henry Ford perhaps is the best known Michigan citizen today and when we get the river and harbor appropriation that my good friend Dr. Morris referred to not long ago you will see the Washington steamers going up the St. Lawrence River and loading at the seaport of Detroit, carrying out the products of Michigan, we will hope the cargoes of nuts to which he referred. But next to Henry Ford I am sure that the best-known citizen of Michigan today is the next speaker upon the program. He needs no introduction to you. He is one of the pioneers of this movement and in my opinion has done more than any other man in this day and age to promote health, to promote good morals and to benefit the race in many ways along the lines that he has chosen. I take great pleasure in presenting Dr. Kellogg of Battle Creek, Michigan. (Applause).

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DR. KELLOGG: Mr. President, Ladies and gentlemen, I fear I cannot qualify in all of the good things which your chairman has said about me. I am glad to be from Michigan. I assure you I am greatly interested in the work of this association. I admire immensely the perseverance of the members of this association. I am not to any extent a nut grower although I have nuts planted in my garden and hope that my heirs will reap the fruit of my trees. I went into the business rather too late. I have been so busy all my life that I did not have time to do some things. But I am very greatly interested in increasing the consumption of nuts. I have been popularizing the idea of nut consumption and making it a staple article of food for almost fifty years, and I have been continually faced with this objection that if we get all the people eating nuts there would not be enough nuts for them to eat. That is really the situation. There is not much use to increase the demand for a thing unless we can supply the demand. So I am very much interested in the production of nuts.

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## NUTS NEEDED AS SUPPLEMENTARY FOODS

DR. J. H. KELLOGG, BATTLE CREEK, MICHIGAN

The nut is the oldest and best of Nature's products intended as food for man. The paleontologists tell us that early man was a nut eater as are the gorilla, the orang-ou-tang, and the chimpanzee, his modern prototypes.

Elliot, an eminent English anthropologist, tells us in his interesting volume, "Prehistoric Man," that "there was not, so far as we are aware, any carnivorous creature in the Eocene period."

Elliot also tells us that walnuts, almonds and palm nuts were produced in great quantities in the forests of the ancient world contemporaneously with the lemur-monkey man, who had then made his appearance in what is now northeastern North America, the first land to rise out of the ancient ocean. From the facts set forth by Elliot showing that all the higher mammals were originally vegetable feeders, as well as from his biological affinities with the anthropoids with which man forms the family of primates, it is evident that man is so constituted that he may if he chooses, select his entire bill of fare from the vegetable kingdom. That this may be done successfully, that is, that a man may live on a diet, no part of which is drawn from the animal kingdom, has been abundantly proven. The experience of many millions of human beings in India and other Oriental countries who abstain from the use of flesh on religious grounds, and to whom cow's milk is almost a novelty, is a practical demonstration of the fact that the vegetable kingdom is able to supply to human beings everything required for complete nutrition.

It is true that some years ago Slonaker, of Leland Stanford University, in an animal feeding experiment in which one group of rats was fed a mixed diet and the other exclusively on food stuffs of vegetable origin, found that his vegetable feeding rats, although for a few weeks showing themselves superior to the mixed feeders later developed unmistakable evidence of

malnutrition and physical inferiority.

Some years later, however, McCollum of Johns Hopkins, then of Wisconsin University, demonstrated conclusively that by making a proper selection of vegetable foodstuffs, rats may live and thrive indefinitely on a diet wholly derived from the vegetable kingdom. In connection with this and other similar experiments, McCollum made the interesting discovery that when an animal's bill of fare is to be wholly drawn from the products of plant life it is necessary, in order that the animal shall be fully nourished, that all parts of the plant should be eaten. His experiments demonstrated that if animals are fed upon seeds, alone they undergo physical depreciation, do not obtain full growth, are unable to reproduce or nourish their kind, and ultimately perish. In like manner, roots are found to be incapable of bringing an animal to full development and sustaining its life indefinitely. It was found that to be well nourished the animal must eat in suitable proportions, variable within considerable limits, seeds or fruits and leaves. The great importance of the green leaf as a complement of other foods has been clearly shown.

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Experiments by McCollum, as well as those of Osborne, Mendel, and numerous other investigators in the same line of research, have made clear several new and highly important facts in the physiology of feeding.

They find that foods contain certain subtle elements known as vitamins which are absolutely essential to the full development and prolonged life of an animal. These elements are not found equally distributed in the parts of plants and animals. In seeds they are found chiefly in the outer layers or envelope which is commonly rejected as bran. A certain vitamin especially concerned with growth and development, the fat soluble B, is found in the green leaf along with lime and iron, all of which are deficient in seeds. Roots especially supply an abundance of alkaline salts which are highly necessary to balance up an excess of mineral acids found in seeds.

Ignorance respecting these highly important facts has been responsible for a great number of failures in attempts to adopt a non-flesh dietary. A diet consisting of cereals and fruits, as for example a bread and fruit diet, while apparently satisfactory for a brief period, must inevitably result in failure because of lack of lime, iron and special vitamins found in the green leaf. The same deficiency exists in flesh foods. The soft parts of an animal, fat and lean meat, are almost wholly lacking in lime and vitamins. They contain a great excess of mineral acids. Even a carnivorous animal fed on such a diet soon shows evidence of failure. The lime in the animal body is found almost wholly in the bones, and the vitamins are concentrated in the liver and other glands, so that in the case of flesh foods, as well as vegetable foods, for complete nutrition it is necessary that the whole animal or its essential parts should be eaten. Wild carnivorous animals do this as do also wild men who live largely upon flesh foods. The cave men crushed and ate the bones of the animals upon which they fed, and the Indian tribes of Texas and the Northwest have long practiced the grinding up of the bones of fishes to eat with their food.

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Dr. Treves, one of London's most eminent surgeons was called upon by the head keeper of the animals of the London Zoological garden for advice respecting the condition of the lions. It was noted that the cubs bred in captivity were club-footed and variously deformed, and in many cases were either born dead or survived but a few weeks. His investigation showed that the fault was wholly in the diet. The lions received only the soft parts, lean and fat, of animals. When given bones and bone meal the difficulty speedily disappeared. Stefansson reports that, when living upon an Eskimo diet it is necessary to take the whole bill of fare, including the raw frozen liver of the seal, otherwise serious illness intervenes.

Hindhede, by arranging a dietary based upon these principles, has demonstrated that a man may be perfectly sustained on a diet which contains no animal product of any sort. In a letter received by the writer from this able Danish physiologist, the statement is made that a strong laboring man was maintained for 23 months in perfect health and vigor on a diet into which no animal products entered.

Another important fact developed by Rubner, Mendel, McCollum and other investigators which is of fundamental importance in animal nutrition, is that proteins differ in their value as tissue builders. Proteins differ from the starches and fats in the great complexity of their composition. Instead of being simple compounds or mixtures of a few simple compounds, proteins, as found in nature, consist of several sorts of highly complex molecules which vary greatly in their composition.

The protein molecule is made up of a number of organic units known as amino acids. There are 30 or 40 different kinds of amino acids of which less than 20 enter into the formation of the proteins of the human body. These 18 or 20 different amino acids are absolutely essential for the formation of body proteins, and are produced by plants, hence if they are not found in the food the body cannot produce them and the material necessary for tissue building or repair will be lacking.

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Proteins which contain all the amino acids essential for tissue building are known as complete proteins. Other proteins, lacking in certain essential constituents, are designated as incomplete: Flesh foods necessarily furnish complete proteins. The proteins of milk and eggs are also complete proteins. The proteins met in the vegetable world are exceedingly varied in character. Each species of plant produces its own kind of proteins. Vegetable proteins differ greatly among themselves. Complete proteins are comparatively rare. The proteins of cereals, for example, have been shown to be deficient in some of the essential amino acids. The deficiency is still greater in the proteins of beans. In fact, the proteins of vegetable foods in general may be said to be

deficient.

The necessity for providing the body with complete proteins was doubtless the original cause which led men under circumstances of privation and emergency to resort to the use of animal flesh for food. The cows of Nantucket, the ponies of Alaska, and I have recently been informed by Mr. Goddard, curator of anthropology in the American Museum of Natural History, the rabbits of northern Canada, in times of great scarcity of food, also resort to the eating of flesh. The necessity for complete protein to maintain physical fitness is so great that animals by nature the farthest removed from the carnivorous class resort to flesh eating when this is the only source of the needed element.

But what bearing has all this upon the dietetic use of nuts? The relation is very direct and very important. The situation developed as a result of the World War made very clear to everybody how close the world has arrived to the point where the careful economizing of our food resources will be absolutely necessary. The rapid increase of the world's population which has occurred, especially within the last two centuries, is a new world experience. Two hundred years ago the average length of human life was less than 20 years, as it still is in Mexico and some other parts of the world where the life-saving influence of modern sanitation and health conservation have not had an opportunity to exercise their influence. In former times great epidemics devastated whole continents so frequently that the world's population barely held its own from century to century. In many instances whole tribes were wiped out. Such catastrophes are now almost unknown, although we still have with us the plagues of influenza, tuberculosis, syphilis, and pneumonia. Even these, however, are being conquered, so that their destructive influence is being stayed.

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At the present rate at which the population of the world is increasing, the time is certainly not far distant when it will be necessary to utilize in the most economical manner possible every acre of soil capable of producing food. During the war the attention of agriculturists was very forcibly called to the enormous waste involved in our so-called animal industry. The first measure of food economy adopted in Germany at the beginning of the war was the slaughter of a large part of livestock. The same measure was adopted in Scandinavian countries and in all parts of central Europe. This was absolutely necessary, as Lusk and numerous other authorities have shown, for the reason that to produce one pound of water-free food in the form of beef or mutton requires the consumption more than 30 pounds of digestible food material. The cow is a much more economical means of food transformation, requiring the consumption of only a little more than 5 pounds of food for each pound produced, so that the waste of food in the production of milk is less than one-fifth as much as in the production of meat. This has led the food economists to recommend the reduced use of meat and the increased use of milk as a source of the complete protein required for sound nutrition. McCollum and other authorities, including representatives of the United States Department of Agriculture, have within the last four years persistently urged upon the public the importance of using more milk and less meat, and not simply as a matter of economy but as a matter of health as well, for it has been shown that the protein of milk is even superior to that of meat. It was found, indeed, that by the use of a few ounces of milk daily, a pint and a half, in connection with a dietary otherwise consisting wholly of foods derived from the vegetable kingdom, the body will be amply supplied with complete proteins, the milk not only furnishing protein of a superior character but serving also to supplement the proteins of the cereals, roots and other vegetable foods, supplying the amino-acids which they lack so as to render them also available for tissue growth and reconstruction.

This discovery respecting the important place which milk is capable of filling in the solution of the great and pressing problem of human nutrition is a highly important one, and its value has led to very active efforts on the part of the U. S. Department of Agriculture to enlarge the dairy interests and increase the milk production of the country as one of the best means of food economy which could be adopted. But even this is not a complete solution of the difficulty, for the keeping of milch cattle involves still a very large waste of food material, five pounds being consumed by the cow for each pound produced. The evident reason for this is the fact that the cow requires the large part of the foods she eats for her own use in maintaining heat production, supplying energy for exercise, supporting the work of the heart, lungs, digestive organs, etc. The food value of the milk produced represents simply what is left over after the cow has made use of what she needs for herself.

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There can be no doubt that as meat production diminishes, as it is certain to do, milk production will likewise decrease. There is even at the present time a notable shortage of dairy products, and the average per capita production will undoubtedly continue to decrease for the same causes which inevitably lead to a lessened meat production. Some other source for the complete proteins needed to supplement the incomplete proteins of cereals and roots must be provided. Fortunately, Nature has supplied us with this all-essential foodstuff in that choicest of all our products, the nut. This is a vitally important fact which sometime will save the race from protein starvation.

A study of the relative protein content of nuts, milk, and meat shows that, pound for pound, the almond, beech nut and walnut contain on an average as much protein as does meat and five times as much as is found in milk, and protein which from rat feeding experiments appears to be of equal value. The chestnut, the chinquapin, the filbert, the hickory, pecan and pine nut contain on an average as much protein as is found in fish, while the butternut, the peanut and the pignolia contain twice as much or 50 per cent more than is found in the best of meat.



The following table shows the number of pints of milk equaled by one pound each of the several nuts mentioned, together with the calory value of the nuts per pound and of the amount of milk containing an equivalent amount of protein and the amount of each kind of nuts needed to supply supplementary proteins for one day:

	<b>Pints of Milk containing as much protein as one pound</b>	<b>Calories Milk</b>	<b>Calories Nuts</b>	<b>Amt. needed for one day</b>
Acorn	2.4	780	2620	8.3
Almond	6.1	2080	3030	3.2
Beech nut	6.6	2145	3075	3.0
Butternut	8.5	2762	3165	2.4
Chestnut	3.2	1040	1876	6.4
Chinquapin	3.8	1072	1800	6.4
Filbert or Hazelnut	5.0	1625	3290	4.0
Hickory nut	4.6	1495	3345	4.8
Pecan	3.6	1170	3455	5.6
Peanut	9.2	2090	2600	2.2
Pinon	4.4	1430	3205	4.8
English walnut	5.4	1555	3300	3.7
Black walnut	8.5	2762	3105	2.4

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From animal feeding experiments it has been determined that about 20 oz. of milk will furnish sufficient complete protein to supplement a vegetable diet otherwise deficient in complete proteins. This amount of milk will supply one-third to one-half the total daily protein requirement for the average person. Nuts are so rich in these precious proteins, practically identical with those of milk, that the protein found in 20 ounces of milk may be furnished by 2 ounces of peanuts, 2½ ounces of butternuts, 3 ounces of almonds or beechnuts, 4 ounces of English walnuts, or filberts, 5 ounces of pinenuts (pinons) or hickory nuts, 5½ ounces of pecans, 6½ ounces of chestnuts or chinquapins, or half a pound of acorns.

The nut is one of the most important and interesting of all foodstuffs for the reason that it presents in concentrated form the most valuable and easily digestible of proteins. It is for this reason that the farmers of Northern Italy are able to thrive on a diet of which the chestnut is the staple. For the same reason 300,000 Pacific Coast Indians prospered for centuries on a diet consisting chiefly of acorns and pinenuts. In recent times, one of these Indians was known to be living at the age of nearly 140 years, and the farmers of the West and South before they had destroyed with axe and fire the splendid oak forests of pioneer days, depended chiefly on mast to fatten their hogs. The acorn was their chief source of protein, which is as necessary for a hog as for a college professor.

From the standpoint of cost, nuts, even at the present extraordinary prices, compare favorably with milk as a source of protein, because of the small quantity required to furnish the needed supplement of complete proteins. For example, shelled almonds, at a cost of \$1.00 a pound (retail) supply for 19.2 cents the same amount of supplementary protein furnished by milk at a cost of 24 cents. Black walnuts supply the same amount for 15 cents, pine nuts (pinons) for 20 cents, hickory nuts 15 cents, and peanuts 4 cents.

The late Dr. Austin Flint more than fifty years ago prepared from almonds a milk for use by certain classes of patients. The writer, about thirty years ago, prepared from the peanut and other nuts a preparation known as malted nuts which much resembles malted milk in appearance and flavor, and which has been successfully used in place of milk by persons sensitized to cow's milk in hundreds of cases.

The preparation of milk substitutes from vegetable sources is not a new idea. When in Russia a few years ago, I found on sale in delicatessen shops a paste prepared from honey and almonds which with the addition of water made a very palatable emulsion much resembling milk in appearance as well as in flavor. I have been informed that the natives of the Philippines prepare from the litchi nut a vegetable milk for feeding infants deprived of their natural nourishment. These natural products have the advantage over the infant foods of commerce most of which are better fitted to destroy than to preserve life. They are complete foods, supplying the essential vitamins as well as other necessary elements.

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The nut is not only the most concentrated form of nourishment known, but, contrary to the general view, is one of the most easily digestible. The supposed indigestibility of the nut is due to two things, eating when already satiated with food; that is, taking the nut as a surplus food, and second, neglecting to masticate the nuts thoroughly. Watch a monkey eating nuts and see how thoroughly he masticates each particle. Any particle not well crushed and emulsified is passed through the intestinal canal undigested and of course unabsorbed. But when crushed and converted into a smooth cream, the nut is one of the most easily digestible of all foods. Most nuts consist almost exclusively of two food principles, proteins and fats. The protein is one of the

finest sort and more easily digestible in the raw state than is cooked protein of any kind. The fat is finely emulsified, and thus prepared for prompt digestion and absorption.

Experiments on human subjects conducted at the Battle Creek Sanitarium by an expert from the laboratory of Yale University, showed that the proteins of nuts are as easily digested and as fully utilized as the proteins of other foodstuffs.

The peanut produces an average crop of at least 40 bushels, or 900 pounds of shelled nuts to the acre, equivalent to 8,280 pounds of cow's milk, to produce which would require 4.6 acres. A grove of black walnuts, 40 trees to the acre, producing one hundred pounds of nuts to the tree, or one thousand to the acre, would afford as much protein as 8,500 pounds of milk, to produce which would require 5.3 acres. It is to be noted, also, that one pound of peanuts has a nutritive value nearly one-third greater than that of the 9.2 pints of milk containing an equivalent amount of protein, while the calory content of the one pound of nuts is more than ten per cent greater than that of the milk furnishing the same amount of protein. In the case of many nuts the disproportion is greater. For example, one pound of filberts has a food value double that of an amount of milk containing the same amount of protein.

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The nut is evidently superior to milk as a source of protein. Like milk, nuts are rich in lime, doubtless due to the high protein content with which the lime is associated in vegetable products. Nuts, like milk, are deficient in iron, although in this respect they are considerably superior to milk. Hence when nuts are freely used as a source of protein care should be taken to supplement them by a liberal quantity of greens, which are rich in iron and lime as well as in the fat soluble vitamins which is also found in abundance in milk but in which nuts are rather deficient.

It thus appears that nuts, because of the superior quality of their protein, may not only take the place of meat in the dietary, but when properly combined with other vegetable foods, may to a large extent, at least, take the place of milk. In this respect they constitute a unique class of foodstuffs.

The soy bean, which like the peanut is a legume rather than a true nut, resembles the peanut in composition and like it affords a protein of a quality so closely resembling that of milk that a very excellent milk has been prepared from it. Its protein is also complete in character and may replace the protein of meat. The soy bean has, in fact, for many thousands of years been the chief source of complete proteins for the Chinese and the Japanese.

Aside from the soy bean and the peanut, nuts have no rivals in the vegetable kingdom. They are real plant aristocrats, the value of which will be more and more appreciated as scientific research and practical dietetic experience make clear their numerous points of superiority.

The meat industry and the milk supply are so closely related that both are influenced by the same causes. Both meat and milk are certain to become scarcer and more costly. And while it is most desirable that milk should continue to constitute a part of the human bill of fare and that its use should be encouraged and if possible increased, it is certain vegetable substitutes for both meat and milk will be increasingly in demand as pasture lands shrink in area and the world's population and consequent demand for food cereals increase.

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It is certainly greatly to be desired that such efforts should be put forward to convince members of congress and of state legislatures of the importance of nut culture as will induce them to institute efficient measures for encouraging the wide spread culture of nut trees and thus make provision in time for the pressing need of the superfine material afforded by them which coming years will certainly develop, for it cannot be doubted that as the earth's population increases and as the science of nutrition is perfected, we shall return more and more to the dietary of primitive man, in which nuts were the chief staple, with fruits, succulent roots and tender shoots as supplementary foods for bulk, vitamins and food salts.

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THE SECRETARY-TREASURER: I have been asked to prepare a paper on the "Propagated Hickories." I have passed around a printed slip giving the results of tests of some hickory nuts which will be useful in connection with the paper.

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## PROPAGATED HICKORIES

WILLARD G. BIXBY, BALDWIN, NASSAU Co., N. Y.

The title of this paper is a little misleading. In the nut contests the word "propagated" is restricted to those nuts which any nurseryman lists in his catalog and of which he is prepared to furnish grafted, budded or otherwise asexually multiplied trees. There are few hickories which are "propagated" in this sense and perhaps a better title would be "What We Know About the Hickories That Are Propagated Experimentally."

In a paper which Dr. Morris is to deliver he will tell us about top working hickory trees. This is a matter of great interest for top working existing trees is the method which at the present time promises to be the means of getting our first orchards of fine hickories in bearing condition.

The earliest instance of which we know anything of grafted hickories is that of the Elliot hickory owned by the late Whitney Eliot, of North Haven, Conn. This was awarded a prize offered by the late A. J. Coe of Meriden Conn., for the best hickory nut exhibited at the December meeting of the Connecticut Agricultural Society in 1892. According to the Bulletin of the U. S. Dept. of Agriculture on "Nut Culture in the U. S.," 1896, this was the product of a grafted tree. I have never seen a specimen of the nut although I understand that the tree is still standing. I have been unable to get any definite information as to when the grafting was done, methods used, etc.

The next instance of successful hickory grafting and the one which is best known is the work of the late Henry Hales of Ridgewood, N. J. When he purchased his place some fifty years ago, he found on it a fine shagbark hickory tree. This had been standing longer than the oldest inhabitant could remember and it is supposed to have been one of the original forest trees of that section and spared on account of the excellent nuts it bore. It came to the attention of the late Andrew S. Fuller, author of the "Nut Culturist" published in 1896, and was described by him in 1870 in the Rural New Yorker. Shortly after this description, Mr. Hales received many requests for scions to which he generously responded and any propagator who thought he could propagate this hickory was given a chance to try, the conditions being that one-half of the successfully grafted trees should belong to Mr. Hales in payment for the scions sent. During the next ten years orders for scions were so numerous that the old tree was kept pretty well pruned. Mr. Hales received during the period only about two dozen trees from the thousands of scions which he sent out. According to Fuller's "Nut Culturist" these were largely grafted by Mr. J. R. Trumpey of Flushing, N. Y., now a part of New York City. Information which I received at the Hales place was that the trees growing there were grafted by Jackson Dawson of the Arnold Arboretum about 1891. Inasmuch as there appear to be trees of two different ages there it is probable that some trees were from one propagator and some from the other. The trees grafted by Jackson Dawson we know were on bitternut root and it seems likely that the others were also for one tree is not like the others and I was informed that that was a grafted tree, but the graft died and a shoot came out at the base of the graft which was thought to be from the graft but, after the tree had grown it became evident that it was not. The buds of this tree show evidence of the bitternut. The nuts, however are not pure bitternut and the tree is seemingly a bitternut x shagbark hybrid. All of the trees grafted by Jackson Dawson were bench grafted in the greenhouse on especially grown stocks. I have two trees on my place from Thomas Meehan & Sons, Germantown, Pa., propagated in the same way and, when received, the long tap roots were coiled up like springs showing that the trees had been grown in pots. These trees, however, have grown well since I planted them out though they were very small and feeble when set out. These grafted Hales trees at the Hales place bore nuts in eighteen to twenty years after grafting. They bore for about five years and then ceased bearing. I went to see them for the reason that I was informed by Miss Hales that the trees were not looking satisfactorily and she was afraid there was some disease on them. I requested the U. S. Dept. of Agriculture to allow Mr. S. M. McMurrin, who has made a study of pecan rosette, to come and look at the trees for it seemed to me that they were similarly affected. He took specimens of the leaves and reported that he could find no evidence of insect or fungus trouble. He also made a careful examination of the soil, and the farm was gone over carefully looking at the pecan and hickory trees growing there of which there are a large number. Most of these did not seem to be in good condition although a few did. Tests made of the soil seemed to show that it was not the kind of soil in which hickories and pecans do their best. It was also ascertained that while Mr. Hales senior was living the trees had received an application of manure every year. Since his death they have not. This, in connection with the poorness of the soil for hickories, seems possible may be the reason for the cessation of bearing. It also seems likely that bitternut root is not a good stock for the shagbark. I have on my place two grafted Cedarapids trees, each of which when received was four years from the graft and four feet in height above the graft. One was on bitternut stock and one on shagbark. The one on shagbark stock had made about six inches the first year, a foot the second year, a foot and a half the third and two feet the fourth while in the case of the one on bitternut root the growths were reversed, two feet the first, a foot and a half the second year, a foot the third year and six inches the fourth year. Mr. Jones has also had the experience of grafting the Vest hickory on the bitternut, had it bear in two years, and then die. While the evidence we have on this subject is not conclusive as there may have been other factors which might have caused the trouble outside of the stock, it shows that the stock on which the different hickories are to be grafted is a matter of importance. Mr. Henry Hicks of Westbury, L. I., who a number of years ago became enthusiastic on the Hales hickory, has four grafted trees or those which he purchased for grafted on his place. One he has had twenty-seven years and it has not borne. It has been twice transplanted. He has two or three others which have not yet borne. Inasmuch as the buds of these trees are not all alike, it is very evident that they cannot all have been grafted from the original Hales tree. The finest looking Hales hickory of which I know is on the place of Frederick E. Willets, Glen Cove, L. I. Mr. Willets could not tell me how many years it had been set out but it was quite a good many. It bears a few nuts but the tree has been disappointing in its performance. I examined it during the past summer and the nuts, of which there were not many on the tree, were dropping off. It was evident that some insect was attacking the husks which may account for the rather unsatisfactory bearing record.

In distinction from this rather unsatisfactory record of Hales trees we have great promise of something worth while in the only other bearing grafted transplanted hickory of which I can give information, Mr. Rush's Weiker tree. This was produced by Mr. J. F. Jones when he was living in Monticello, Fla. A southern pecan nut was planted in 1902. It was root-grafted below the surface of the ground in 1903, sent to Mr. Rush in the spring of 1904 and planted out at that time. Mr.

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Jones says that the tree was not over eight inches high when sent. It bore its first nuts in 1917 and has borne a few every year since. This year the tree set full and had a good crop when I saw it last. The nuts borne by this tree are considerably larger than those of the parent Weiker tree. Inasmuch as the original Weiker tree has given us our best hickory bearing record, it seems not unlikely that this grafted Weiker tree may also be an unusually good bearer.

Against this slow record of grafted transplanted hickory trees, we have some remarkably quick results with top worked hickory trees. Mr. Jones has a bitternut tree now about five inches in diameter which was top worked in the Spring of 1916 to Fairbanks variety, ten grafts being put in, two of which blew out that summer or fall and were replaced the next spring. In 1919 all the grafts, the two year ones as well as the three year ones bore nuts, about 120 maturing. The tree set full of nuts in 1920, but caterpillars got on it, unnoted, and practically the entire crop dropped off. Mr. Jones also has a smaller bitternut tree top worked at the same time to Siers. It bore two nuts in 1919. He also has a mockernut tree top worked at the same time with Kirtland and which set some nuts in 1919 but which dropped off before maturity. It set quite a number in 1920. Mr. D. C. Snyder, Center Point, Iowa, has a shagbark hickory some twenty-five or thirty years old which was top worked shortly after it had begun to bear. In 1913 the four top limbs were top worked to Fairbanks hickory, the rest of the tree being undisturbed. In 1915 these grafts bore nuts and have borne every year since. In 1919 they bore two quarts. Inasmuch as this was a year when the hickory crop in that section was a failure it was thought to speak well for the bearing of the Fairbanks hickory. In 1916 four grafts of Dennis hickory were put in and three of Cedar Rapids. The Dennis grafts bore four nuts in 1918 and over a dozen in 1919. The Cedarapids bore one dozen in 1919 besides a number more which a squirrel got before Mr. Snyder did. Mr. William A. Baker of Wolcott, N. Y., top worked a bitternut tree to Fairbanks in 1917 and the tree bore ten nuts in 1919. Mr. Harvey Losee, Upper Red Hook, N. Y., grafted the young shoots of cut back hickories and out of three shoots so grafted had them bear in three, four and five years respectively. Dr. Morris has grafted a Taylor hickory on a small tree which bore five years after grafting. Dr. Deming on his place at Georgetown, Conn., has probably a greater collection of top worked hickories of various varieties than anybody else. These trees are growing finely and give promise of bearing early. A Taylor hickory on stock 1¼" diameter grafted, April 26, 1918 had ten nuts on it on June 27, 1920. A Griffin hickory grafted in 1915 which is now 2½" in diameter had 81 nuts on it on the same date. There seems to be no question but that anyone who has land with hickory trees one to four inches in diameter can easily and quickly change them into orchards of hickories bearing fine nuts by top working.

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We next come to the relative merit of the various hickories of which we know. I was fortunate in securing for the 1919 contest enough specimens of the greater portion of those hickories which have been propagated experimentally to a considerable extent so that some information on this point can be given. The printed slip which I will pass around gives the results of these tests and will give a better idea of the different nuts than can be done in any way except by passing around samples. It will be noted from the slip that the nuts run very close indeed and it is very probable that another year these nuts would not show exactly the same results for it has been clearly shown that nuts vary greatly from year to year. There are other characteristics of hickory nuts which are of great importance which are not shown in the annual contests. These are the bearing records of the tree, its ability to stand various diseases and most of all how it will work out when grown in orchard form. This can only be told by experience. From the fact that, in the 1919 contest, of the ten varieties of the experimentally propagated hickories there was only a difference of five points between the highest and the lowest, it shows that the merit of each nut is sufficient so that all of these should be tested out in orchard form. In other words we should not for example select the Vest and Manahan as the best that we have and propagate them to the exclusion of the others. It is probable that there will be great differences in the orchard behavior of these various hickories shown as this is done and that then we shall be able to select the most desirable varieties. Some tests made recently on nine standard southern pecans the Schley, Burkett, Moore, Alley, Delmas, Moneymaker, Pabst, Stuart and Vandeman show a great difference between the highest and lowest in the number of points awarded, this difference being 10 points as against 5 in the cast of the hickories. The Hatch bitternut and Stanley shellbark noted on this slip are here not because it is believed that, as market nuts, they will compare with the first ten mentioned but because they are the best nuts we now have which are not shagbarks or of which the shagbark is not one parent. It is believed that those nuts will be valuable for hybridizing purposes.

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There is one matter suggested by the slip on which I will touch although it is not properly within the scope of the subject set for this paper and that is the possibilities of hickory breeding. Of the ten hickories noted on the slip as receiving 70 to 75 points, four, it is agreed, are hybrids. The examination which I have made of the others leads me to believe that more of them are, but four out of ten with the possibility of more is sufficient to cause us to take notice. There are some nine hickory species native in the north eastern United States and they hybridize to a considerable extent. Some of these species show most remarkable differences in characteristics. The shagbark is unexcelled for quality of kernel. The shellbark bears nuts as large as the largest black walnut. The bitternut bears nuts with a thinner shell than any of the finest southern pecans and with a larger proportion of kernel. What we know about practical plant hybridization leads us to believe that we can combine the good qualities of these various species of hickories. Think of what it would mean to have hickories equal in quality of kernel to the best shagbark, of the size of the largest black walnut with a shell thinner than the thinnest shelled pecan we have even seen, and with a larger proportion of kernel.

While the hickory is the nut which has given us the most trouble in propagation and gives us the most trouble in transplanting and grows the slowest, it is certainly difficult to find one which gives more promise either in growing the fine hickories we now have or in breeding up better ones. I am convinced that as soon as we can furnish the fine hickories we now have in commercial quantities they will command prices equal to those paid for the finest pecans.

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THE PRESIDENT: I will call upon Mr. J. F. Jones, of Lancaster, Pennsylvania, who has the subject of "Selecting and Handling Scions."

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## SELECTING AND HANDLING SCIONS

J. F. JONES, NUT SPECIALIST, LANCASTER, PENNSYLVANIA

In the selection of scions of nut trees for grafting the propagator should keep in mind the fact that the wood selected must be full of vitality and must be of solid, well matured growth, that will stand the maximum amount of exposure and hardship after being grafted, as the grafts and stocks of nut trees callous or heal very slowly in comparison to fruit trees, and the scions must be of solid, well matured growth if good results are to be obtained. These requirements usually go together however and if we select scions of solid, well matured growth, we usually get scions in which the tree has stored the maximum amount of "starch" or vitality.

### HOW TO JUDGE SCIONS

The experienced propagator of nut trees can quickly distinguish between good and poor scions for grafting, but the beginner, not knowing the ear marks of good scions, often fails to select the best scions for grafting. The common mistake made by the beginner in the selection of scions of nut trees, is in selecting the smaller growth. The smaller growth is usually more pithy and lacking in vitality and gives poor results in grafting. Poor scions are usually characterized by pithy wood and a light colored, thin bark. The buds are usually farther apart than they are on good scion wood, though this is not always true, as good scions sometimes have the buds set well apart, except near the terminals. The distinguishing marks of good scions are solid, well matured growth, and a thick, dark colored bark. The buds are also larger and usually set closer together.

### WHEN TO CUT SCIONS

Scions must be cut while the tree is still dormant and, in the case of trees that the wounds bleed when the tree is cut, as do the English and Japan walnuts, under certain conditions, we must guard against cutting scions soon after severe freezing weather and before the tree has fully recuperated. This semi-sappy condition of the trees following low temperatures that freeze the wood, seems to be a provision of nature to restore the moisture or sap lost from evaporation, and although more noticeable in some species of trees, notably the English walnut, this condition undoubtedly exists in other species of trees to a greater or less extent and we always try to avoid cutting scions of any kind soon after hard, freezing weather. I have found scions of the English and Japan walnuts, cut from trees in this condition, to be practically worthless for propagation, although the scions may have been cut in late winter, long before the sap gets up in the tree, naturally.

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### HANDLING AND KEEPING SCIONS

Scions of nut trees for grafting should be handled carefully to avoid rubbing off the buds, although this is not so important with nut trees as with fruit trees, for the reason that the more important nut trees such as the various walnuts, pecan and hickories have compound buds and if the larger buds should be destroyed the secondary buds may be counted upon to grow. The scions should be tied in bunches of a convenient size to handle and, after being well tied and carefully labeled, should be packed in paper lined boxes that will prevent evaporation of moisture in the packing material. Any material that will absorb and hold moisture and that will not heat when bulked, will answer the purpose for packing scions, but we have found sphagnum moss to be the best material for this purpose. This material can be obtained from the local florists or dealers in cut flowers usually. Sphagnum will absorb a good deal of moisture without actually becoming wet and will also hold this moisture and give it off more slowly than any other packing material with which I am familiar. This is especially important in keeping scions of nut trees in good condition for grafting, because, if packed too damp, the scions are soon spoiled for grafting, even if kept at a low temperature.

As a precaution against fungi, we usually use bordeaux mixture, two thirds standard strength, to dampen moss for packing scions, especially if they are to remain in storage several months.

Our rule is to use moss only slightly damp to the touch and if used in sufficient quantity, say two or three times as much bulk as we have of scions, we find no trouble in keeping scions in perfect

condition for months. In fact, as an experiment, we have carried pecan scions in cold storage and without re-packing for fifteen months and then get a fair stand of grafts to grow.

We usually advise putting scions in cold storage where convenient, especially if they are for use in late May or June, but this is not at all necessary if the scions are packed in moss only slightly damp. In fact scions kept in an ordinary cellar at a temperature around 50 degrees have given us better results on the average the past two years than have those from cold storage.

### **The association adjourned until 2 p. m.**

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**AFTERNOON SESSION, FRIDAY, OCTOBER 8, 1920, 2 P. M.**

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THE PRESIDENT: We very fortunately have with us a gentleman from the Bureau of Entomology, Mr. F. E. Brooks, who will talk to us about nut insects for a time and we will be very glad to listen to him.

MR. BROOKS: I believe your program is full for this afternoon and I shall keep you but a few minutes.

A little more than a year ago the problem of insects affecting the nut crop of Northern United States was assigned to me by the Bureau of Entomology. I wish to say the work has been very delightful to me from several standpoints. In the first place, it has brought me into association with a delightful group of workers. I want to express to you the pleasure I have had in meeting the various nut growers of the northern part of this country and noting the hearty way in which they are ready to co-operate in solving the nut insect problems. The field of work is interesting because there appear to be in sight no insect pests that promise to embarrass or overwhelm the nut grower. We have a few quite serious insect problems, perhaps none more serious than that occasioned by our old acquaintance, the "chestnut worm." That problem, however, is being solved rapidly in many localities by the chestnut blight.

Thus far in the work, I have devoted most of my time to a study of the species attacking the fruit of nut trees, and I may mention three groups that have been given special consideration. First, the group to which the chestnut worm, or chestnut weevil, belongs. There are two very similar species of these weevils which attack chestnuts, one which attacks hickory nuts and pecans, one which attacks hazel nuts and numerous species which attack acorns. The adults of these weevils are medium-sized beetles, yellow, brown or gray in color, and all have enormously long snouts. The mouth is located at the point of the snout and the beetles use these snouts to bore through the covering of the nuts after the kernel is partially or fully formed. When the puncture into the nut is completed one or more eggs are inserted by means of an extensile, thread-like tube, or ovipositor, of the same length as the snout. The eggs hatch into the familiar worms found in ripe chestnuts, hickory-nuts and hazel nuts. The large hole in the shell of the nut is made by the full grown worm as it escapes to enter the ground, where it completes its transformation into a beetle. An interesting thing in connection with these weevils is that each species confine its attacks to one particular kind of nut. Even those species that attack acorns show a decided tendency to distinguish between oak species and confine themselves as groups very largely to particular species or botanical groups of oaks. There is, therefore, no danger that any of these weevils will multiply, for example in an oak forest, and then migrate into nearby plantations of chestnut, hickory or hazel. Hazels might be used for interplanting among chestnut or hickory trees with no danger that the hazel nuts would become infested by the weevils that develop in the chestnuts or hickory nuts. This habit of the weevils is greatly to the advantage of the person who would plant a particular kind of nut outside its natural range, or at a considerable distance from any other trees of its kind. He could do so with reasonable assurance that the weevil attacking his species of nut would not occur upon his trees until brought into the locality by artificial means.

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There is another group of weevils, nearly related to the common plum curculio, the species of which attack immature nuts. In this group the snout is much shorter than in the group just described, and the insects are considerably smaller. There is one species, *Conotrachelus juglandis*, that confines its attacks to the young fruits and shoots of walnuts of the butternut group, another, *Conotrachelus retentus*, that seems to attack exclusively the black walnut fruits from the time they set until they are half grown, still another, *Conotrachelus affinis*, that appears to attack only half-grown hickory nuts. Another species, *Conotrachelus aratus*, feeds abundantly in some localities within the leaf petioles of hickory. At least two other species of the group commonly attack acorns. Those injuring walnuts lay their eggs on the concave side of crescent-shaped punctures which they eat in the husks of the young nuts. The larvae developing from the eggs cause the nuts to drop within a few weeks and the larvae enter the ground to complete their transformation. There is a divided tendency with some of these species to attack the young wood and leaf stems of the introduced species of walnut. Dr. Morris states that he has had young Japanese walnut trees killed by *C. juglandis* feeding in the grub stage within the branches. He has, however, found that the pest succumbs to an arsenate of lead spray.

Species of this group are apt to have alternating periods of increase and decrease and a year of great abundance may be followed by a year of comparative scarcity. This variation is due, at least in part, to the fact that the larvae, as they feed within the tissues of their host plants, often

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become rather heavily parasitized by certain two-winged and four-winged flies, the parasitized larvae dying before they reach the adult stage. Nature in this way does considerable toward holding the pests in check, but artificial means of control will often need to be considered.

The third group referred to is represented by a two-winged fly, about the size of the common house fly, known technically as *Rhagoletis suavis*, and commonly as the walnut husk-maggot. The fly is light brown in color, with broad, irregular, dark brown bands on the wings. It appears when walnuts are nearly grown and deposits clusters of small, white eggs within punctures in the husks. Maggots hatch from the eggs and at the time the walnuts drop these maggots are often found converting the inner parts of the husk into a blackened, pulpy mass. Infested nuts are disagreeable to handle and the husk does not part readily from the shell. I have found the fly attacking black walnuts, butternuts, Persian walnuts and Japanese walnuts, within the states of West Virginia, Maryland, Pennsylvania, Ohio, New York, Connecticut and Massachusetts. It probably occurs over the natural range of the black walnut and butternut. It is proving to be a rather serious pest, especially of the Persian walnut. Some of the infested walnuts appear to drop prematurely and others adhere to the branches beyond the regular harvest time. The shell of infested Persian walnuts parts poorly from the husk and the nut is discolored, soiled and unmarketable.

The fly has rather interesting habits. I found that by pricking a nearly mature black walnut with a pin, the wounds would almost invariably be used in a little while by the female flies for depositing their eggs. In one such wound, 180 eggs were laid within 24 hours. When the husk was pricked a slight flow of juice would take place and the male flies would soon find the spot, and, recognizing, I suppose, a suitable place for the females to come to oviposit, they would stand guard at the puncture awaiting the coming of the female. On one occasion I made minute punctures in the husk of eight black walnuts and in a little while a male fly was located at each puncture. Pairing took place usually as soon as the female came and began to lay eggs. Sometimes a male would be found at a puncture in the early morning and would hold its position against all coming males throughout the entire day. When another male would come to the nut the two flies would rear up facing each other and engage in a brief sparring bout with their front legs. Usually, the original occupant of the nut would be the victor. In some experimental spraying of Persian walnut trees in Maryland and Pennsylvania the past season with a sweetened arsenate of lead spray apparently good results were obtained. In one case it seemed that the spraying was about 75 per cent efficient in controlling the pest. In another case, whereas last year 75 nuts in 100 were infested, this year, after spraying only four nuts in 100 contained the maggots at harvest time.

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I desire to state to the nut growers that I am interested in any nut insect problems that you may encounter and shall always be glad to receive reports and specimens. Your co-operation in this work is greatly appreciated and I hope we may continue to work together and that before long we may have more definite knowledge of the means of preventing, to some extent at least, the various forms of injury by insects to the nut crop.

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MR. RUSH: I cannot help but express a word of gratitude and appreciation to my friend Mr. Brooks in helping me out of a serious difficulty that I had in connection with walnut culture at Lancaster. A year ago I was ready to throw up the sponge. In fact I might say that my whole crop last year was destroyed by this husk-maggot. This year I have a very fine crop. Last year it was practically worthless. This year I have very few walnuts that were affected by the maggots, largely owing to the successful spraying that he gave the trees at the proper time. I think the future has a bright prospect for making walnut culture more profitable.

THE PRESIDENT: We are certainly under obligations for the very interesting talk and glad that Mr. Brooks could be with us.

The first thing on the program for the afternoon session, according to the published program, I know will be of a most interesting character, Top-Working Hickories, by Robert T. Morris.

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## TOP WORKING HICKORIES

ROBERT T. MORRIS, NEW YORK

At the present time when our views on the subject of top working trees are based upon incomplete knowledge and experience perhaps it is unwise to present a paper upon the subject which might be taken as authoritative. On the other hand my experience to date is worth recording for its face value, subject to change of view subsequently.

Different species of hickory act differently when subjected to top working methods. The bitternut may be cut back severely without giving evidence of any great degree of shock. The shagbark on the contrary makes slow recovery and many years are required for a cut-back shagbark hickory to regain normal equilibrium between top and root. The pignut and mockernut apparently stand midway between the bitternut and the shagbark in respect to the trimming of the top. My experience with shagbark includes the top working of trees ranging from a few inches in diameter up to fifteen or twenty inches in diameter, and the cutting back has included all stages

from actual felling of the tree to cutting off half of the top or less than half of the top. The idea of felling trees completely was to graft stump sprouts or to insert the slot bark graft into the stump near the ground. When this has been done the larger hickories do not send up stump sprouts at all and the root dies excepting in cases in which a slot bark graft has been introduced. The graft grows slowly without a great degree of vigor and requires so many years for balancing the root that the method has not been practical up to the present time. The same statement is true of the shagbark hickory which has been trimmed back very severely leaving nothing but the stubs of large branches to be grafted immediately or for the purpose of grafting sprouts in the following year. The bark of the shagbark hickory is so hard that new shoots are choked severely and many years are required before they have a secure hold upon the stock. My final conclusion is that we may cut shagbark limbs having a diameter of three inches or less for the purpose of leaving grafting stubs. If a large number of grafts are inserted in such a topworked tree or in stock sprouts which start and are grafted in the following year the work is successful. In order to avoid the labor of topworking a large shagbark tree in its entirety we may graft only one or two limbs and allow stock sprouts to grow on other limbs until both stock sprouts and graft sprouts have become well branched. Branches carrying stock sprouts may then be removed a few at a time year after year, leaving the graft sprouts in charge finally.

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By means of the bark slot method of grafting grafts may be inserted in any part of a hickory tree. The bark slot method consists in using a chisel and mallet for cutting parallel lines the width of the scion in the bark of the stock. The tongue of bark between the parallel lines is pried outward with the point of the chisel until the scion has been inserted next the wood and the tongue of bark is then allowed to return to place, leaving the scion interposed between the tongue of bark and the wood. Rules which apply to the shagbark may be applied to all of the hickories with which I have experimented. When cutting back the limbs in preparation for topworking it is well to leave as many as possible of stubs or branches of small diameter. Branches of small diameter may be grafted by ordinary cleft grafting methods but branches of larger diameter should be treated by the bark slot method. At the present time and in the locality of my country place at Stamford, Connecticut, melted paraffin suffices in place of grafting wax and melted paraffin is brushed over the entire scion, buds and all, as well as over the wound in the stock.

The time for cutting back hickories in preparation for topworking is probably important and in my experience to date, autumn cutting is preferable. The reason is that a good deal of activity is going on in the tree before it enters into a state of winter rest and wounds are pretty well repaired. In winter cutting there is some danger of incomplete repair and in the springtime the free flow of sap invites the entrance of various enemies, bacterial and fungous. Summer cutting according to the laws of plant physiology would cause more shock to the tree than cutting at any other time, although practically I have done this successfully. Without regard to season for cutting in preparation for topworking it is very important to trim cut ends very smoothly with a sharp knife in order to remove ragged tissue left by the saw. It is difficult to persuade employees to do this and it will not be done as a rule unless the owner looks after the matter personally. The smoothly trimmed end of the cut branch should immediately be protected with white paint, melted paraffin, or some other protective covering.

What are the disadvantages of the slot bark method of topworking hickories? The scion does not have such a secure hold upon the stock as it does in cleft grafting and it will blow out in a high wind unless it is protected by braces. I have found it not harmful to a tree to fasten laths to the stock for holding the growing scion, driving galvanized iron nails through the lath directly into the stock. Unless growing grafts are well braced by some method the entire season's work may be lost in two minutes of a gale preceding a thunderstorm in summer. By the slot bark method, in other words, we may catch more grafts and lose more grafts than by any other method with which I am familiar, but the loss may be avoided by proper attention.

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The best time for grafting varies with the locality. At Stamford I have grafted hickories from February until September. Very early grafting is largely a failure because of incomplete repair of the wound in the stock and scion. Late summer grafting is not practical because the scions which make a start do not lignify their new shoots sufficiently to withstand the winter cold. In late April or early May when the sap is running very freely we also have a considerable loss of scions because an excess of water causes the scion shoots to grow too rapidly before wound repair has taken place to the point necessary for conducting nutrition for the growing shoots. Grafting after the leaves are pretty well out on the tree has given me best success. Grafting from then up to the last week in July has been found to be practical. Scions for topworking hickories have been employed for what I call "mediate" and "immediate" grafting. By mediate grafting is meant the employment of scions which have been cut while they were dormant and which have been stored in any appropriate way. Immediate grafting means the transference of scions cut from one tree and used upon another in the same hour or day. Mediate grafting is the sort which belongs to all history of the subject and immediate grafting relates more particularly to my recent experimental work.

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MR. BECHTEL: What kind of wax did you use if any besides paraffin?

DR. MORRIS: I have given up everything but that. The paraffin has a number of special advantages. In the first place, it seals any wound against infection from bacteria or fungi. It prevents moisture from rain carrying bacteria into the wound. It prevents evaporation from the cut surfaces.



MR. BECHTEL: Doesn't it melt too much in the sun?

DR. MORRIS: It might with you and you might need to use a harder paraffin. There are a great many kinds of paraffin. The paraffin series is a large one in chemistry. The one I find best for our locality is the common parowax that you can find in any grocery store. I use just the pure straight thing but in your country you are further south and may need a different one. It does melt some in the middle of a hot day and will be nearly fluid sometimes but it hardens up when the sun goes down.

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MR. FOSTER: Were the grafts kept in cold storage?

DR. MORRIS: I have used two ways of keeping grafts for top working. Some have been kept in cold storage, others have been kept in the ice house. I have been in the habit of kicking up the sawdust and dropping scions in the hole not very far above the ice. Last year I could not get any ice and two years ago I could not get any but the scions kept just as well in the sawdust near the ground. Then I have kept them packed in leaves with two feet of leaves on top of the scions. I have also kept some as Mr. Jones has but the difficulty is in keeping them at the right degree of moisture. The enzymes go to work the minute the cells of the scion have a full charge of water despite low temperature unless it is actually below freezing. Scions of another kind are the ones that I cut off from one tree and put on the next tree the same hour or day. That has only been possible by this method that I now employ. Almost any time in the summer we can do that without keeping the scions in storage at all. I gave some of them a resting period experimentally for a day or two but to no advantage.

PROF. CLOSE: Don't you have to be pretty careful with the melted paraffin so as not to injure the tissue?

DR. MORRIS: Yes we need special apparatus. I took a lantern, cut out the top and sunk a spun cup down in the lantern. On a cold day I turn the alcohol flame higher than in a warm day. I have been trying to have this lantern made so that it could be got on the market. There is nothing else to my knowledge that will allow the grafter to regulate the temperature of melted wax according to the weather. I am going to get it manufactured so you can each have one.

MR. BIXBY: There is a series of paraffines pure paraffines which are known only in chemical laboratories and also a number which can be obtained without much difficulty. The common parowax I think is the grade that is known in the trade as 120. That is it melts at 120 degrees F. but paraffin can be obtained without much difficulty that melts at 125°, 128° and 130°, so if the parowax is too soft for Mr. Bechtel's district I am sure he can get something that will be all right. He might have to send to New York to get it but it is readily obtained there.

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MR. BECHTEL: I have used bees wax and find that that melts at a higher temperature.

DR. MORRIS: I want complete transparency.

MR. FOSTER: Would it be out of order for a beginner to ask what type of grafting Dr. Morris uses in his work on these trees.

DR. MORRIS: I think that somebody who was not a beginner might ask that quite as well. I have tried almost all the methods employed by the experts and have gotten down to very simple principles. If I am going to get fifty, sixty, eighty or ninety per cent of catches in hickory as we sometimes do I have to use methods that are very simple. For limbs that are small not larger than one's finger the plain cleft graft is good enough and I like as far as possible to choose a branch that is about the diameter of the scion. If the limb is larger in diameter than the scion I make my cleft to one side so that the cambium line of stock and scion will correspond. It is important to have cambium layers together. By all means the best feature of all in my grafting work is what I call the bark slot. This bark slot consists in making two parallel lines in the stock bark the width of the scion. I turn down that tongue of bark and stick in the scion. I turn back the bark again and bind all with raffia. That is the bark slot graft. The bark slot is by all means the most successful method that I have ever employed. What are the objections to it? Not so firm a hold on the stock as you will get in a cleft. What are you going to do about it? Put on good strong braces for the growing stock. I find it does not do much harm to drive galvanized nails right into the tree to hold the brace, three or four nails right into the limb, and then tie the rapidly growing shoot to the brace. If I do not do that the new shoot blows out very readily when I use the bark slot. In other words you will catch more by this method and lose more unless you give the grafts a good deal of attention.

PROF. CLOSE: How do you trim the scion?

DR. MORRIS: I trim it mostly with one good long cut on one side and sometimes turn it over and make a little nick on the other, but one good long cut is usually all that it needs.

PROF. CLOSE: Supposing the bark does not peel?

DR. MORRIS: If it does not I think the chances are against its catching your graft. I have done all my grafting until this year at times when the bark peeled but this year I carried it up into September after the bark had set and I am trying to see if I can get a catch then. In that case I take a chisel and chisel off the bark where it is hide-bound. The experiment may be a failure but I have had so many failures that they are sort of a pleasant experience.

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MR. FOSTER: In the cutting back I understand that you prefer to do so when the tree is dormant.

Then in the spring when you start your grafting do you leave that cut just as it is or do you cut it off again?

DR. MORRIS: These are very important questions that are coming out. When you have sawed off the limb trim the end neatly with a sharp knife. An employee will almost always leave the cut end ragged but if you do it yourself and have smooth ends and cover them with paraffin you can graft right squarely on that end. Turn down your bark for a slot and stick in the scion at any time. If the cut end was made by someone who was not careful make a cut down through any living bark with a chisel or a knife until you get down to the wood, then make parallel lines from that point and turn down the tongue of bark. I have put in scions where I had to use a heavy chisel and mallet to turn down the tongue. It was not necessary to put on any binding there where the tongue of bark was so thick.

PROF. CLOSE: I understand you to say that if the end has become dried you go down below the dried part?

DR. MORRIS: When I find the end of the stub dry I go below that point to get live bark for grafting purposes. After my scion is well under way a year or so then I saw off any projecting stub beyond the graft and put paraffin over the cut end. That form of graft works very well except that it makes more work.

MR. LITTLEPAGE: I have been very much interested in what Dr. Morris said. I found it no trouble whatever to get a hickory from four to six or eight inches to grow a great big graft, but I have never seen one live three years. I have my woods full of dead ones. I have one in front of my house now which I slip-bark grafted about the diameter of two inches and it is still growing but I expect an invitation to its funeral next spring. I have never seen a hickory tree successfully grafted over five inches in diameter. I found in my woods that the trees would sometimes die down to the ground. If they lived they would drag along for two or three years. If those of you who were out there yesterday had had a little more time I could have shown you those dead hickories. I would like to know what your experience is in grafting hickories over an inch in diameter.

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DR. MORRIS: That is an important point and it relates to the matter of cutting back to such an extent that it causes too much shock to the tree. In very large hickories I have cut them hack to short stubs and have had a number of them die. On the other hand where I have cut back so that the largest limbs cut were not more than three inches in diameter those trees would do very well. I have living shag bark grafts now on trees that are from five inches to more than fifteen inches in diameter.

MR. LITTLEPAGE: Do you cut these back in the winter or spring?

DR. MORRIS: I do not remember about all. Some, were cut back in both seasons. Winter is probably better. Autumn better yet.

MR. LITTLEPAGE: I cut mine in the spring.

DR. MORRIS: That has a lot to do with it if the trees bleed too much.

MR. FOSTER: Are your pignuts native?

MR. LITTLEPAGE: I think most of them are worse than that.

MR. FOSTER: They are familiarly known in my state as pig nuts.

PROF. CLOSE: You could top-work them.

THE PRESIDENT: We will proceed with the next number. We are honored in having with us the President of the National Nut Growers Association who has come to us all the way from the southland to tell us about selection and propagation for the improvement of the pecan. I now have the honor of presenting to you Mr. Theodore Bechtel, President of the National Association.

MR. BECHTEL: Mr. President, Ladies and Gentlemen: After having listened to so many good papers and addresses it seems to me that as far as imparting any knowledge to this audience my trip may have been in vain. However I assure you as this is my first visit to Washington it lacks a whole lot of being in vain from what I have already seen and enjoyed. I may be able to add a few points to what has already been said.

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## SELECTION AND PROPAGATION FOR IMPROVEMENT OF PECANS

THEODORE BECHTEL, OCEAN SPRINGS, MISSISSIPPI

Mr. President, Ladies and Gentlemen: It is indeed a great pleasure to meet you all here in the interest of Horticulture, one of the greatest, and, by the way, the oldest industries of which we have any record, since Adam and Eve were engaged in it, and in the interest of one of the greatest branches of that industry, Nut Culture, and this in the greatest city on Earth, because it is the seat of Government of the greatest nation on Earth. We are all here, primarily, in the

interest of Nut Culture and I venture to say that these meetings will not be in vain, as a congregation of such intelligence, interest and determination as I see displayed here is certain to accomplish much in the course of time. The very fact that there are many problems in Nut Culture to be worked out makes the industry the more interesting for those who are not looking for an easy get-rich-quick scheme. We have accomplished some things in the line of propagation of pecans which were said to be impossible only a few years ago, and they now seem easy. The problems you will have to work out in the Northern pecan section, as it appears to me, are selection and development of suitable varieties for your climate. This will no doubt be done by using the best hardy varieties you already have, some of which are showing good results, and crossing these just as is being done in the South now by our Government officials and by several private individuals. This great Government of ours has an Agricultural Department which is capable of performing tasks in the way of experimental work in this line on an extensive scale, which would be too great an undertaking for an individual, and we should use every effort to induce this work to be extended to the Northern sections, if it has not already been begun.

The results obtained by Mr. C. Forkert, of Ocean Springs, Mississippi, who was one of the first to take up the work, are highly interesting and give satisfactory evidence of what can be done by way of combining the good qualities of two varieties by a systematic scientific method of cross pollenizing and the work of Dr. Van Fleet, whose place we visited yesterday certainly was convincing of the great possibilities along this line of work. The fact that you have not the best now does not indicate that you will not in time surpass in results some of the sections where pecans now abound. Jackson County, Mississippi, had no native pecan forest to start with and yet we now have some of the best and most profitable orchards in the world, and it is the place where most of the standard high class varieties have originated.

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In the selection of varieties upon which to build up your pecan industry be careful to choose varieties showing as many of the following qualities as possible: Productiveness, hardiness, early maturity, plumpness of kernel, good flavor and cracking qualities. The varieties selected for cross pollenization should combine as many of the desirable qualities as possible. By grafting from the young hybrids into the top of old bearing trees you may have samples of nuts in a very few years. The propagation of pecans in the Northern nurseries seems to be well under way and will no doubt be stimulated as orchard planting increases.

I might add as a suggestion that seedlings to graft upon be raised from seed obtained as near by and as nearly in the same latitude as possible as these will usually be found best adapted to local conditions of that section.

Whether grafting or budding is the best method of propagation will likely depend upon local conditions. We find in the far South that budding succeeds best in some localities while grafting is best in others. Ultimate results of the two methods in the orchards are equal. In sections where there are native pecans growing in suitable places these should be top worked to the best hardy varieties possible for quick results. The best method to do this work will also depend upon local conditions and seasons. The slip mark method of grafting as early in the spring as the bark will slip, will no doubt be one of the most expeditious, as it is quickly done, and in many sections is very successful, providing the scions are kept perfectly dormant and the waxing and tying are carefully done.

As commercial orcharding is still in the experimental stage in the Northern section of our country it will be well to sound a note of warning to prospective planters that they may avoid some of the mistakes that we in the Southern pecan belt made at one time. Next to the neglect, which some of the planters allowed their orchards to undergo, probably the selection of the wrong kind of land has been the cause of more disappointment than any other one source. A fertile soil deep, mellow, well drained sandy or gravelly clay subsoil should be ideal for pecans anywhere in the latitude in which they are hardy. However, many other types of soil are producing pecans, and if your home happens to be located where the soil is not ideal, you can still grow them by furnishing the elements which nature has failed to provide, if your soil is well drained and free from hard pan. The planting and cultivation, to be sure, must be carefully and thoroughly done to insure success anywhere.

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I will say in conclusion that I believe there are wonderful possibilities in Nut Culture in this country of ours. We know it is an established fact that nuts are entered into the dietary of our upwards of one hundred and ten million inhabitants of the United States of America more and more from day to day. We have evidence of this in our importations of nuts, which have increased from year to year until they have nearly reached the enormous value of \$57,000,000 for the year 1919 as stated by the American Nut Journal. Then, too, there certainly can be no more fascinating branch of horticulture combined at the same time with financial reward.

Now, let me thank you for your attention and say that I only wish that every one of you might join us in our big meeting of the National Association at Austin, Texas, next week.

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MR. FOSTER: A thought occurs to me in connection with Dr. Morris' idea of paraffin for use in warm climates. I happen to know as a patent attorney that in the manufacture of candles in order to give paraffin heat resisting qualities they introduce stearic acid. I have no doubt that it would be just as successfully employed in paraffin for the purpose of grafting. I think in candle making they add something like ten or fifteen per cent to the ordinary paraffin.

MR. LITTLEPAGE: I think we are very fortunate to have with us Mr. Bechtel and Mr. Perry from down South who are really in the nut business. The problem before us is varieties. If you want to plant black walnuts what walnut do you want to plant? Just because I happen to say that Stabler is a first-class walnut does not make it so. If you want to plant English walnuts what variety? I said to Dr. Van Dazce a few years ago, "I wish I knew more about that variety." He said: "Don't bother about that. You will be top working them all in a few years." (Applause.) I have found a bigger pecan down in Indiana than the Major. It is a big type and I wish we knew more about it. I wish the Department of Agriculture would make an investigation and find out. What nuts to plant and what soil to plant them on and what varieties to plant it seems to me ought to be the trend of our talk here at these meetings, and I am glad that Mr. Bechtel has taken up that question.

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MR. OLCOTT: I think the members of the association would be interested in hearing a brief account from Mr. Bixby of the only commercial nut planting proposition in the North at present,—a very successful one. He has visited it within a week and I think he could tell us what varieties they have planted.

THE SECRETARY: About a week ago I was at Alton, Illinois, at the place of Mr. E. A. Riehl. He has been a pioneer in many things, in fruit culture and what interests us more today in nut culture. He is outside the native chestnut belt and many years ago he planted some native American chestnuts. When the Rochester chestnut came out he planted it and he obtained from the late J. R. Parry of Parry, N. J., his best Japan chestnuts including the Reliance. He also obtained Boone trees from the originator the late Geo. W. Endicott, Villa Ridge, Ill. He has raised many seedling trees from the above varieties and planted a small hillside to them. Out of those he has selected the best and is propagating from them. He has chestnuts there that I wish I might show here, some that are fifty per cent larger than Paragon and with a better flavor. Furthermore they will drop out of the husks so that it is not necessary to pick up an unopened burr and heat it or pound it to get the nuts out. He has now between one and two thousand chestnut trees. Most of his chestnut trees however are seedling trees which do not bear nearly as well as his best trees. The greater part of his trees are in land that has never been cultivated. Many of his trees are not yet in bearing. Some of his trees however are now 25 to 28 feet spread and bearing heavily. He is certain that the yield of his orchard could be greatly increased by top working the poor bearers and that he is doing. Still he told me he obtained not less than 35¢ per pound for any of the crop and for some as high as 40¢ and 50¢ wholesale. In 1920 he produced over 4000 pounds.

In this connection a short history of the Boone tree will be of interest. In the spring of 1895 Mr. Endicott fertilized blossoms of Parry's Japan Giant chestnut with pollen of a native American chestnut and planted the nuts. This cross was made with difficulty for the American and Japan chestnuts do not bloom at the same time and it was several years after he had made up his mind to make the cross before he was able to do it. In the fall of 1897 one of the trees produced six burrs filled with nuts and was named the Boone. Since then it has borne as follows: 1898, 1 lb.; 1899, 3 lbs.; 1900, 5 lbs.; 1901, 6 lbs.; 1902, 8 lbs.; 1903, 12 lbs.; 1904, 17 lbs.; 1905, 25 lbs.; 1906, 31 lbs.; 1907, 43 lbs.; 1908, 50 lbs.; 1909, 56 lbs.; 1910, 5 lbs. (small crop due to hard freeze in April); 1911, 80 lbs.; 1912, 76 lbs.; 1913, 140 lbs.; 1920, 153 lbs. I am not informed as to the crops in 1914 to 1919 inclusive. Two other trees of the same parentage planted at the same time bore 128 lbs. and 168 lbs. respectively in 1920. If we consider that chestnut trees are set 40 feet apart each way, which means 27 trees to the acre, and estimated the crop at a fraction of that borne by the Boone tree we shall still have figures sufficient to show the wonderful possibilities of the chestnut in those sections outside of the native chestnut area of the country where it will succeed.

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Mr. Riehl also has black Walnuts. He procured a Thomas black walnut from Joseph W. Thomas & Son, King of Prussia, Pa., fifteen or sixteen years ago. From that original Thomas tree he has top worked a lot of seedling black walnut trees and he has I should think between one and two hundred in bearing at the present time many of them bearing heavy crops. It is very evident that Mr. Riehl has in his chestnuts and in his black walnuts gotten northern nut culture down to the point where it pays. I wanted to get Mr. Olcott to go there on his trip and get some facts from Mr. Riehl to present at this meeting. When I was there I had another mission in mind and I spent the time in getting what I went for. Consequently I did not get all the practical details and results in dollars and cents which we ought to have to demonstrate that it has been a commercial success. But I am satisfied that it is because he is constantly increasing his plantings.

MR. JONES: Two years ago he favored black walnuts.

MR. BECHTEL: What has he done with pecans?

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THE SECRETARY: The pecan is native with him but he is probably pretty near its northern limit even though I have found it bearing good crops further north. The pecans I have seen at Alton do not seem to be bearing much. He has one or two northern varieties top worked on native pecans one eight years old and another one five neither one of which is bearing.

MR. BECHTEL: He had a very small choice nut that he prized very highly and sent me some scions to propagate for him I think about 12 or 14 years ago. I grew them on our native stock shipped them to him. I never followed it up to see what results he had. I think probably those roots may have frozen out if he had severe winters.

THE SECRETARY: What he showed me were two of the standard northern varieties, I think Busseron and Indiana, which he had grafted on young trees. In southern Indiana they are doing much better. Grafted varieties are bearing but with Mr. Riehl it is the black walnut and the chestnut

with which he is making a success.

THE PRESIDENT: The next speaker has for his subject the southern pecan and how its commercial development came about. He comes from the one state in the Union of which I may be somewhat jealous. It is the only state east of the Mississippi River with a larger area than Michigan. (Applause). I take pleasure in presenting Mr. A. S. Perry, of Cuthbert, Georgia, Secretary of the National Nut Growers' Association.

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## GEORGIA'S PECAN INDUSTRY

A. S. PERRY, CUTHBERT, GEORGIA

My heart thrills with pride and pleasure as I stand in the Capital City of our great nation and bring greetings to the Northern Nut Growers Association from the fertile fields of the far South.

I am a southerner to the manner born. For six generations my people sleep in Georgia soil and for an hundred years my family have lived in the Albany district the queenliest section of the far south that rests resplendant as a jewel upon the snowy bosom of her royal mother Georgia and as beautiful as a cluster of fragrant flowers that nestles in the girdle of a lovely woman.

My imperial mother Georgia is a land of surpassing loveliness and thus has for ages been the inspiration of poets and painters too.

The southerners dream of beauty is the magnolia and who can tint her roses or paint the morning glory that points its purple bugle towards the sky as though to sound the revelie for a waking world. No prima donna has ever yet entertained the crowned heads of Europe with such music as that divine melody with which the mocking bird greets the coming dawn.

Ours is a land where skies bend blue and all nature seems to smile; where mosses veil the infirmities of decrepit oaks and vines spring unbidden from the ground to hide the scars of grey old walls; where the grape-vine staggers from tree to tree as though drunk with the purple juice of its own luscious fruit; where flowers lie at your plate on a winter's day and the humblest laborer carries in his dusky hand flowers fit to grace a May queen's crown.

As proud as I am of the beauties of Georgia I am prouder still of her material and natural resources. We have a vast undeveloped empire within whose borders there awaits the prospector such potential treasure as would make the fabled wealth of Lydia's ancient king seem but a beggar's trifle, and the consuming ambition of my life is to see these resources developed to the fullest degree and then shall my imperial mother Georgia shine as the brightest star that gleams in Columbia's diadem.

But of all the natural resources of Georgia there are none to be compared to the possibilities in the development of our NATIONAL NUT the Paper Shell Pecan.

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The history of the paper shell pecan is but another example that "a prophet is not without honor save in his own country," for native Georgians failed to avail themselves of the opportunity at their door and the credit for the development of Georgia's pecan industry belongs to the far sighted men and women of the North. Then why should I not feel grateful to such men and women as you believing as I do that the paper shell pecan industry is destined to lead Dixie out of her industrial bondage and restore her to her rightful place among the sisterhood of states.

"History repeats itself" says the soldier and there is pictured in his mind vision of other Shenandoah Valleys swept by the fiery broom of war and other Atlantas and Savannahs given to the flames on some other Sherman's March to the Sea.

But history has repeated itself; the North has again invaded the South but not with drum and fife and armed hosts and has been met not with shot and shell but with a genuine southern welcome and from this commingling of northern capital and energy with southern soil and sunshine has sprung a new industry of such roseate promise as to almost make the story of Aladdin's Wonderful Lamp fade into insignificance and Dixie's imperial product, the cultivated paper shell pecan makes her bow to the world.

French explorers as early as 1740 left authentic records of pecans in the Mississippi Valley and the many giant pecan trees scattered from Maryland to Texas which the scientists tell us are hundreds of years old seem to indicate that the pecan is a native of America whose origin is lost in prehistoric times.

The earliest financial transaction in pecans that has come to my notice was in 1772 when William Prince of Flushing, New York, sold in England eight pecan trees for ten guineas each. These trees were grown from seed planted by himself.

Prior to 1890 there had been little if any attempt to plant pecans in orchards but about this time a few scattering seedling orchards began to appear.

In October 1902 about thirty owners of small pecan orchards met in Macon, Georgia, and organized the National Nut Growers Association. Of those pioneer growers only three remain today as active members of the Association, Theo. Bechtel, H. C. White, and O. P. Mears.

By this time the art of budding and grafting having become reasonably well known several pecan nurseries came into bearing and orchards of budded trees began to appear and the foundations of a real industry were laid. About this time the nursery crook began to appear and sold thousands of worthless trees but despite this handicap pecan culture continued to spread and shortly thereafter attracted the attention of Prof. John Craig of Cornell who after investigation pronounced it safe sane and profitable. He also made a study of the various sections and decided that the Albany district was the ideal section for profitable pecan culture.

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This announcement by Prof. Craig was sufficient to induce northern capitalists to begin developing the Albany district on a commercial scale and several companies entered the field planting many thousand acres to be sold in units. As an evidence of the lack of faith on the part of local land owners let me say that a few weeks ago I read the original contract between one of the pioneer development companies and the gentleman from whom they bought their land. This contract was dated early in 1908 and provided for the sale on time payments of several thousand acres of land closing with the limitation that unless as much as 100 acres of this land were planted in pecans and sold in 1920 the contract was to be null and void. As a matter of fact this company developed and sold about 4500 acres in less than five years. They have long since retired as developers and give their entire time to the care of their immense orchards and the sale of their nuts which annually run around two hundred thousand pounds.

More than one of these pioneer development companies found themselves in financial difficulties due to the fact that they had sold their orchards too cheaply. Pecan growing is expensive, much more so than the average man thinks and the pecan orchards in the Albany district today that do not meet the expectations of their owners are mostly those that suffered for lack of money. Those companies with financial resources and intelligent horticulturists have developed orchards that are a source of perennial pleasure and profit to their owners.

The cultivated paper shell pecan is as superior to the wild seedling as is American gold to Mexico's money. These wild seedlings are small in size artificially colored a bright red and have a sharp, astringent taste and have a commercial value only because they are used to lower the price of mixed nuts.

When the average man hears the word "pecan" he instantly thinks of the bitter red little nut which is ever present in the supply of Christmas goodies but which is religiously culled and fed to the glowing grate. Mr. Average Man never even heard of the southern paper shell pecan. In fact, up to the present time, the demand has far exceeded the supply and but little if any effort has been made to develop new markets. I think it a conservative estimate that not ten per cent of our population have ever tasted a paper shell pecan.

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The paper shell pecan is our national nut and its only competition in the markets of the world is the ignorance of the public. Acquaint the public with its merits and there will be a demand for a million times our present supply.

Away with the thought of overproduction. The "avalanch of nuts" is an old wife's fable. Do not talk to us about overproduction, when the food problem is giving the gravest concern to the master minds of the world. With population increasing and food supply diminishing the gaunt specter of famine is creeping closer and closer to the homes of men even in our own favored land.

Hunger knows no armistice. It conquers amid the snowdrifts of the North, where the grand army of Napoleon found its winding sheet. It conquers amid the burning sands of the south where the phalanx of Alexander halted in mutiny. Away with such nonsense as overproduction in discussing this the choicest food product ever given by a gracious God to a hungry world.

The ideas of yesterday do not fit the ideals of today. When conditions shift opinions must be adjusted accordingly and the pioneer growers are about to realize their golden dreams and reap their reward, for their orchards are coming into bearing and yielding tons of beautiful brown nuts for which they find a ready sale at prices ranging from 50 cents to 75 cents per pound and at even higher prices for extra fancy stock.

No doubt many extravagant statements have been made about the pecan industry but why exaggerate when the plain truth staggers the reason? Why draw on the imagination when reputable growers in the Albany District certify to returns to non-resident owners of \$300 per acre in a single season.

This is one infant industry that will not cry for a protective tariff. Never will Capitol Hill resound with the eloquent plea of some statesman urging that the southern paper shell pecan industry be protected by a tariff wall.

The paper shell pecan is the horticultural triumph of the ages the gift of a gracious God who no doubt could but never did produce a finer nut and who in his inscrutable wisdom gave a natural monopoly in its culture to the lower cotton belt for no where else on the habitable globe does it reach the perfection attained there.

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The Mississippi Valley has been called the cradle of the pecan industry and Georgia its nursery.

Almost all the standard varieties of pecans have come from the lower Mississippi Valley, Jackson county, Miss., perhaps leading the procession as she is the mother of no less than twelve of the standard varieties now fruiting in thousands of orchards making heavy the pockets and light the

hearts of as many owners.

Southwest Georgia has monopolized the pecan nursery business. Given Albany, Georgia as a center and scribe a circle with a sixty mile radius and you have inclosed the area from which 90% of all pecan nursery stock has come. This circle includes Monticello, Florida, which probably is entitled to the honor of having grown a greater amount of pecan nursery stock than any other one community.

Texas produces the bulk of the pecan crop well informed men stating that nine-tenths of the pecans come from the Lone Star State. This may be correct but practically all Texas pecans are seedlings and while some are of real merit the bulk of the Texas crop goes to the crackeries.

The pecan belt roughly speaking is the lower cotton belt and includes in a general way the southern part of South Carolina, Georgia, north Florida, Alabama, Mississippi, Louisiana and parts of Texas and Oklahoma. The paper shell pecan grows to perfection in this limited area and nowhere else but all varieties do not thrive alike in the different sections and the growers have long since learned this and have eliminated the cumberers of the ground and replanted with those varieties adapted to that territory.

To successfully develop a pecan orchard requires money, brains and everlasting bull-dog determination for the lean years with all going out and nothing coming in try the patience and test the nerve of the stoutest man. In pecan growing even as in love-making "faint heart ne'er won fair lady."

While the kingdom of the pecan stretches from Charleston to the Rio Grande, the seat of government the capital city is Albany, Georgia, for in the charmed circle known as the Albany district is to be found a greater number of cultivated paper shell pecan trees than in all the world besides. Here it is that abundant northern capital applied to southern soil and sunshine has made the desert to blossom like the rose. Here it is that abandoned farms scarred with gullies and overgrown with briar have been touched as with a magic wand and transformed into a veritable fairyland of flower gardens and fertile fields dotted with hundreds of thousands of beautiful pecan trees that lift their majestic heads towards the sky as though proud of their royal lineage. Here it is that the Mexican boll weevil before whose blighting breath our snowy fields of cotton melted over night brought no terror for King Cotton no longer reigns supreme. The king is dead but the people rejoice as the scepter falls from his nerveless hand and a new monarch ascends the throne. Millions of royal banners flutter in the breeze glistening green with promise for the future and hope is high, and the hearts of the people light as they gather to pay homage to the new monarch, Her Imperial Majesty the Paper Shell Pecan.

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THE PRESIDENT: We now have arrived at the time when we should go ahead with some of our business work and probably the first thing we should take up is the report of the committee on nominations.

MR. OLCOTT: Your nominating committee regards it as especially fortunate that the association has a board of officers so well equipped as is the one under which the organization has just completed another year. For that reason and also because in a single year officers can scarcely put into effect plans they may have in view, the president especially being of necessity engaged largely in becoming acquainted with the field and the membership; your committee recommends the re-election of the present officers: President, Wm. S. Linton, Michigan; Vice-President, James S. McGlennon, New York; Treasurer, Willard G. Bixby, N. Y.; Secretary, Dr. W. C. Deming, Connecticut, and the executive committee as at present composed.

The Northern Nut Growers Association has reached the stage of advocating strongly the planting of nut trees of the kinds the Association has investigated. Roadside planting appears to offer an immediate field for activity and President Linton's leadership by reason of his special interest and activity in this field is particularly needed during the coming year when through the urging of this and other societies it is expected many states will follow Michigan in the matter of roadside tree planting.

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We believe it would be a matter of particular satisfaction to any nominating committee of this association (as it is of this committee) to recommend continuation in office of Treasurer Bixby and Secretary Deming.

(Signed)

RALPH T. OLCOTT  
T. P. LITTLEPAGE  
ROBERT T. MORRIS  
C. A. REED  
C. P. CLOSE

MR. LITTLEPAGE: I move the adoption of the report and that the secretary be instructed to cast the entire vote of the association in support of the report of the committee.

MR. JONES: I second the motion.

The motion was carried.

THE PRESIDENT: Ladies and gentlemen. When I started for Washington it was with the determination that another should succeed me as president of the association the one reason being that my time had been so occupied during the past year that it seemed impossible for me to go ahead with the work as it should be done as president of this organization. Now I am going to accept the election which you have so kindly conferred and I am doing it for two reasons. I like the association and the membership of this organization. I feel for the other reason that my work has not been completed and I desire to finish it. Now then you should have your membership doubled. Every last member of the organization should put forth efforts this year towards that end. Here is one plan that I have under way. I asked the faculty of our agricultural college at Lansing if they would undertake to supply me with the names of those who have nut trees in Michigan not the ordinary kind but those producing good nuts and in plenty. I have the names of from fifty to one hundred of those men owning perhaps a thousand good nut trees. I do not believe that there is one of those men but would become a member of this association if the matter were properly presented to him. We have in Michigan 1,500 townships or more. Now we have a way of reaching the supervisors of those townships through some of our departments and we can practically take a census of the nut bearing trees in Michigan so that instead of having from fifty to one hundred names here we should have several hundred. Really 75 per cent of those men should be members of this association. Now what we hope to do this year in Michigan I feel can be done in every other state that is interested in our particular work. I want to ask your co-operation you who live in other states to assist in doing it. Then when we meet a year hence I hope it may be somewhere in the central West. You honored our state last year with the annual meeting. Of course we would like to have you there again. You are welcome. We would be glad to receive you but Michigan has been thus honored and I imagine that it would add to our force in other sections to hold the meeting elsewhere, in Illinois or Iowa or perhaps even a little further west. Some associations are now meeting in Yellowstone Park and if we should go there we would have the states of Idaho, Montana, Utah and Wyoming. We should get membership in all of those states. The place of the next meeting I think is very important. Now I think I have plainly stated my position in the matter and I am going to try to serve you another year. I hope that at the end of that year we will have our membership at least doubled. Let us try and treble it. I thank you. (Applause).

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The next subject under discussion then will be the place of meeting.

THE SECRETARY: The by-laws say that the place for the next meeting shall be selected by the convention assembled or in the event of failure in that by the executive committee. Sometimes we have done it one way and sometimes the other. The proper thing to do I think is for the advocates of the different localities to now present their attractions.

MR. POMEROY: Our vice-president when he left asked me to suggest Rochester, N. Y. While at Rochester Niagara county is only a short automobile or trolley ride away. In Niagara county are quite a good many walnut trees in bearing.

MR. RUSH: Mr. President, I invite this association to convene next year in Lancaster City, Lancaster County, Pennsylvania. We can show you a very prosperous nut nursery and some young bearing walnut trees and Harrisburg and other places of interest. I am satisfied that you can not meet at a more convenient place than Lancaster City. Therefore I extend the association a hearty invitation.

THE SECRETARY: I would like to hear from Mr. Reed as to the attractions of the eastern shore of Maryland.

MR. REED: There are several places, Mr. President, where I wish you might go next year. One of those places is the eastern shore of Maryland. As I told you last year I regard the eastern shore of Maryland as one of the promising places of the whole East for the development of nut orcharding and I find there a great deal of latent interest and a great deal to see. I am a little disappointed that we have not some representatives here at this meeting from the eastern shore. I am sure that if we should decide to go there we would be received with enthusiasm and we would be shown something that would be quite a surprise to most of us.

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Then another place that I would like to have considered for some meeting in the near future is the middle West. The Professor of Horticulture in Missouri is a warm personal friend of mine a classmate of mine in college, and he is very enthusiastic about the possibilities of nut culture in that state. He is waiting to be told or shown how to go ahead, and if we were to go out there I am sure he would follow the lead if we set the pace. He would take hold and push the nut industry in that section. In that same neighborhood is the orchard that Mr. Bixby told us about the chestnut orchard of Mr. Riehl of one or two thousand chestnut trees planted on hillsides that have never been plowed and which are giving Mr. Riehl a very lucrative income. Mr. Riehl is 83 years old and is not going to live always. We certainly ought to see that place while he is there. We have no invitation out there and none from the eastern shore and I am always in favor of going where we have an invitation. It would be my feeling in view of the present situation that we accept one of the invitations that have already been given to us.

MR. RUSH: We met once in Lancaster about eight years ago but at that time we had little to show. We had no nut nursery of any consequence at all and no bearing walnut trees at that time. Now we have them in their prime.

DR. MORRIS: I would like very much to go to both places, the ones described by Mr. Pomeroy and



by Mr. Rush.

MR. JONES: I would like to say that we were at Rochester three years after Lancaster and I think Lancaster is entitled to it if you take time into consideration. I think Lancaster is entitled to the meeting now.

MR. LITTLEPAGE: I move that we accept the invitation of Mr. Rush and Mr. Jones to meet in Lancaster, Pennsylvania next year. I am going to couple with that another motion which you can consider if you desire and that is that we fix the time of meeting. I think that rather important. I think there are many reasons for it. These meetings are attended by many people who must know as far in advance as possible. Quite a good many people take touring trips over the United States and if they know when these meetings are going to be held they would be very glad to time themselves to be at that point at that particular time. For example a few years ago when we had a meeting here Mr. Groner toured here from Oregon and timed his trip to be here. Later he timed his trip to be at the national meeting at Mobile, Alabama. It is very important because we all take vacations and we have to make our vacation arrangements in advance. It seems to me that the time would be fixed now instead of letting it lie over and finally select the wrong time. I therefore move that we accept the invitation of the gentlemen from Lancaster and then that we fix the time.

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PROF. CLOSE: I second the motion.

The motion was unanimously carried.

MR. REED: Mr. President, I would like to make a suggestion in regard to the date. There are two purposes that we have in mind. One to see things growing and another to see the product. We can hardly do both the same year. This year we have seen things growing. We have had almost a summer meeting and it seems to me that unless the local folks who have invited us to Lancaster should disagree we might well afford to have our next meeting a December meeting. Then we can see nuts. We can discuss nuts themselves. I would make that motion that our meeting be the second week in December the Wednesday and Thursday of the second week in December, 1921.

THE TREASURER: Would not the prime object in going to Lancaster be to see things grow? Wouldn't it be difficult if not impossible to really accomplish that by a December meeting?

MR. LITTLEPAGE: I think a winter meeting might just as well be held in New York or Baltimore or Washington. I do not agree with Mr. Reed. If I go to Lancaster I would go to see things. I went up there one December and nearly froze.

DR. MORRIS: We could split the difference between the two. I think Mr. Jones and Mr. Rush should be consulted in the matter.

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MR. RUSH: I think it would be important to have it the same week as the York Fair as they have the reputation of never having any rain and this is a very good time of the year to have an exhibition. You see the fine crops and everything which is agricultural and horticultural. And another thing in connection with this we can see the hazels on the bushes at this time of the year.

DR. MORRIS: I move that we meet about this time next year.

MR. RUSH: I think this week in 1921.

MR. LITTLEPAGE: In order to get the matter before the meeting I move that the convention next year meet at Lancaster, Pennsylvania on the Thursday and Friday of the first week in October.

MR. JONES: I second the motion.

The motion was unanimously carried.

PRESIDENT LINTON: Before closing I want to call to your recognition a kindly act that I know will please you all. Yesterday while we were having our pictured taken I lost this package of papers. Today it has been returned to me by two boy scouts. From what I know of that organization I do not believe that there is anything doing the boy any more good than their training. I am interested in a forty-acre piece of land on Lawton Lake, Michigan, on which this year we permitted the boy scouts to camp. I followed their training somewhat to ascertain what it was. I was in camp with them two or three days and learned that it is a training that is doing the boys of the country a lot of good. Their motto as I understand it is to do good or to be of service to others. These two lads that brought this package to me refused to receive any compensation whatever. They are the two who have tramped from New York City to San Francisco and are now on their way back. If these boys or their organization ever get interested in our movement in the planting of nuts throughout the country we will be glad to help them.

PROF. CLOSE: There is one committee whose report has not been called for and for the sake of the record I presume it might better be offered. That is the auditing committee. The committee was composed of Messrs. Reed and Close and we desire to say that the report of the treasurer has been scrutinized very carefully and we are not able to detect any mistakes. The balance in the treasury is \$75.26; total receipts including the amount on hand at the beginning of the year \$666.48; total expenditures \$591.22, leaving a balance in the treasury of \$75.26.

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THE TREASURER: I want to offer a resolution that Article III of the by-laws on *Membership* which now reads, "All annual memberships shall begin with the first day of the calendar quarter following the date of the association" be amended to read, "That all annual memberships shall

begin with the first day of such calendar month as shall be agreed upon."

Now I will tell you why I ask that. Most of the memberships are combined with the subscription to the American Nut Journal. In many instances the new members have requested that their subscription to the journal be dated back one or two months for the sake of getting one or two numbers of the journal. In some instances they are already subscribers to the journal and they want to change it to make it come the same time. I offer that amendment to the by-laws.

MR. REED: I move that the change be made.

DR. MORRIS: I second the motion.

The motion was carried.

THE TREASURER: Here is another thing I think is a matter of a good deal of importance. There has been spoken of two or three times during the day the great progress which is likely to be made in systematic hybridization of nuts. It has come to my knowledge recently that the Arnold Arboretum is seeking to establish a regular plant breeding department. They have growing on their grounds the greatest collection of trees and shrubs that will grow in that section that can be found anywhere in the country. I want to offer a resolution as follows:

WHEREAS it is the firm belief of the Association that one of the most hopeful sources of obtaining nuts better than we now have is by carefully planned and executed work of hybridization, and

WHEREAS such work, particularly in the case of the slower developing nuts, such for example as the hickories, will require the uninterrupted carrying out of carefully planned work for a long series of years, and

WHEREAS the Arnold Arboretum, of Jamaica Plain, Mass., has on its grounds a greater collection of the trees and shrubs from all parts of the world that will grow in that location than can be found anywhere else in the country, including a large number of hickories of various species in bearing, and

WHEREAS the Arnold Arboretum is now assembling on its grounds the various propagated nut trees, and has expressed its intention of continuing this work and of including all varieties that it may be able to obtain of those hickory trees notable for any one quality and which may promise to be valuable for hybridizing purposes, and

WHEREAS the Arnold Arboretum is desirous of establishing a regular plant breeding department where nut trees, particularly hickories, as well as trees valuable for timber purposes, flowers, etc., may be bred, and, in order to provide for the uninterrupted carrying out of this work is seeking to raise an endowment, be it hereby

RESOLVED: That the Northern Nut Growers Association assembled in the City of Washington, D. C., this 8th day of October in the year 1920 heartily endorses this purpose of the Arnold Arboretum as one likely to promote the acquisition of finer nuts than we now have, and urges all persons able to do so to aid in any way possible.

DR. MORRIS: I move that we adopt that resolution.

MR. REED: I second the motion.

The motion was carried unanimously.

THE PRESIDENT: If there is nothing before the body at this time I will declare the eleventh annual session closed.

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## APPENDIX

From C. K. Sober, Lewisburg, Pa.:

My bearing chestnut trees, most of them, have gone out but in the 40 acres of chestnut nursery stock I find there are thousands of trees that seem to be immune from the blight up to this time. While they stand right beside trees in the nursery that have died from blight yet there is not a spot on them.

From W. O. Potter, Marion, Illinois:

I am putting forth every effort to develop a nut orchard here in southern Illinois the like of which will not be excelled in this state. My pecans are doing nicely. I have five acres already set to budded trees and fifteen acres planted to seedlings which I hope to bud next year. I have budded chestnuts, black walnuts and almost all varieties of nuts that will grow here in the North. I am using filberts for fillers among my pecans.

I have just harvested my first crop of filberts from my experimental garden here in town and my

bushes at Halcyon Frunut Gardens (this is the name of my nut farm) are growing nicely and some have catkins for next year's crop. The filberts that I have just harvested were borne from three Cosford bushes of the French strain. I have some German strain that I received from Mr. McGlennon that are full of catkins for next year.

I had some pecans to bloom last spring, but they failed to set any nuts. I have about a peck from two budded Thomas black walnut trees that are four and five years old. I have one Stabler that has two nuts on it now only three years from transplant. My Rush seedling chinquapin that bore last year has only about six nuts on it this year but they have not yet matured.

I hope some day to have a nut orchard that will be the show place of southern Illinois and then I will invite the association to have an annual meeting here and at my farm.

From G. H. Corsan, Toronto, Canada:

This time I can say that my trees never looked so well. All passed through last winter and the terrible winter of three years ago. My list consists of the following: Constantinople hazelnuts, Kent filberts, Manchurian juglans regia, Jap heart nuts, Pomeroy juglans regia, Canadian seed juglans regia, common native chestnuts, Col. Sober's paragon chestnuts, castanea crenata.

The chestnuts grow a foot more from all terminal branches, not a twig winter-killed. Constantinople hazelnuts grew two feet from all terminal branches and not a bud winter-killed. Kent filberts killed back some branches, others did not, grew well this summer from 1½ feet to a yard.

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There is a huge crop of Pomeroy paragon chestnuts on my trees this year. No blight near me, as thank heaven the farmers around me are too stupid to plant chestnut trees and in fact no farmer ever planted a nut tree with two exceptions within 20 miles of me. But one farmer by name of Anderson planted a mile of black walnuts along the roadside 75 years ago. These trees are loaded with nuts and boys just now and they reach away up higher than the tallest phone wire (that is the lowest branches do).

All juglans regias grew a yard from each terminal bud. My Pomeroy's after killing back for several years have at last got a real good start and are going to live and bear. When I see a bluish tinge to the leaf of juglans regia, together with a smooth glossy leaf, not too long—having 7 and not 17 leaves to the stalk—and having a very white grey bark, then I know that the nut will be EXTRA good, and though that type of tree is a bit tender and requires water in the early and mid-dry summer, as well as hard wood ashes, lime and chicken manure in the late fall, this is the tree that on the north aide of Lake Ontario where I am now some day will bear and ripen real nuts.

My grapes and peaches ripen well this fall, though we as all others had a late spring and my Indiana and Iowa pecans actually grew 2 feet from terminal buds.

Were I an old man of 80 I would plant nut trees to the exclusion of every other work. First, I would be growing a crop of food 150 years after my death. Second, I believe that every man who has vitality to live over 80 has been a bad man in his youth and he owes it to the world. Third, it is a healthy occupation, stooping down and digging and takes the rust and poisons out of the system. Fourth, there is a joy seeing the leaves and branches grow the next summer and in old age one must feed and take joy from the eye and ear more and more and less and less from the mouth and stomach. Fifth, it is not at all an unreasonable supposition that as a boy again I may be climbing the same trees that I planted. And if I know for certain that I would not be then some other boy will take my place.

The salvation of the future is more and more food from trees and less and less from animal sources. The day is fast passing when the farm consists of a tobacco barn, a pig pen, a cow stable and a hennery. From living upon a badly selected type of food we fear the flu and other diseases. No disease will ever come out of a nut tree. But we are a lot of fools and blame the absolutely innocent cucumber for what a vile mixture of salt and vinegar does to us and thus these same asses will say, "that nuts are unhealthy" and we pay a billion dollars out every three months to have the dentists fix our teeth that never receive any nut grinding exercise!

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From J. F. Jones, Lancaster, Pa.:

I expect as you do that there will be no need of much room for the convention. The fact is that without any commercial nut planting in the territory covered by the Northern Nut Growers Association it is remarkable that there has been as much interest as there is. I happen to know that the southern pecan (National) Association was kept going by the nurseries down there for a good many years, or largely by them, and without the commercial planting of the pecan there I do not think the Association would have kept going very long even if it had been founded.

I believe eventually there will be some interest in commercial planting north but it will go pretty slow and be after our time I judge. In commercial planting I mean plantings of not less than ten acres. I occasionally sell orders of 50 and even 100 trees, but they are usually scattered as to kinds and varieties of nuts and evidently designed to test out on a fair scale the merits of the different nuts. A man was here a few days ago and gave me an order for nearly a hundred black walnut trees. He has been planting for several years, starting with a half dozen trees three or four years ago and reports the trees doing fine. I presume you could call his planting this year a small commercial planting as that is what he has in mind.

The boom in planting fruit trees has taken some interest away from nut planting and this will

continue as long as fruit is selling well.

From T. C. Tucker, Sail Francisco, Ca.:

Your program for the approaching meeting of the Northern Nut Growers Association, which has just reached me, is a most interesting one. It is with regret that I find I shall not be able to be with you. This is shipping season for the California Almond Industry and my presence here at this time is imperative.

While through the California Almond Growers Exchange I have for some time been a member of the Northern Nut Growers Association, I have not as yet had the pleasure of meeting with you, but I want to extend you a cordial invitation to visit California and I hope that at some future date a convention of the Northern Nut Growers Association will be held in this state. Here, as nut growers, you will find much of interest. This is the only state in the Union producing almonds commercially. Our 1919 crop was worth approximately \$4,000,000.00 and represented 7000 tons of nuts. Here in this state we also produce the California Walnuts which in 1919 brought a return of approximately \$20,000,000.00. Both of these industries are in their infancy, particularly is this true of the almond. It is estimated that there are 100,000 acres in California planted to almonds, the major portion of which is non-bearing.

We are now preparing for the future through an energetic sales campaign and by making plans for manufacturing by using almonds in new and attractive preparations. In 1919, the California Almond Growers Exchange, a non-profit association of 3800 farmers, spent approximately \$208,000.00 for National Advertising and the expenditure in 1910 will exceed a quarter of a million dollars. This is done not only to sell the crops of 1919 and 1920 advantageously, but to educate the consumer up to the high food value of the almond and incidentally to lay a substantial foundation for future business.

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We believe that the outlook for the California Almond is promising, but it is only as promising as the growers co-operate to that end. We believe that by a strong association of growers, quality and grades can be improved, distribution widened and the public made acquainted with the value of our product through the medium of our advertising.

We are also taking up at this time the cultural question endeavoring to eliminate the undesirable varieties and improve those which are commercially profitable.

We have some eighty odd varieties of almonds in this state, many of which are not known commercially. You will thus see that we have quite a problem in cultural lines.

The principal object of the Northern Nut Growers Association, I believe, is the diffusion of knowledge on cultural questions, but a word of co-operative marketing may not be amiss.

Our investigations have shown that for twenty-five years before the war Nonpareil Almonds (our highest priced variety) retailed at about 30c per pound. The grower received from 7c to 10c per pound, the average being close to 8c. This was before the association was formed. After the association was organized, the grower received, through co-operative marketing and by the elimination of speculation and waste in distribution, a range of from 14c to 20c for Nonpareils with an average of approximately 16c while the price to the consumer remained about 35c. During the past two years, the price to the consumer has of course advanced to meet the increase in cost of transportation, cost of doing business and of production. As a matter of fact, the increase in price to the consumer has not kept pace with the big increase in the cost of production. The point I wish to make, however, is that co-operative marketing has on the average, by the elimination of speculation and, as before said, by minimizing waste in distribution, secured for the almond grower a living price.

We do not believe that the marketing problems of the farmer will ever be satisfactorily solved until he takes them up through co-operative methods and solves them himself.

My work for the past eleven years has been in connection with the sale of almonds and I am happy to say that while our country is going through a period of trying re-adjustment at the present time, the association has meant to the almond growers of California a wonderful insurance against loss. The consumer, too, has been benefited as this association has been able to lay down almonds in the markets of the United States at a lower distribution cost than would otherwise have been possible.

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However, assuming that this convention is interested mostly in cultural questions, I shall refrain from further discussing the marketing problem. Let us not however, lose sight of the fact that it matters not what may be the quality of our product if we cannot dispose of it at a profit.

A satisfactory margin of profit means improved varieties, better culture, increased yields and better satisfied producers. Scientific yields and better satisfied producers. Scientific cultural effort, to achieve its highest possibilities must inevitably be linked with commercial success.

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## ATTENDANCE

Dr. J. E. Cannaday, Charleston, W. Va.

Conrad Vollertsen, Rochester, N. Y.  
J. P. Beck, Saginaw, Michigan  
Prof. C. P. Close, Maryland  
B. C. Foster, Washington, D. C.  
J. W. Ritchit, Yonkers, N. Y.  
Dr. G. J. Buist, Brooklyn, N. Y.  
T. P. Littlepage, Washington, D. C.  
C. A. Reed, Washington, D. C.  
Mrs. C. A. Reed  
William S. Linton, Saginaw, Michigan  
W. C. Bixby, Baldwin, N. Y.  
Mrs. Bixby  
A. S. Perry, Cuthbert, Ga.  
Dr. W. C. Deming, Wilton, Conn.  
R. T. Olcott, Rochester, N. Y.  
W. R. Fickes, Wooster, Ohio  
A. C. Pomeroy, Lockport, N. Y.  
Elam G. Hess, Mannheim, Pa.  
F. E. Brooks, French Creek, W. Va.  
W. N. Roper, Petersburg, Va.  
Mrs. Roper  
Dr. R. T. Morris, New York City.  
Dr. J. H. Kellogg, Battle Creek, Michigan  
J. F. Jones, Lancaster, Pa.  
Miss Jones  
Dr. J. B. Curtis, Orange Heights, Fla.  
Mrs. Curtis  
Dr. John F. Keenen, Brentwood, Maryland.  
J. S. McGlennon, Rochester, N. Y.  
H. C. Best, Bridgeport, Conn.  
J. E. Brown, Elmer, N. J.  
E. E. Reynolds, Washington, D. C.  
J. G. Rush, West Willow, Pa.  
D. F. Clark, Harrisburg, Pa.  
Theodore Bechtel, Ocean Springs, Miss.  
Mrs. Bechtel  
Miss W. M. Daish, Washington, D. C.

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## EXHIBITS

Morris hybrid chinquapin No. 1—From graft set spring 1910 on bush chinquapin stock. A scientific cross or hybrid made by Dr. Robert T. Morris New York City. Very resistant to blight is not blight proof. Has the fruiting habit of the chestnut and bears on very small bushes or trees. Grown by J. P. Jones, Lancaster, Pa.

Morris hybrid chinquapin No. 2—From grafts set on stocks of the bush chinquapin spring 1919. Similar to No. 1.

Chinese pine nuts, *Pinus armandi*, from the mountains of North China. The Chinese pine nuts, *P. armandi* and *P. bungeana*, although not equal to some of our own pine nuts from the southeastern states, are considered the best and most reliable for eastern and northern planting in this country. Sent in by J. F. Jones, Lancaster, Pa.

Bush chinquapin *Castanea pumila*, grown by J. F. Jones. Branches of ordinary wild nuts.

24 plates hazels or filberts grown by Carl Vollertsen, Rochester, N. Y.

Nine varieties *J. regia*, peanuts, hazels and Weicker shellbarks, grown by J. G. Rush, West Willow, Pa.

23 plates and varieties of the southern pecan, sent by A. S. Perry, Cuthbert, Ga. Also collection of photographs.

Specimens of the Beam, Beaver, Clark, Manahan, Stanley, Swaim and Weicker hickories by W. G. Bixby, New York.

Miscellaneous nuts by W. C. Deming, Wilton, Conn.

Large table map of the United States with the different nuts grown therein so placed as to show their native habitats. By C. A. Reed, Nut Culturist, Dept. of Agriculture.

Specimens of *Corylus avellana*, Montebello Bysance and other nuts by Dr. David Fairchild, Washington, D. C.

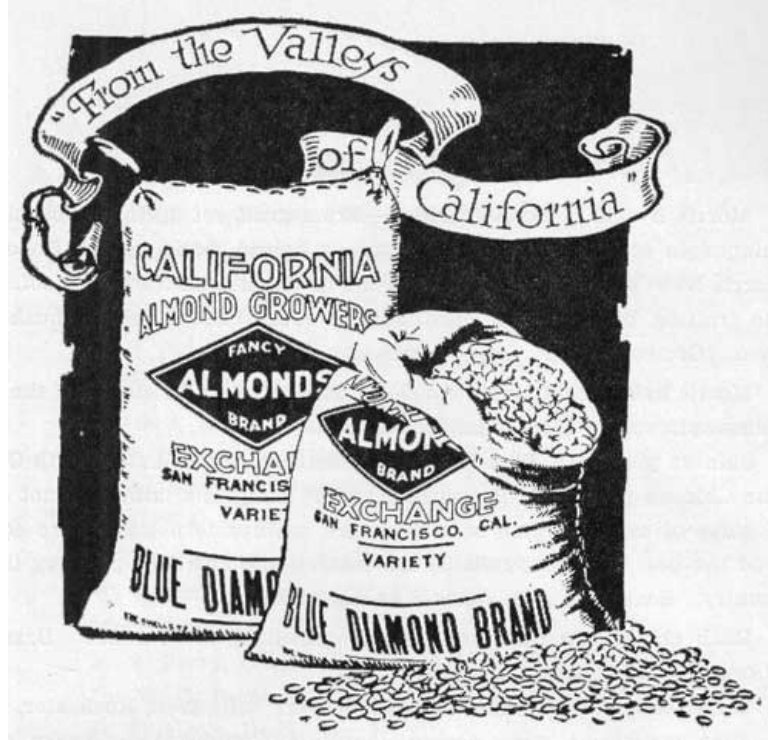
By Prof. C. P. Close, College Park, Md., plates of seedling *J. regia* from J. W. Smith, Centerville, Md. Five seedling *J. regia* probably Mayette from S. H. Derby, Woodside, Del. Japanese seedling

chestnut from J. W. Killen, Felton, Del. The tree on which they grew has never blighted. J. Sieboldiana from tree set by Prof. Close in 1910, first crop 1920.

Native chinquapins and two varieties of Dr. Van Fleet's hybrid chinquapins. Major pecans borne in 1919 on three year graft set by Prof. Close at College Park. A hazel seedling from New Jersey grown on four year old graft. Large and good.

By Dr. R. T. Morris of New York, plate of pistache nuts, 6 varieties of hazels, 1 of black walnuts and one of butternuts.

Nut cracker for pecans of different sizes.



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[Pg 139]

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REPORT OF THE PROCEEDINGS AT THE ELEVENTH ANNUAL MEETING \*\*\*

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