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Proceedings at the Third Annual Meeting

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REPORT OF THE PROCEEDINGS AT THE THIRD 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
THIRD ANNUAL MEETING
LANCASTER, PENNSYLVANIA
DECEMBER 18 AND 19,
1912
THE CAYUGA PRESS ITHACA, N. Y.
1913**



PROFESSOR JOHN CRAIG
A FOUNDER OF THE ASSOCIATION
Died 1912

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* Honorary Member.

** Life Member

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CONSTITUTION AND RULES OF THE NORTHERN NUT GROWERS ASSOCIATION.

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

Object. The promotion of interest in nut-producing plants, their products and their culture.

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 approval of the committee on membership.

Officers. There shall be a president, a vice-president, and a secretary-treasurer; an executive committee of five persons, of which the president, vice-president and secretary shall be members; and a state vice-president from each state represented in the membership of the association.

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

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.

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

Discipline. The committee on membership may make recommendations to the association as to the discipline or expulsion of any member.

Committees. The association shall appoint standing committees of three members each to consider and report on the following topics at each annual meeting: first, on promising seedlings; second, on nomenclature; third, on hybrids; fourth, on membership; fifth, on press and publication.

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NORTHERN NUT GROWERS ASSOCIATION THIRD ANNUAL MEETING DECEMBER 18 AND 19, 1912

AT LANCASTER, PENNSYLVANIA

The third annual meeting of the Northern Nut Growers Association was held in the Court House at Lancaster, Pa., beginning December 18, 1912, at 10 A. M.; President Morris presiding.

The Chairman: The meeting will be called to order. We have first an address by the Mayor of Lancaster, Mayor McClean. (Applause.)

Mayor McClean: Ladies and gentlemen of the Northern Nut Growers Association:

The Mayor of a city of the size of this, in which conventions meet so frequently, is so often called upon to make a speech that the prospect of having to do so causes him some disturbance of mind, not only on the day of the delivery of the speech but for many days preceding; but I confess that the invitation to come here today has had no such effect on me. I am very glad to meet and mix up with the members of this organization. The evolutionists tell us where we came from; the theologians, where we are going to; but no matter how much we may differ as to the theories of these respective leaders of thought, upon one thing we can all agree and that is that we are here. You ladies and gentlemen representing the Northern Nut Growers Association are here to interchange opinions and discuss questions which have to do with the greater success of the very useful industry, the youthful and useful industry, in which you are engaged. I am here as the Mayor of this goodly town to tell you that you are not looked upon as intruders; that we will be blind when you help yourselves to our wine flasks, but that we will not be deaf should you ask for more. I am thoroughly in sympathy with the purpose of this organization, understanding it to be the encouragement of the planting of nut bearing trees in order that an addition to our present food supply may be provided; and that much waste land, now profitless, may be taken up and converted to practical and profitable uses; and further that through the medium of such tree planting and tree care as you propose, landscape embellishment in greater degree than that which now exists may be provided. We hear very much about conservation these days and it seems to me that the proposition which you advance is conservation in a very worthy and very high degree. The soil and climate of Lancaster County seem to be peculiarly adapted to the growing of trees bearing nuts and fruits, and I am sure that the result of this convention will be to stimulate locally a very great interest in this worthy undertaking. You have chosen wisely in selecting Lancaster as the place for this meeting, because we feel and we are satisfied that you will agree, after you have been here a few days, that this was the town that Kipling had in mind when he wrote of the town that was born lucky. (Laughter.) Here you will find all the creature comforts, everything that makes for the pleasure of existence, good food and good water, and if there be any of you who have a liking for beverages other than water, it may be some consolation to you to know that in this vicinity the mint beds are not used for pasture, the punch bowls are not permanently filled with carnations, the cock-tail glasses show no signs of disuse and the corkscrew hangs within reach of your shortest member. (Laughter.) We are a great people over this way. Perhaps you are not aware of that, but we bear prosperity with meekness and adversity with patience. We feel that we can say to you, without boasting, if you seek a pleasant country, look about you. You may not know it, but it is a fact and the United States census reports ever since census reports have been made will prove it, that the annual valuation of the agricultural products of the county in which you now sit exceeds that of any other county in all this great nation. (Applause.) Another bit of local history may surprise you when I tell you that the combined deposits of the banks of Lancaster County approximate the enormous amount of fifty million dollars, that they are larger than the total deposits of any one of seven states in the Union that I can name and that they exceed the combined deposits of two of those seven states. But I don't want to take up your time with a recitation of local history, because I feel that your Lancaster colleagues will give you all the information, and I don't want to spoil their pleasure in giving it by anticipating them. I congratulate you upon the success of this convention. I applaud the purpose for which you are united. I felicitate you upon your achievements up to this time, and predict for you a greater measure of usefulness and advantage in the time to come, which usefulness and advantage, let me suggest, can be made yours more promptly, certainly more surely, by your proceeding upon the principle that whatever is of benefit to the organization as a whole must be of benefit to each of its members, either directly or indirectly. I trust that you will go on with this good work and stimulate enthusiasm in your purpose in a nation wide way, working together with one common object, proceeding under the motto of the Three Guardsmen of France, "One For All and All For One." I now extend to you the freedom of the city. Roam where you will. Just one bit of advice I have to give. Contrary, perhaps, to general report, this is not a slow town and therefore you are in more danger of being run down than run in. (Laughter.) I will not follow the time honored practice of handing you the keys of the city, for the reason that when I heard you were on the way, I had the old gates taken off the hinges in order that your incoming might be in no way impeded. (Laughter.) And now, in the name of the city of Lancaster, its heart filled with the sunny warmth of July, I bid you welcome and promise that we will try to extend to you a hospitality as generous as golden October. (Applause.)

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The Chairman: Will Mr. Littlepage please respond to the Mayor's kindly address of welcome?

Hon. T. P. Littlepage: Mr. President: On behalf of the members of the Northern Nut Growers Association, I desire to thank the Mayor very cordially for his delightful words of welcome to this city. We feel that the words haven't any strings to them, such as were indicated in a little poem I noticed the other day, which said that a young man took his girl to an ice cream parlor and she ate and she ate and she ate until at last she gave him her heart to make room for another plate. (Laughter.) There apparently isn't anything of that in the cordial welcome which we have

received here to this great County of Lancaster. I know now after hearing the Mayor's discourse upon the great resources of this county, why it was that a young fellow who had rambled out into the West and happened to drop into an old fashioned protracted meeting, when asked to come up to the mourners' bench, objected somewhat, and finally when they said, "Well, young man, you've got to be born again;" replied, "No, it isn't necessary, I was born in Lancaster County, Pennsylvania." (Laughter and applause.) I understand now why the young man was so sanguine, why it wasn't necessary to be born again, even under the auspices of the Great Spirit. It is very gratifying indeed to be in the midst of a great county of this kind that has made one of the great basic industries so successful. It takes three things to make a really great nation; it takes great natural resources, it takes great policies and it takes great people. We have nations in this world where the resources, the possibilities of agriculture and all lines of human endeavor are as unlimited, almost, as ours, but they haven't the people and in the cases where they have people of the right kind, they haven't adopted the policies. It takes those three things for any county, any state or any nation to be really great, and it is indeed gratifying to those of us who believe in the highest development, the best for humanity, to come into a county where the people, through their industry, their policies of advancement, have made that county one of the best farmed agricultural counties in the United States; and that is saying a great deal when you consider the greatness of this nation and her immense wealth and resources. It is indeed gratifying to all of us who are spending some time and some effort to further somewhat the advancement of the country along horticultural lines, to be met with a cordial welcome and to come into this community that has so highly developed her various resources: so, on behalf of this Association and all its members, even the members that are not here, those of them who might, if they desired, take advantage of the Mayor's corkscrew and carnation bowl, I thank the Mayor and thank the citizens of this County and say that we are delighted to be among you. (Applause.)

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The Chairman: We will now proceed with the regular order of business. As my paper happens to be placed first on the list, through the methods of the Secretary, I will ask Mr. Littlepage to kindly take the chair while I present notes on the subject of hybridizing nut trees.

THE PRACTICAL ASPECTS OF HYBRIDIZING NUT TREES

DR. ROBERT T. MORRIS, NEW YORK



DR. ROBERT T. MORRIS OF NEW YORK
First President of the Association, 1911 and 1912

In the experimental work of hybridizing nut trees, we soon come to learn that a number of practical points need to be acquired before successful hybridizing can be done. This is a special field in which few have taken part as yet, and consequently any notes upon the subject will add to the sum total of the knowledge which we wish to acquire as rapidly as possible. First, in collecting pollen; it is important to shake our pollen into dry paper boxes. If we try to preserve the pollen in glass or in metal, it is attacked by various mould fungi and is rapidly destroyed. We have to remember that pollen consists of live cells which have quite as active a place in the organic world as a red squirrel, and the pollen grains need to breathe quite as much as a red

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squirrel needs to breathe. Therefore they must not be placed in glass or metal or tightly sealed. Further, the pollen grains need to be kept cool in order to avoid attacks from the greatest enemy of all organic life, the microbes or the lower fungi. Probably we may keep pollen for a longer time than it could ordinarily be kept, if it is placed in cold storage, but practically I have tried the experiment on only one occasion. Last year I wished to cross the chinkapin with the white oak. The white oak blossoms more than a month in advance of the chinkapin in Connecticut, and the question was how we could keep the white oak pollen. Some of it was placed in paper boxes in cold storage; some in paper boxes in the cellar in a dry place. Pollen which had been kept in the cellar and pollen which had been kept in cold storage were about equally viable. It is quite remarkable to know that pollen can be kept for more than a month under any circumstances. Hybridization occurred in my chinkapins from this white oak pollen. Sometimes, where the flowering time of such trees is far apart, it is important to know how we may secure pollen of one kind for the female flowers of the other. Two methods are possible. In the first place, we may secure pollen from the northern or southern range of a species for application upon pistillate flowers at the other end of the range of that species. Another way is to collect branches carrying male flowers before the flowers have developed, place them in the ice house or in a dark, cold room without light until the proper time for forcing the flowers, and if these branches are then placed in water, the water changed frequently as when we are keeping flowers carefully, the catkins or other male flowers will develop pollen satisfactorily a long time after their natural time of furnishing pollen, when they are brought out into the light. In protecting pistillate flowers from the pollen of their own trees, with the nut tree group where pollen is wind-borne rather than insect borne, I find that the better way is to cover the pistillate flowers with paper bags, the thinner the better, the kind that we get at the grocery store. It is best to pull off the undeveloped male flowers if they happen to be on the same branch with the female flowers, and then place the bags over the female flowers at about the time when they blossom, in advance of pollination of the male flowers. It is not safe to depend upon pulling off the male flowers of an isolated tree and leaving the female flowers without bags to protect them from pollen of the same species or of allied species, for the reason that wind may carry pollen to a great distance. One of Mr. Burbank's critics—I am sorry he has so many, for they are not all honest or serious—one of his critics, in relation to the crossing of walnuts, said that it was due to no particular skill on the part of Mr. Burbank, for, whenever the wind blew from the east, he regretted to say that his entire orchard of Persian walnuts became pollinized from the California black walnuts nearly half a mile away. This is an exaggeration, because the chances are that most of the Persian walnuts were pollinized from their own pollen, but in the case of some Persian walnuts blossoming early, and developing female flowers in advance of male flowers, pollen might be carried to them from half a mile away in a high wind from California black walnut trees. Black walnut pollen would then fertilize pistillate flowers of the Persian walnut. I have found this a real danger, this danger of wind-pollination at a distance, much to my surprise. Last year I pollinized one or two lower branches of female flowers of a butternut tree which had no other butternut tree within a distance of a good many rods, so far away that I had no idea that the pollen would be carried from the tree with male flowers to the one which happened to have female flowers only that year; consequently I placed pecan pollen on the female flowers of the lower branches of this butternut tree without protecting them with bags, and left the rest of the tree unguarded. There were no male flowers on that butternut tree that year. Much to my surprise, not only my pollinized flowers but the whole tree bore a good crop of butternuts. This year, on account of the drought, many of the hickory trees bore female flowers only. I do not know that it was on account of the drought, but I have noted that after seasons of drought, trees are apt to bear flowers of one sex or the other, trees which normally bear flowers of both sexes. This year a number of hickory trees bore flowers of one sex only, and I noted that some shagbark trees which had no male flowers had fairly good crops of nuts from pollen blown from a distance from other trees. I had one pignut tree (*H. Glabra*) full of female flowers which contained only one male flower, so far as I could discover and which I removed. On one side of this tree was a bitternut; on the other side a shagbark. This tree bore a full crop of pignuts, (*Hicoria glabra*) evidently pollinized on one side by the bitternut and on the other side by the shagbark. These points are made for the purpose of showing the necessity of covering the female flowers with bags in our nut tree hybridizations. We must sprinkle Persian insect powder inside the bags or insects will increase under protection. When we have placed bags over female flowers, it is necessary to mark the limb; otherwise, other nuts borne on neighboring limbs will be mistaken for the hybridized nuts unless we carefully place a mark about the limb. Copper wire twisted loosely is, I find, the best. Copper wire carrying a copper tag with the names of the trees which are crossed is best. If I mark the limb with string or with strong cord I find there are many ways for its disappearance. Early in the spring the birds like it so well that they will untie square knots in order to put it into their nests. Later in the season the squirrels will bite off these marks made with cords for no other purpose, so far as I know, except satisfying a love of mischief. Now I am not psychologist enough to state that this is the reason for the action of the red squirrel, and can only remember that when I was a boy I used to do things that the red squirrel now does. (Laughter.) Consequently, on that basis, I traced the psychology back to plain pure mischief. Red squirrels and white footed mice must be looked after with great care in our hybridized trees. If the squirrels cannot get at a nut that is surrounded by wire cloth, they will cut off the branch and allow it to fall to the ground and then manage to get it out. White footed mice will make their way through wire, and mice and squirrels will both manage to bite through wire cloth unless it is very strong in order to get at the nut. The mere fact of nuts being protected by wire cloth or in other ways seems to attract the attention of squirrels. One of my men, a Russian, said, in rather broken English, "Me try remember which nuts pollinized; no put on wire, no put on tag, no put on nothing; squirrel see that, see right straight, bite off one where you put sign for him." (Laughter.) The best way for keeping squirrels

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and white footed mice from ascending a tree, I find is by tacking common tin, slippery smooth tin, around the trunk of the tree and this may be left on only during the time when squirrels are likely to ascend the tree. They will begin long before the nuts are ripe. In the case of hazel nuts, I have surrounded the bushes with a wire fence or wire mesh, leaving a little opening on one side, and have placed steel traps in the opening. Now here enters a danger which one does not learn about excepting from practical experience. I went out one morning shortly after having thought of this bright idea and found two gray squirrels in the traps. They had followed their natural instinct of climbing when they got into the steel traps, and climbing wildly had broken off every single branch from those hazels which carried hybridized nuts. There wasn't one left, because the squirrels when caught had climbed into the trees and had so violently torn about with trap and chain that they had broken off every single branch with a nut on it. So many things happen in our experiments that appeal to one's sense of the ludicrous, if he has a sense of humor, that I assure you nut raising is a source of great delight to those who are fond of the drama.

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The field of hybridizing nut trees offers enormous prospects. We are only just upon the margin of this field, just beginning to look into the vista. It has been done only in a limited way, so far, by crossing pollen and flowers under quite normal conditions. We may look forward to extending the range now of pollinization from knowledge based upon the experiments of Loeb and his followers in biology. They have succeeded in developing embryos from the eggs of the sea urchin, of the nereis, and of mollusks, without spermatozoa. Their work has shown that each egg is a single cell with a cell membrane and it is only necessary to destroy this cell membrane according to a definite plan to start that egg to growing. Life may be started from the egg in certain species without the presence of the other sex. This may lead us into a tremendous new field in our horticultural work. We may be able to treat germ cells with acids or other substances which destroy the cell membrane so as to allow crossing between very widely separated species and genera. Loeb, by destroying the cell membrane of the sea urchin, was enabled to cross the sea urchin with the star fish, and no one knows but we may be able, following this line of experimentation, eventually to cross the shagbark hickory with a pumpkin and get a shagbark hickory nut half the size of the pumpkin. That is all! (Applause.)

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(President Morris then took the chair.)

The Chairman: Please let me add that the hickory pumpkin idea is not to be taken seriously. That is a highly speculative proposition. I have found some times that, in a very scientific audience, men who were trained in methods of science, had very little selvage of humor,—little margin for any pleasantry, but this highly speculative suggestion, curiously enough, is not in fact more speculative than would have been the idea twelve years ago that you could hatch an egg, start an egg to development—without fertilization.

Mr. Hutt: I would like to ask how widely you have been able to cross species?

The Chairman: It has been possible to cross species of hazels freely with the four species that I have used, the American hazel, *Corylus Americana*; the beak hazel, *Corylus rostrata*; the Asiatic, *Corylus colurna*, and *Corylus pontica*. These apparently cross readily back and forth. With the hickories I think rather free hybridization occurs back and forth among all, but particularly in relation to groups. The open-bud hickories, comprising the pecan, the bitternut, the water hickory, and the nutmeg hickory, apparently, from my experiments, cross much more readily among each other than they cross with the scale-bud hickories. The scale-bud hickories appear to cross much more freely among each other than they cross with the open-bud hickories; not only species but genera may be crossed, and I find that the walnuts apparently cross freely with the open-bud hickories and the open-bud hickories cross with the walnuts. I have thirty-two crosses between the bitternut hickory and our common butternut, growing. All of the walnuts apparently cross rather freely back and forth with each other. I have not secured fertile nuts between the oaks and chestnuts, but I believe that we may get fertile nuts eventually. The nuts fill well upon these two trees fertilized with each others' pollen respectively, but I have not as yet secured fertile ones. We shall find some fertile crosses I think between oaks and chestnuts, when enough species have been tried.

Mr. Hutt: Do you notice any difference in the shapes of any of those hybrids, the nuts, when you get them matured and harvested? Do they look any different from the other nuts on the tree?

The Chairman: There isn't very much difference, but I seem to think that sometimes the pollen has exercised an influence upon the nuts of the year. Theoretically it should not do so, but I noticed one case apparently in which I crossed a chinkapin with a Chinese chestnut, and the nuts of that year seemed to me to present some of the Chinese chestnuts' characteristics.

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Mr. Hutt: This year I crossed a number of varieties of pecans and in nearly all those crosses there was to me quite an evident difference in the nuts. For instance those gathered off certain parts of a pecan tree of certain varieties, Schley or Curtis or Frotscher, would be typical nuts, but those hybrids or crosses that I produced were distorted, more or less misshapen and seemed to have peculiarities; so that when we came to look over the colony we were in doubt whether they were hand pollinated hybrids or had been pollinated before we got the blossoms covered. Many of them evidenced a great number of distortions, and one of them I remember particularly whose shell was so thin it was just like a piece of brown paper; and there were several peculiarities that were quite noticeable in those hand pollinated nuts.

The Chairman: That is a very interesting point. When we come to consider deformities of nuts we shall find very many cases due to the character of the pollinization. I crossed the Persian walnut with the shagbark hickory and had nuts that year of just the sort of which Mr. Hunt speaks, with shells as thin as paper. One could crush them with the very slightest pressure of the finger. The shells were not well developed. Unfortunately the mice happened to get at all of those nuts. I don't know if they were fertile or not. The kernels were only about half developed. I should look for deformity in these nuts rather than a taking on of the type of one parent over the other, the idea being based on theoretical biological considerations. We had last year a photograph of a tree in California which apparently was a cross, a very odd cross—does any one remember about that California tree?

Mr. Wilcox: It was a cross between *Juglans Californica* and the live oak.

The Chairman: Both the foliage and the nuts were very remarkable and pertained to characters of these two trees. Such a cross to my mind would be wholly unexplainable excepting on the ground recently brought out by Loeb and his followers in crossing the lower forms of animal life and finding that the cell membrane of the egg, if destroyed, will allow of very wide fertilization subsequently with other species. It occurs to me now—I had no explanation last year, but it occurs to me now, knowing of Loeb's experiments—that it is possible that one of the parents, the parent California oak tree carrying the female flowers, might have had its sex cells subjected to some peculiar influence like acid, sulphurous acid, for instance, from some nearby chimney. Sulphurous acid perhaps from someone merely lighting a match to light a cigar under the tree; he might have so sensitized a few female flowers, may have so injured the cell membrane of a few female germ cells that cross pollinization then took place from a walnut tree. It is only on some such ground as the findings of Loeb that we can explain such a very unusual hybridization as that, which appeared to me a valid one, of a cross between an oak and a walnut.

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(Secretary Deming then called attention to hybrids in the various exhibits.)

Professor Smith: I should like to ask why, if this free hybridization takes place in nature among the hickories, you do not have a perfect complex of trees showing all possible variations in the forest.

The Chairman: In answer to Professor Smith's question I will start from his premises and remark that we do have such complexities. The hickories are so crossed at the present time, like our apples, that even crossing the pollen of various hickory trees of any one species does not promise interesting results unless we cross an enormous number. They are already so widely crossed that it is very difficult sometimes to determine if a certain tree is shagbark or pignut or shellbark or mockernut. For the most part the various species and varieties of hickories retain their identity because their own pollen is handiest, and different species do not all flower at the same time. Their own pollen from the male flowers is apt to fall at the time when their own female flowers are ripe and under these circumstances the chances are very much in favor of the tree pollinizing its female flowers with its own pollen. On the other hand, there is hardly one chance in many hundred thousand for any crossed nut to grow, for the reason that most nuts are destroyed by mice, squirrels, rats and boys. If you have a hickory nut tree growing in a lot, and which has produced a bushel of hickory nuts year after year, do you know of one single nut from that tree which has grown? In this plan of Nature, this plan of enormous waste of Nature in order to get one seed to grow, the chance for a hybridized hickory nut to grow under normal conditions, is so small that we should have relatively few crossed trees growing wild in Nature, though we do find quite a good many of them.

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Professor Smith: If I am not taking up too much time, I would like to put some more questions to you.

The Chairman: That's what we are here for.

Professor Smith: Have you ever tried the plan of serving collations to squirrels? Why wouldn't it pay to give them portions of wheat and corn? Second, what percentage of the oak pollen kept in cold storage a month was alive? Third, what is the range of time that the hybridizer has to make the pollinization? Must we go on the dot or have we two days or four days or a week, in the case of hickories and walnuts?

The Chairman: I think possibly as these are three direct questions, I might answer them now. No, I think it would be better to have all questions bearing on this subject brought out and then I will answer all together. So if you will kindly ask all the questions, I will then endeavor to answer them.

Mr. Corsan: The squirrels bothered me last year. I've got forty acres of land for experimental purposes only and I started planting and the little beggars would dig down exactly where I planted the nuts, so I went into town and got a rat trap with a double section so I could catch them alive; and I caught so many by feeding them cheap pignuts, the sweet pignuts from Michigan, that I brought them in and my boys sold them for twenty-five cents apiece. Since then we have never been bothered with red squirrels. For the white footed mice I laid down large doors over some hay or long grass and they gathered underneath and then I lifted the doors up every day and with a stick I smashed hundreds of them. I have posted a notice to leave the skunk and mink alone; I don't want anybody on the place shooting them.

The Chairman: I will first answer Professor Smith's questions. This matter of serving collations for squirrels had best be done as collations are served at political meetings—with a trap

attached. You don't know how many squirrels there are in the vicinity or how many white footed mice. You will be surprised at the numbers of the little rascals, and not only that, but the field mice, the common field mouse and pine mouse run in mole holes under the ground and can smell a nut a long way off. They are extremely destructive. What percentage of pollen grains of the white oak were alive? I do not know. Enough to fertilize a number of flowers. The sooner pollen is used the better. I cannot answer the question exactly because I did not make an experiment in the laboratory to know what part of the pollen was viable. I put on a good deal of it and there were at least some viable grains in the lot. That, however, is a matter which can be subjected to exact laboratory tests without any difficulty. I am so busy with so many things that I can only follow the plan of the guinea hen that lays forty eggs and sits in the middle of the nest and hatches out all she can. Now the range of time for pollinizing is a thing of very great importance and we have to learn about it. We must all furnish notes on this question. With some species I presume the duration of life of pollen, even under the best conditions, might be only a few days. Under other conditions it may be several weeks; but we have to remember that, in dealing with pollen, we are dealing with a living, breathing organism.

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The Secretary: I believe the experiment has been carried to completion of fruiting a thousand trees from nuts grown on one pecan tree without two of the resulting nuts being like one another or like the parent nut. Is that true, Mr. Reed.

Mr. Reed: Yes, you might say ten thousand.

The Secretary: We have an illustration of the variability of the progeny of a nut in this collection of chestnuts by Mr. Riehl out in Illinois. This is a parent nut, the Rochester, and these others are seedlings from the Rochester, except where marked otherwise, some showing a tendency to revert to the parent, and some promising to be improvements on the parents.

The Chairman: Mr. Secretary, I think we'd better confine ourselves to the hybrid question at the present time.

The Secretary: Are not those all hybrids?

The Chairman: I don't believe any man can tell, unless you get the flowers, because you have the American and European types merging together so perfectly. Some of them show distinctly the European type; others show distinctly the American type. That is what I would expect, however. The practical point is the question of quality. Which one keeps the American quality and which one retains the coarseness of the European type?

Mr. Harris: Speaking of variations of nuts I think it is well known that there is quite a variation in the nuts of the oak. I noticed in one species, michauxii, which is an oak in the South, that its nuts varied a great deal. It is something of the type of the chestnut, the white oak or the rock oaks and it varies a great deal.

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I found one on my father's range in New Jersey and also one on the Potomac. The variations extend to the trees as well as the nuts.

The Chairman: The oak tree properly belongs in another tree group and some of the acorns are not only edible, but first-rate. In China there are at least three species found in the markets to be eaten out of hand or roasted. Our white oaks here, some of them, bear very good fruit, from the standpoint of the boy and the pig, anyway, and it seems to me that we may properly include the oaks in our discussion. There would be great range in variation of type from hybridization between oak trees and I have seen a number of oak trees that were evidently hybrids, where the parentage could be traced on both sides, that were held at very high prices by the nurserymen. I asked one nurseryman, who wanted an enormous price for one hybrid oak, why he didn't make ten thousand of those for himself next year? It hadn't occurred to him.

If there is no further discussion in connection with my paper we will have Mr. Littlepage's paper on Nut Promotions.

Mr. Littlepage: Dr. Deming said that he thought it might be time that we have something just a little lighter—that either he should read a paper or I. (Laughter.) Inasmuch as he included himself, I took no offense whatever. The subject I have written on, roughly and hurriedly, is Fraudulent and Uninformed Promoters.

FRAUDULENT AND UNINFORMED PROMOTERS

T. P. LITTLEPAGE, WASHINGTON, D. C.



MR. T. P. LITTLEPAGE OF INDIANA
President of the Association

In the beginning, let me assert my confidence and interest in agriculture in general. This is one of the basic industries, upon the proper understanding and growth of which depends the food supply of the nation. It is admitted by scientists that, other conditions being equal, an adequacy or inadequacy in the supply of proper food makes the difference between great people and undesirable people. This being true, the various operations of agriculture must always be of the greatest concern to those who are interested in the nation's welfare.

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The "back-to-the-farm" movement is being discussed today in various periodicals, but back of the "back-to-the-farm" movement is a philosophy that has not been generally understood. It is not proper here to take time to discuss the reasons why the man in the "steenth" story of some magnificent office building, with telephones, electric lights, elevators, and all modern conveniences, longs for the time when he can roam again amidst the green fields in the sunshine and fresh air, but suffice it to say that in my judgment a majority of the professional men, and men in other walks of life, would, if they could, abandon their various employments and turn again to the soil. The boy on the farm dreams of the days when he can be the president of a bank, have a home in the city, own an automobile, smoke good cigars and go to the show every night. The bank president dreams of the day when he can turn again to the farm and walk in the green fields, where he can shun the various artificial activities of life, drink buttermilk and retire with the chickens.

It may be asked what connection these statements have with the subject, and the answer is this—that in the minds of many thousands of people there is this supreme desire to some day own a portion of God's footstool to which they can retire from artificial and vainglorious environments to those under which they can be their real selves and follow pursuits to their liking. It is this that makes it possible for the promoter of various horticultural enterprises to succeed in interesting in his schemes the clerk, the merchant, the doctor, the lawyer, the school teacher, the preacher, and all others whose occupations confine them within the limits of the great cities.

In the beginning, let us distinguish between the fraudulent promoter and the uninformed promoter. The fraudulent promoter is he who recognizes this great and worthy ambition of many people to buy a spot to which they can some day retire and work and rest and dream and enjoy the coming and going of the seasons, and the sunshine and the shadows, and who capitalizes this ambition, with that industry as his stock in trade which, at the particular moment, happens to offer the most attractive inducements. Those familiar with the industry he is exploiting, can tell him by his actions, by his words, by his nods and winks. It is hard for the crook to disguise himself to the informed.

Distinguished from the fraudulent promoter is the uninformed promoter, but, so far as results are concerned, there is not much difference between them for the innocent investor. They both lead him to failure. They are unlike only in this, that the pathway of the one is lined with deception, crookedness and chicanery; of the other, with blasted hopes based upon good intentions but bad information. Both lead to the self-same sepulcher which in the distance looks white and beautiful but when reached is filled with the bones of dead men.

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There is not much difference after all, when one comes right down to the facts, between the crook who starts out deliberately to get one's money and the fellow who starts out in ignorance

and makes great promises of returns that he knows nothing about. Both succeed in getting one's money and both succeed in misleading those who have a desire to lay aside something for their old days. We naturally feel more charity for him who has good intentions, but who fails, than for him who starts out with bad intentions. But, after all, only results count.

Did you ever receive the literature of one of these various concerns that has pecan or apple orchards to sell? How beautiful their schemes look on paper! With what exquisite care they have worked out the pictures and the language and the columns of figures showing the profits! While writing this article I have before me a prospectus of a certain pecan company that prints columns of attractive figures. Fearful, however, that the figures would not convince, it has resorted to all the various schemes of the printers' art in its portrayal of the prospective profits from a grove set to pecans and Satsuma oranges, and it tells you in conclusion that it guarantees by a bond, underwritten by a responsible trust company, the fulfillment of all its representations. Yet what are the facts? Their lands are located in a section where the thermometer falls to a point that makes highly improbable the profitable growing of Satsuma oranges. And all their figures are merely estimates of the wildest character, printed in attractive columns, based upon nothing.

As a member of the National Nut Growers Association I was this year chairman of the committee on orchard records. I sent out blanks, with lists of questions, to many prominent nut growers to see if I could secure data upon which to base a report to the association. The replies I received showed the existence of some very promising young orchards of small size, well cared for, but they also showed that there was no such thing as an intelligent report upon which reliable data as to the bearing records of orchards could be based for any future calculations. There are two reasons for this. First, most of the figures we have are based upon the records of a few pet trees around the dooryard or garden, grown under favorable conditions. Second, the young groves are not yet old enough for anyone to say, with any degree of accuracy, what the results will be. Therefore, the alluring figures printed in these pamphlets are only guesses.

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Furthermore, what of the contract of these concerns? What does it specify? You would be surprised to know the legal construction of one of these contracts, together with their guaranty bond. In most cases they advertise to plant, and properly cultivate for a period of five to seven years, orchards of the finest varieties of budded or grafted pecan trees, with Satsuma oranges or figs set between. But the guaranty company is usually wise enough to have lawyers who are able to advise them of their liabilities, and about all they actually guarantee is that, after a period of five years, provided all payments have been promptly met, there will be turned over to the purchaser five acres of ground with trees upon it. Five years old? No, they may not be one year old. Budded or grafted? No, they may be mere seedlings. Oranges set between them? No, the orange has passed out of the proposition before the bond stage. The companies generally print a copy of the bond, but usually in such small type that the victim does not read it, though the heading is always prominent. It thunders in the index and fizzles in the context.

Moreover, suppose suit is brought on one of these contracts and bonds? What is the measure of damages? What basis has any court or jury for fixing damages? And be it remembered that courts do not exist for the protection of fools against their folly. The principle "caveat emptor" is as old as the common law itself, and it means that the buyer must beware, or in other words, that he should inform himself, and that he cannot expect the courts to protect him where he has failed to exercise due caution and diligence. Therefore, as a lawyer, I should very much hesitate to take on a contingent fee the suit of one of these various victims against a promoting orchard corporation.

However, in any jurisdiction where there is a criminal statute against fraudulent representation and obtaining money under false pretenses, I should not hesitate, if I were the prosecuting attorney, to indict every member of such a corporation, and, to sustain the case, I would simply present to a jury of honest men the representations in their advertising literature, and then have the court instruct the same jury as to the validity and limitations of their contract. Their advertising is brilliant enough to dazzle the sun. Their contract is as dull as a mud pie.

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In addition to all of this comes the question of orcharding by proxy, and the success of the unit or acreage system, and many other similar questions; and let me say that I doubt if there is today in the United States one large development scheme, either in pecan or apple orchards, that will prove of ultimate financial profit and success to the purchaser. The promoter may get rich—he has nothing at stake. In most instances he has the price of the land in his pocket before there is a lick of work done on it, and the payments come in regularly and promptly to take care of his salary and the meager and unscientific development.

Of course I would not be understood as saying that pecan or apple orchards cannot be made profitable. I am of the opinion that reasonable sized orchards in proper locations and proper soil, of proper varieties, with proper care in handling, are good investments, and, as proof of my confidence, I am planting orchards both in the north and south. The adjective "proper" which I have used here may seem insignificant at the start but, believe me, before you have begun to clip the coupons off your orchard bonds this adjective will loom up as important as Webster's Unabridged Dictionary. In fact you will wonder how it has been possible for anyone to forecast in one word such comprehensive knowledge. Think of a man a thousand miles away putting money into the hands of some unknown concern, for five acres of unknown land, to be set in unknown varieties of trees, to be cared for by unknown individuals. Can he not see that, in keeping with all the other unknown factors, his profits must also be unknown?

We look at a great industrial enterprise, such as the steel trust, and marvel at its success. But it must be remembered that this industry started many years ago, and step by step built furnace

after furnace and mill after mill, after the owners had tried out and become familiar with all the factors of that industry, and after great corps of trained experts had been developed, and after science had given to this industry many of the most marvelous mechanical inventions of the age. These facts are overlooked, however, when some fellow steps up and proposes to put a steel-trust-orchard on the market in twelve months. In most industrial enterprises there are well-known and established factors to be considered. In horticultural enterprises, however, no man knows what twelve months hence will bring. I read the other day with great interest the prospectus of a great pecan orchard started several years ago by a very honorable and high-minded man, and the promises of success were most alluring. What are the facts? The boll weevil came along and wiped out his intermediate cotton crops. The floods came later and destroyed acres of his orchards, and, if he were to write a prospectus today, it would no doubt be a statement of hope rather than a statement of facts. He would no doubt turn from the Book of Revelations, where at that time he saw "a new heaven and a new earth," and write from the Book of Genesis, where "the earth was without form and void."

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How many people have been defrauded by these various schemes, no one knows. How many clerks, barbers, bookkeepers, stenographers, students, preachers, doctors, lawyers, have contributed funds for farms and future homes in sections where they would not live if they owned half of the county. How many people have been separated from their cash by literature advertising rich, fertile lands in sections where the alligator will bask unmolested in miasma for the next fifty years, and where projects should be sold by the gallon instead of by the acre.

Some time ago it was reported that inquiries in reference to the feasibility and profits of various orchard schemes had come in to the Bureau of Plant Industry of the Agricultural Department, at Washington, in such numbers that the officials of that Bureau had considered the advisability of printing a general circular, which they could send to the inquirers, advising them to make due investigation, and giving a few general suggestions about proxy farming and orchard schemes. I was advised by a friend in the middle west that the contemplated issuance of this circular by the Bureau of Plant Industry had aroused a number of protests throughout the country, and that various Senators and Members of the House of Representatives had entered strong protests with the Secretary of Agriculture against it. A number of these protests have come to my notice, and they take various forms of opposition, but are all unanimous against the Department of Agriculture offering to the prospective purchaser any information. Various reasons for their stand were given by the protestants, but how flimsy and ridiculous they are when analyzed. Congress for a number of years has been appropriating money and authorizing certain work by the Department of Agriculture. It is the people's money, and the people's Department, and the information gathered by the experts in this Department ought to be the people's information, and it ought to be possible for any citizen to write the Department a letter about any proposition that he has received from any of these various promoters, and have the advice of those who know most about it.

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I suppose the Department of Agriculture has entirely too many duties to perform to undertake a work of this kind, but what an inconsistent position it is for a Member of Congress, who has been voting for appropriations to carry on this work, to appeal to the Secretary of Agriculture to suppress such information in order that some exploiter may get somebody's money under false representations. I think if it were possible today to know the list of concerns and companies who registered, directly or through agents, their opposition to this proposed warning circular, you would have a correct index of the concerns good to let alone. For no honest, reputable individual or company need be afraid of the work or suggestions of that great Department. I have the pleasure of knowing many of the officials in the Bureau of Plant Industry, and never anywhere have I seen a body of men so conscientiously engaged in the work of promoting legitimate horticultural and agricultural knowledge. It is the very life of that great Department, and its officers and employees above everyone else are most interested in seeing the land produce the most and best that it can be made to produce, and they are best qualified to pass upon these matters.

Most of the questions in these various schemes are questions of soil and horticulture. One letter in opposition to the Agricultural Department's attitude, that was brought to my attention, stated that crops varied under different conditions, and that no one was able to tell what a certain soil would or would not produce throughout a period of years, and intimated that the Department of Agriculture might mislead the public; and yet the concern that sent it printed columns of figures guaranteeing returns from pecans and Satsuma oranges in a section where orange growing is of very doubtful possibility. Boiling down these objections by the promoters, they come to simply this: That the Agricultural Department, with no motive but to tell the truth, and with its corps of trained experts, might mislead the public, but they (the promoters) could not possibly be mistaken in their fabulous figures compiled for the purpose of getting money from some misinformed victim.

Proxy farming never was a success and I do not think it ever will be. One of my friends told me a short time ago of a very successful young pecan orchard on the gulf coast. Upon inquiry I found that it was of reasonable size, nine years old, and that the owner had lived in it nine years. It was not 500 acres in extent, or 1,000 acres, or 2,000 acres, but about 20 acres. Last summer I went into a beautiful apple orchard in Southern Indiana and saw about forty acres of trees bending to the ground with delicious Grimes Golden apples. On that particular day there were great crowds of people walking among the trees and admiring the fruit. I too walked among the trees a short time, but of greater interest to me than the trees was the old, gray-haired man who had made the

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orchard. The trees could not talk, but he could, and he told the story of the years of care, and diligence, and work, and thought, and patience, that showed why it is not possible to cover the mountains of a state with orchards bringing almost immediate and fabulous incomes.

Some time ago I stood talking to the old superintendent of the Botanical Garden in Washington—William R. Smith, now deceased—and while discussing with him the requisites for tree culture, he said "Young man, you have left out the most important one of them all," When I asked him what I had left out, he said "above all things it takes the eye of the master." So it does, and the master is he whose vigilance is continual, who watches each tree as if it were a growing child—as indeed it is, a child of the forests—who has the care and the patience, and who is not dazzled by the glitter of the dollar, but who loves trees because they are trees.

Theoretically, one can figure great successes in big horticultural development propositions, but these figures rest upon theory and not fact. It would be difficult to state all the reasons why I have a firm conviction that such big schemes of every kind will fall, but I believe this conviction is shared by the foremost thinkers in the horticultural world. A four-year-old boy was once taken to see the animals in a circus. He was very much interested, but, when shown the tremendous elephant, shook his head and said "he is too big."

A small grove properly handled ought to be an excellent investment. The various uncertainties and vicissitudes involved can, in a degree, be compensated for by great care; and I suppose it would be possible even with some of these big schemes—by placing enough money behind them—to insure a fair degree of success. It must be borne in mind, however, that these promoters, of whom we have been speaking, are not so much concerned in the successful orchard as they are in big salaries and profits, and, if one has money enough to pay big salaries and profits, and still pay for the proper care of the orchard, then he does not need an orchard. Most of these promoters charge too much for a proper and honest development alone, and too little for the proper development plus the profits and salaries of the promoters. I wish it were not so. I wish the old earth could be made to smile bountiful crops without such expensive tickling, but this is one of the checks and balances that nature places upon her great storehouse of wealth.

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The Chairman: This is a matter of very great importance and I hope we shall have a good discussion, from a practical point of view, by men who know about fraudulent promotions and their effect. We ought to go on record in this matter right now. I know of numbers of teachers, doctors and other poor people who have put money into nut promotion schemes without knowing anything about the ultimate prospect of profit.

Mr. Hutt: One noticeable thing about the promoter's literature is that he never knows anything about crop failure, and in the agricultural and horticultural world that is a thing that is painfully evident to a man who has been in business a great length of time. In the promoter's literature it is just a matter of multiplication; if one tree will produce so much in a year, a hundred trees will produce a hundred times as much. I got a letter the other day from Mr. S. H. James, of Beaumont, Louisiana, and he said, "I have been very fortunate, I have actually had two good crops in succession," and when you come to compare that with the promoter's literature—why he knows no such thing as crop failure. Anybody who knows anything about agricultural or horticultural work knows that we have winter and floods and everything else to contend with.

The Chairman: Someone might tell us about failures they happen to know of in promotion schemes.

Mr. Smith: I would like to ask if Mr. Littlepage isn't going to open up that barrel of actual facts that he has about yields?

Mr. Littlepage: Mr. President, I didn't know that I had a whole barrel of actual facts. When I started in several years ago a barrel wouldn't have held all of them, but I think that now I could put the actual facts in a thimble. I've got several barrels of good pecans, however, I'd like to open up and let Mr. Smith sample if he wants to.

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The Chairman: Let's hear about frauds from someone who knows how the land was managed and how the trees were managed and how it actually occurred.

Mr. Van Duzee: Mr. President, I feel that I ought to say something, first in commendation of the paper itself. It is a question how far we, as an Association, are responsible for the care of our fellowmen, but at this period when the industry is new, I feel that it is a very legitimate thing for us to do a little work to try and prevent these people from preying upon our fellowmen. The president remarked this morning that something was an evidence of the tremendous waste in Nature. It is true, Nature, in building a forest, wastes a vast amount of time and energy. These people who are preying upon the nut industry today find as their victims the weaklings which Nature buries in the forest. Those things are incidental and we must expect them, but I feel that a paper of this kind, at this time, is a very valuable thing and I hope it will receive wide publication. We cannot say too much to discourage this sort of thing. Now, to respond, in a measure, to the President's request for actual facts, I am confronted with this proposition, that some of the men who have made the greatest failures are men who have done so through ignorance. They are honest men, they are personal friends of mine. I don't care to go too much into details, because they are just as sorry today as I am, but I have seen this done. I have seen

hundreds of acres of nut orchards in the South planted with the culls from nurseries bought at a very low figure. I have seen these trees neglected absolutely, not in one case but in many cases. I have seen the weeds as high as the trees at the time when a telegram was received by the local agent that a carload of the purchasers of these tracts was about to leave to look over their property. I have seen the local manager hustle out, when he got that telegram, and hire every mule in the community to come in and, with a plow, throw a furrow or two to the rows of trees so that they could be distinguished from the weeds they were growing among. As Mr. Littlepage has said, there can be no success in such operations; and I feel, looking at it in a very broad way, that this is a very good time to emphasize the point that those of us who have the greatest experience in the growing of nut trees do not feel that these enterprises are legitimate, or that they promise very much success. (Applause.)

Mr. Pomeroy: I live just a short distance from Buffalo. A few months ago—I got it on the very best authority—there was some salesman in Buffalo who didn't have time to call on all those who wanted to give him money for pecan propositions. He didn't have time, Doctor, he just had to skip hundreds of them, he said; he was just going from one place to another, making his collections. Buffalo is a city of only about 450,000 people and there must be some money being collected and sent in to somebody.

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The Chairman: Very glad to hear of that instance; let's hear of others.

Mr. Littlepage: I would like, if possible, to answer Mr. Smith's question. I didn't know that he referred to facts about these promotions, I thought perhaps he meant facts about nut growing.

Mr. Smith: You said you had made inquiries as to nuts, harvest yields, orchard yields; it was those, particularly, that I had in mind.

Mr. Littlepage: Oh well, I could give those to you readily. There are some very promising orchards, making a good showing under investigation, handled under proper conditions and of proper size. I would not want to say that those things are not possible. Talking specifically of these overgrown schemes, one of them is recalled to my mind, a development company in southern Georgia, that advertises very alluringly. It set out one year a lot of culls; they all died. I am told that they went out the second year and, without any further preparation, dug holes and set out another lot of culls. They too died; and then they went out the third year and planted nuts, and those trees, at the end of a year's growth, were perhaps six or seven inches high, and the salesman from that company, I understood, took one of the prospective purchasers over into a fine grove owned by another man on the opposite side of the road, and let him pick out his five acres from the orchard across the road. That's one type I could multiply indefinitely.

Mr. W. C. Reed: I think this is a very important matter. As a nursery man who has sold a great many trees to promoting companies, I want to say that I have never, with one exception, seen an orchard that has been a success, but I have seen hundreds of failures, some of them where they have set out orchards of 150,000 trees and sold them off in one and ten acre tracts, and in only one case have I seen a success. I think these promotions should be avoided by the nut growers of the North.

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The Chairman: This is very valuable information, coming from a dealer.

Mr. Van Duzee: I have found this in the yields of my orchards. Six or seven or eight years ago, I discounted every source of information that I could have access to, as to yields, brought them to a conservative point, submitted them to the best informed men in the United States, and then divided those figures by five as my estimate of what I might hope to accomplish as my orchards came into bearing. I have since been obliged to find some excuses for failing to even approximate those conservative figures. I had this year in our orchard, a 35 acre plot of Frotscher trees which is one of the most promising varieties, six years of age, and there were not five pounds of nuts in the whole plot. I have had an orchard of 36 acres, mostly Frotscher and Stewart, go through its sixth year with less than 200 pounds of nuts to the entire orchard. I have another orchard of 30 acres which in its sixth year has produced less than 100 pounds of nuts. Now many of these promoters guarantee to take care of these orchards, which they are selling, for 10 per cent or 20 per cent, or even half the proceeds of those orchards, from the fifth year. You can see readily that the entire crop of such orchards as I have been able to produce, would not begin to pay their running expenses the sixth and seventh year.

The Chairman: You took good care of yours?

Mr. Van Duzee: I think so. I think there are many gentlemen in the audience who have been through them, and it is conceded that my orchards are at least fairly good representatives of what can be done under normal conditions.

Mr. Corsan: Are yours southern orchards?

Mr. Van Duzee: These pecan orchards are in south-western Georgia.

Mr. Corsan: The Northern Nut Growers Association, as I understand, is a collection of men who are interested in finding out what we can do in the way of growing nuts for the North. We go to the markets and see baskets of cocoanuts, Brazil nuts, California walnuts, but no nuts growing for the market around our neighborhood. In my own city, Toronto, I can see some nut trees because I look very closely at everything, but the average person cannot see them because they are very few. I have a number of experiments on hand. If I succeed in even one of these

experiments, I am satisfied to spend my whole life at it. I am not nervous, I can watch a hickory tree grow. (Laughter.) I want to grow some nuts for the next generation. I haven't the slightest thought of making a copper of money out of it but I am going to enjoy the thing, and that's the idea of the Northern Nut Growers Association, or else I have made a mistake.

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The Chairman: Is there any further discussion on the matter of frauds? Does anyone else wish to speak on this subject?

Mr. Littlepage: It is indeed very gratifying to hear the President of the National Nut Growers' Association, Col. Van Duzee, speak on this subject and to have the honor of having him with us as a member of our Association. It is gratifying to have him come out in such strong terms on this question. It has always been his policy and his reputation, so far as I have heard, to stand for what is best and squarest in nut culture.

The Chairman: The paper of Mr. Littlepage is one of very great importance, because the number of frauds associated with an enterprise is an indication of the fundamental value of the cause. These fraudulent nut promoters capitalize the enthusiasm of people who want to get back to the land, just as porters at the hotels capitalize the joy of a newly married couple. (Laughter.) We have in this "back-to-the-land" movement, a bit of philosophy of fundamental character which includes the idea of preservation of the race. Preservation of the race!—why so? Nature made man a gregarious species and, being gregarious, he has a tendency to develop the urban habit. Developing the urban habit, he fails to oxidize his proteins and toxins. Failing to oxidize his proteins and toxins, he degenerates. Recognizing the degenerating influence of urban life, by means of his intelligence he has placed within his consciousness that automatic arrangement, as good as the automatic arrangement which turns water on to a boiler, which says to him, "go out and oxidize your proteins and toxins." That is what "back-to-the-land" means. You've got to begin from this fundamental point. Now then, if this represents a fundamental trait in the character of our species and we are acting in response to a natural law, then must we be doubly careful about having our good intentions, our good methods, halted by unwisdom. That brings to mind the point made about our present Secretary of Agriculture. I am very glad this has been made a matter of record here, for I am sorry to say that in connection with another subject—(health matters)—wherever there has been opportunity for the Secretary to act, he has decided as a matter of policy on the side of capital and against the side of public interest. Almost every time, so far as we have a record of the action of the present Secretary of Agriculture and of Dunlap and McCabe, his assistants. We ought to state here, in connection with fraudulent nut promotions, that he has acted in favor of capital and against the public interest if it is true. It ought to go as a matter of record from this Association. We may be bold in this matter, but we should be righteously bold because we are speaking for the public interest ourselves. We have nothing to gain; there is nothing selfish about this organization. We may be kindly and say that the Secretary is at the mercy of shrewder men.

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Mr. Corsan says that we are interested in scientific work only. That is true at the present time, because all progress must be from a scientific basis. If our care in managing experiments is such that we cannot avoid getting rich, we will accept the result. (Laughter.) I am glad that in connection with this discussion Mr. Corsan made one epigrammatic remark,—that he was not nervous and could watch a hickory tree grow. I tell you there's a lot of wit in that.

Mr. Littlepage: He has good eyesight, Mr. President.

The Chairman: The reason why we have so many fraudulent promotions is largely because of our American temperament; we are so nervous that we can't watch a hickory tree grow. In matters of public health, our Secretary of Agriculture has prevented actual criminals from being brought to justice—he made that his policy.

I think those are the points that I wish to make in commenting upon Mr. Littlepage's paper and if he will make any concluding remarks we will be very glad to hear them. In regard to Mr. Hutt's suggestion that we cannot count on crop success or crop failure mathematically—now, there are fortunes to be made from the proper management of good nut orchards. We know of orchards where very large incomes are at present being made, and I am very glad that the sense and sentiment of this meeting is against quotation of that feature. I have not heard here one word in quotation of orchards which bring incomes of \$10,000 a year or more from various kinds of nuts, and we know there are many such orchards. It is the failures upon which we should concentrate our attentions right now, and the reason for failure is not that nut growing is not going to make progress but that we cannot count on our nuts from a mathematical basis. One of my friends, an old Frenchman, became very enthusiastic about raising poultry. He sent out requests for circulars to every poultry fancier who published circulars, and I will wager that he got 50 per cent of answers to his requests for circulars about fancy poultry. He began to raise chickens, and my father-in-law met him on the street one day and asked how he was getting on with his pullets that were going to lay so many eggs. "Oh," he said, "Ze trouble is with ze pullet; she no understand mathematique like ze fancier. If I have one pullet, she lay one egg every day; if I have two pullet, *perhaps* she lay two egg every day, and if I have three pullet, she *nevaire* lay three egg every day." (Laughter.) Now I think that the remaining time this morning we had better devote to the executive session, then we had better meet at two o'clock for the election of our committee. The meeting then is at present adjourned, with the exception of those who will take part in the executive session, and we will meet again at two P. M. There is one point I wanted to make in connection with Col. Van Duzee's remarks that a certain number of really honest men have allowed their names to be used in connection with promotion propositions. Men who are

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quite skillful at learning the use of names, have gotten men of good intentions and kindly interest, I know, to lend their names as even officials of nut promotion companies. Besides that, a good deal of garbled literature of recommendation has gone out in their circulars. I have had a number of circulars sent to me quoting abstract remarks that I had made relative to nut culture in general, and this has been applied concretely in circulars; the context did not go with it. I asked a lawyer what I could do about it, and after going over the question he said that I probably was powerless.

After announcements by the Secretary, the convention took a recess until 2 P. M., at which time it was called to order by President Morris and the regular program was resumed as follows:

The Chairman: The executive session will be held after the meeting, as many are here to hear the paper on the chestnut blight, so we will proceed at once to the order of business and listen to the first paper by Mr. Rockey.

Mr. Rockey: This paper deals more particularly with the work that has been done in Pennsylvania. But what has been done here may be considered to be typical of what has been done elsewhere.

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RECENT WORK ON THE CHESTNUT BLIGHT

KELLER E. ROCKEY

Forester in charge of Demonstration Work, Pennsylvania Chestnut Tree Blight Commission

The history of the blight, briefly outlined, is as follows:

In 1904 the diseased condition of the chestnut trees around New York City was noted and an examination of them showed that they were being attacked by a disease at that time unknown. Investigations since then have shown that the blight had been at work there and elsewhere for a number of years before that time, but it has been impossible to determine just when it first appeared or where. The disease was studied and described at that time.

On display here are specimens and photographs showing the appearance of the blight so that I will not go into that part of the subject in detail. I hope that you will notice, however, the symptoms by which the disease is recognized: 1st. The small red pustules which produce the spores and, on rough barked trees, appear only in the crevices. 2nd. The peculiar mottled appearance of the inner bark of the canker. 3rd. The discoloration of the outer bark. 4th. The danger signals, such as withered leaves in summer or persistent leaves or burrs in winter, suckers which develop at the base of cankers, and the yellowish cracks which soon appear in the bark over the cankers.

Workers in the Bureau of Plant Industry, Washington, D. C., have been studying the blight since 1908. In the Spring of 1911, a bill creating the commission for the investigation and control of the blight in Pennsylvania was passed, and the active work began in August 1911. The method upon which the Commission is working is outlined in Farmers' Bulletin No. 467, of the Department of Agriculture, and consists briefly of determining the area of blight infection and in removing diseased trees west of a certain line, with the purpose of preventing the western spread of the blight.

This Commission has ascertained as accurately as possible the amount of infection in the various parts of the state and the results are given in a map on display here. The state is divided into two districts by a line drawn along the western edge of Susquehanna, Wyoming, Columbia, Union, Snyder, Juniata and Franklin Counties, which is approximately the western line of serious blight infection. West of this line a large portion of the state has been scouted, and the remainder will be finished early in 1913. We have learned by experience that in the winter, after the fall of the leaves, the best scouting work can be done. Persistent leaves and cankers along the trunk are readily seen, and more and better work can be accomplished than in the summer, except when the snow is very deep.

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Blight infections have been found in counties adjacent to this line: also in Fayette County, near Connellsville, in Warren County, near Warren, and in Elk County, near St. Mary's. These three infections were directly traceable to infected nursery stock, and in one case the blight had spread to adjacent trees. A large area of diseased chestnut in Somerset County illustrates the harm done by shipping infected nursery stock. The centre of this infection is a chestnut orchard where about 100 scions from an infected eastern orchard were grafted to native sprouts in 1908. The percentage of infected trees in the orchard from which the scions were obtained, according to a count made this Fall, averages 80 per cent. Evidently these scions brought the disease into this region, for the grafts have all been killed by the blight and every tree in the orchard is killed or infected by disease. On adjoining tracts over 5,400 infected trees have been cut, and there are a number of others in process of removal, radiating in all directions from the orchard as a center to a distance of three miles. Another infection of 143 trees was found in Elk County. It is thought that three trees at the centre of infection were diseased in 1909, although it is possible that one of these trees was already infected in 1908. In 1910, 27 additional trees were infected; in 1911, 50 additional trees, and in 1912, 228 additional trees. The disease spread in all directions from

the center of infection to a distance of 700 feet.

These infections are interesting in showing the rate at which the blight may travel in healthy timber.

These infections have all been removed and it is the expectation that by the end of January 1913 all scattered spot infections will be removed from the territory west of the line previously mentioned, and that, to the best of our knowledge, these western counties will be free from blight. In 1913 the field force will be concentrated on the advance line and the work will be carried eastward. The Commission has the power to compel the removal of infected trees. In the western part of the state this power has been exercised in the few cases where it was necessary. As a rule, however, the owners are not only willing but anxious to get rid of the infected trees, and our field men are given hearty support by individuals, granges and other organizations. The timber owners of Elk County had printed and posted an announcement that the chestnut blight had been found in the locality and warned the people to be on the look-out for it. In addition the Commission has had a man, for a short time at least, in each of the eastern counties of the state, and their time has been taken up principally by those who requested inspections of timber with the view of determining the percentage of blight infection and the best method to be pursued in combating it and realizing on their timber. Our men are all deputy wardens, with the authority which is attached to this office, and are instructed to do their utmost to prevent fire damage.

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An exhibit which consists of specimens showing the blight in various stages together with photographs, literature, etc., was placed in about 30 of the county fairs throughout the state. The appreciation of the public has been so clearly shown that next year it is the intention of the Commission to continue and perhaps increase this phase of the work, and to place large permanent displays at the Commercial Museum, Philadelphia, the State Capitol, Harrisburg, and other places.

Many of the Annual Teachers' Institutes have been reached with a display and lecture. We have arranged also to have a speaker at fully one hundred of the Farmers' Institutes this winter. We are also arranging to have a permanent display at many of the public schools, normal schools and colleges, where instruction on the blight is given. An effort was made last winter to enlist the service of the boy scouts and we are indebted to them for considerable work, chiefly in an educational way. The successful outcome of all our work will depend in a large measure upon the owners themselves, and it is our purpose to give them all the information possible upon the whole subject.

The Commission established a Department of Utilization which is collecting information on the various industries which use or might use chestnut wood, listing the buyers and owners of chestnut wood, thus assisting owners of blighted chestnut trees in marketing their timber to the best advantage. The Department is trying to increase the use of chestnut wood by calling attention to its many good qualities, and thus utilize the large quantity which must necessarily be thrown upon the market. There has been more or less discrimination against blighted chestnut timber. This has been in many cases unjust, since the blight does not injure the value of the wood for most purposes for which it is used. However, the owners sometimes fail to realize that the blight cankers are the most favorable places for the entrance of the borers, and that where a large number of trees are being considered, a percentage of them will be materially injured by insects which follow blight infection. Where telegraph poles are barked, it is often seen that borers have attacked the wood under blight cankers, and have not touched any other part of the tree. All blighted timber should be cut before death to realize its best value, since insects and wood-destroying fungi cause the very rapid deterioration of dead, standing timber. There has been a good market in almost every locality for poles, ties and the better grades of lumber. Cordwood presents the difficult problem of disposal. The best market for this is in the central part of the state, at the extract plants. The Commission has secured from the Pennsylvania R. R. a special tariff on blighted chestnut cordwood so that this product may be profitably shipped from greater distances than before.

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The Commission has inspected all chestnut nursery stock shipped from nurseries within the state and has also provided for inspection of all chestnut stock entering the state. This should prevent a repetition of infections in the western part of the state which might destroy millions of dollars worth of timber.

From time to time publications have been and will be issued by the Commission, which are obtained free of charge upon request, or they may be consulted in the leading libraries throughout the state.

An appropriation for \$80,000 was given by the last Congress for scientific research work upon the blight disease and work is being carried out in cooperation with the various states. Several of the Government investigators are now at work upon our force. Some of the most important unsolved scientific problems of the blight, as given by Secretary Wilson, in his message, to Congress, are as follows:—

First, the relation of the disease to climate.

Second, the relation of the parasite to the varying tannin content of the tree.

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Third, the origin of the disease.

Fourth, relation of birds and insects to the dissemination of the disease.

Fifth, the nature and degree of resistance of the Asiatic species. Another problem in relation to tree treatment may be added, that is, the relation of spores and mycelium to toxic agents.

The Pennsylvania Commission maintained laboratories during the summer at Charter Oak, Centre County, and at Mt. Gretna, Lebanon County. The latter has been moved to Franklin and Marshall College, Lancaster, for the winter. We have also had a laboratory at the University of Pennsylvania, which has been greatly enlarged this fall.

The number of people who informed us that they had discovered a sure "cure" for the blight made it necessary to obtain an orchard near Philadelphia where all such discoverers were given an opportunity to demonstrate the efficacy of their remedies. It might be noted that in every case the blight is thriving as usual. These cures consisted largely of an injection of a toxic principle by some means into the circulation of the tree. In some cases this was accompanied by a fertilizer of some kind, and this fertilizer may account for the apparently improved condition of the tree in some cases, after such remedies were used, since the growth was increased and the leaves and branches had a healthier appearance. This increased growth has not had any appreciable effect upon the rapidity of spread of the blight mycelium. As the experiments are not officially finished and recorded it is too early to give any further data. Our pathologists have also conducted experiments in this same line but no medicinal remedy or fertilizer has yet been found.

The varying chemical constituents of chestnut trees, principally tannic acid, have often been suggested in regard to the origin and spread of the blight. Investigators are now working along this line and we hope, for valuable results before long.

The origin of the disease, as already stated, is something of a mystery, and there is as yet no generally accepted theory, although many people have very pronounced views on the subject. Many puzzling facts have been noted since investigating the disease in Pennsylvania, among them being the large percentage of infection in eastern York and southern Lancaster counties, the relative small percentage in certain localities around which the blight is generally prevalent, and recent infections found in Warren and other western counties, a great distance from what is known as the western advance line of the disease.

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Our pathologists have reported some very interesting facts in regard to the dissemination of the blight. In the preliminary report of the summer's work at our field laboratories the results tend to show:

First, the prolific ascospore stage is very important in causing the spread of the blight, the spores at this stage being forcibly ejected from the pustules and borne through the air for some distance. This ejection of spores takes place under natural field conditions only when the bark has been soaked by rain, but the expulsion of spores is also dependent upon temperature conditions and ceases entirely at temperatures from 42 to 46 degrees F. and below.

Second, the wind plays a large part in local ascospore dissemination.

Third, birds and insects (except ants) are apparently of very little importance in the dissemination of the blight except in providing wounds. Further investigations of the importance of ants is being made during the present winter.

Several kinds of beetles have been observed eating the pustules and are in this way beneficial, since tests show that they digest and destroy the spores. It has also been suggested by workers in the Bureau of Entomology that such beetles, which are of several kinds, may be of value in the attempt to control the disease. These are perhaps the only natural enemies discovered to date.

The proper classification of the chestnut blight fungus has also been the subject of much discussion. Last winter specimens of what in external characteristics appeared to be *Diaporthe parasitica* were found in western Pennsylvania, Virginia and elsewhere, growing upon chestnut, oak and other species. This condition was puzzling and the subject of some controversy. It has been found, however, that this fungus, called the "Connellsville fungus," is a distinct species closely related to the true blight fungus, being, however, entirely saprophytic. Cultural distinctions are apparent and the ascospores differ in size and shape so that no further confusion need occur.

Upon the question of immunity of certain kinds of Asiatic stock, there is very little to report beyond what was known one year ago. In the investigations made the work has been hampered by the fact that much of the so-called Japanese stock is in reality a hybrid of European or American species. In 1909, 45 Japanese seedling trees were set out at Gap, Lancaster Co., for experimentation along this line. A recent examination showed that 90 per cent are infected. Concerning the variety or purity of this stock, I have not been informed. Our force as well as others are at work upon the problem which will require many years' study.

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Previous investigations seem to show that certain pure strains of Japanese and Korean chestnut are resistant to the blight. Blight cankers may be found upon them but they are less easily infected and suffer less than the more susceptible varieties. With this as a working basis, considering the results that have been attained in other fruit by selection and hybridization, the situation is hopeful. Prof. Collins said at the Harrisburg Conference in February that "There is no reason to doubt that we may eventually see an immune hybrid chestnut that will rival the American chestnut in flavor and the Paragon in size".

In southern Europe chestnut orcharding is a well established and profitable industry. In the

United States chestnuts have been considered a marketable commodity ever since the Indians carried them to the settlements and traded them for knives and trinkets. The demand has always exceeded the supply and at the present time about \$2,000,000 worth of nuts are imported from Europe annually. With the development of the better varieties of the American nut has come an increased activity in the United States and the chestnut orchard industry promises to become one of very large importance. It has an added advantage that the trees can be grown upon the poorer types of soil which are not adaptable for farming or the raising of other fruit.

At the present time there are in what is known as the blight area of Pennsylvania, or eastern half of the State, about 100 orchards ranging from 12 trees up to 400 acres in extent. These orchards are in varying stages of blight infection, some of them being almost entirely free, due to the attention which has been given them. In order to protect such orchards the Commission is compelling the removal of infected trees within a certain radius of them.

As you know the blight has been a very serious factor in this industry. Some of the orchards have been completely annihilated and the income reduced from several thousand or more dollars per year to nothing. Whether or not the blight will completely wipe out the orcharding industry is a subject of large importance. Personally I believe that chestnuts will be raised commercially in Pennsylvania in increased abundance, and as the various phases of the blight subject are brought to light, keeping the disease under control can be more easily accomplished. At the present time this is being done in certain orchards by the present methods of examining the trees often, treating each infection, or removing the tree. If this policy is successfully pursued for several more years it will demonstrate conclusively that chestnuts can be grown in spite of the blight and this will mean an opportunity to use vast areas of waste land in Pennsylvania and in the other states, in a highly profitable manner.

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The Chairman: The subject of the next paper is Some Problems in the Treatment of the Chestnut. It will be presented by Mr. Pierce, after which we will have a general discussion of the entire subject.

Mr. Pierce: Mr. President, ladies and gentlemen: I see that, as we wrote our papers separately, some of the things I had in mind will be similar to those Mr. Rockey had.

SOME PROBLEMS IN THE TREATMENT OF DISEASED CHESTNUT TREES

By ROY G. PIERCE

Tree Surgeon, Pennsylvania Chestnut Tree Blight Commission

The problems that present themselves to the growers of chestnut trees concerning the present disease may be summed up under three heads: first, what the disease is, how it is caused, and how it may be recognized; second, what is to be done with diseased trees to bring them to health or to prevent them from infecting other healthy trees nearby; third, what means in the future can be undertaken to keep a tree healthy, that is, to prevent reinfection.

First, what the disease is, how it is caused, and how it may be recognized. The disease known as the chestnut tree blight is caused by the fungus, *Diaporthe parasitica*, which usually finds entrance to the tree through wounds in the bark. The mycelium or mass of fungous filaments gradually spreads through the bark in much the same manner as mold spreads over and through a piece of bread, even penetrating the wood to a depth of sometimes five annual rings. The spread of the fungus, resulting in the cutting off of the sap flow, is the immediate cause of the wilting and dying of the leaves and branch above the point of girdling. This wilting of the leaves, followed later by the death of one branch after another as the fungus spreads, has given rise to the term "blight" of the chestnut trees.

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The danger signals which the chestnut tree displays when diseased are not a few. In summer, when the tree is first affected, the leaves turn yellow-green and wilt, later turning brown. Small burs and withered leaves retained in winter are some signs of the diseased condition of the tree. At the base of the blighted part a lesion, or reddish brown canker, is usually found. This lesion may be a sunken area or, as is frequently the case, a greatly enlarged swelling, known as a hypertrophy. After a branch has become completely girdled sprouts or suckers are very apt to be found below the point of girdling. In old furrowed bark on the main trunk of the tree the presence of the disease is seen in the reddish brown spore-bearing pustules in the fissures. In determining the presence of the fungus in the furrowed bark of old trees, one must learn to recognize the difference between the light brown color characteristic of fissures in healthy growing bark, and the reddish brown color of the fungus. When the disease has been present several years the bark completely rots and shrinks away from the wood, and when the bark is struck with an axe a hollow sound is produced.

Many of the owners of chestnut trees throughout Pennsylvania do not acknowledge that a fungus

is causing the death of the trees. They state that since they have found white grubs or the larvae of beetles in nearly every tree that dies, that it has been the larvae that killed the tree. It is acknowledged that generally white grubs are found in dying chestnut trees, and that in nearly all of the large cankers or lesions these grubs are present. However, if one will take the pains to examine the small twigs and branches or the new shoots rising from the stumps, that are diseased, he will not find the grubs present.

Second, what is to be done with diseased trees to bring them back to health or to prevent them from infecting other healthy trees nearby. To bring the trees back to health implies that the disease can be cured. This is not always true for the tree may be already nearly girdled, when the disease is first noticed. A tree taken in time, however, may have its life prolonged indefinitely though it may have the blight in some portion of it every year. More particularly does this apply to valuable ornamental and orchard trees.

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Prof. J. Franklin Collins, Forest Pathologist in the Department of Agriculture in Farmer's Bulletin No. 467 on "The Control of the Chestnut Bark Disease" gives the following: "The essentials for the work are a gouge, a mallet, a pruning knife, a pot of coal tar, and a paint brush. In the case of a tall tree a ladder or rope, or both may be necessary but under no circumstances should tree climbers be used, as they cause wounds which are very favorable places for infection. Sometimes an axe, a saw, and a long-handled tree pruner are convenient auxiliary instruments, though practically all the cutting recommended can be done with a gouge with a cutting edge of 1 or 1½ inches. All cutting instruments should be kept very sharp, so that a clean smooth cut may be made at all times."

All of the discolored diseased areas in the tree should be removed. Small branches or twigs nearly girdled are best cut off. Cankers in the main trunk or on limbs should be gouged out. Carefulness is the prime requisite in this work. If the disease has completely killed the cambium, the bark should be entirely removed as well as several layers of wood beneath the canker. By frequent examination, however, diseased spots may be found on the tree where the mycelium of the fungus is still in the upper layers of the bark. It is not necessary then to cut clear to the wood, but the discolored outer bark may be removed and a layer of healthy inner bark left beneath the cut. The sap may still flow through this layer. The border of the diseased area is quite distinct, but cutting should not stop here but should be continued beyond the discolored portion into healthy bark, at least an inch. The tools should be thoroughly sterilized by immersion in a solution of 1.1000 bichloride of mercury, or 5 per cent solution of formaldehyde, before cutting into the bark outside of the diseased area. Experiments have shown that a gouge or knife may carry the spores into healthy bark and new infection take place. Experiments are being carried on in the laboratory to determine the length of time which spores will live in solutions of different strengths of fungicides.

It has been shown that a cut made pointed at the top and bottom heals much faster than one rounded. The edges of the cut should be made with care so as not to injure the cambium. The chips of diseased bark and wood should not be allowed to fall on the ground then to be forgotten. A bag fastened just below the canker will collect most of this material as it is gouged out and prevent possible reinfection, which might take place if the material were allowed to scatter down the bark. Canvas or burlap spread around under a small orchard tree might be sufficient to catch all of the diseased chips of bark and wood cut out of the lower infections. This diseased material should be burned together with blighted branches. After completely cutting out all of the diseased parts the cut surfaces should be either sterilized or covered with a waterproofing which combines a fungicide with a covering. Among these might be mentioned coal tar and creosote, or a mixture of pine tar, linseed oil, lamp black and creosote.

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The trees which have been killed by blight, or nearly girdled, have been overlooked. These should be cut off close to the ground, the stump peeled and the bark and unused portions of the tree burned over the stump. The merchantable parts of the trees should be removed from the woods promptly, as all dead unbarked wood furnishes an excellent breeding place for the blight fungus.

Third, what means in the future can be undertaken to keep a tree healthy, that is, to prevent reinfection. The spores may be carried by so many agents that it is difficult to prevent reinfection. However it is clear that the farther infected products or trees are removed from healthy trees the less liable they are to have spores carried to them. Cooperation with nearby owners of diseased trees will help solve this problem.

Spraying on a large scale has only been carried on, so far as I know, on the estate of Pierre DuPont, Jr., at Kennett Square, Pennsylvania. At this place there are many large chestnut trees ranging from sixty to ninety feet in height, many of which were planted some sixty-five years ago. Mr. R. E. Wheeler started the work of cutting out diseased limbs and cankers in October 1911, and began spraying with Bordeaux mixture in April 1912. The formula 5-5-50, five pounds of copper sulphate and five pounds of lime in 50 gallons of water was found to be injurious to the foliage in the Spring. This was changed therefore, to 4-5-50, which had one pound less of copper sulphate. This did not seem to injure the foliage.

About 70 trees were sprayed twenty times during the season. Nearly all of these were gone over four times to remove diseased branches and cankers, once in October 1911, then in early summer and again in September and November 1912. As an example take tree No. 6 which was studied, December 14, 1912. It is 39 inches in diameter at breast height, and approximately 70 feet in height. On this one tree six diseased limbs were removed, and sixteen cankers were cut out. Of these sixteen, two infections continued, that is, were not completely cut out, and had

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spread; three had infections below old limbs which had been removed, and eleven were healing over. This tree was about 1000 feet away from other badly infected trees, though but 25 feet away from other chestnut trees in the same row. The experiment of Mr. DuPont in spraying shows what can be done on valuable lawn trees. On the whole, these trees look well and healthy. Trees which were not sprayed over three times and were within 50-100 feet from badly blighted trees, became infected in so many different places that it will be necessary to remove them.

One of the problems to be solved next year will be that of the least number of sprayings which will be effective in preventing new infection.

The Chairman: The question of the chestnut blight is now open for discussion.

Mr. Littlepage: I should like to ask these gentlemen how far west they have heard of chestnut blight—that is, heard of it with any degree of authenticity, and also whether or not they care to express an opinion as to what the prospects are in the middle west, say out in Indiana, Illinois and Ohio?

Mr. Pierce: In answer to that question, I will say that in Pennsylvania we have found infections in Wayne County and also in Fayette County, both near the western extreme of the state, but those have been attended to, very largely, and the boundaries closely determined. In Ohio there have been several reports of the blight being found, but I don't think either of the reports have been proven. There has been a fungus that I have spoken of as the Connellsville fungus, that has been all around in that neighborhood, south-western Pennsylvania and eastern Ohio.

The Chairman: Is the Connellsville fungus also *diaporthe parasitica*?

Mr. Pierce: Yes, sir. It was placed by Mr. Anderson, who did the work on that, in the same genus as *diaporthe*, but he preferred the name *endothia parasitica*. [Pg 49]

The Chairman: The question is of changing the generic name, from *diaporthe*, on the basis of the previously established species?

Mr. Pierce: Yes, sir, previously established species of *endothia*. It is only a suggestion of Mr. Anderson; it was made by him. This was very similar to the true blight fungus and when our men first went out into the western part of the State, they reported these various cases that came up there as chestnut blight, and none of the pathologists of our force then were competent to determine the difference, except that the fact was noted even then that it was not growing as a parasite in the sense that the true blight fungus has been growing in the east.

The Chairman: That may be due to varietal differences, though, rather than specific?

Mr. Pierce: Yes, although Mr. Anderson seemed to think it was specific.

The Chairman: Is there any further discussion? The subject is worthy of a good deal of comment.

Mr. Pomeroy: I want to ask the speaker what the approximate cost would be for one spraying of a tree about that size, 70 feet in height?

Mr. Pierce: We have photographs on the table there showing our eight hundred dollar spraying machine, the same kind used in Massachusetts in gypsy moth work. With this two men can spray about ten such trees in a day. I haven't got it down in black and white but I figured that, on those chestnuts at DuPont's, they sprayed about 600 gallons a day. Ten trees a day would make it, say, with a \$2.50 man, not very high for a tree. I think it costs in all something like four dollars a tree during the whole season, but that is a very rough estimate and the materials are not included.

The Chairman: The cost will have to be calculated on a sentimental basis for the ornamental trees, and on a commercial basis for the commercial trees. The actual value of the spraying has not yet been determined. This spraying cannot reach the mycelium in the cambium layer; if the disease has been carried in by a beetle or woodpecker your spraying would be ineffective.

Mr. Pierce: Yes indeed, that was just the thought Mr. Galena had, notwithstanding the fact that they cut out all visible infections and the trees were so blue with spray that you could see them for half a mile. [Pg 50]

The Chairman: But, later on, cracks and squirrel scratches and all sorts of injuries would allow new spores to be carried in?

Mr. Pierce: Yes, sir.

Mr. Reed: The future of the chestnut depends so largely on the conquering of this disease that no other horticultural problem of this nut is, just at present, imperative. So far as we know, all of the European and American varieties are highly subject to this disease, so much so that there is no inducement to plant them, and we are waiting for Dr. Morris and a few other hybridizers to find some hybrids, or straight Japanese varieties, that are of sufficient merit, and of sufficient degree of resistance to this disease, for us to have a basis for building up the future industry. On the tables there are quite a number of exhibits from Mr. Riehl and Mr. Endicott of Illinois. Most of them are hybrids between the American and the Japanese species, but, so far as we know, they have not been tried in communities where the disease prevails. We don't know whether they are

resistant or not, as they are being grown in a section entirely outside of the area where the blight exists. I think I am right in that, am I not, Mr. Pierce? Is there any chestnut blight in southern Illinois?

Mr. Pierce: There has been none reported.

Mr. Reed: I think that the varieties that these men in Indiana have originated are the most promising we know of. I think that in examining these specimens you will agree that they are of fairly high quality and good size, and if they prove to be resistant to the disease much may be expected from them.

Mr. Hutt: I have not seen the chestnut blight at all. I hope that it isn't in our section. I have heard it was brought in from some point but I do not know whether it was identified exactly as the chestnut blight.

Mr. Pierce: I saw a specimen sent from North Carolina and it proved to be the Collinsville fungus.

Mr. Corsan: If you remember reading Fuller's book on nuts, he reported that the chestnut blight extended through the Carolinas but said that chestnuts were still coming from that direction in great abundance. Up in Canada we haven't the chestnut blight. The chestnut tree runs from the Ohio River to the Niagara River but it doesn't cross into Michigan, except along the Michigan Southern and Lake Shore Railroad where some enterprising gentlemen have planted the chestnut with the tamarack alternately all the way from Cleveland to Chicago. I examined the state of Indiana across and from top to bottom several times in the summer and I never saw any chestnuts there, but I have seen some newly planted places in Michigan; near Battle Creek I saw a farm of about fifty acres. We are having up in Ontario, beyond Toronto, a blight that has attacked the Lombardy poplar and that looks similar to the chestnut blight. I have been watching it for the last ten years and the tree seems to have at last outlived it. It dies down and then a little sprout comes out from the carcass.

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The Chairman: Isn't that the poplar tree borer that always attacks the Lombardy?

Mr. Corsan: Oh no, it's very similar to the chestnut tree blight. We can grow chestnut trees all we like but no one has brains enough to grow them. The farmers grow pigs and things but don't bother with chestnut trees; consequently the chestnut blight does not exist there.

Mr. Pierce: I didn't answer a portion of Mr. Littlepage's question. Mr. Littlepage asked whether or not the blight might be expected in the Middle West. That depends, more or less, upon the results of the work Pennsylvania is now carrying on. If we can keep the disease from extending through the territory in which we are working, there is a very good chance to keep it out of the West. If we are not successful, it may be expected to develop, in time, over the whole chestnut range.

There seems to be a very good opportunity for growing the chestnut commercially beyond its present range; that is, where it is so infrequent as not to be in danger from infected growths nearby.

In the eastern part of the state different people have reported that the blight seemed to them to be dying out and, a number of these reports coming from a certain locality, the Commission decided to investigate one which seemed to be better reported than the others. It was found, after a very extensive investigation, that this dying out was true only in the sense that it was not spreading, perhaps, as fast as it had been spreading before. The mycelium and the spores were healthy and were affecting the new trees in quite the same manner as the year before and as in other parts of the state.

The Chairman: The question of controlling blight after it has appeared is of very great consequence. Concerning any commercial proposition with chestnuts the people are wide awake to the seriousness of the blight. They are afraid to go into growing chestnut orchards; they have had so many fake propositions in the past in pecan promotions that they are afraid of chestnuts and everything else. Any proposition for bringing forward chestnuts commercially must be a plain, simple, straightforward statement of the truth, the whole truth and nothing but the truth. We are ready, all through the North and East, to raise hundreds of acres of chestnuts, such as Mr. Reed has spoken about, ones which resist the blight, or ones which resist the blight comparatively well.

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Let us consider comparative immunity for a moment. We know how expensive it is to manage an apple orchard, and yet, with the present high prices, the profits on apple orchards, well managed, are great. May we not have chestnut orchards managed with the same degree of relative expense and the same degree of relative profit? I would like very much to hear from some of the men who have actually raised chestnuts in orchards concerning the relative care of the chestnut compared with the apple, and the relative profit. I see Col. Sober here; can't you tell us about your experience in managing the blight? Can it be managed successfully in proportion as apple tree parasites are managed?

Col. Sober: My experience has been this; I have four hundred acres of chestnuts in bearing. They range from five years to fifteen years old. I find that I can control the blight easier than I can control the scale on apple trees. If anyone doesn't believe this I invite him and all to come to my place and see for themselves. I think I have nearly one million seedling and grafted paragon trees. I don't think you will find fifty affected trees on the whole place today. I have men going in

every grove at the present time who have inspected thousands of trees and found seven that had blight on the limbs, so I know what I am speaking about.

The Chairman: What is your method?

Col. Sober: Cutting out, cutting off anything I see; if it is really necessary, cut the tree down; but we don't often find that necessary because just as quick as we see any affected, or any limb dying or dead, we cut it off. I had my groves laid out in sections of a hundred feet wide and numbered; and I had charts made so that they can be inspected section by section. In that manner, every tree is inspected. One individual will inspect the trunk and another one the top. In each section I can show you as far as we have gone. I can show you how many trees are in each section and how many affected trees there are in that section, or whether there are any or not. I say I can control it easier than I can control scale and with less expense and I want that to go on record. There is no question about it. It can be seen at my place. I go over my groves about four times a year and have been doing it all the time, and I don't doubt but that I discovered this disease the first of anybody in the state, perhaps, in 1902. I was looking around to cut scions and I saw one tree whose center was dead and around it were the finest shoots almost that I had ever seen for grafting purposes. I went to it and saw the center was dead. I cut some scions and today that is one of the finest trees I've got on my place. From what I know now that was a blighted tree.

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A member: Did you paint over the scars?

Col. Sober: No sir, but we are doing it now, using white lead.

A member: How much blight is there around you?

Col. Sober: I am surrounded with it on all sides. Right up against my groves about 17 per cent of the trees are affected. That is the report coming from the parties inspecting now for the Blight Commission. I shipped Mr. Mayo about four or five thousand trees this fall. I don't suppose there were a dozen that were thrown out, thinking they were blighted or diseased. We have records of all that up at my place. There are some trees right here now that came from my nursery. I wish you gentlemen could just see for yourselves; come out and see.

The Chairman: In advancing this chestnut on a commercial basis it had better be stated that it does not blight as badly as the American chestnut and that when blighted it can be cared for with less cost than the apple tree. I would suggest that some such notice be sent out with commercial stock. That would put it on the right basis so that the chestnut would find its position, which it is not finding now because the people are full of the blight; and if a frank, full statement of this sort were made I believe it would be extremely important.

Mr. Rockey: I went through practically the whole extent of Mr. Sober's orchard recently and found one infected tree. I can vouch for the statement that he has made that he is almost surrounded by blight.

The Chairman: I have given attention to only a few of my own trees that were blighted because I have too much else to do and too large a place, a couple of hundred acres engaged in a small and large way,—a variety of ways—with nut trees; and the few I have cared to save after blight has begun I have saved by cutting it out very thoroughly and using either white paint or grafting wax. I used also pine tar and some gas tar. I killed some good trees that I wanted particularly to save by putting on gas tar.

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The matter of compelling the removal of infected trees is a very important one, but it must rest with the authorities. In the vicinity of New York we have so much hard wood that you cannot sell it unless you are in some sort of a trade combination. Fine oak, fine hickory, fine chestnut, you can't dispose of in New York City, because we have such a lot of it. We have wild deer within fifteen miles of New York City on three sides of us on account of the forests. You have got to find some special way for disposing of this blighted chestnut timber. Telephone and telegraph poles and ties all go for nothing, unless you happen to be so situated that you can manage the matter commercially, and a way should be found by the state so that people can dispose of their blighted timber, which is just as good as any other.

It is very important to note that the boy scouts are interested, and we ought to encourage their interest. It is a splendid thing, getting the interest of boys engaged. You know how active a boy is in getting a snake from under a rock and he will do the same thing with the chestnut blight. It is his natural tendency to hustle when he gets after anything. This chestnut blight belongs to the microbe group and the microbe is the great enemy of mankind. In wars the microbe kills about eight men for every one killed by missiles. If we can encourage the interest of boy scouts in fighting the greatest of all human enemies, the microbe, including this little fungus, we shall have a splendid working force.

In regard to the injection of poisons and medicines into trees, it seems to me that a very firm stand ought to be taken by all responsible men who know anything about plant pathology. We know that a poison injected into a tree must either act injuriously right there upon the cells of the tree, or else must undergo metabolic changes. A tree cannot use anything that is thrown into it, poison or food or anything else, until it has undergone a metabolic change; you must have a distinct, definite chemical process taking place and we ought to state that most of the substances which are alleged to be of value, when injected into a tree, are either absolutely worthless or injurious. One man tried to persuade me that his medication if applied to the cambium layer would be absorbed, and said that if I would only use it on a few of my trees I could see for myself.

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He said it would drive off even the aphides. I tried it on four trees affected with aphides and found that he told me the truth. It drove them off, because the trees died and the aphides left. One tree lived a year before being killed; it was a most insidious sort of death, but the aphides left that tree. (Laughter.)

Some of the Asiatic chestnuts resist the blight very well. Curiously enough when grafted upon some of the American chestnuts they then become vulnerable. Two years ago, from a lot of about one thousand Korean chestnuts in which there had been up to that time no blight, I grafted scions on American stump sprouts and about 50 per cent of those grafts blighted in the next year, showing that the American chestnut sap offers a pabulum attractive to the Diaporthe, and that is a fact of collateral value in getting our negative testimony upon the point.

Concerning the question of carrying blight fifty miles, there's no telling how far birds will fly carrying the spores of Diaporthe upon their feet. The spores are viscid and adhere to the feet of beetles, or migratory birds which sometimes make long lateral flights following food, rather than direct flights north and south. It is quite easy to imagine birds carrying this Diaporthe over an interval of possibly fifty miles, making that distance in one night perhaps. Someone may have carried chestnuts in his pocket to give to his granddaughter fifty miles away, and in that way carried the blight. If any grafted trees have been carried fifty miles, or any railroad ties, with a little bark on, carried fifty miles and then thrown off, it might blight the chestnuts in that vicinity. One can have as much range of imagination as he pleases as Longfellow says, There is no limit to the imagination in connection with questions of spreading the blight of Diaporthe.

Some of the Japanese and Korean chestnuts and some of the Chinese chestnuts resist blight fairly well. Among my chinkapins, I have the common *pumila* and the Missouri variety of *pumila*, which grows in tree form forty or fifty feet high. I have the alder-leaf chestnut, which keeps green leaves till Christmas, sometimes till March when the snow buries them, and those comparatively young trees have shown no blight; but one hybrid, between the chinkapin and the American chestnut, about twelve years of age, has blighted several times. I have cut off the branches and kept it going, but this year I shall cut it down. It will start at the root and sprout up again. I thought I'd give up that hybrid, but having heard Col. Sober's report I will begin at the root and look after some of the sprouts. That hybrid is the only one of my chinkapin group that has blighted at all.

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In regard to the use of bichloride of mercury or formaldehyde, it seems to me that formaldehyde will be a better germicide than bichloride of mercury, because bichloride of mercury coagulates the albuminous part of the plasm and may destroy the cell structure, whereas the formaldehyde will be more penetrating and less injurious. One would need to know how strong a formaldehyde solution can be used safely. I presume the most vulnerable part of the tree would be at the bud axils. Spraying must require considerable experience at the present time and is of doubtful efficiency for timber chestnuts I am sure. We would like very much to hear any further comment upon this subject.

Prof. Smith: Mr. Sober's orchard is so unusually large that evidently it does not apply to average cases. The average man is buying chestnut trees for the garden or yard or lane. Prof. Collins has an acre on the top of a hill at Atlantic Forge and there he has fought diligently with the skill of a highly trained man, and the blight is gradually driving him back. I think that in a short time the trees on Prof. Collins' acre will be gone. I believe we need much more information before we can offer any hope that chestnut trees from a nursery will be safe against blight. I should like to ask the Blight Commission if they are at the present time planning to breed immune strains of chestnuts, and if not, I wish to suggest that it is a piece of work well worthy of their consideration. They might try grafting on American stocks, or on their own seedlings, some of the Korean chestnuts, on any variety that promises resistance, and also hybridizing, with the hope of getting a good nut that will resist the blight.

The Chairman: That is a very important matter, no doubt. In regard to the few chestnuts bought for lanes and gardens, I know a good many men who have bought a few grafted chestnuts with the idea of setting out a number of acres if those few did well, being men of a conservative sort. Men of that sort are the ones we want to have in our Association. We want to have men who will buy four trees, and if they do well, set out four hundred acres. That is what a great many men have had in mind in buying two, four or six trees of any one kind; they want to try them out. That is the wise way, the conservative way, the truly progressive way. If we are going to have very large numbers of any one kind of chestnut set out, we must make a statement of the dangers, so that men may be forewarned. If they set them out without warning and are disappointed, they drop the entire subject and go to raising corn and hogs; and then, to save trouble, turn these hogs into the corn and get to doing things in the easiest way, rather than carry on the complicated methods of agriculture that belong to the spirit of the present time. I would like to know if many efforts are being made toward breeding immune kinds. I am at work on that myself.

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Mr. Pierce: Our Commission has recently gotten, I think, about fifty pounds of Chinese chestnuts of several kinds, which they expect to plant for experiment. Besides that they have made some other arrangements of which I know very little. This investigation will take years. The Commission has been compelled to devote itself to so many lines of work that I am afraid this question has not been given the attention it might have had. I think in the future there will be a good deal done along that line.

Two of us have been given the title of tree surgeons, and we work, or make arrangements to have someone else work, sometimes the scout, in the orchards throughout the state. I have a list of

two hundred owners of cultivated chestnut trees that I got in the last month from various sources. Anyone in Pennsylvania who has a cultivated chestnut tree, can send a postal card, get one of us out to examine the tree and see whether it is blighted, and we will demonstrate what can be done in the way of treating it. I have done that right along in the last two months. If it is only a single tree I cut out all I can myself.

The Chairman: There are two distinct questions; first, the chestnut as a food tree, and second, as a timber tree. Your work has been chiefly with the chestnut as a timber tree?

Mr. Pierce: No, mine has been mostly on the lawn, so that it is for nuts.

Experiments made on one or two species of Japanese chestnuts show about 9 per cent of tannin; the tannin in the American chestnut runs only 6 per cent and in the small American, runs less. We know that the Japanese is somewhat more immune than the American. We have already found that it has 50 per cent more tannin. I believe one of us wrote you about experiments to find out the percentage of tannin in Corean, North Japanese, South Japanese and Chinese chestnuts. The investigation will be carried on for the next two or three months.

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Mr. Corsan: May I ask if there is any soil food that would increase the amount of tannin? Trees protect themselves. We have watched the black walnut and seen him fight all sorts of enemies. The tree has poisons everywhere and the nut a thick shell to boot and doesn't coax enemies to get at him or to eat him until he is ripe.

A Member: Have you found that fertilizing a tree increased the percentage of tannin?

Mr. Rockey: That hasn't been determined yet but it will be studied.

The Chairman: It is a question if the tendency would not be for tannin to go over to sugar and cellulose under cultivation. I don't remember the chemistry on that. Aren't there any expert chemists here who can tell us? The natural tendency of the tree under high cultivation would be to change tannin over into sugar and starch.

Mr. Corsan: This talk of the chestnut blight reminds me of a remark made by a gentleman at a peach growing convention. He said the best thing that ever happened to this country was to get that San Jose scale because it stopped lazy men from growing peaches. He said, "I don't mind it a bit and can make more money than when peaches were nothing a basket." Probably nature will help us some way.

The Chairman: We have to consider what nature wants to do.

Mr. Mayo: If I am in order, I would like to know whether this fungus trouble is likely in the future to attack or has at any time attacked, the apple, pear or quince?

The Chairman: I think it has been pretty well decided that they are not in danger. I will, however, ask Mr. Rockey and Mr. Pierce to answer that question.

Mr. Rockey: Up to the present time there has been no indication that the blight will get into them. This might be a good occasion for me to mention the Connellsville fungus again. It was found on some of the oaks and other trees in this section of the country, and for a time it looked as though the blight was getting into other species, but since that fungus has been identified there has been no indication that the blight will extend beyond the chestnut group as a parasite, although you can inoculate oaks and other trees with the fungus and it will live in them, but only on the dead portion of the tree and not as the parasite lives on the chestnut.

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Prof. Smith: I should like to ask Mr. Sober if he has found any evidence that the paragon chestnut differs from the native chestnut in resistance to the blight, and if his paragons are different from other paragons?

Col. Sober: I cannot say whether my chestnuts are different from the other paragon chestnuts or not, or whether they are as resistant to the blight. I know it is a very sweet chestnut. In regard to keeping my groves clean—from 1901 to 1910, we had three broods of locusts and two hailstorms that opened the bark in almost every tree and branch. The limbs were stung by the locusts thousands of times, so that I didn't have a crop of chestnuts. Professor Davis was cutting off limbs for a couple of months so you see my trees were open, if any ever were, to receive the blight. The hailstorms destroyed the leaves and I didn't have any chestnuts that year in one part of my grove and with all that—you people come and see how clean it is, that's all there is to it. I know what I've done and what I can do.

The Chairman: The next paper in order is that of Professor Smith.

NUT GROWING AND TREE BREEDING AND THEIR RELATION TO CONSERVATION

PROFESSOR J. RUSSELL SMITH, PENNSYLVANIA

Prof. Smith: Mr. Chairman, ladies and gentlemen; I am going to ask your indulgence for including

in my subject a matter that perhaps goes a little beyond the scope of this organization, for I wish to speak of fruit as well as nut-bearing trees. Conservation, whose object is the preservation of our resources for future generations, as well as for ourselves, finds its greatest problem in the preservation of the soil. The forests can come again if the soil be left. It is probable that we can find substitutes for coal, and for nearly everything else, but once the soil is gone, all is gone; and the greatest danger to the soil is not robbery by ill cropping, because no matter how man may abuse the soil, scientific agriculture can bring it back with astonishing speed. But the greatest enemy of conservation is erosion, the best checks for erosion are roots.

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Thus far, the only man who has been telling us anything about planting roots upon the hillsides is the forester. But he usually sets nothing but wood trees, which at the end of fifty or a hundred or a hundred and fifty years, we can cut down, and which, during the intervening time, have done nothing but cast shade, drop leaves and retain the soil. My doctrine is that the potentially greatest crop-producing plants are not those on which we now depend for our food, but are the trees; that the greatest engines for production are not the grasses, but the trees. Our agriculture is an inheritance from the savage, and the savage found that he could do better with annual grains than he could with nut trees, because he didn't know how to improve the nut crop by selection of the trees, while there came involuntarily an improvement in the other crops. No man today knows the parentage of some of the cultivated plants and grains on which we now depend. Thus we came down to the present day of science, with the purely chance discoveries of savages as the main dependence of mankind for the basis of agriculture.

We have within a decade discovered the laws of plant breeding. We know a good deal more about it now than ever before and are in a position to start about it very deliberately and with a reasonable certainty that we are going to get certain combinations of qualities if we keep at it long enough. Thus the hickory and walnut offer perfect marvels of possibilities. Look around on these tables and see the size of some of these things. There are hickory nuts $1\frac{1}{4}$ inch long and there are shagbarks as full of meat as pecans and probably quite as good. There are in Kentucky, I am told, hickory nuts that you can take in your fingers and crush. Here we have the pecan, this great big shellbark from Indiana, the shagbark from the North, and the thin shell nuts from Kentucky. Now hybridize these and I think, if you work at it long enough, you will get a tree that will have all those good qualities.

The wonderful black walnut is a tree of hardiness, and the delicious Persian or English walnut is a nut of acceptable form. The pair offers splendid possibilities in their hybrid progeny.

We have fruits thus far recognized as of little value which offer great possibilities as forage producers. The mulberry bears from June to September and the persimmon from September till March and the pig harvests them himself.

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We have the possibility of a brand-new agriculture, depending not upon grains, but upon tree crops, provided someone will breed the crop-yielding trees which we can use. This will permit us to use entirely different kinds of land from that now considered best for agriculture. The natural necessities for plant growth, I believe, are heat, moisture, sunlight and fertility. Now they are not all the limiting factors with man, because man adds the fifth, the arbitrary fact of arability, and that right away bars out about half of the fertile earth, because when we insist on heat, light, moisture, fertility *and arability*, we leave out that rough half of the earth equally fertile, idle, subject only to the work of the forester, who will give us a forest about 1999. It might just as well be planted with a host of crop-yielding trees, the walnuts, hickory nuts, pecans, persimmons, mulberries—and the list is very long. There are at the present time in use in Mediterranean countries twenty-five crop-yielding trees other than the ordinary orchard fruits. I am told that they have oak trees there which yield an acorn that is better than the chestnut. A pig will fill himself with acorns on the one hillside and with figs on the next hillside and then lie down and get fat. We are too industrious, we wait on the pig; I want the pig to wait on himself.

But who is going to breed these things? These crop yielding trees? A gentleman told us this morning that he was not nervous, that he could watch a hickory tree grow, and stated that he had forty acres of land and was breeding trees for fun. Here is Dr. Morris, who is having a delicious time doing the same thing. We should not have to depend on enthusiasts who are working for fun; we must not depend on such sources for the greatest gifts in the line of food production that man can imagine. This work should be done by every state in the Union. I believe that it is capable of proof that we can get just as much yield from a hillside in untilled fruit and nut-yielding trees, as we can from putting that same hillside under the plough and getting wheat, corn, barley, rye and oats and a little grass once in a while. It will make just as much pig or just as many calories of man food from the tree crops as it will make under the plough. And under the plough that hillside is going down the stream to choke it and reduce the hillside to nothing.

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We have three classes of land. The first class is the level land, which belongs to the plough now and for all time. The third class, which is the unploughable steep mountain and hill land, is probably as great in area as the level land, and between the two is the hilly land that we are now cultivating to its great detriment, visibly reducing the earth's resources by bringing about rapidly that condition which has led to the saying in the Old World: "After man, the desert." The Roman Empire, where men have had possession for two thousand years, proves, "After man, the desert." It is equally proven in much of China, but it can be prevented if these hill lands are put to trees. But we cannot afford to put those lands into trees unless the trees yield.

I movethat this Association memorialize those persons who are in position to promote the breeding of fruit and nut-yielding trees, that we may bring nearer the day of tree-crop

agriculture. I want a letter to go from this Association with the authority of the Association and its sanction, to the Secretary of Agriculture at Washington and to all the men in authority in the Bureau of Plant Industry at Washington, to the Presidents of the State Agricultural Colleges, the Directors of Experiment Stations and professors who are interested in plant breeding. That will make a list of three or four hundred persons and involve an expenditure of a few dollars but I believe it will be productive of good. I hope that the Association will see fit to lend its name and a little cash to that proposition, because if we can get the authority of the state and the money of the state, the results will come much more rapidly than if there are just a few of us doing it independently. (Applause.)

The Chairman: Will someone put Prof. Smith's suggestion in the form of a motion?

A Member: I move that it be referred to the Committee on Resolutions.

(Motion carried.)

Mr. Corsan: Undoubtedly we all agree with Prof. Smith. He spoke of the persimmon. When I speak of the persimmon in my country nobody knows what I am talking about. I found two trees in Battle Creek, Michigan, in a front yard. The person who owned them was an old lady. I said, "Will you give me these persimmons?" She said, "Yes, take them all; the neighbors come here and while they are getting the persimmons they bother me a lot. Everybody seems to like them." They were delicious persimmons that were quite edible before frost, they are probably the two furthest north persimmon trees in the world. I went a little way around Devil Lake, and found pawpaws. They are a very good fruit when cultivated. The idea of preserving the soil and not sending it all into the Lakes and down into the Gulf of Mexico—that is a good idea of Prof. Smith's.

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Mr. Gardner: I submit that that Battle Creek woman should start a new breakfast food. (Laughter.)

Mr. Corsan: Every second year there is an immense crop on one of the persimmon trees; they are a male and female, I think. You can't see the branches for the fruit, and the thermometer there falls to 22 degrees below zero.

The Chairman: You can graft the male trees with pistillate grafts if you want to, or you can transfer grafts both ways. The persimmon and pawpaw will undoubtedly both grow at Toronto. They are not indigenous there because of natural checks to development in their sprouting stage, but if you buy Indiana stock for Toronto, such transplanted trees will both grow there, I am sure. This is not quite relevant to Prof. Smith's paper. It seems to me that Prof. Smith gave us a very comprehensive resumé of facts bearing upon the situation, perhaps not particularly calling for discussion. We are very glad to have his arraignment of facts.

The next paper on the program will be that of Dr. Deming. While Dr. Deming is getting ready, I would like to have the trees shown. Mr. Jones will speak about his pecans, these specimens of young trees here.

Mr. Jones: These are pecans that Mr. Roper brought up from the Arrowfield Nurseries. (Here Mr. Jones described the trees.)

The Chairman: Would those trees grow after they have been dried as much as that?

Mr. Jones: I don't think so; pecans don't stand much drying.

The Chairman: No, unless you cut off all the roots.

Prof. Smith: If we should dig up a tree like this and cut it off a foot and a half down, would it be all right to transplant it?

Mr. Jones: Yes, if your season should not be too dry.

The Chairman: What has been your experience with the Stringfellow method of cutting off every single root?

Mr. Jones: We cut the tap-roots off, but leave an inch of the lateral roots.

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The Chairman: I think you can do better by following the Stringfellow method and cutting off all the laterals.

Prof. Smith: If you were going to transplant those for your own use where would you cut them off?

Mr. Jones: About here, a foot and a half down.

The Secretary: And the top?

Mr. Jones: Yes, sir, I'd reduce the top about that much; I think we will have to work for a better root for the North.

BEGINNING WITH NUTS

DR. W. C. DEMING, WESTCHESTER, NEW YORK CITY

In his official capacity as secretary of the Northern Nut Growers Association the writer is frequently asked, by persons wishing to grow nuts, about climate, soils, varieties and methods.

The following observations are intended to apply only to the northeastern United States, the country lying east of the Rockies and north of the range of the southern pecan. They are intended more for the person who already has his land, or is restricted in his range, than for the one who can range wide for larger operations and will study deeper before deciding.

It is probable that most nuts will grow wherever the peach will. Outside the peach area there is probably not much use in trying to grow the pecan or Persian walnut. Yet it must always be remembered that nut growing in the North is, at present, almost entirely experimental and that anybody may be able to disprove the authorities. We are all experimenting now. By and by it will be different.

In severer climates the chestnut, shagbark, black walnut, butternut, hazel, beech, pine, Japanese cordiformis and hardy Chinese walnuts can be grown or, at least, offer possibilities. In such climates the development of the native nuts by selection and crossing, and the adaptation of alien nuts, deserves, and will repay, experiment.

It is to be supposed, as before said, that the hopeful beginner already has his land. Let him choose the best part of it that he can spare. By "best part" is meant the most fertile, not too wet nor too dry nor, if possible, too hilly to cultivate. Hard pan near the surface, and too thick to be easily broken up by dynamite, is not desirable.

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A nut orchard ought to have much the same preparation as an apple orchard. A practical way would be to plow deeply and harrow well in summer and sow a cover crop like rye and vetch or clover. The more stable manure, or other fertilizer, applied the better.

Let the field now be staked off thirty feet apart in squares, or in triangles if preferred. Late in the fall dig the holes and plant nuts, three or four in each hole, two to four inches deep, according to size, and six inches apart. Put a good handful of ground bone in each hill. Unless the soil and subsoil are mellow, so that the long tap roots may penetrate deeply, it would be best to dynamite the holes, using a half pound of 20 per cent or 25 per cent dynamite at a depth of two and a half feet. This is a simple matter and the dynamite companies will furnish materials and instructions. It is also some fun.

There is some danger that nuts planted in fall may be destroyed by rodents, that some will "lie over" and not sprout the first year, or that all the nuts in a hill may make inferior plants, so that some authorities advise putting them in a galvanized wire cage, the nuts only half buried, then covered with a few leaves during the winter and otherwise left exposed to the elements. In the spring they must be taken from the cage and planted in the hills before the sprouts are long enough to be easily broken.

The different kinds of nuts should be planted in "blocks" rather than mingled, to facilitate handling.

These nuts are to furnish trees that are later to be grafted or budded. After they have grown a while the weaker ones are to be removed, as necessary, until only the strongest remains in each hill. When grafted and grown to great size the brave man will thin them out to sixty feet apart. Interplanting with fruits or vegetables may be practised.

As to the kinds of nuts to be planted that depends on what you want to grow. If chestnuts it must be remembered that the bark disease is very likely to attack them, in the East at any rate. Experiments with chestnuts outside the range of the blight are very desirable. The American (*Castanea dentata*) and European (*C. sativa*) chestnuts are specially susceptible. The Asiatic chestnuts (*C. Japonica*, etc.) seem to have a partial immunity, especially the Korean, and it is possible that the native chestnut grafted on these may be rendered more or less immune. It is being tried and is an interesting experiment.

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The Asiatic chestnut trees are dwarfish in habit, come into bearing early, the nuts are generally large and some of them of pretty good quality. They may be planted as fillers between the trees of larger growth. The nuts may be bought of importers. (See circular on "Seedsmen and Nurserymen".) The small Korean chestnut has been especially recommended.

If you wish to grow the shagbark hickory (*Hicoria ovata*) plant the best specimens of this nut you can get, or the bitternut (*H. minima*) which is said to be a superior stock for grafting.

High hopes are held that that other favorite hickory, the pecan (*H. pecan*) may be grown far outside its native range, and the Indiana pecan is the nut on which these hopes are founded. Seed nuts may be obtained from reliable Indiana dealers, but it is said that some of them are not reliable.

The hickories may be budded and grafted on one another so that one kind of stock may serve for both shagbark and pecan.

If you want to grow the Persian walnut (*Juglans regia*), often called the "English" walnut, the black walnut (*J. nigra*), seems to afford the most promising stock, though *J. rupestris*, native in Texas and Arizona, has been recommended and *J. cordiformis*, the Japanese heart nut, is also promising. This nut can be recommended for planting for its own sake as the tree is hardy, a rapid grower, comes into bearing early and bears a fairly good nut. There are no grafted trees, however, so the variable seedlings will have to be depended upon.

On any of these walnut stocks the black walnut and the butternut (*J. cinerea*) may also be propagated if worthy varieties can be found. There are none now on the market.

The nuts mentioned are enough for the beginner and the three stocks, chestnut, hickory and walnut, will give him all he wants to work on and furnish plenty of fascinating occupation.

The hazel, the almond and others, though offering possibilities, had better be left to those further advanced in the art of nut growing.

Now the nut orchard is started and the owner must push the growth of the trees by the ordinary methods, cultivation, cover crops and fertilizers. See any authority on growing fruit trees.

In from two to five years the trees will be ready for budding and grafting, they will have made a good growth above ground, and a bigger one below, they are permanently placed and haven't got to be set back a year or two, or perhaps killed, by transplanting, with loss to the tap roots and laterals. In the writer's opinion that natural tap root of the nut tree growing down, down to water is not to be treated as of no importance.

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So let your seedlings grow up and down happily while you get ready the stuff with which to build their future character, for seedling trees are very slow in coming into bearing, and uncertain in type and quality of nut. Grafted trees bear early and true to type.

Take your choicest bit of ground and put it in the best shape you know how. Then order the finest grafted trees you can find on the market. (See circular on "Seedsmen and Nurserymen".) Your choice will be limited for there are as yet only a few grafted varieties of the Persian walnut and the Indiana pecan, and but one of the shagbark hickory to be had. Of chestnuts there are more and, in the South of course, plenty of pecans. But pecan growing in the South is another story. If you order chestnuts be sure that they do not come from a nursery infected with blight. Get young trees because they are more easily established.

Order from two to four of each variety. Fewer than two gives too small an allowance for mortality and more than four, besides the not inconsiderable strain on the pocket, will divide your attention too much; for you have got to give these trees the care of a bottle baby.

Set them sixty feet apart if you have the room. If not set them closer. Better closer if that means better care. They may be set in the fall but probably spring is better, as early as you can get them in. Follow the instructions of the nurserymen closely. Digging holes with dynamite is probably good practice. Put some bone meal in the soil around the roots but no strong fertilizer. Some soils need lime. Tamp the soil about the roots with all your might. It cannot be made too firm.

Then water them all summer, or until August if they have made a good growth. Give them all they can drink once a week. Sink a large bar about a foot from the tree and pour the water into the hole, as much as the soil will take.

Keep up cultivation and a dust mulch or, if you cannot do this, mulch with something else. Mulching doesn't mean a wisp of hay but something thick or impervious. Six inches of strawy manure, grass, vines or weeds; an old carpet, burlap, feed or fertilizer bags or even newspapers, held down with stones or weeds or earth, all make good mulches.

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These trees ought to grow and, whether you ever succeed in grafting your seedlings or not, you should have at least a small orchard of fine nut trees.

The second summer with the trees will be something like the baby's. Worms may bother them. Look out for bud worms and leaf-eating caterpillars. Give them all the water they can drink in the dry dog days. Nurse them, feed them and watch them and they will grow up to bless you. Some of them may bear as early as apple trees.

These trees, and such scions as, from time to time, you may obtain elsewhere, are to furnish your propagating material.

The plan just described may be modified in various ways, but the general principles are the same. Instead of planting the nuts in their permanent positions they may be put in nursery rows where they may have the advantage of intensive cultivation. The best of the resulting trees may be grafted or budded in the rows, or after they have been transplanted and have become well established. This method is an excellent one and has distinct advantages and many advocates.

Yearling seedlings may be bought and set either in permanent positions or in nursery rows.

Of course the man who is in a hurry, who can disregard expense and who does not care for the experience and gratification of grafting his own trees, may set his whole plantation with expensive grafted trees and replant where they fail.

The technique of budding and grafting you must work out yourself with the help of the instructions obtainable from several authorities, or, by far the surer way, study the art with a

master. The essentials are good stocks and good scions, the right moment—and practice.

Excellent publications giving instructions in methods of propagation are: "The Persian Walnut Industry in the United States," by E. R. Lake; Bulletin 254, Bureau of Plant Industry, U. S. Department of Agriculture, 1913: "The Pecan," by C. A. Reed; Bulletin 251 of the same department, 1912: "Walnut Growing in Oregon," published by the Passenger Department Southern Pacific Company Lines in Oregon, Portland, Oregon, revised edition, 1912; and "Nut Growing in Maryland," by C. P. Close; Bulletin 125 of the Maryland Agricultural Experiment Station, College Park, Maryland. Any of these may be had free on application.

The files and current issues of the nut journals are full of information. Join the nut growers associations, subscribe to the nut journals, get all the literature (see Circular No. 3) and you will soon be happily out of the fledgeling stage of nut growing and begin to do as you please.

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The Chairman: Comment upon this paper is now in order.

Mr. Lake: You say you are going to issue that?

The Secretary: On my own responsibility, but subject to modification.

Mr. Lake: If that is going out as a circular of the association, I would like to suggest two slight changes. For instance, you wouldn't expect the ordinary nut tree to begin to bear as early as the ordinary transplanted apple tree.

The Chairman: Some would.

Mr. Lake: A summer apple would begin to bear much earlier than the ordinary nut tree.

The Secretary: Well, chestnuts begin to bear very early after grafting. I refer only to grafted trees here.

Mr. Lake: I thought that the paper had to do with trees that were planted as nuts.

The Secretary: No, I think I made that perfectly clear.

Mr. Lake: What is that new statement about roots, that it is desirable to leave them?

The Secretary: That it is better that a tree should go undisturbed than that it should be transplanted.

Mr. Lake: Isn't there a question about that?

The Secretary: A question would arise in the hands of an expert, perhaps, but I think for an amateur, that a tree growing where the nut was planted is more likely to live and do well than a transplanted tree.

Mr. Lake: I am not so certain about that, but what I had in mind was that the planter would get the idea that the tap-root was not to be cut off and that it is very desirable to the tree.

The Secretary: That's a good point.

The Chairman: About cutting the tap-root I have said yes and no so fast that I don't know which I've said last, and it seems to me that we ought to have discussion on this very point.

The Secretary: I have said that in buying these grafted trees you should set them out following the instructions of the nurseryman closely.

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Mr. Lake: But that statement about the tap-root would lead the average planter to think that it was very desirable to have the tap-root.

The Secretary: Has it been settled that it is not desirable?

Mr. Lake: Well, I think it has been generally accepted that it is of no special value.

The Secretary: That trees will grow as well transplanted as if they have never been transplanted?

Mr. Lake: Well, I shouldn't want to put it that way, but this is the point: I would like to have the tree planter understand that a walnut tree doesn't need the tap-root and if he cuts off the tap-root in planting, there is no great loss. I wouldn't want to say that his trees wouldn't begin to bear earlier or bear larger if left in the original place. I prefer to transplant my own tree after it is grown, rather than run the risk of getting scrub trees in the post hole or on the hill. I prefer to select the grafted trees even without the tap-roots, which would be removed in digging, and planting them all uniform, rather than to plant the seeds. Speaking for the amateur, I think the latter is good practice. The point I had in mind was that many people will not take the time to plant nuts but will want to set grafted trees, and the question is, should they have considerable tap-root—the grafted trees?

The Secretary: Following my plan, a man would buy a small number of fine trees and set them out at once; that would probably be all he would undertake and all he could probably manage. He would also plant a small number of nuts on which to experiment in propagation. My experience up in Connecticut has been that all my southern transplanted trees, almost without exception,

have died. I have planted pecans and Persian walnuts from a number of different nurseries. I have done it personally and done it as carefully as I could, but they have either made a very feeble growth indeed or have all died. On the other hand, the seeds I have planted have grown into very vigorous trees.

Mr. Rush: I have had a little experience with the tap-root theory. You can't dig a walnut tree without cutting the tap-root, and that tap-root, I find, is practically of no benefit at all after you have your upper laterals, and an abundance of them; by cutting the tap-root growth is stimulated and a new tap-root is made. It is very largely in the mode of pruning the tap-root. You can readily stimulate the tap-root system.

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The Chairman: You try to keep an equilibrium by cutting down the top in proportion?

Mr. Rush: Yes, sir.

Mr. Pomeroy: In examining transplanted trees I found ten times as many roots where the tap-root had been cut; and there were two tap-roots. I like a tree with a good tap-root system and I am positive that if you transplant a tree you get a better root system, get a great many more roots.

The Chairman: The tree development, it seems to me, depends not upon the number of roots which are carried with it when it is transplanted, but upon the feeding roots which develop. Now, if we cut back the tap-root, cut back the laterals, cut back the top, we have a tree carrying in its cambium layer, food, just as a turnip or beet would carry it—and I look upon a transplanted tree much as a carrot or beet, with stored food ready to make a new root.

Mr. Harris: I planted last fall a year ago a lot of English walnuts. Would the gentleman advise taking those up, cutting the tap-roots and planting them again?

Mr. Rush: I don't think that would be advisable.

Mr. Harris: They were grown from the nuts sown in a row last fall a year ago and grew very well.

Mr. Rush: In propagating the English walnut we have had them do the best by transplanting when the tree is about two years old, but it will more or less disturb the vigor of a tree to transplant it. That is self-evident; it needs some time to heal those wounds that are made both in the root and the branch.

Mr. Harris: What time of year do you bud them?

Mr. Rush: In August.

Mr. Hutt: I notice some trees here that are evidently two-year old pecans that have been cut back, and you notice that in every case several tap-roots have taken the place of the one. Here are some others that have not been cut. These have gone straight down. They are strong roots with few fibers on them. On these other trees that have been cut the formation of tap-roots continues. They will go down till they strike a permanent water-table and then the tap-root will stop. In Hyde County, North Carolina, near the ocean, the water-table is close to the surface and there is a deep black alluvial soil with a great deal of water in it. In order to grow anything there they have to put in ditches to get the water out. The pecan trees growing there have absolutely no tap-roots at all, it rots off as soon as it strikes the permanent water-table; and I think that's the reason they produce such enormous quantities of pecans in that county. In bottomless, sandy land where there is no clay the root keeps on going down till it finds the permanent water-table, even if that is six or eight or ten feet down. These roots, as you see, were going right down to China to look at that king on the other side if they got a chance. It's the same with the long leaf pine. It has a tap-root below ground thicker than the trunk above ground. The reason is that it grows naturally on those bottomless places; the root goes down till it strikes water, then runs off laterally. If you cut the roots they are bound to make new tap-roots. You can see the place where they have been cut and in place of one tap-root you have two, going right down into that sandy soil till they find a water-table. I believe that a nurseryman who will cut off the root of the pecan tree when it is transplanted, will cause it to form more lateral roots and make a better tree. There's a great number of vigorous roots in this tree than in this, and this tree whose root has been cut off will make a tree much easier to transplant and will be a better tree than those with great thick roots without the fibers that have the root hairs upon them.

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A member: You wouldn't recommend cutting back that tap-root too severely, would you?

Mr. Hutt: In planting a tree of this kind, I'd cut off a foot or 18 inches. If you get about 24 inches in a specially good soil, or about 30 inches of root ordinarily that's all you want.

A member: I should think that would depend quite a little on the height of the water-table. If you were planting on land where the water-table is low, you would leave more tap-root?

Mr. Hutt: Yes.

A member: That was the reason I brought up the point, because I think cutting so short would be too severe.

Mr. Hutt: The cambium is the only part of the tree that maintains growth. Every wound kills the cambium to a certain extent, so I always cut off roots of any size with sharp shears as smoothly as possible. I cut far enough back to find good, fresh, living tissue. In moist soil that will callous over. In the South the soil is moist and we have growing conditions in the winter time, so it will

callous over during the winter. In the North, I understand, you make a practice of planting in the spring, because of the weather conditions.

Mr. Harris: In Western Maryland we have in the mountains a deep, sandy soil; there doesn't appear to be any water bottom to it; what would the tap-root do in that case? [Pg 73]

Mr. Hutt: It will go down until it finds what it wants, finds sufficient moisture.

Mr. Harris: Gravelly bottom?

Mr. Hutt: If you have ever seen the roots of a long leaf pine, you've seen where the roots go to when they get a chance.

Prof. Smith: I should like to ask Dr. Deming if he would give us his experience in propagating the walnut and hickory?

Dr. Deming: A very important thing indeed for us nut growers in the North is to learn how to propagate. Dr. Morris has had some success; I haven't had any. I have tried it summer and spring, year after year. I believe there are a few pieces of bark, without buds, still growing. Chestnuts I haven't found very difficult, but with the walnut and hickory I have had no success whatever, although I have practiced the best technique I could master. I think one reason why I have had no success is that I haven't had good material. I have had good stocks, but I haven't had good scions, not the sort of scion that the successful southern nurserymen use. Still, Dr. Morris has had success with the same kind of material that I have failed with.

The Chairman: Not very much success.

Mr. Lake: Dr. Deming said that the land ought not to be too dry nor too wet. Would you feel like saying that a water-table at 24 inches was neither too low nor too high?

Mr. Hutt: It depends a great deal on the nature of the soil, the water-pulling capacity of the soil. Take a soil like that I mentioned, in Hyde County, near the ocean; you can see it quake all around you.

Mr. Lake: But would you say that the northern nut grower might safely put his orchard on soil that had a water-table within two or three feet of the surface?

Mr. Hutt: I could tell if I saw that soil. If it is craw-fishy, or soil that is ill-drained or won't carry ordinary crops, I'd say keep off of it, but if it will bear ordinary crops it's all right; in some cases where the soil is very rich the plant does not need to go down into that soil anything like the depth it would in a poor soil. The poorer the soil the further the roots have to go to find nourishment.

Mr. Lake: I think that is an extremely exceptional case in relation to northern nuts. There is very little such North Carolina land in this section of the country, if I judge right. We don't plant nut-growing orchards up here in peaty soils, so Dr. Deming's recommendation was rather for very good agricultural soil. A water-table here must be eight or ten feet deep; in that event, it would not make any difference whether you left three feet of tap-root or 15 inches. [Pg 74]

Mr. Hutt: No.

The Chairman: In the soils of some parts of New England, a tree would have to have a root three or four hundred feet deep to get to flowing water, but nevertheless trees flourish there.

Mr. Lake: But the capillarity of the soil provides water for the tree above the water-table.

Mr. Corsan: It all depends on the kind of nut. At St. Geneva I came across a butternut that was growing in a soil that would kill a chestnut very quickly. The soil was very springy and wet and the butternut just loves that soil. I found that while other butternut trees bore nuts in clusters of one to three, this butternut tree was bearing them in clusters of ten and eleven. At Lake George, right in front of the Post-Office, there was one tree twenty-four years old, two feet through, that grew butternuts in clusters of ten and you could get a barrel of nuts from it. It bore again this last summer heavily, not in clusters of ten but in clusters of seven or eight. When we have damp soil we can't grow the chestnut but the hickory nut will grow in a swamp, and so will the butternut.

The Chairman: And the beech.

Mr. Corsan: The beech wants clay; it won't grow unless there is clay.

The Chairman: Our beech will grow where it has to swim.

Mr. Reed: Before we get away from this discussion I think that we ought to commend Dr. Deming in the selection of this subject and in the handling of his paper. In my position in the Government, we have a good many inquiries about nut matters, and they are usually from people who want to know how to start. The great call for information at the present time is from the beginners, not from the advanced people, and I am glad that Dr. Deming took that subject and handled it as he did, and I am glad that he proposes to issue it as a circular from this Association. It will be a great relief to others who are called on for information.

I should like to have a word, too, about this tap-root question. From what has been said it is pretty clear that there is quite a difference of opinion. We sometimes think we can improve on [Pg 75]

nature in her ways by harsh methods and, while I know it is customary in the nurseries of the South to cut the tap-roots back pretty severely, I wonder, sometimes, whether that is always the best thing.

I haven't had any personal experience, but I have observed quite a good deal, and the tendency, it seems to me, is to try to develop as much as possible the fibrous root. Sometimes that is brought about by cutting the tap-root, or putting a wire mesh below where the seed is planted, so as to form an obstruction to the tap-root, so that it necessarily forms a fibrous root. Where the tap-root is the only root I doubt very much the advisability of cutting back too severely.

Col. Van Duzee: I have heard this subject discussed all over this country, in meetings of this kind, and a great deal of energy has been wasted. I do not think any of us know anything about it, but I do wish to say this, that when you come to transplant a tree from the nursery to the orchard, there are things of infinitely more moment than how you shall hold your knife between your fingers when you cut the roots. The exposure of the roots to the air, the depth to which the tree is to be put in the ground, the manner in which it shall be handled—those things are of infinitely more importance, because we know we can transplant trees successfully and get good results when the tap-root has been injured or almost entirely removed. I do not consider that the question of cutting the tap-root is of very serious importance, but I do think we should insert a word of caution as to the exposure of the roots of trees to the atmosphere, and make it just as strong as we are capable of writing it.

The Chairman: That is a very interesting point, that we have fixed our eye on the tap-root and talked too much about it. Not long ago one of the agricultural journals decided finally to settle the question about the time for pruning grapes, whether it should be done in the fall, spring, winter or summer, and after summing up all the testimony from enthusiastic advocates for each one of the seasons, the editor decided that the best time is when your knife is sharp; and that is very much the way with the tap-root. Be very particular in getting the root in and caring for it.

Mr. Pomeroy: Prof. Close, in a bulletin issued two years ago, spoke as does Col. VanDuzee about protecting the roots of the trees; he said "when the trees are taken from the box that you receive them in, don't expose them to the sun or air, puddle every tree, and plant as soon as possible." I think that is pretty good advice. It doesn't cost any money, and takes very few minutes, to puddle the trees and it saves many of them.

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The Chairman: I have tried the Stringfellow Method of cutting back top and root until my men asked me if I didn't want to transplant another tree instead, and they have grown just as well as trees on which I took great pains to preserve fine branching roots.

The Secretary: The last thing in my thought was to start a discussion of this perennial subject of the tap-root, but I should like criticism of this little circular, no matter how severe, because I am not finally committed to it and want to make it as useful as possible.

Prof. Smith: Every man likes to ride his own hobby horse. Would it not be wise to suggest that some of these seedlings be put in odd corners? Certainly the hickory and walnut are adept in making themselves a home in the roughest kind of land.

The Secretary: I have tried that, but I don't think, as a rule, the trees do well when stuck around in fence corners and odd places. To be sure the trees I put behind the barn or pig pen have grown beautifully, so that at one time I thought of building barns and pig pens all over the farm to put trees behind, but where they were set in fence corners and out of the way places they have not done very well. I think the experience of others is about to the same effect.

Prof. Smith: My experience has been different from yours. I have some chestnut and walnut trees, on an unploughable hillside in the corner of my father's farm in Virginia which I stuck there ten or a dozen years ago and have done very little to them. Of course they are native. They have thriven. Nature does it exactly that way.

The Secretary: It seems to me there is no question that they will do better under cultivation. Of course they may do fairly well in odd places if they can dominate the other growth.

Prof. Smith: A man could take a pocketful of the various kinds of nuts and go around his fence corners and plant a few. In an hour he can plant fifty, and if he gets one to grow it is good return for that hour's work.

The Secretary: I have advised people to take a handful of nuts and a cane when they go out walking and occasionally stick one in.

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The Chairman: In our locality, people would ask, "Why is that string of squirrels following that man?"

Mr. Corsan: I have been planting nuts in that way for years.

The Chairman: If a man planted trees which belonged in his neighborhood, nuts that were already in the dominant ruling group, then his chances for success would be very good, but if he introduced in fence corners trees that had to adjust themselves to a new environment, he would find very few growing and the squirrels, other trees and various obstacles to development in the midst of established species, would wipe out most of them. Nevertheless, as it isn't much trouble, I would advise anybody to take a pocketful of hickory nuts out with him when he goes for a walk and plant one every little way.

A Member: The idea is good; let us follow it up.

Mr. Rush: I don't think it is feasible at all to plant trees around fence corners.

The Chairman: In our locality it would not do at all.

A Member: It won't do in any locality. The sods and grass around the tree will dwarf it and cause a very slow growth. Our time is valuable and we can't wait on that kind of a tree to bring results. Cultivation is the main need. Sometimes trees will do well where the soil is rich and competition absent. In Burlington, N. J. we found a walnut tree bearing enormous crops in a back yard. I have seen the same thing in this county, and also in Carlisle, and the Nebo tree, famous for its wonderful productiveness, has a similar environment. But it is high cultivation that usually is necessary for the best results in all trees, and walnut trees particularly.

The Secretary: Here is a note relating to this subject:

"The women of Sapulpa, Okla., who recently organized for city and county improvement and advancement, have determined to plant pecan, walnut and hickory trees on both sides of a road now being constructed through Creek County, basing their action on the theory that two pecan trees placed in the back yard of a homestead will pay the taxes on the property. They believe that when the trees begin to bear they will provide a fund large enough for the maintenance of the road."

The Chairman: That's all right if you can look after them.

Mr. Littlepage: It is very interesting to listen to these discussions of roadside trees and I have until recently been a strong advocate of them, but I have changed my opinion. I don't think there is anything in the planting of trees in fence corners or along the roadside, for several reasons. The first reason is that nobody knows how long it is going to take that tree to amount to anything. I wouldn't give two cents a piece for trees stuck out where you cannot cultivate them and get to them to fertilize them. Another thing, we are right up against the problem of the insect pests of these trees and who is going to take care of them along the roadside? The insect pests will get on them and come into the fields of the man who is cultivating and raising trees legitimately. Down in southern Indiana, now, we find along the roadside hundreds of walnut trees that are every year eaten up with caterpillars. They love those trees and come over on to my trees. I keep my trees cleaned off pretty well. There's that problem. Up to a short time ago I was an advocate of roadside trees. It would be all right if there was some means of cultivating them. If there is land somewhere that is of no use, so that it doesn't make a bit of difference whether the trees on it have insect pests or not, you can go out there and scatter nuts and let it alone and wait the length of time you've got to wait. I don't think it's of much value, however, even then. I don't think there is a thing in it. I used to pride myself on the fact that I had set out more trees than anybody else in the State of Indiana. I haven't bragged about that for a long time, though I have set out, perhaps, in the last eight or ten years, or had set out under my direction, about 750,000 trees; I am not particularly proud of that any more, but I am proud to meet the fellow who has set out twenty or thirty acres of trees on good land, the best he's got, and cultivated them and kept the insects off of them and burned them up instead of letting them prey on the neighborhood. I think there should be a law passed that these trees along the roadside must be cut down or that somebody will have to take care of them.

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The Chairman: The original idea of roadside trees was constructive in its nature but failed to include the idea that, with the increase of orchard trees, or trees of any one species, we increase the insect pests because we disturb the balance of nature; and by disturbing the balance of nature we give advantage to insects which then remain on neglected trees to prove a menace to our own orchards. It we have various towns setting out roadside trees and detailing the children to look after them, asking the children to report on them, I believe the thing can be made a success and that the taxes of many a small town can be paid from the nut trees along the roadside, provided you have one boy or one girl for each tree, their services to be given free and the profit from the tree to be given to the town.

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Mr. Corsan: How about the cattle? Let them keep grazing around?

The Chairman: Oh, my, yes.

Prof. Smith: I think we sometimes let our feelings make us say things that our brains would scarcely approve. I believe Mr. Littlepage's charge against the tree on the roadside is not necessarily substantiated. I don't know just how he is going to take care of his trees, but if it requires a vehicle carrying spray, I submit that a roadside tree is about as well fixed as one in his field. If it requires a man with a stick or a hoe or a ladder, the tree on the roadside is in about as eligible a location as one in the field. If care implies the idea of turning over the soil, the roadside is handicapped, but nature has got along without having the soil upturned. My point is this; there is on nearly every farm in the East a little patch of land somewhere, a little row between a road and stream where a few trees can grow, and if fertilization is required, a few barrels of manure can go there as well as anywhere else. The fact that a tree is put in a place that is not ploughed doesn't mean that it is beyond all care. My point is that with care we can get trees in fence rows without tillage and that, in addition to Dr. Deming's formal and carefully cultivated plot, there is about every farm a place where a man can stick a few trees and give them such care as can be given without tillage.

Mr. Littlepage: I agree heartily with Prof. Smith's theory, but having had some experience, I find

those things that he describes are not done; there is just that difference, always, between theory and fact. I read a beautiful book once, written by a woman, entitled, "There is No Death," and I found on inquiry that she had already buried four husbands. (Laughter.) I was much interested in reading, once upon a time, Rousseau's beautiful story of domestic life and I found that while he was writing it, his children were in an orphan asylum. A fellow teaching in the high school in Terre Haute, Indiana, married one of the beautiful attractive young ladies of that town. Shortly after they were married he was busy writing and turned and told her that he didn't love her any more and he wished she'd go home. She was heartbroken and left and it turned out later that he was writing a book on how to get to Heaven. (Laughter.) There's just the difference between theory and fact. This is a beautiful theory. I used to be the strongest advocate of it, but all you've got to do is to go on a farm and try it. The trees won't get big enough to amount to anything in our lifetime, because these things you say you will do to them you don't do; at least, that has been my experience, and I would like to ask anyone to point to any section in the United States today, from the Atlantic Ocean to the Pacific, where this theory is carried out successfully; and yet I know it has been advocated for fifty years.

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The Chairman: How about school children reporting on trees under their care?

Mr. Littlepage: Whenever you give the proper care to them you solve the problem—whenever anyone will convince me that that will be done. There is no reason, of course, why the tree won't grow in these places, but my experience is that they don't thrive.

The Chairman: I've put out thousands of them for public-spirited citizens, but it would be difficult to find one of them today.

Mr. Rush: In France and in Germany the land is very valuable and they take a great deal of pride in their nut trees. The nuts we have here in the Lancaster market, Persian walnuts, are largely brought from France, Spain, Italy and Germany. The land being so valuable there, they devote much of their waste land to nuts, like Mr. Smith's idea of planting along the wayside, and they plant and cultivate them in their yards and in all corners. They would not, under any consideration, plant a maple tree just for the shade; the tree must serve for both fruit and shade, and those are some of the sources of foreign wealth.

Mr. Harris: I don't think the question is so much one of planting in fence corners as that we have a great deal of waste land on which the soil is very well adapted to growing nut trees. I know that sometimes in growing peach trees it is almost impossible to cultivate them. I know places in western Maryland where the rocks are lying so that you can hardly plough, and yet the soil is fertile and particularly adapted in some places for peach trees, and would be for chestnut trees. They have there a system of cultivation much as if you used the plough, and yet they are on steep hillsides. There is no reason, I think, why nut trees shouldn't grow there as well as on the level field where you can cultivate every inch of soil.

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The Chairman: They are looked after, that's the whole thing.

Mr. Gowing: I come from New Hampshire and we have what used to be an old farm, but it is now a pasture and the soil is quite a potash soil, I think, amongst the rocks, and there's some apple trees planted there by the original man that worked this place. It was too rough to plough, but they have borne us as good apples some years as we have had on the place; and on this same piece of twenty acres or so, there's some chestnut trees more than two feet through that were cut off when the land was cleared, and they must have done well, for they grew to be such enormous trees.

The Chairman: The trees are planted on this same old stump land?

Mr. Gowing: Yes, sir.

The Chairman: A great deal of stump land can be planted in this way.

Mr. Corsan: That wouldn't be planting them along roadsides and in fence corners.

The Chairman: No, they would be looked after; the whole thing is looking after them.

A Member: My idea is that there would be very few nut trees planted if every one was to start his own trees. They put off planting the trees even when they can get them at the nurseries, and if they had to start their own nurseries there wouldn't be one planted to where there's 10,000 now; and I think that in the end the nurserymen are going to attend to the planting of trees and the other people are going to attend to growing them. Maybe I'm mistaken but did this Government ever produce any trees? Prof. Smith spoke of appropriating money and letting the Government get us some new variety. Hasn't it always been private individuals who get the new varieties? I have been trying to think of some fruit tree, apple or something, that a state or the Government has propagated.

The Chairman: In this country I believe the Government has never done it, but in some parts of Europe, especially Switzerland, the taxes of some towns are paid by the trees along the roadside; but there every man has to report on his own trees and the proceeds go to support the town, and the taxes of certain small towns are actually paid today by roadside trees; but this is in a country where land is valuable, and every tree is under the direct supervision of a citizen who must report on it, and the product of that tree goes to the Government, he giving his labor instead of paying taxes.

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Prof. Smith: I was merely pleading for the continuation and spread of that work, both geographically and in increasing the varieties of trees.

Mr. Lake: I am heartily in favor of that, but I think it ought to be referred to a committee. I want Prof. Smith to write it out in the form of a letter.

Prof. Smith: I am glad you called my attention to that.

Mr. Lake: The Government and the states are now engaged in such work and this ought to give it impetus. I think that the time and labor of the Nut Growers Association, since its organization, will have been well spent if we succeed in bringing to fructification this one resolution. I want also to suggest that Prof. Smith include among the nuts, the beechnut, because there's more meat in beechnuts for the amount of shell than any other nut we grow.

The Chairman: If there is no further discussion, we will have now to spend a short time in Executive Committee work. I think we will ask to have a Nominating Committee appointed first. Mr. Rush, will you kindly read the list of the names of the men you proposed to act as a Nominating Committee?

Mr. Rush then moved that the Nominating Committee consist of Messrs. Lake, Hutt, C. A. Reed, Smith and Deming, and the motion was adopted, after which the Nominating Committee reported as follows: For President, Mr. Littlepage; for Vice-President, Mr. C. A. Reed; for Secretary and Treasurer, Dr. Deming. On Executive Committee: Dr. Robert T. Morris, in place of Mr. C. A. Reed. On Hybrids, Prof. J. R. Smith, in place of Mr. Henry Hicks. On Membership Committee, Mr. G. H. Corsan, in place of Prof. E. R. Lake. On Committee on Nomenclature, Dr. W. C. Deming in place of Prof. John Craig; the other committees to stand as heretofore.

Mr. Lake: I move that the secretary be instructed to cast the ballot of the association for these nominations.

The motion was seconded and adopted and the ballot cast in accordance therewith.

The Chairman: Now I will appoint as a Committee on Resolutions relating to Prof. Craig, Dr. Deming and the Chairman; Committee on Exhibits, Col. VanDuzee, Mr. Roper and C. A. Reed, and they will be here this evening to report on exhibits. Committee on Resolutions, Prof. J. Russell Smith and Mr. T. P. Littlepage. There is no Committee on Incorporation. Will someone propose that we have such a committee? [Pg 83]

The Secretary: Isn't it a desirable thing that the society should be incorporated? It was mentioned to me by a wealthy man that if anyone wished to leave, or give, some money to this association, they would be much more likely to do it if the society were incorporated.

The Chairman: I think it would be better for someone to make a motion.

Mr. Lake: I move that a Committee on Incorporation be appointed by the chairman; a committee of three.

(Motion seconded and adopted.)

The Chairman: The Committee on Incorporation will consist of Mr. Littlepage and Prof. Close. This evening we will meet informally here at about eight and tomorrow at ten we have the meeting at the Scenic to hear the papers of Mr. Rush and Prof. Lake and Prof. Reed, and see the lantern slides. We will first meet here at nine o'clock for an executive meeting and to look over the exhibits. The Committees will report at that time.

(After discussion, on motion of Prof. Smith, seconded by Mr. Littlepage, the selection of the place of the next meeting was left to the Executive Committee.)

The report of the Secretary and Treasurer was then read.

(SEE APPENDIX)

The Chairman: You have heard the Secretary's report. We had better take up, first, the question of deficit. What are we going to do about the \$66.00? What prospects have we for the balancing of that account?

The Secretary: That account will be easily balanced, and more than balanced, by the dues coming in and then I will proceed to run up a deficit for next year.

The Chairman: You have heard the Secretary's report. If there is no discussion, a motion to adjourn will be in order.

(Adjourned till December 19th.)

The Convention met, pursuant to adjournment, December 19th, 1912, at 9:30 A. M., President Morris in the Chair, and went into Executive Session.

It was moved and carried that the President be empowered to appoint a committee to attend the conference at Albany, called for the consideration of the hickory bark borer, by the Commissioner [Pg 84]

of Agriculture of the State of New York.

The question of the publication of reports of the Convention proceedings in the American Fruit and Nut Journal, was next taken up and it was moved by Mr. Lake and carried that the papers and discussions of this Society shall be used for its own publications exclusively, except as the Executive Committee deems it to the best interests of the industry to furnish them for separate publication.

The Secretary: On November 8th, I received a letter from Calvin J. Huson, the Commissioner of Agriculture of New York, to this effect.

Dear Sir:

At the coming land show in New York this department proposes to have, as a part of its exhibit, a collection of native and introduced New York grown nuts.

Can you give us the names of growers of the better strains of nuts who might be able to furnish material for such an exhibit. Perhaps your association would be able to assist in the matter. The Department will be able to stand a reasonable expense for cost of nuts, expressage, etc. Perhaps a few seedling trees would add interest.... By the exhibit as a whole we wish to show the variety and quality of nuts that may be grown in this state....

Very truly yours,

CALVIN J. HUSON,
Commissioner.

He wished me to assist in getting up an exhibit, but as he only gave us a week I was unable to do anything. I do not know that there is any action to be taken on that, but I read the letter simply to show that the interest in nut growing is increasing and that this is an opportunity for us to make an exhibit another year.

Mr. Lake: Would the secretary take the trouble to make a collection of nuts covering the territory of the association and submit it for exhibit at a meeting of this character, this land show, giving credit to the donors for material, somewhat as Mr. Reed has done in pecans for the National Nut Growers Association?

The Secretary: I think I'd have a few minutes to spare to do that.

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Mr. Lake: I think it would be an admirable thing.

The Chairman: Yes, it would advertise the organization extensively and be a constructive step in agriculture.

Mr. Littlepage, have you any report from the Committee on Incorporation?

Mr. Littlepage: That is a matter that will require considerable thought and attention. It will require attention from several standpoints, as for example under what laws we might wish to incorporate, so I think the committee will reserve its report to make to the Executive Committee at some later meeting.

The Chairman: We have no other business, I believe, and will now retire to the hall where we will have the lantern slide exhibition. The morning session closes the meeting and we are to meet at two o'clock at the Monument and from there go out to see certain trees in the vicinity. Mr. Rush and Mr. Jones are to show us these and their two nurseries.

Mr. Lake: I would like to offer as a resolution, that the secretary be instructed to make arrangements with the publishers of the American Fruit and Nut Journal for the distribution of one copy to each member as a part of his membership fee. The secretary will then be able to reach the members in his published notices without special printers' troubles of his own, and the members will be able to get some live matter right along.

The motion was seconded and adopted, after which the executive session closed and the members adjourned in a body to the Scenic Theatre, where the regular program was resumed as follows:

The Chairman: We will have Mr. Rush's paper first.

THE PERSIAN WALNUT, ITS DISASTER AND LESSONS FOR 1912

J. G. RUSH, PENNSYLVANIA

The year just closing has been full of disasters both on land and sea, though I do not wish it to be understood that I am inclined to be a pessimist on account of these occurrences.

I wish to speak of a disaster which overtook the walnut industry in the northern states. Early in the year we had an arctic cold wave which put the thermometer from 23 to 33 degrees below zero. This cold wave apparently did no injury to the walnut trees at the time but late in the spring it was discovered that the wood cells were ruptured though the buds and bark were uninjured. In cutting the scions in early April the bark and buds seemed in good condition for grafting; but as the time approached to do the work it was readily seen, by its changed color, that the wood was injured, some scions of course more than others. Those that were only slightly discolored were used in grafting. But as time passed the unhappy result came to light that out of about 2,000 nursery trees grafted only one graft grew. After climbing an 80 foot walnut tree to get our scions, and paying a good price for them besides, this was rather discouraging.

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This cold wave, which was unprecedented for the time, had wrought other injuries to the nut industry. That was especially to the young trees that were transplanted the fall previous and last spring. The transplanting with a frost injury already was too great a strain on the feeble life of the trees. The consequence was that some of them died outright, and others made only a feeble growth. But where low and severe pruning was practised good results followed and such trees as were established on the original root system escaped the frost injury entirely. The young nursery trees with dormant buds were not affected in the least but made a strong growth of from three to seven feet this last summer.

The intense cold wave was such that some old and young seedling Persian walnut trees were killed outright, and not only the Persian walnut but in a few instances the American black was very much injured; likewise the Norway maple, magnolia, California privet and roses. Also the peach both in tree and fruit.

Now in conclusion let me say, what is the lesson to be learned? First, as to the propagation of the Persian walnut, great care should be taken that only trees that are hardy should be propagated from, as well as having good bearing qualities with a first class nut. Second, after a freeze such as we had last winter, a special effort should be made to save the newly planted tree by close and severe pruning. As, for example, I had a very fine two year old Hall Persian walnut which was referred to me as dead. I cut the tree off about 4 inches above where it was budded on the black walnut stock. It was not long after that signs of new life appeared and eventually it made a very fine, handsome tree. Nature does indeed some wonderful tricks in this respect by which we can learn valuable lessons; and chief of these is close pruning.

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Such a cold wave may visit us only once in a lifetime and should not discourage us from carrying nut culture to its highest development. We must not think for a moment that other walnut sections are exempt from similar visitations. They have them in the Pacific Northwest, and in France and Germany.

As regards the walnut industry for Lancaster county or Pennsylvania in general, I am safe in saying that a fair percentage of the farmers are taking hold of it. This is because of the fact that the San Jose scale has practically destroyed all the old apple trees around the farm buildings, and, not wishing to have the building denuded of the customary shade and fruit, nut trees are planted instead. This is in reality the practice prevalent in France and Germany where they utilize every foot of ground to profitable account.

The life of an apple tree is from fifty to sixty years whereas a walnut tree is just in its prime at that age and destined to live for hundreds of years afterwards. Then again the ravages of the chestnut tree blight are destroying the cultivated paragons just as freely as the chestnuts in the forests, which in a few years will be things of the past, thus giving still more room for walnut and other nut trees.

The Northern Nut Growers Association was organized for a grand and noble purpose, that is to stand together shoulder to shoulder to devise ways and means to bring nut culture to a grand and glorious success.

Mr. Corsan: The temperature Mr. Rush spoke of rather surprises me. Last year at Toronto it did not fall lower than 9 degrees below zero. We had summer almost until New Year's and then a very severe winter until April. I didn't notice any evergreen trees killed, but at Detroit, the Bronx and various other places, I never saw a winter so disastrous for killing evergreens.

The Chairman: Not only that but nurserymen all over eastern New England said they suffered greater losses last winter than ever before.

Prof. Smith: I would like to ask Mr. Rush if it would be possible to cut scions by December 1st, so as to escape danger from such great freezes.

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Mr. Rush: I really have little experience in keeping scions. This fall I put some in the moist cold earth in the cellar. I think the experiment will be successful because I have known chestnut scions cut in the fall, to be kept under leaves in the grove till spring.

Prof. Smith: I should like to suggest that you try the following experiment; bury them, wrapped up in a gunny-sack or something, entirely underground where they will have absolute moisture and be shut away from the air. I have found that very successful.

Mr. Rush: Sometimes the trouble is they get too moist.

The Chairman: There is a principle here, and we had better keep down to principles as much as we can. That principle is that if the cells of the scions are distended with water a certain chemical process is going on all the while, because a scion is just as much alive as the red squirrel; it is a living organism. Now then, if the cells are a very little below normal dryness the chemical processes mostly cease, and that is better. We have to use nice judgment in avoiding having a scion so dry that its cells perish or so moist that its cells are undergoing chemical processes too rapidly. Our scions are cut, say, the last of November, then covered with leaves enough to prevent freezing and thawing. That will carry scions pretty well through the winter and perhaps is the best way, but we must never forget that in dealing with scions we are dealing with living red squirrels just as when we are dealing with pollen.

A Member: Are the leaves moist or dry?

The Chairman: The driest leaves in the woods contain more water than you think they do. They carry enough to maintain the life of the cells, if they are packed pretty firmly about your scions, and at the same time the scions are still allowed to breathe. I keep them above ground. I put a layer of shingles on the cellar floor, if I've got a bare ground cellar floor, and then a layer of very fine leaves like locust leaves, then a single layer of scions and then a good big heap of leaves over those, packed tight, a good big heap of apple leaves or anything you have at hand. Try it on the basis of principles. It is a complex question. You can't settle any of these questions off-hand. Every man who has had much experience has learned that he needs a whole lot more.

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Prof. Smith: Have you had any experience in fixing up a bed of scions like that and putting it in cold storage?

The Chairman: Yes, but you must tell the cold storage people not to let them get too dry. Tell them you want them in moist cold storage, and to keep the temperature about 40.

A Member: We have found with walnuts that if you have the scions too damp they won't keep very long. If you have them just moist enough to hold them you can keep them all winter, maybe indefinitely.

The Chairman: If your cell is full of water the scion will work as hard as an Irishman.

A Member: I find that we have to graft them above ground, in the North, and if they are too moist when grafted they will dry up, but if kept dry they will grow, because they will remain in good condition until the sap comes up in the stock.

The Chairman: Yes, you must choose a position midway between too dry and too moist.

Mr. Littlepage: That is very important; they won't stand dampness.

Mr. Pomeroy: Wouldn't it be well to dip the cut end of the walnut scion in wax to hold the sap?

The Chairman: I am afraid that would stop its breathing. You are dealing with a red squirrel all the while, remember that.

Col. Sober: My method is this: I have a little room about six feet wide with ice packs on both sides and double doors. In that I pack my scions in this way: I take carbide cans made of iron and put damp sawdust, about an inch or so, on the bottom and then I pack my scions in the cans, cut end down, then I put the top on loosely. I have carried them over the second year in that way.

The Chairman: But you let them breathe all the while?

Col. Sober: Certainly, and they have but very little moisture. They are kept in a temperature of about 40 degrees.

Prof. Smith: How often do you wet that sawdust?

Col. Sober: Not once.

The Chairman: Well, that's in keeping with our theoretical basis.

Col. Sober: I cut scions any time between now and March. I don't take them out of storage until we use them. We graft up to the middle of June.

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The Chairman: I found some hickory scions that had been accidentally overlooked, kept under leaves, and the buds in the cambium were perfectly good after two years. In regard to winter injury—in the vicinity of Stamford, Conn., the nurserymen reported greater losses of all kinds in nursery stock than they had had before in their experience. I noticed that some small branches of the Persian walnuts had been injured, and particularly where grafts had started a little late and had not lignified quite thoroughly I lost whatever grafts had not had time to lignify. Last winter the injuries in our vicinity consisted chiefly of two kinds; occasional killing of the small branches—this does little harm because, where the branch is killed and dies back for a certain distance, we have three or four more branches starting up, so that perhaps it is not sophistical to say that it does the tree good. We get a larger bearing area than if it were not for this occasional freezing of small branches. Another form of injury occurs in the spring. The sap will start to ascend when we have warm days in February and March; then a few cold days come and, if we have absolutely freezing temperature at night, this sap freezes and when it freezes it expands, as water does everywhere, and the result is a bursting of the bark. That is an occasional happening with all trees but particularly with exotics. One kind of winter injury has been overlooked in connection

with the walnut. The very last thing which the tree does in the autumn is to complete its buds for female flowers. That is the very last job the tree has on hand and if the tree cannot complete the buds for female flowers perfectly, then a very little wood killing will make that a barren tree, although it appears to be a good strong tree. That covers the kinds of winter injury I have seen in the vicinity of Stamford, Conn.

(Here Col. C. K. Sober of Pennsylvania showed lantern slide views of his orchards of paragon chestnuts and his methods.)

The Chairman: We will have now Mr. Reed's address with lantern views.

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A 1912 REVIEW OF THE NUT SITUATION IN THE NORTH

C. A. REED, WASHINGTON, D. C.

In taking up the question of the present status of the nut industry of the Northern States, we have to do more with what has not been accomplished than with what has been. Very little has been done toward developing the northern chestnut. What has been done has been mostly with the European species and so far that has not been very satisfactory. The European species is quite subject to the blight. The Japanese nut is not ordinarily of a quality equal to that of the American. It is thought, too, that with the Japanese chestnut the chestnut blight has been introduced, which has been so serious to our native species. The walnut has not become well established in the eastern states. So far, most of the European nuts that have been imported have been too tender to adapt themselves to our climatic conditions, and the filbert, when brought from Europe, proves quite subject to a blight that prevails everywhere with our native species, but with them is not so serious. In running over these slides, I will begin first with the chestnut. That is perhaps the best known species in this locality. That shows one of our native chestnut trees as it is familiar to you all in a great part of this territory under discussion, that is, the part of the United States east of the Mississippi River and north of the Potomac. That photograph was taken some time last June or July when the tree was in full bloom. The chestnut is one of the most beautiful of our native nut trees. This tree has the blight in one of the earlier stages and it is shown here merely to call attention to the disease, because no discussion of the chestnut industry at the present time can be complete without at least calling attention to the seriousness of that blight. That tree, perhaps, has not been affected more than two years, possibly one. Is that right, Mr. Pierce?

Mr. Pierce: About two. That's an 18 or 20 inch tree, isn't it?

Mr. Reed: Yes, sir.

Mr. Pierce: It must be an 18 or 20 inch tree to be so badly blighted at the top.

Mr. Reed: Two years, but you see it's pretty well gone. We come now to the Paragon, one of the first trees of that variety ever propagated. It was planted where it stands, by the introducer, Mr. Henry M. Engel, at Marietta, where they had quite an orchard at one time, but the blight is so serious that there are only a few specimens of the trees left. That tree is probably in the neighborhood of twenty-five years old. The next slide shows two trees of the same variety that we may possibly see this afternoon. They are on the farm belonging to Mr. Rush and they are about twenty years old.

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Prof. Smith: What have those trees yielded?

Mr. Rush: They yield four, five, six and seven to eight bushels. You can see that they are not far from the barn and the roots run under that barnyard manure pile.

Mr. Reed: What would you consider an average crop?

Mr. Rush: They grow five or six bushels per tree.

Mr. Reed: The greatest attention that has been paid to developing the paragon chestnut in orchard farming has been on the plan Mr. Sober has just shown, by clearing away the mountain side and cutting down everything but the chestnut sprouts. This photograph was taken in a thicket where the underbrush had not been cleared away. Those are a good age now or perhaps a little bit older than we usually graft, aren't they, Mr. Sober?

Mr. Sober: Yes, sir; one or two years old. When they get to be three years old they are past grafting, according to my method.

Mr. Reed: This photograph was taken at Mr. Sober's a little over a year ago, taken in the rain and is not very clear, but it shows the distance between the trees at the time when these trees were four or five years old—is that right?

Mr. Sober: They are eleven year old trees.

Mr. Reed: Do you thin them out after they get that size?

Mr. Sober: Yes, sir, they should be thinned out more, but I hesitated on account of the blight; I

have thousands that I could spare, but for fear the blight will take them out.

A Member: Do you cultivate the ground?

Mr. Sober: I don't cultivate it, I just pasture it. The land is fertilized, but not cultivated.

Mr. Reed: That is a photograph of a large chestnut orchard in this county. It is not many miles from here. I understand that owing to the blight and to the weevil, that orchard has not been satisfactory, and I was told two or three days ago that it was being cleared away.

The Chairman: What varieties?

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Mr. Reed: Paragon and native stock.

A Member: Was that the old Furness Grove?

Mr. Reed: Yes, sir. That slide shows the congeniality, ordinarily, between the stock of the native chestnut and the paragon. The next slide shows a typical instance of malformation between the Japanese and native chestnut. I understand that this is not unusual at all. The Japanese, ordinarily, does not make a good union with the American sweet chestnut. That slide was taken in Indiana. It is a twenty-five acre paragon orchard owned by Mr. Littlepage and Senator Bourne of Oregon, planted in the spring of 1910. The next slide shows one of the trees in the orchard during its first season. Mr. Littlepage had to have them all gone over and the burs removed. They were so inclined to fruit during the first season that they would have exhausted themselves if the burs had not been removed. They made a very promising start, but I understand from Mr. Littlepage that a number of the trees have since died. Is there anything you'd like to add to that, Mr. Littlepage?

Mr. Littlepage: I haven't yet quite determined the cause of the trouble. Last winter I lost perhaps one-third of the trees with a peculiar condition. The wood under the bark was darkened. I sent some of them to Washington the year before to see if there was any blight or fungus and they reported there was none on any of the trees, but this winter perhaps one-third of the trees died down to the graft. A few, however, would sprout from the scion, giving me, of course, the grafted top again. It seemed to indicate, perhaps, a winter killing and yet I would not undertake to assert that that was the cause, but it was very serious.

Prof. Smith: Was the land low or high?

Mr. Littlepage: High land along a hillside, very excellent land for chestnuts.

Mr. Reed: Sandy loam?

Mr. Littlepage: No, it's a hilly clay with a considerable humus and set in clover.

The Chairman: Which way does it face?

Mr. Littlepage: South.

The Chairman: That is rather bad.

Mr. Littlepage: I don't know. I have some over on the other side of the hill and I don't know whether the killing was greater on the other side or not.

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Mr. Reed: We have before us a view of the original Rochester and its originator, Mr. E. A. Reihl, of Alton, Ill. Over in the Court House we have on exhibition nuts of that variety which most of you have seen. You are aware, probably, that it is a native chestnut. It is one of the largest and best of the native chestnuts and originated in southern Illinois, where so far the blight has not spread. It gives considerable promise for the future. We come back now to Lancaster county to a chinkapin tree, a hybrid chinkapin. The original tree stands in a forest in this county, and as you notice there, it is a very good sized tree. You might think from the looks of the photograph that that is a chestnut, but the nuts are small and borne in racemes, so they are typical chinkapins.

Mr. Lake: One parent was a chestnut?

Mr. Rush: We don't know; it's a native tree; it's a hybrid.

Mr. Lake: It's a supposed hybrid.

Mr. Reed: Yes, the chestnut and chinkapin grow close together.

The Chairman: What is the form of the nuts?

Mr. Rush: Round like a chinkapin. I think it was a chestnut on a chinkapin.

Mr. Lake: If it is a chinkapin, what is there to indicate that there is any chestnut blood in it?

Mr. Rush: The size of the tree and the fact that the nut matures with the chestnut. The chinkapin is about three weeks earlier than this variety of chinkapin.

Mr. Reed: That photograph is typical of the Rush hybrid chinkapin. We take up the butternut now. So far as we know, there are no named varieties of the butternut; there cannot be until some good individual tree is found which is of sufficient merit to entitle it to propagation by budding and grafting. It is one of the best known nuts in our field, especially in New England; it is more common there than it is further south.

This slide shows the native butternut in the forests of southern Indiana near the Ohio River. Of course, those trees in forests like that don't mature many nuts. It is not in the forests, ordinarily, that you will find individual trees of sufficient merit to entitle them to propagation. It is the tree in the open that has had greater opportunities than are afforded in the forest.

Mr. Lake: Are there any coniferous trees in that forest?

Mr. Littlepage: No, that's an alluvial bottom, Mr. Lake. There is quite a long bottom by the creek where the butternut grows profusely. We have the same tree on the farm that Senator Bourne and I own. Hundreds of those trees grow in the woods there. It's rich alluvial soil.

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Mr. Lake: The fact that it is rich alluvial soil does not usually bar coniferous trees; it may in your section.

Mr. Littlepage: There are none there.

Mr. Reed: The slide before us shows typical black walnuts that are almost as common, perhaps more so, in many parts of the area under discussion, than the butternut. This photograph was taken in Michigan where the trees are growing along fence rows without cultivation or special attention. No one knows whether the nuts of those trees are of special value or not. It merely shows the starting point for improvement in the walnut. We come now to the Persian walnut, which Mr. Lake will discuss more fully in a few minutes. This is one of the trees we will probably have an opportunity to see this afternoon. It is between Mr. Rush's nursery and the station, on the right hand side as you are going out. Just above the top of the fence you will notice a dark line which indicates the point of union. The Persian walnut was grafted on the black stock. The Persian is of slightly greater diameter. Now we have Mr. Rush in his walnut nursery. These are seedling walnuts in their third year.

Mr. Rush: Second year.

Mr. Reed: Second year from the time of planting. You will notice the luxuriant growth. The next slide shows the methods of propagation. This is the first step in the operation. The knife is similar to those on the tables in the Court House. The next slide shows the second stage in the operation where the bark has been lifted and Mr. Rush holds the bud of the Persian walnut in the fingers of his left hand, and the next slide shows the bud in position and being held firmly by a finger of the left hand. As soon as it is in position like that, Mr. Rush lifts the pencil—the instrument that he holds in the right hand and folds the bark back over the new bud and then cuts it on the outside, so that he makes a perfect fit. If anything, the bark of the black walnut overlaps slightly the bark of the bud, and the third step in the operation is the wrapping. Below, right at this point, is a completed operation. That was done in August, using buds of the present season's growth, and in about how many days is it that you take off the wrapping?

Mr. Rush: About two weeks.

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Mr. Reed: In about two weeks take off the wrapping; and about how much longer is it before you get a growth like that?

Mr. Rush: About two weeks more, three weeks more.

Mr. Reed: In about four or five weeks from the time of the operation a growth like that is not uncommon.

Prof. Smith: When is the top cut off?

Mr. Rush: When I see that growth is taking place I cut the top off in order to encourage the growth to get strong enough for the winter. Of course our object is to keep the bud dormant until the following season, perfectly dormant, but sometimes they do make a growth and, if they do, cut them off at the top and force them. You will not get that bud to grow next summer, but another bud starts out below that branch and gives you your tree.

Mr. Reed: That one dies then?

Mr. Rush: Yes, sir, invariably dies.

Mr. Reed: There is one of Mr. Rush's own growing of the Rush walnut, a little tree which, in its second season, matured two nuts. That photograph was taken just about the time the nuts were ready to be gathered.

Mr. Corsan: I noticed in the nurseries at the Michigan Agricultural College, a lot of black walnuts that were sun-scalded. They were too far apart. Can anyone tell us anything about this danger of sun-scald to the trunk?

Mr. Reed: Well, in this particular instance, the tree stands right next to a fence, so it is protected from the hot sun during a large part of the season. Perhaps Mr. Rush could tell us whether he has had any trouble with sun-scald.

Mr. Rush: Not at all, none whatever, never.

The Chairman: There is, in some localities, a great deal of danger from sun-scald. In the vicinity of Stamford, Conn., most of the English walnuts will sun-scald more or less unless we look out for that and give them shade; mostly in the trunk below the branches.

Mr. Lake: How about the nuts?

The Chairman: I haven't seen any scalding there.

Mr. Reed: These are all interesting points and I am glad to have them thrown in. Mr. Rush can tell us about this slide. It is one of the cut-leaved varieties of walnut from California that he is propagating. It is more of an ornament than it is a commercial nut, isn't it?

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Mr. Rush: It is both combined. It is very productive and very hardy. The nut is not quite as large as the Nebo. It is the cut-leaved weeping walnut. The first tree that came from California cost twenty dollars. It is very ornamental.

Mr. Reed: This is a view of a seedling Persian walnut orchard in Bucks county, this state, some twenty or thirty miles north of Philadelphia. It is now about ten years of age and is owned by Mrs. J. L. Lovett, of Emilie. Some of the nuts of this orchard are on exhibition over in the Court House. The orchard was not given any special cultivation at the time this photograph was taken. The nuts from the trees, of course, are very ununiform, being seedlings, and the bearing of the trees is not especially large, but the apparent thrift and vigor of these trees gives a good deal of ground for looking forward to a walnut industry in the eastern states.

Prof. Smith: Do you know the origin of the seed?

Mr. Reed: No, sir, we do not. The nuts from which those trees were planted were obtained and planted by Mr. Lovett who is now deceased.

The Chairman: One of the most important features, it seems to me, of grafting, is the idea that we can graft from prolific trees. The majority of trees, of walnuts, hickories, anything you please, are not remarkably prolific, but in grafting you select a tree that is prolific as one of the most desirable of its qualities.

A Member: You say that this grove was given no particular cultivation; are they careful to allow all the foliage to remain on the ground where it drops?

Mr. Reed: I couldn't answer as to that.

A Member: Mr. Sober, do you do that?

Col. Sober: Yes, sir.

A Member: The point I wanted to make is that that is probably very much better than any cultivation that could be given.

The Chairman: The matter of cultivation is one we have got to settle in this country. I have been over the walnut orchards on the Pacific coast, in the East and in Europe, and I find three entirely separate and distinct methods of treatment. On the Pacific coast, the rule is to cultivate every year and irrigate where they can, but to cultivate, at any rate, whether they irrigate or not. In the East, where people are supposed to be very industrious, we have adopted the lazier way of letting the trees grow in sod; but that is not so bad if we follow the principle brought forward by Stringfellow of letting the leaves all decompose, and adding more fertilizer and more leaves and taking away nothing. In France and Germany and England, where the trees are cultivated, particularly in France, where they are best cultivated, we find two methods; first, keeping up clean cultivation and adding a little lime every year and, second, add lime without the cultivation. One great feature of the treatment of the tree in France, where the best walnuts come from, is the addition of a little lime every year, even if it's a limestone ground, and that may possibly account for the delicate character of the French walnuts and the reason why they have the first call in the market. I don't know that that is true, but it seems to me, at least, a collateral fact, and collateral facts often mean something.

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Mr. Pomeroy: Judging from my own experience I think that that orchard would be producing now two or two and a half bushels per tree each year if put under cultivation and given the care of an ordinary peach orchard.

Mr. Reed: These are seedling trees, you understand, in that orchard we showed. This is a Persian walnut tree in Mr. Rush's front yard. I've forgotten the variety.

Mr. Rush: That is the Kaghazi.

Mr. Reed: Now we come to the original hickories. This is one of the earliest hickory nuts propagated, in fact, it's about the only one so far. That tree is owned by Mr. Henry Hales of Ridgewood, N. J.

Prof. Smith: Have they fertilized it?

Mr. Reed: No, not especially. It stands on good, fertile soil but I think no attention has ever been paid to it in the way of cultivation.

Prof. Smith: Have you its yielding record?

Mr. Reed: It never made large records; as I recall it now, it has never borne more than a few bushels at any one time, perhaps two bushels.

The Chairman: One reason is because it has been cut back regularly every year for scions?

Mr. Reed: Yes, that's true.

Prof. Smith: Over two hundred years old, then?

The Chairman: I doubt if that tree is over fifty or sixty.

Mr. Reed: That's what I should say,—somewhere in the neighborhood of fifty or sixty years old.

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Mr. Reed: That slide shows a typical grafted tree in Mr. Hales' garden. It's a nice shapely, thrifty tree about seven years old and only recently came into bearing to any extent. The nurserymen have had great difficulty in propagating it until recently. Now that Mr. Jones has come up from the South and he and Mr. Rush are getting down together earnestly in the propagation of these northern trees, we will probably have more of them, but in all the years that Mr. Hales has been working with that particular variety, he has never been able to get more than a few trees grown in the nursery, so it is not disseminated to any extent.

The Chairman: Do you think that this will be like the pecan and hickory, that some varieties will bear fifteen years after grafting and other varieties two years after grafting, for instance, as extremes?

Mr. Reed: Probably so, the same as it is with other fruits.

The Chairman: It seems to me that that is what we may fairly anticipate.

Mr. Corsan: Like Northern Spy apples and other apples.

Mr. Reed: This slide is a little bit out of order. It's a native Persian walnut tree that stands in this county. It is owned by Mr. Harness. Mr. Rush has propagated it under the name of Geit. That photograph was taken in the fall of 1911. Last year it suffered greatly during the extreme weather, but it came out again and made a very good growth. This is the original Rush tree that we may be able to see this afternoon. And this is the original Nebo that we had hoped to be able to see but will probably not succeed. It is some seven or eight miles from Mr. Rush's home and we will hardly be able to make it this afternoon. The slide before us shows some European filberts that were planted by Mr. Hales and up to the present time they are doing nicely although they have never fruited especially heavily; but there is no blight.

The Chairman: How many years?

Mr. Reed: I think those are ten to twelve years old. Perhaps you have seen them.

The Chairman: Yes. There are two features connected with the filbert that we ought to discuss right here. One is the tendency to its being destroyed by the blight of our American hazel, which extends to Indiana, and another is the fact that it blossoms so early that the female flowers or the male flowers are both apt to be killed by the frost. All the members of this Association ought to get to work to bring out a variety which will have the blight-resisting features and the later blooming of the American hazel.

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Mr. Reed: This slide shows a filbert we will probably be able to see this afternoon. It is in Mr. Rush's door yard and is still pretty young. I believe it has not borne of any account.

Mr. Rush: It has borne a little.

The Chairman: How old is it?

Mr. Rush: I think it's about five years old. It is a Barcelona.

Mr. Reed: The next slide is taken in the orchard of Mr. Kerr at Denton, Md. At one time he had a very nice orchard of these filberts, but the blight has gotten in and has about wiped out everything. In a letter from him this fall he said he had very few nuts of any variety, although he did have a few. A letter that came this week from J. W. Killen, of Felton, Md., said he had found filberts to be about as unprofitable a nut, as any he could have grown.

We will spend a few minutes now running over the pecan situation. We can hardly omit it altogether because there are so many people in the northern states who are interested in the pecan in a financial way. The chart before us shows first the native area. This part here is the portion of the United States in which the pecan is a native. You notice how far upward it extends, almost to Terre Haute, Indiana, and across southern Indiana along the Ohio River, and it is right in here, about where the pencil indicates that some of our best northern varieties have originated. Mr. Littlepage and W. C. Reed and others have shown us nuts over in the Court House that originated there. The Busseron and the Indiana are the two most northern. They are a little way north of Vincennes. No varieties so far of any merit have originated in Illinois. While we have the map of Illinois before us, I would like to point out the place where Mr. Riehl originated the variety of chestnut we referred to some time ago. Down in more southern Illinois is where we find Mr. Endicott. This darkened area along the southeastern part of the United States, and extending away up into Virginia, shows the area to which the pecan has been planted with more or less success. This area extending down over the Piedmont and up into Virginia and West Virginia, is the mountain area to which the pecan is not adapted. You never find pecans on the uplands. This thick, heavy area shows the territory within which the pecan has been most extensively planted. It is not common down in southern Florida. You notice, too, that over here in Texas there have been very few orchards planted to pecans. North of these shaded areas, anywhere up in Ohio or Pennsylvania or New York, the pecan has not shown any adaptability or

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has not shown sufficient adaptability to justify commercial planting. Whatever planting of pecans is done in the area north of the shaded portions there must be considered as experimental.

The Chairman: The southern part of Texas is actually in the tropical zone. It would be interesting to know if we have the pecan actually growing in the tropics.

Mr. Reed: We have more or less vague reports that it is growing down near Brownsville. I think Mr. Littlepage told us the other day of a friend of his who is planting pecans.

The Chairman: Brownsville is very close to the tropics.

Mr. Littlepage: Mr. Yoacum told me he had a grove down there that had not been a success so far. I know that quite a number of people have discussed the question of planting pecans in that section.

Mr. Reed: This is one of the largest of pecan trees; it is the largest that it has ever been my personal privilege to see. It has a circumference of between 18 and 19 feet and a spread of about 125 feet. We estimated that it was about the same height. It stands on the west side of the Mississippi River, some distance south of Baton Rouge.

Mr. Littlepage: What is the approximate water level below the ground?

Mr. Reed: It is quite near the surface.

Mr. Littlepage: I thought so. There are conditions you will observe that are unusual. In lands where the water level is near the surface, there is a tendency in the tree to shove out a lot of surface roots. You can travel all over the pecan belt of Indiana and will never see a pecan tree that does not look as if it had been driven in the ground with a pile-driver, but I have noticed that you find those spreading roots where the water level is near the surface of the ground.

Mr. Reed: It is interesting to know that right near this tree were other large trees, nearly as large, that were blown over, and they showed no tap-roots, but merely the surface roots. This slide shows a pecan bloom. The pistillate bloom is clear up on the terminate growth; the staminate, like other nut trees, is on the growth of last season and comes out somewhat in advance of the pistillate, necessarily.

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We come now to the wild pecans of Texas. The recent census figures show that fully three-fifths of all the pecans produced in the United States come from Texas. This photograph shows the native wild pecans along the Colorado River. Here is the pecan as a park tree. This picture was taken in Llana Park, New Braunfels, in west Texas. One of the nuisances in pecan trees is illustrated in the upper part of this photograph; you will notice the Spanish moss that grows so densely on the pecan trees if neglected. Unless the moss is kept out it gets so dense that it smothers the fruiting and leafing surface, so trees that are densely covered with that are able to make leaves only on the terminals. You notice in the rear the leaves of bananas that grow there throughout the entire year.

The Chairman: I have noticed that the mistletoe was a bad parasite on the pecans in some regions. Have you found that?

Mr. Reed: Yes, that is true; that is one of the pests of the pecan. This slide shows a typical Texas scene. The wild pecans have been gathered and are brought into town and are waiting the buyers. You will notice right here is a bag that has been stood up and opened, waiting for a buyer, the same as we see grain in the streets of northern towns, and here are pecans on their way from the warehouse to the car. The next slide shows another step; they are on their way now from Texas to the crackery or the wholesalers. The crop of pecans in Texas alone usually runs from 200 cars to 600 or 700 cars. This year the crop is small and probably not over 200 cars, so the prices are going up. This is the pecan crackery in San Antonio, having a capacity of 20,000 pounds a day. The pecans are cracked by machinery and the kernels are picked out by hand. This slide shows a native pecan tree. The one in the foreground was from across the river near Vincennes. It is one of the first northern varieties that was introduced, but it is now superseded. The next is the original tree of the Busseron. The nuts from that tree are on exhibition over at the Court House brought here by Mr. Reed. The tree was cut back quite severely several years ago to get budwood and has not made sufficient top yet to bear normal crops again. This is the original tree of Indiana. Beside the tree is the introducer, Mr. Mason J. Niblack, the gentleman with his hand by the tree. Now we come to the original Green River, one of the northern Kentucky pecans. It is in a forest more than twelve miles from Evansville across the Ohio River in Kentucky. The trunk of that tree is typical of others in the forest. There is a pecan forest of perhaps 200 acres, from which everything but pecan timber was removed several years ago.

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The slide before us shows the trunk of a supposed chance hybrid between hickory and pecan. The next slide shows a grafted tree of that variety. It is interesting to note the vigor of this hybrid. It is quite the usual thing to get added vigor with hybrids. This is one of the most beautiful, dense, dark green trees that I have ever seen in the hickory family. This tree is in northern Georgia, but it is not so prolific as the parent tree.

The Chairman: Does the shell fill down there?

Mr. Reed: No, it does not.

The Chairman: It grows very vigorously in Connecticut. It is a perfectly hardy hybrid, but I am

afraid I shall only be able to use the crop for spectacle cases.

Mr. Reed: This shows one of the most common methods of propagating the pecan, the annular system. It is a slight modification of the system Mr. Rush applies to the propagation of the walnut. This shows one of the tools designed especially for annular budding, the Galbraith knife. The rest of the operation you already understand. It is merely placing the bud in position and wrapping the same as Mr. Rush does.

The Chairman: I would like to ask, does it make a great deal of difference whether the bud ring is half an inch long or an inch and a quarter long?

Mr. Rush: It does not make any difference. The union takes place on the cambium layer. It is not made on the cut.

The Chairman: Then the length of the bud is not of great importance?

Mr. Rush: No, it is of no importance at all.

Mr. Reed: This slide may be a little bit misleading. Two nuts matured in the nursery on a scion that was inserted in February. The scion was taken from a mature tree and the fruit buds had already set and had enough nourishment to carry them through the season so that they matured. That is no indication of what may be expected in the way of bearing. It is one of the freaks. This is merely a view of a fourteen-year old pecan orchard in south-western Georgia, a 700-acre orchard owned largely by one person. That is the orchard belonging to Mr. G. M. Bacon, a name probably familiar to some of you. Those trees are set 46 feet, 8 inches apart, each way. There are twenty trees to the acre, just beginning to bear now. That photograph was taken some two years ago showing the first step in topworking. The top has been removed, as you notice, and the next slide shows the subsequent water-sprouts which are later budded. The lower branches were left in the first place to take up the sap while the new head was in formation. They have now been removed. Our next point might be brought out in connection with this slide. One of the typical, sub-tropical storms, not unusual in the Gulf States, swept over this area in September, just as the nuts were beginning to mature and defoliated the trees and whipped off the nuts. The sap was still in circulation, and the varieties that respond most readily to warm weather, that start earliest in the spring, sent out new leaves, so that foliage was foliage that ought to have come on the next year, that is, it was exhausting next year's buds. The same year the tree sent out its blossom buds, so it had no fruit the following season. This slide shows one of the pests in the pecan orchard, the twig girdler, at work. The insect deposits its egg under the bark up at about that point, then goes down below girdles the twig, and it breaks off, goes to the ground, and the insect comes out, goes into the ground and comes out the next season. There are a good many drawbacks that are occurring and more are to be expected the same as with other fruit. There are probably no more setbacks to pecan growing than there are to the growing of other fruit, but this is one of the things. This orchard was set in land bordering the Flint River and at the time this picture was taken the water stood at the depth of three feet. It probably did no harm, because it didn't stay more than a week or ten days. Sometimes it stays longer and in such cases it is a serious matter. In Texas, floods come up like that into the branches of the trees, so high in some seasons after the nuts are formed, that the nuts deteriorate and fall to the ground. In such cases it is a pretty serious thing. (Applause.)

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The time for which the "scenic" was engaged having expired, the delegates returned to the Court House and the regular program was resumed.

The Chairman: We will next hear from Mr. Lake.

Mr. Lake: My topic, aside from the slides, was concerning the result of the work at Arlington this year. It is all written out but I don't propose to read the paper at this stage. I have not been a teacher and lecturer for 25 years for nothing, and I don't propose to kill the few friends I have among nut growers by talking them to death when they are hungry and want to see something interesting. I will send this paper in due time to the secretary, and give way now to Mr. Jones. I did want to show you on the slides a few illustrations of cross fertilization between the Japanese and the American walnut, but we will put those in engravings and put them in the Northern Nut Growers' Journal, so that you will see them there with better satisfaction. Now one or two words about these Persian walnuts. These are eastern grown seedlings, the best that I have been able to pick out. Here is an Oregon grown nut. That is the ideal type for dessert walnuts. This is the Meylan. There is only one better, and that is the real Mayette, of which we grow very few in the United States, but we are growing considerable of the Meylan. Whether we can grow this successfully here or not, I am not certain, but it is well worth trying. The better type of our nut seedlings in the east are from the Parisienne. We must get a nut something like this that you can crack between your fingers, not one that is sealed so hard that it requires a hammer, and must get one with a very good quality of meat. One great advantage to the walnut grower in the East will be that he can get his crop on to the Thanksgiving market, which is the cream of the market—something the Western or European nut grower cannot do. So if we can grow a nut reasonably fair in quality we can expect excellent results.

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The Chairman: Mr. Jones, will you give us your points now?

Mr. Jones: Dr. Deming yesterday asked me to give a little demonstration of grafting and I have brought along a sort of transplanted nursery on a board, so that I might do so.

(Here Mr. Jones demonstrated methods of grafting the pecan.)

The Chairman: Tell us about the wax cloth, Mr. Jones.

Mr. Jones: We use that over the cut.

The Chairman: How do you make your wax cloth?

Mr. Jones: We take a roll of this, possibly three or four yards long, very thin muslin, roll it up and drop it in the melted wax.

The Chairman: How do you make that wax?

Mr. Jones: We don't measure the ingredients, but I think it varies from four to six pound of rosin, to one pound of beeswax and a tea cup full of boiled linseed oil and about a tablespoon of lamp black.

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Prof. Smith: What do you use the lamp black for, Mr. Jones?

Mr. Jones: To toughen the wax so that it will not crack and so that it will adhere better.

A Member: How do you get your excess of wax off the cloth?

Mr. Jones: We just throw the rolls on a board and press them.

Mr. Reed: I believe you would find it easier to tear it up into strips than to put it in rolls. We have been using that method. We ran short of cloth and I went to town and got some and tore off a piece about 8 or 9 yards long and folded it up into strips that wide and dipped it in the pure beeswax and pressed it on a board and it was ready for work.

Col. Sober: I take just a common corn cob and wind it on as you would on a spool, then, while the wax is warm, I dip it in; you can have the cloth half an inch wide or an inch wide just as you please. My way of making wax is, I take two pounds of rosin, one pound of beeswax and half a pound of tallow. I find that stands all kinds of weather.

Mr. Jones: You prefer the tallow?

Col. Sober: Yes sir, I do.

The Chairman: Beef tallow or mutton tallow?

Col. Sober: I prefer mutton tallow; two pounds of rosin, one of beeswax and half a pound of tallow. Then you want to boil it very slowly and thoroughly, and pour it in cold water.

A Member: Do you unroll this roll of cloth?

Col. Sober: I have a machine to turn it on just the same as you would on a spool.

Mr. Jones: The strip goes through the wax?

Col. Sober: No, you wind that, then when your wax is warm, you drop this in but secure the ends, then take it out and lay it by till it's all saturated; then I tear it off as I use it. I find that is the most convenient thing, and I generally get calico, that is pretty closely woven, but is rotten so that it tears easily.

Mr. Jones: Did you ever use raffia for tying your grafts?

Col. Sober: No sir, I have not.

Mr. Jones: We have used it on pecans and walnuts for the reason that it doesn't have to be untied as it bursts off with the growth of the tree.

Col. Sober: This wax I have tried on thousands and thousands of grafts and it stands all kinds of weather. You can get wax that's been there 8 or 10 years and you can take it off now and use it.

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Mr. Jones: That is one advantage of using the tallow; linseed oil will dry out.

Col. Sober: Tallow is the best; that's been my experience.

A Member: If linseed oil is not used immediately or very soon, it gets hard.

Mr. Jones: It's all right in wax and all right in cloth, too, if you keep it in a damp place till ready to use.

Mr. Hutt: Can you use parafine in place of beeswax?

The Chairman: Have you tried this method on the other hickories besides the pecans?

Mr. Jones: Yes sir.

The Chairman: You've got shagbark to catch fairly well, have you by this method?

Mr. Jones: Yes sir.

The Secretary: How did your pecans and hickories do last summer?

Mr. Jones: I've forgotten the exact percentage that grew. Some died after they had made a growth of several inches. I think I left too many limbs growing on the hickories. Some of them made quite good growth.

A Member: When is this kind of grafting done?

Mr. Jones: We wait until the sap is up.

The Chairman: What do you cover the top with?

Mr. Jones: With wax. We leave this open at the bottom, for the reason that the sap can get out and not ferment. If it holds the sap, it will sour you know.

The Chairman: How far down does your wax go, Mr. Jones?

Mr. Jones: Far enough to cover up the wrapping.

A Member: Does that work on pecans as well as hickories?

Mr. Jones: Yes sir. To show the value of this patch, we have grafted rows side by side and got 80 per cent where we used this patch and 34 per cent where we waxed it over solid and left no ventilation or exit for the sap.

A Member: Isn't that to keep the wax out of the cambium layer?

Mr. Jones: Yes sir, it does that too.

Prof. Smith: Are there any fine points about this trimming, other than mere wedge?

Mr. Jones: No sir, only it's thick on one side, as you will see so that it wedges tightly.

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A Member: Isn't it a fact that you can use three and four year pecan wood just as well?

Mr. Jones: Yes sir, two year wood or three will give you better results than one year.

Col. Sober: What time in the season do you graft?

Mr. Jones: The 20th of April to the 20th of May here.

Prof. Smith: What stage of stock do you prefer?

Mr. Jones: Well it doesn't matter, you can graft these after they have made a foot of new growth, if you've got a good dormant scion; you could put in a graft any time in the summer, perhaps.

A Member: How long do you leave on the paper bags?

Mr. Jones: Until the scion begins to grow. Sometimes I have made a mistake and left them on until they grew up and curled down.

Prof. Smith: What is the superiority of that over plain cleft grafting?

Mr. Jones: You can do better work and do it quicker. I have put in 1200 grafts in a day.

The Chairman: You don't mind this arch being left up?

Mr. Jones: That ought to go a little deeper, maybe, but it don't make much difference, so long as it is well waxed.

Prof. Smith: The paper bag protects the scion?

Mr Jones: Yes sir. The object is not to protect the scion so much as to keep it dry. You want to keep the scion dry until it gets sap from the stock to start it into growth.

Prof. Smith: Is it necessary that this should be waxed cloth?

Mr. Jones: No sir, we use paper ordinarily, of course we run wax over the paper in waxing the scion and then the paper is as good as cloth.

Col. Sober: Do you find it apt to curl up in windy days—the paper? I tried that and had all kinds of trouble until I got on to the tape.

Mr. Jones: We don't try to tie with the paper; the paper is only to let the surplus moisture or sap out.

A Member: Does this tend to hold that in or is it all held in by the patch there?

Mr. Jones: This doesn't really need any tying, as it is large.

The Chairman: Would you carry the patch around to the other side?

Mr. Jones: No sir, just fill it up with wax.

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The Chairman: And the juice runs out of there and will escape anyway.

Mr. Jones: Yes sir.

A Member: Do you wax in addition to the paper you put on?

Mr. Jones: We don't wax the scion all over. We used to take hot wax and run a thin layer over the whole scion, but we quit that and used the bag, because if you wax over a scion tight and it happens to have sufficient moisture, it will start growth with that moisture before it makes the union.

Prof. Smith: Do you wax the tip end?

Mr. Jones: Yes sir.

Prof. Smith: Do you wax this in here?

Mr. Jones: Yes sir; we fill that over with liquid wax. It is possible to have your wax too hot, and burn the scion.

Prof. Smith: Have you found that all the species of hickory take grafts with equal ease?

Mr. Jones: We grafted some here last spring that started very nicely and then died. I don't know whether it was in the hickory stock or whether they were robbed by the sprouts; we didn't pull off any sprouts. There's a whole lot of things we don't know about grafting yet, but will know more in time.

The Chairman: How about using scion wood more than one year old?

Mr. Jones: We prefer two or three year old wood for the scion. We have coming now, 3,000 walnut scions from California and they are all to be two and three years old. I have put in rows of 100 with large two year scions and you could count 100 and not find one dead among them and some of the scions were almost as big as my wrist. It's a job to cut them. You see that scion, being large, has enough vitality to hold it until it can make a union.

A Member: You want one bud on this?

Mr. Jones: We generally have two buds.

A Member: Do you use the same method on the Persian walnut?

Mr. Jones: Yes sir; we got a little stingy one year and cut these all to one bud and hardly got any out of them. You've got to have wood enough to hold the scions dormant; of course there may be one or more buds on the scion.

The Chairman: And got to have food enough in them.

Mr. Jones: Yes sir. Col. Sober grafts chestnuts that way, but I have never been able to graft pecans and walnuts with very short scions. [Pg 110]

The Chairman: I have caught chestnuts with one bud, but most of the nut trees want more food and you've got to have a lot in the scion.

Prof. Smith: Have you used that with pecans in the North?

Mr. Jones: Yes sir, this will be our method of propagation.

After Mr. Jones had given further illustrations of the process of grafting, the convention adjourned.

SOME PERSIAN WALNUT OBSERVATIONS, EXPERIMENTS AND RESULTS FOR 1912

E. R. LAKE, WASHINGTON, D. C.

The Arlington work for 1912 in the propagation of the Persian walnut consisted in top-grafting three and four year old nursery stock by several methods, as ordinary cleft, side cleft, bark cleft, prong, whip and modified forms of these. For wrapping we tried bicycle tape, waxed cord and cloth, with wax and plasticine for covering.

The work was done during the latter part of April and first part of May. The stocks averaged from $\frac{3}{4}$ to $1\frac{1}{4}$ inches diameter, and were cut off from 16 to 30 inches above the surface of the ground. In a few cases bark grafting by modified whip form was performed upon the branches at a height of about 4 feet.

Later in the season from June 12th to August 25th buds were placed by varying methods. In the earlier instances the buds were taken from left-over grafting stock. Of the scion wood received last year all the wood from Eastern growers was frost bitten and wholly failed to take with one or two exceptions.

The Pacific Coast wood was received in excellent condition and operations with it were gratifying, especially with the ordinary cleft graft, and patch bud.

Next year's work in grafting will be confined to the cleft, and the bark-whip processes. This latter is very simple and under careful treatment promises to be a convenient and successful process.

In the budding operations we resorted to a number of methods largely for the benefit of the information obtained from the practice, and not so much for the returns in propagated trees. [Pg 111]

However, for 1913 in the work of propagating for stock results we shall confine our practice to

the patch method, though we may find from later tests that the hinge method so favorably looked upon by Oregon is better suited to the work.

Various experiments with tying material were tried. Raffia, cotton cord, waxed cloth and bicycle tape were used. The raffia and cord gave best results. A tight tie is needed.

June-budding from the left-over graft-wood gave a very low percentage of "takes." Most of the buds appeared to be drowned. Buds from the current year's growth inserted from early to middle of August are at present apparently in good dormant condition.

Some July buds from the left-over graft-wood placed in the younger branches of a twelve year old American black took well and made from three to six inches growth. The branches were cut back as soon as the buds appeared to be set, a course that would not be advocated if one were doing the work for re-topping. The young wood from these buds is delicate and soft and in order to insure their living through the winter, so far as our efforts may avail, they have been enclosed in strong paper bags. In our budding and grafting operations we had no success with the Japanese or Chinese stocks. We expect to try them further as their rapid growth makes them much to be desired if a permanent union can be effected. So far as we have been able to learn from the southern propagators who have worked along this line, no difficulty has been encountered in effecting a short-life union,—four to six years on an average, though a few have kept alive for twelve years.

The growth of the successful grafts has been very variable. In several instances in which both scions upon a stock grew, the growth was from two to three feet. In other cases the young wood was scarcely a foot long.

The fact that the stocks and scion-wood varied widely in size and vigor and the further fact that the scions were from several varieties of western stock are quite sufficient causes for no uniform results in this respect.

The wood of all successful grafts appears to be in excellent condition for the winter season and we are looking forward to an interesting further growth of these next year, though the trees have just been transplanted. In order to doubly insure ourselves against loss of the varieties now growing one half, or even more in a few instances, of the young wood has been removed and placed in a cold room so that further grafting or budding of these varieties may be made next year.

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Nursery trees of the Franquette, Pomeroy, Parisienne and unidentified others, on their own roots are making a pitiable effort at successful growth, while all wood on the black stock is making excellent growth.

In one instance the wood of Mayquette a cross between Mayette and Franquette formed two nutlets. Lack of pollen was all that prevented the fruiting of one-year-old grafted trees. A splendid point for the unit orchard booster, but a point of no value to the real walnut grower.

CROSS FERTILIZATION

Owing to the very vigorous weather of the past winter the catkins on the older Persians at Arlington Farm were killed. In order to study the conduct and product of these trees we sought pollen elsewhere to fertilize their liberal display of pistils. We were successful in obtaining some from the trees of Messrs. Killen and Rosa, and Miss Lea, but though this and some pollen of black, butternut and the Japanese was used no pollination was successful.

In the case of sieboldiana, however, we succeeded in securing what appears to be fruit of certain definite cross-fertilization, as sieboldiana x nigra; sieboldiana x cinerea and possibly sieboldiana x regia.

Only in one instance did the nuts appear to have other than the usual characters of sieboldiana.

The nuts of the cinerea cross were longer, more tubular and somewhat deeper furrowed and darker.

Unfortunately some conflicting results in the fruiting of the sieboldiana places the possible cross-fruits under a cloud.

A peculiarity of the blossoming of the sieboldiana at Arlington this year was that the stamens and pistils of an individual tree opened at dates of six to ten days apart, and with the tree used for crossing the catkins were all off before the pistils opened. As no two trees are near together, perhaps two to three hundred feet being the closest, natural cross-pollenating was not expected. However, after the cross-pollinations by hand were made and fruits set, and even matured, it was found that some clusters had from one to three more nuts than were hand treated. Many of the clusters had less nuts than the number of pistils treated, which was to be expected.

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But how to account for the extra sets is a problem not clear for it is possible that pollination might have occurred in one of two ways—by stray pollen grains from the hand operations by wind-carried grains from the trees. In any event only the fruiting of the trees from the nuts under consideration will settle it, and as these have been planted we are on the way to the solution.

THE INDIANA PECANS

R. L. McCoy, INDIANA

The pecan is probably the best nut that grows. It belongs to the hickory family which is indigenous to North America. Since water is its natural distributing agent it is most generally found growing intermixed with the large hickory nut or shagbark in creek and river bottoms. While the hickory is hardy enough to thrive even into the Canadian provinces the pecan is not so hardy and is seldom found in the northern tier of states. It thrives well as far north as the northern boundary of Illinois. The writer has seen a transplanted tree in bearing in Branch County, Michigan, and native trees along the Mississippi River near the mouth of the Wisconsin.

The nuts in the extreme northern limit are not much larger than a hazel nut. But the nuts that grow in Indiana and Illinois from the Ohio River on the south to Rock Island on the northwest and Lafayette on the northeast are much larger. Here are found many superior nuts worthy of propagation. In fact, the writer has before him a great many nuts of named and un-named varieties which he and Mr. Littlepage and others have discovered in their search for worthy nuts in the native pecan woods. There are many thousand acres of these groves on the Ohio, Green, Wabash and Illinois rivers where many trees are found which bear nuts as large as some of the varieties which are being propagated in the Gulf Coast country.

The nuts of the Evansville group are especially noted for their fine flavor. The people of this section will not eat southern pecans if they can get native nuts. This year several carloads of these native wild nuts will be shipped to the Cleveland, Boston, and New York markets. While the finer nuts seldom get into the markets at all but are bought by wealthy men in the locality where they grow. Many men buy from a special tree year after year—its flavor suiting their taste.

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The yield from some of these larger trees (and there are many of them four feet in diameter and some as large as nineteen feet four inches in circumference at shoulder height) is very good. The writer has seen a number in the last few days which were estimated to have from four to six hundred pounds, the most of the crop having not yet been gathered. He knows of one tree which bore (17) seventeen bushels and Mr. Louis Huber of Shawneetown gathered 718 pounds from another tree. Two hundred and eighty-five pounds of nuts were gathered and weighted from the Luce tree. These nuts were gathered green for fear of their being stolen and it was estimated that fifteen pounds were left on the tree. Also that the hail storm in early September destroyed fifty (50) pounds more. Hence the Luce bore approximately eight bushels. The Kentucky tree had four and one-half bushels by measurement. The Warrick tree had, the best we can estimate, about 150 pounds. The Grayville, or Posey as Mr. Littlepage wishes to call it, bore at least two hundred pounds by weight. One hundred and sixty pounds were gathered from the Major and two hundred and fifty pounds from the Green River tree. We do not think the Hinton bore to exceed two pounds of nuts. We do not know the amount of nuts gathered from the Indiana and the Busseron trees. The Buttrick tree had some three or four bushels of nuts this year but as a dredge ditch was recently constructed by it, destroying half of its root system, it did not mature its crop. This tree has been in bearing since 1817 and it has not been known to miss a crop previous to this year.

In our search for nuts worthy of being propagated we have found several nuts as yet un-named that are in our opinion much superior to any northern nut that has been brought to public notice. But as we know little of their bearing record and do not wish to burden the nurserymen with too many varieties we will keep these trees under observation for a year or two before naming them.

We have been trying to propagate some of the best varieties at our nursery for about three years. Our first attempt was root-grafting in which our success varied from 15 per cent to 75 per cent under the best conditions. We found after some experience that it was not difficult to root-graft. But last winter, 1911-12, was the coldest winter for some years, the thermometer registering as low as 20 degrees below. Most of our root-grafts were killed back to the ground but few if any of them were killed outright. When spring came they started new growth and are now about four feet high. The fall of 1911 was very warm and wet and they were in vigorous growth until the first week in November when we had a hard freeze which killed the wheat, causing the worst failure in that crop ever known in this section. The winter then following being very cold we had two conditions against spring root-grafted pecans. But we failed to see any budded ones that were injured. However, we only had pecans budded to hickory which was done by Mr. Paul White in May, 1911 and, so far as we know, this was the first hickory top-worked to pecan in Indiana. However, he now has quite a number top-worked last spring that have made a growth of three or four feet. We also have both budded and root-grafted pecans from last spring and summer so that in the spring we will have a better opportunity to see what effect the winter will have on them.

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So far as we are able to determine from our observation of a few orchards all pecan trees bought from southern nurserymen and planted in this section have either died out or made very feeble growth. Although some large Texas nuts have been planted here and grown, yet they have either not fruited at all or the nuts have proved no better than our native nuts.

The northern pecan timber is not brash like the southern pecan but is very elastic and tough. An axe-handle made from northern pecan sells for ten cents more than one made from hickory and pecan timber is much sought after by axe-handle makers.

The people in this section have in the last few years awakened to the fact that their swamps

studded with pecan trees are about the most valuable lands they possess and many are the inquiries: "Where can we get good budded or grafted pecans?"

The idea of propagating the northern pecan is of very recent origin and while the few attempts at propagation have not as yet met with any very great success, yet we are hoping that the time will be when many acres of our lands shall be set in valuable pecan orchards and our highways lined with long rows of fine pecans, chestnuts, and English walnuts which shall serve the three-fold purpose of beautifying Mother Earth, yielding delicious food, and furnishing a place of rest for the weary traveler.

APPENDIX

REPORT OF THE SECRETARY AND TREASURER

Bal. on hand, date of last report	\$ 48.73	
Annual dues and life membership	178.00	
Advertisements in Annual Report	25.00	
Sale of report	18.00	
Dr. Crocker, paid for list of names	2.00	
Prof. Collins, paid for reprints	8.00	
Total receipts	\$279.73	
Expenses:		
Expenses of Prof. Collins	\$ 20.85	
Printing report and reprints	195.16	
Other printing	38.00	
Postage	35.75	
Typewriting	16.24	
Stationery	4.50	
Miscellaneous	14.30	
Total expenses	\$324.80	
Bill receivable		; 1.00
Bill payable	22.00	
	\$346.80	\$280.73
Deficit		\$66.07

Our first annual report, embodying the transactions at the first and second annual meetings, was issued in May, and copies were sent to all members, to the principal libraries of the country, to officials of the Agricultural Department at Washington, and to some state agricultural officials, to several agricultural and other periodicals for notice and review, and to various persons especially interested. Eighteen copies have been sold.

About 1,000 copies of each of the two circulars, "Why Nut Culture is Important" and "The Northern Nut Growers Association and Why You Should Join It", have been sent to members and correspondents, and also revised circulars on the literature of nut growing and on seedsmen and nurserymen.

An illustrated article about nut growing and the association appeared in the Literary Digest and many agricultural and other periodicals have had notices of our association and our meeting.

Besides the regular notices sent to members and papers, different notices and brief statements about nut growing, were sent weekly for five weeks before the meeting to 80 different newspapers published in the country about Lancaster in the hope of getting a good local attendance. The Pennsylvania Chestnut Blight Commission assisted in this publicity campaign by sending postal card notices to about a hundred persons in the eastern part of Pennsylvania who were known to have from a few to thousands of cultivated chestnut trees.

The secretary's correspondence has increased so as to become, if it were not for enthusiasm, burdensome. Often several inquiries a day are received and they come from all parts of the United States and Canada.

The following figures are brought up to date of going to press.

Our membership has nearly doubled since the last report was issued, increasing from 60 to 113. We have lost 1 member by death and 2 by resignation. Our present membership standing at 110.

REPORT OF COMMITTEE ON RESOLUTIONS

Read by Professor Smith

RESOLVED:

1. That we extend our thanks to the Mayor and citizens of Lancaster for the welcome and entertainment they have afforded us while here and for the excellent auditorium they have placed at our disposal.
2. That we extend our thanks to Messrs. Rush and Jones and their entertainment committee.
3. That we extend our thanks to the Pennsylvania Chestnut Tree Blight Commission for the attendance of their representatives. We note with keen interest their expressions of hope for the control of this cyclopean menace.
4. That we express our deep appreciation of the great interest and valuable services of Dr. Morris, the retiring President, and Dr. Deming, the Secretary and Treasurer, two officers to whose untiring efforts this Association is largely due.
5. That we express the thanks of the Association to those members and others who have enriched this meeting by their interesting exhibits.
6. That the following letter be sent from this Association to the,—

Secretary of Agriculture,
Persons in authority in the United States Bureau of Plant Industry,
The Presidents of Agricultural Colleges,
The Directors of Agricultural Experiment Stations,
And leading Teachers in Agriculture Colleges.

The Northern Nut Growers' Association, by resolution passed at its third annual meeting, held at Lancaster, Pa., in December 1912, calls your attention to the importance of, and need for, the breeding of new types of crop yielding trees. We now have the possibility of a new, but as yet little developed, agriculture which may (A) nearly double our food supply and also (B) serve as the greatest factor in the conservation of our resources. [Pg 118]

(A) Our agriculture at the present time depends chiefly upon the grains which were improved by selection in pre-historic times, because they were annuals and quick yielders. The heavy yielding plants, the engines of nature, are the trees, which have in most cases remained unimproved and largely unused until the present time because of the slowness of their generations and the absence of knowledge concerning plant breeding.

We now know something about plant breeding, and its possibilities as applied to the crop yielding trees seem to be enormous. They certainly warrant immediate and widespread effort at plant breeding. A member of this Association has shown that the chinquapin can be crossed with the oak; that all the walnuts freely hybridize with each other and with the open bud hickories, a class which includes the toothsome and profitable pecan. There is in California a tree which is considered to be a cross between the native walnut and the live oak. The Mendelian Law in connection with past achievements in plant breeding, and the experiments of Loeb in crossing the sea urchin and the star fish are profoundly suggestive.

The possibilities of plant breeding as applied to crop yielding trees seem to be enormous. They certainly warrant immediate and widespread effort toward the creation of useful strains which may become the basis of a new agriculture yielding food for both man and the domestic animals.

(B) The time for constructive conservation has come. Our most vital resource is the soil. It is possibly the only resource for which there is no substitute. Its destruction is the most irreparable waste. So long as the earth remains in place the burnt forest may return and the exhausted field may be restored by scientific agriculture. But once the gully removes this soil, it is the end so far as our civilization is concerned—forest, field and food are impossible and even water power is greatly impaired. Our present system of agriculture, depending upon the grains, demands the plowing of hillsides and the hillsides wash away. This present dependence upon the plow means that one-third of our soil resources is used only for forest, one-third is being injured by hillside erosion, and only one-third, the levellest, is being properly used for plow crops. [Pg 119]

The present alternative of Forestry for hillsides is often impossible because the yields are too meagre. Almost any land that can produce a forest, and much that has been considered too dry for forest, can produce an annual harvest of value to man or his animals when we have devoted sufficient attention to the breeding of walnuts, chestnuts, pecans, shellbarks, acorn yielding oaks, beech nuts, pine nuts, hazel nuts, almonds, honey locust, mesquite, screw bean, carob, mulberry, persimmon, pawpaw, and many other fruit and nut trees of this and other lands.

The slowness and expense of the process of plant introduction and tree breeding limits this work

to a few individuals with patience and scientific tastes and to governmental and other institutions of a permanent nature. The United States Government and each state experiment station should push this work vigorously and we appeal to you to use your influence in that direction. You may find material of interest in our published proceedings and in the Fruit and Nut Journal, the organ of the industry, published at Petersburg, Virginia.

REPORT OF COMMITTEE

ON THE DEATH OF PROFESSOR JOHN CRAIG

Read by Dr. Morris

"The Northern Nut Growers' Association suffered very great loss in the death of Professor John Craig, at Siasconset, Massachusetts, on August 10, 1912.

"Professor Craig, from his many responsible positions in the horticultural world, had acquired a wealth of information which was always at the disposal of his friends and students. His training as a teacher gave such facility in expression of view, that his part in our discussions inspired the audience and called forth the best that others had to offer.

"His type of mind was essentially scientific, and combined with this type of mind there was a rare quality of critical faculty in relation to the relative practical values of horticultural ideas and methods. His interest in the Northern Nut Growers Association belonged to a natural fondness for everything that promised new development, and he established at Cornell University the first course in nuciculture,—so far as we are aware,—that has ever been formulated at an educational institution.

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"The personality of Professor Craig, characteristic of that of the scientist, was marked by simplicity and directness of manner, impatience with error due to carelessness or intent, but unlimited benign tolerance of all men who honestly expressed views opposing his own or who made conscientious mistakes. Professor Craig possessed that broad humanity which found quite as large interest in his fellow man as it found in his special study of plants, and his charming personality, strong manly bearing, scholarship, and active interest in whatever engaged his attention at all, will be ever remembered by those of us who had the pleasure and the profit of his acquaintance."

Mr. Littlepage: I would just like to say, in connection with the very appropriate and excellent words which the President used in reference to Prof. Craig, that it certainly meets the most hearty approval of all of us who knew Prof. Craig, that this association go on record in this manner. At the first meeting that was held, by the few of us who met in Bronx Park Museum at New York, to start this organization, you will remember the enthusiasm and the words of encouragement that Prof. Craig gave us at that time. He was there among the first and there was always intermingled with the scientific phase of the subjects that he discussed, the practical, genial good fellowship that made everyone like him; and after all, it is but proper that we stop for a moment and express our deep appreciation. In this life of turmoil and business hustle, I think that we sometimes do not quite realize the shortness of life, the shortness of the time that we have to accomplish any of those things in which we are interested; and it is the men who are giving their time to these scientific subjects, the results of which will inure to all humanity, who are certainly entitled to consideration and a kindly remembrance. That is why it was that I heard with such gratification the words of the President about Prof. Craig.

REPORT OF COMMITTEE ON EXHIBITS

Read by Professor Hutt

By J. G. Rush, West Willow, Pa.

Persian walnuts, four varieties: Hall, Burlington, Nebo, Rush; plate of mixed, imported varieties; Seedling walnuts, Paradox walnut, black walnuts and rupestris, (Texas); two plates Chinquapins; chestnuts, Giant Japanese; shellbarks: LaFeuore, very good, large, Weiker, fair; two seedlings: Paradise nut; two plates filberts; Lancaster Co. pecans; budding knives.

By Wilmer P. Hooper, Forest Hill, Md.

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Seedling Persian Walnut; Sir Clair; tree probably fifty years old, vigorous, hardy, annual bearer. On farms of L. J. Onion, Cooperstown, Md. P. O. Sharon, Md. 1911 crop one bushel; 1912 crop one and one half bushels.

Alexis; tree twenty-eight years old; vigorous, hardy, annual bearer, flavor good.

Farm of Alexis Smith, Churchville, Md. Crop 1911 one bushel; crop 1912 one bushel.

Sheffield; tree six years old; bought of Hoopes Brothers & Thomas; hardy, vigorous; 6 to 18 feet high; on farm of Mrs. S. T. Poleet, Cooperton, Md., P. O. Sharon, Md.

Smith; tree forty to forty-five years old; large, hardy; on farm of J. T. Smith, Berkeley, Md.

Beder; fifty to fifty-five years old; large, annual bearer; grown from nut on farm of David Hildt, Janettsville, Md.

Hooker; tree twenty-two years old; origin Franklin Davis; vigorous, hardy, annual bearer, hard shell, fine butternut flavor; from farm of Mrs. Kate Hooker, Vale, Md.

By Mr. Knaub.

Shellbarks, five varieties: three black walnuts, two butternuts; one chestnut.

By Mrs. J. L. Lovett, Emilie, Pa.

Six varieties of Persian walnuts.

By E. B. Holden, Hilton, N. Y.

Holden walnut.

Stock Seed Nuts from J. M. Thorborn & Co., 33 Barclay St., New York City.

Juglans Californica, Juglans cordiformis, Juglans Sieboldi, Juglans nigra, Juglans cinerea, Juglans sinensis, Carya alba (shellbark), Carya porcina (pignut), Carya tomentosa (mockernut), Carya sulcata, Corylus rostrata, Corylus amara, Castanea Americana.

By E. A. Riehl, Alton, Ill.

A plate of Rochester nuts and thirty seedlings of it, showing tendency to reversion; eight varieties of shagbark; eight varieties of shellbark; eight plates of Sieboldi; eight plates black walnuts (Thomas); Rush Chinquapin.

Collection of walnuts by Professor Lake, of Washington, D. C.

Royal Hybrid, California x nigra; Paradox, California x regia; Meylan, Gladys, Sypherd, Stabler, Milbank, St. Clair.

By A. C. Pomeroy, Lockport, N. Y.

Pomeroy walnuts and seedlings of the original tree.

By T. P. Littlepage, Washington, D. C.

Indiana pecans, six varieties: Warwick, Posey, Major, Kentucky, Indiana, Hodge; Hinton, McCallister hican, Barnes walnut from Washington, D. C., four varieties shagbark.

By W. C. Reed, Vincennes, Ind.

Indiana pecans, thirteen varieties: Luce, Beard, Busseron, Porter, Squires, Kentucky, Hall, Sullivan (2), Warwick, Indiana, Wilson.

By Col. C. K. Sober, Lewisburg, Pa.

Photograph of his chestnut orchard and nursery.

By C. A. Reed, Department of Agriculture, Washington, D. C.

Exhibition jars of Holden walnut, Warwick pecan, Kentucky pecan, Luce pecan, Hales shagbark, Kirtland shagbark, Weiker shagbark. Exhibition of Squirrel, Perfection and Great Grip nut crackers; White, Jones and Galbreath budding tools.

By Arrowfield Nurseries, Petersburg, Va.

Seedling pecan trees.

THE HICKORY BARK BORER

That our correspondence with the New York State Commissioner of Agriculture, as published in the annual report, has borne fruit is shown by the calling of a conference at the office of the Commissioner at Albany on February 24th, "to consider methods of control of the hickory bark borer".

Among those present were the following:

Frederick Allien, representing Riverdale Park Association.

H. W. Merkel, Forester, New York Zoological Park; representing Bronx, Valley Parkway Commission.

Dr. W. A. Murrill, Acting Director, New York Botanical Garden.

J. J. Levison, Forester, Department of Parks, Brooklyn.

Wesley B. Leach, Consulting Arboriculturist, Boro of Queens.

Clifford R. Pettis, Superintendent of State Forests, Albany.

Dr. E. P. Felt, State Entomologist, Albany.

Dr. W. C. Deming, Sec., Northern Nut Growers' Ass'n, Westchester.

George G. Atwood, Chief, Bureau of Horticulture, State Dept. of Agriculture, Albany.

B. D. Van Buren, Assistant Chief.

Dr. W. H. Jordan, Director, State Experiment Station, Geneva.

George L. Barrus, Conservation Commission, Albany.

S. H. Burnham, Assistant State Botanist, Albany.

Dr. Donald Reddick, Professor of Plant Pathology, College of Agriculture, Ithaca.

Glenn W. Herrick, Professor of Entomology, College of Agriculture, Ithaca.

W. H. Rankin, Conservation Commission, Albany.

P. J. Parrott, Entomologist, State Experiment Station, Geneva.

F. C. Stewart, Botanist, State Experiment Station, Geneva.

After a prolonged discussion the following resolution was unanimously adopted:

WHEREAS, the hickory bark borer is at present extremely injurious and destructive to hickory trees in and around New York City, and has already destroyed and is threatening the destruction of thousands of valuable trees; and

WHEREAS, it has been demonstrated in several instances, on a large scale, that the hickory bark borer can be practically controlled; therefore, be it RESOLVED, that we hereby respectfully request the commissioner of agriculture to take such steps as may be necessary to bring about the enforcement of the provisions of the agricultural law relative to insect pests and diseases with particular reference to control of the hickory bark borer; and be it further

RESOLVED, that the thanks of the conference are hereby tendered to Commissioner of Agriculture Huson for his courtesies and the calling of the conference.

The following "News Items" of no date, but received in the early part of June, shows what action has so far been taken:

STATE DEPARTMENT OF AGRICULTURE

News Items

Commissioner Huson of the State Department of Agriculture is receiving considerable information relative to a serious outbreak of the hickory bark borer in the vicinity of New York and on Long Island. This borer is the principal cause of the death of thousands of hickory trees. The greatest infested area is in the northern part of New York City, in Westchester County, in Queens and Nassau Counties, though much injury has been observed throughout Suffolk County, particularly along the northern shore of the island. The area of infested hickories is about the same as the territory where the chestnut trees have succumbed to the attacks of the chestnut bark disease. Now that the chestnuts have so nearly disappeared and the fact that the hickory trees are also threatened with entire extermination because of the hickory borer, requests have

been made by many citizens, that the Commissioner of Agriculture should exercise such authority as the law gives him in the control of this pest. That the hickory trees that have not been attacked may be saved, or in a very large measure protected has been proven in the Zoological Park and in the parks of Brooklyn. The able superintendents of these two parks have for the last two or three years, been cutting out every infested hickory tree and in that way the other trees are found at this time to be free from insects and they have been saved from certain destruction.

The hickory borer eats its way into the bark of the hickory trees in mid-summer. Eggs are laid which hatch and the grubs feed in peculiar galleries in the bark and between the wood and the bark is such a way as to cut off the flow of the sap, thus causing the death of the trees. These grubs are in these galleries at this time of the year and will remain so until about the middle of June. It is, therefore, necessary that the infested trees be cut and destroyed before that time in order to prevent further widespread of the insects. The Commissioner has been promised the hearty cooperation of many influential and interested citizens in this movement and agents of this Department are on the ground with authority to inspect trees to ascertain the limit of infestation and they have been directed to mark such trees as should be removed and destroyed at once.

All persons are requested to inform the Department of the location of infested hickory trees and to extend to the inspectors such assistance as may be desired.

Department Circular Number 64 on "Dying Hickory Trees" will be sent to all applicants.

CALVIN J. HUSON,
Commissioner of Agriculture

Albany, N. Y.

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MISCELLANEOUS NOTES

Members present:

Dr. R. T. Morris
Mr. T. P. Littlepage
Dr. W. C. Deming
Mr. C. A. Reed
Mr. W. N. Roper
Prof. E. R. Lake
Mr. E. S. Mayo
Mr. A. C. Pomeroy
Mr. J. F. Jones
Mr. J. G. Rush
Col. C. A. Van Duzee
Prof. J. Russell Smith
Prof. W. N. Hutt
Mr. G. H. Corsan
Mr. C. S. Ridgway
Mr. H. N. Gowing
Mr. W. C. Reed
Mr. W. F. McSparren.

Others present:

Mrs. C. A. Reed
Mrs. A. C. Pomeroy
Mrs. J. F. Jones
Mrs. C. S. Ridgway
Prof. F. N. Fagan, Dept. of Horticulture, State College of Pennsylvania
Mrs. Fagan
Mr. Roy G. Pierce, Tree Surgeon, Penn. Chestnut Blight Commission
Mr. Keller E. Rockey, Forester in Charge of Demonstration Work, Penn. Chestnut Blight Commission
Col. C. K. Sober, Lewisburg, Pa.
Mr. S. V. Wilcox, Rep. Thos. Meehan & Sons, Germantown
Mr. H. Brown, Rep. Thos. Meehan & Sons, Germantown
Mr. Wilmer P. Hoopes, Forest Hill, Md.
Dr. A. H. Metzger, Millersville, Pa.
Mr. Amos M. Landis, Lancaster, Pa.
Mr. Blair Funk, Pequea Creek, Pa.
Mr. David S. Herr, Lancaster, Pa.
Mr. Edward Harris, Sr., Cumberland, Md.
Mr. Edgar A. Weimer, Lebanon, Pa.
Mr. Benj. H. Gochnauer, Lancaster, Pa.
Mr. C. G. Reese, Elizabethtown, Pa.
And others.

CORRESPONDENTS AND OTHERS INTERESTED IN NUT CULTURE

ALABAMA

Williams, P. F., Prof. of Horticulture, Ala. Polytechnic Institute, Auburn
Alabama Farm Journal, Montgomery, Ala.

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ARIZONA

Biederman, C. R., Garces, Cochise Co.
Huntzinger, H. G., Teviston
Rodgers, Robt. A., Forest Service, U. S. Dept, of Agric, Canille

ARKANSAS

Wilson, B. N., Prof. of Mechanical Engineering, Univ. of Ark., Fayetteville
Powers, R. C, 414 So. Trust Bldg., Little Rock, Ark.

CALIFORNIA

McNeil, Anna, 2154 Center St., Berkeley
Baker, W. A., Greenfield
Leonard Coates Nursery Co., Morgan Hill
Smith, R. E., Agric Exp. Sta., Whittier
Burbank, Luther, Santa Rosa

CANADA

Cleugh, H. H., Castlegar, British Columbia
Secord, Harper, St. Catherin's, Ontario
Porter, W. T., 1520 St. Clair Ave., Toronto
Sager, D. S., Dr., Brantford
Moyle, Henry, 84 Bedford Road, Toronto
Ross, Malcolm N., Dept. Public Works, Regina, Saskatchewan
Saunders & Co., W. E., London, Ontario
Hubbell, W. S., Spanish River Lumber Co., Little Current, Ontario
Peters, E. W., 742 Somerset Bldg., Winnepeg
Graham, Wm., Hagensburg, British Columbia

COLORADO

Bell, Bessie, Miss, 156 S. Sherman, Denver
Morgan, J. W., Dr., 85 S. Penn. Ave., Denver

CONNECTICUT

Cleveland, E. S., Hampton
Buttner, J. L., Dr., 763 Orange Street, New Haven
Jewell, Harvey, Cromwell
Gorham, Frederick S., 48 Holmes Ave., Waterbury
Jenkins, E. H., Agric. Exp. Sta., New Haven
Spring, Sam. N., State Forester, New Haven
Pratt, C. M., Newtown
Hale, Geo. H., Mrs., Glastonbury
Miles, H. S., Dr., 417 State St., Bridgeport
Ives, E. M., Sterling Orchards, Meriden
Cook, Harry B., Orange, Ct.
Allen, G. Wilford, M.D., Boardman, Ct.
Smith, Geo. W., Elm Fruit Farm, Hartford
Lane, W. S., Norfolk
Werle, Jos. A., Merwin's Beach, Milford
Williamson, Robert, Greenwich
Stauffer, W. F., No. 81 S. Burrirt St., New Britain
Boyd, Wm. A. Dr., Westport
Lewis, Elmer H., Central Village
Frothingham, Channing, New Canaan
Fletcher, Albert E., Box 67, Farmington
Morre, R. D., Colchester
Wolcott, C. B., P. O. Box 39, Plantsville

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DELAWARE

Killen, J. W., Felton
McCue, C. A., Prof., Newark

Cowgill, L. P., Dover
Cannon, Miss Lida, Dover
Kosa, J. J., Milford
Sypherd, C. D., Dover
Whitehead, F. Houston, Lincoln
Studte, M. H., Houston
Knipe, T. E., Delaware City
Dunn, Thos. F., Dover
Webb, Wesley, Dover

FLORIDA

Simpson Bros. Nurseries, Monticello
Curtis, J. B., Orange Heights
Floyd, W. L., Prof. of Horticulture, University of Florida, Gainesville
Baldwin, Ed. S., DeLand

GEORGIA

Wight, J. B., Cairo
Wilson, J. F., Dr., Waycross
McHatton, T. H., Prof. of Horticulture, Athens
Edwards, B. H., Macon, Ga.
Southern Ruralist, Atlanta

IDAHO

Vincent, C. C., Prof., College of Agriculture, Moscow
Ackerman, W. B., P. O. Box 184, Twin Falls
Hays, L. H., Mace

ILLINOIS

Lindholm, E., 9139 Commercial Ave., Chicago
Stoll, Wm. Paul, 1264 Glenlake Ave., Chicago
Schafer, J. F., Mt. Pulaski
Koonce, Geo. W., Greenville
Watson, Bloomington
Banning, Thos. A., Mrs., Chicago
Graham, R. O., Bloomington
Karstens, Peter J., Chicago
Leslie, A. M., 201 Main Street, Evanston
Fisher, Mr., "Cairo Citizen", Cairo
Endicott, H. W., Villa Ridge
Hektoen, H., Memo. Inst. for Infectious Diseases, Chicago
McVeigh, Scott, 1208 Wrightwood Ave., Chicago
Evans, Homer W., R. F. D. 6, Plainfield
Buckman, Benjamin, Farmingdale
Horner, H. Clay, Chester
Burt, Frank A., 115 1-2 So. Race St., Urbana
Sommer, George W., No. 106 N. La Salle St., Chicago
Spalding, C. W., No. 1851 Byron St., Chicago
Strawbridge, A. N., No. 533 E. 33rd St., Chicago
Remley, Mrs. Grace, Franklin Grove
Prochnow, I. W., No. 1127 Second Ave., Rock Island
McFarlane, H. W., Chicago
Graham, W. H., Fort Gage
Fink, Wm. H., No. 4030 N. Pauline St., Chicago
Crandall, C. S., Urbana
Campbell, T. W., Elgin
Badgley, B. H., No. 2241 Greenleaf Ave., Chicago
Millroy, W. L., Quincy
Sweeney, Jno. M., No. 1636 Manadnock Block, Chicago
Krossell, C. F. P., Dr., No. 5502 Indiana Ave., Chicago
Weeks, E. F., No. 143 N. Dearborn St., Chicago
Heald, Prescott, No. 107 So. Glen Oak Ave., Peoria
Riddle, F. A., Mrs., No. 1441 Jackson Boulevard, Chicago
Kennish, F. H., No. 124 East Oak St., Kewanee
Finley, J. B., Care of Moline Polo and Shaft Co., Moline
Braden, E. S., No. 10 S. LaSalle St., Chicago
Kemp, E. F., No. 108 S. LaSalle St., Chicago
Peterson, Albert J., No. 3448 Hayes St., Chicago
Hewitt, R., No. 149 E. Chicago Ave., Chicago

Hopkins, A. M., R. 710, 167 W. Washington St., Chicago
Hemingway, Geo. R., Oak Park
Rut, Z. D., Park Ridge
Dietrich, J. J., Arlington Heights
Hansell, E. F., No. 5654 W. Lake St., Chicago

INDIANA

Leiber, Richard, Indianapolis
Garden, Daniel A., Elnora
Cathcart, Alva Y., Bristol
Strassell, J. W., Supt. of Schools, Rockport
Howard, W. T., R. F. D. 19, Indianapolis
Boos, E. M., R. F. D. 2, Milan
Boss Co., John C, Elkhart
Green, Frank, No. 811 So. St., Newcastle
House, M. M., 1664 College Ave., Indianapolis
Simpson & Sons, H. M., Vincennes
Woodbury, C. G., Lafayette
Ray, Elgin H., Winamac, R. F. D. 1
Fellwock, P. B., 3 Up. Fourth St., Evansville
Hooke, Ora G., Albany, Delaware Co.
Smith, Oren E., Dr., Traction Terminal Bldg., Indianapolis
Whetsell, Edward, 107 Kirkwood Ave., Bloomington
Swain, W. H., South Bend
Knapp, Dr., Evansville
Yoder, A. C., Dr., Goshen
Knaub, Ben., R. 1, Box 99, North Vernon
Lukens, B., Mrs., Anderson

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IOWA

Dennis, A. B., Dr., Cedar Rapids
Ruppersberg, E. A., Miss, Charles City College, Charles City
Patten, C. G., Charles City
Sawyer, L. H., Des Moines
Thompson, Harry French, Forrest City
"Successful Farming" Des Moines
"Kimball's Dairy Farmer" Waterloo

KANSAS

Godfrey, F. M., Holton
Skinner & Co., J. H., Topeka

KENTUCKY

Matthews, Clarence W., State University, Lexington
Horine, E. F., M.D., 1036 Bardstown Rd., Louisville
"Inland Farming", Louisville
Brislin, John A., Cash. Farmers' Bank of Ky., Frankfort
Kiefer, Louis W., 901 N. Elm St., Henderson

LOUISIANA

Hinton, E. G., Weeks

MAINE

Soule, Sidney S., Mrs., South Freeport
Hitchings, Edson F., College of Agriculture, Orono
Peardon, J. H., Matinicus
Stryker, D. J., Rockland
Chase, Dr. Walter G., Wiscasset

MARYLAND

Michael, Jesse J., Frederick
Little, William E., Westminster
Bunting, J. T., Box 137, Marion Station
Benkert, George, Baltimore
Heron, Benj. F. L., Box 58, Mt. Ranier
Coad, J. Edwin, Drayden, St. Mary's Co.

Munter, D. M., No. 22 Virginia Ave., Cumberland
Daingerfield, P. B. K., Maryland Club, Baltimore
Bachrach, Walter K., No. 16 W. Lexington St., Baltimore
Hewell, John, No. 2028 W. Lexington St., Baltimore
Hays, Amos H., Parkton
Stem, C. W., Sabillasville
Tyler, John Paul, No. 344 W. Preston St., Baltimore
Munter, D. W., No. 1642 Runton Ave., Baltimore
Kerr, J. W., Denton
Overton, W. S., R. F. D. 2, Silver Spring
Harris, Edward, Sr., 31 S. Liberty St., Cumberland
Strite, S. M., 52 Broadway, Hagerstown
Harrison's Nurseries, Berlin
Hoopes, Wilmer P., Forest Hill
Irwin, Arthur J., 226 E. Main St., Frostburg
McDaniel, Alex H., North East P. O., Cecil Co.

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MASSACHUSETTS

Blood, W. H., Mrs., Jr., 147 Grove Street, Wellesley
Reed, Orville, Rev., Granville, Centre
Deroo, Frank B., Box 363, Needham
Fox, Jabez, 99 Irving Street, Cambridge
Hall, James L., Kingston, Box 31
Adams, Norris W., Box 323, Worcester
Mass. Agric. Coll., Amherst
Crosby, Fred, Bolton
Bailey, Thos. W., Kingston
Griffin, W. E., Cor. Central St. & B. & M. R. R., Worcester
Dawson, Jackson, Mr., Arnold Arboretum, Jamaica Plain
Dowse, Granton H., Wrentham
Ellsworth, J. Lewis, Sec'y Mass. State Bd. of Agric., Boston
Fleming, Charles B., Norwood
Brounell, Lewis, 1030 High Street, Fall River
Portmore, J. M., 7 Denison Av., So. Framingham
Humphrey, F. A., Worcester
Waugh, F. A., Prof., Amherst
Beebe, E. Pierson, Boston
Mead, H. O., Lunenburg
Torrey, John P., Dr., Andover
Affleck, G. B., 287 Hickory St., Springfield
Deming, Grove W., Mt. Hermon School
Elder, David, Harwich, Mass.
James, Gorton, 492 So. Station, Boston
Sturtevant, E. L., Brookline
Brown, J. Frank, The Corey Hill Hospital, Brookline
Willwerth, A. H., No. 21 Greenwich Park, Boston
Day, W. Taylor, No. 313 Main St., Great Barrington
Coney, Harriet M., Miss, No. 106 Church St., Ware

MICHIGAN

Brauer, H. A., 810 W. Huron St., Ann Arbor
Cobb, Myron A., Central State Normal School, Mt. Pleasant
Ilgenfritz's Sons Co., T. E., Nursery, Monroe
Haines, Peter S., Detroit
Kidder, Samuel, Ann Arbor
Paul, Irwin, Muskegon, R. F. D. 7
Garfield, Chas. W., Hon., Grand Rapids
Wermuth, Burt, Assoc. Ed. "Michigan Farmer", Detroit
Eustace, H. J., Prof., State Horticulturist, E. Lansing
Carmichael, Milton, 281 Yard Bldg., Detroit
Richardson, A. H., Dr., The Martha Washington, Mt. Clemens
Baker, N. I., Dr.,
Himebaugh, Clayton D., Sheffield Mfg. Co., Burr Oak
Spring, O. L., 728 Wabash Ave., Detroit
Reshore, L. T., Dowagiac
Adams, Rollo K., Middleville
Montgomery, R. H., 46 Jefferson Ave., Detroit
"The Gleaner", Detroit
Davis, R. J., Lock Box 753, Buchanan
Simpson, Wallace N., No. 379 W. Main St., Battle Creek
Palmer, A. C., Ellsworth
Faurote, Fay L., Lord Bldg., Detroit

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Andrus, F. P., Almont, Lapeer Co.
Gamble, M. D., E. F., Coldwater
Horner, E. E., Eaton Rapids Woolen Mills, Eaton Rapids
Stryker, F. A., Buchanan
Lake, Geo., Northville
Hanes, P. S., No. 730 Sheridan Ave., Detroit
Handy, J. W., M.D., No. 105 West 1st St., Flint

MINNESOTA

Fairchild, D. H., St. Paul
Husser, Henry, Minneiska
Wedge, Clarence, Albert Lea
Cutting, Fred, Byron
Underwood, Roy, Lake City
Alford, E. F., 2390 Woodland Ave., Duluth
Latham, A. W., Sec'y State Hortic. Soc'y, 207 Kasota Bldg., Minneapolis
Woodbridge, Dwight E., U. S. Bureau of Mines, Duluth
Tillinghast, E. G., Leetonia Mining Co., Hibbing
Lake Sarah Specialty Farm, Rockford
Farm Stock & Home, Minneapolis

MISSOURI

Bostwick, Arthur E., 70 Vandeventer St., St. Louis
Stark Bros.' Nurseries and Orchards Co., Louisiana
Williams, F. V., D.D.S., 3720 Virginia, Kansas City
Born, H. H. Dr., Park & Compton Sts., St. Louis
Bailey, B. A., Versailles
Wallace, E. S., Office of City Chemist, Kansas City
Cummings, C. C., Dr., Joplin
Wilcox, Walter H., 433 Forth Ave., Webster Groves
Mosher, H. G., Schell City

NEW HAMPSHIRE

Dillingham, Thos. M., Dr., Marlboro
Clement, Ruth E., Miss, E. Deering

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NEBRASKA

Rolder, C. A., Dr., Hedde Bldg., Grand Rapids

NEVADA

Swingle, C. G., Hazen
Gregory, E. R., Dr., Reno

NEW JERSEY

Lovett, J. T., Little Silver
Pomona Nurseries, Palmyra
Bobbink & Atkins, Rutherford
Speer, Lester W., 401 Passaic Ave., Nutley
Black, Son & Co., Jos. H., Hightstown
Chevrier, Chas. S., P. O. Box 579, Trenton
Rice, John J., Almonnesson
Parry, John R., Parry
Totten, A. B., Middlebush
Hartt, Wm. S., Box 366 Toms River
Dantun, A. P., Walsted Farm, Freehold
Shoemaker, Wm. E., Bridgeton
Miller, Jessie E., Miss, 204 W. Passaic Ave., Rutherford
Hall & Robert Tubbs, Willowwood Farm, Pottersville P.O.
Mount, T. S., Hamilton Sq.
Schulze, Edward H., Elizabeth
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Palmer, H. C. H., Main Road, Vineland
Putnam, G. H., Vineland
Parkin, J. W., No. 576 E. 23rd St., Paterson
Martin, Geo. W. R., No. 47 Chestnut St., Newark
Lintner, Geo A., Summit, New Jersey

Kirkpatrick, F. L., No. 35 E. Chestnut St., Merchantville
Gilmore, Jr., Thos. J., No. 219 Montgomery St., Jersey City
Haddon, Chas. K., Camden
Black, Walter C, Hightstown
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Bailey, G. W., Kenilworth
Eyferth, Adolph, No. 554 Tenth St., N.E., West New York, N. Y.
Matlack, C. L., No. 47 Potter St., Haddenfield
Wellborn, C. E., Weston
Somers, A. F., No. 187 Warren St., Jersey City
Turner, H. J., Box 356, Montclair
Woodruff, Leon, No. 27 Jefferson St., Bridgeton
Davis, H. H., No. 113 Chestnut St., East Orange
Butler, F. W., Mrs., Plainfield
Kevitt, T. C, Anthonia
Maurer, E. H., No. 309 S. Broad St., Elizabeth

NEW MEXICO

Thompson, W. M., Dr. Logan

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NEW YORK

Hedrick, U. P., Prof., Experiment Station, Geneva
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Bailey, Liberty H., Cornell Agric. Coll., Ithaca
The Rochester Nurseries, Rochester
L'Amoreaux Nursery Co., Schoharie
Green's Nursery Co., Rochester
Lewis, Roesch & Son, Nurserymen, Fredonia
Burnette, F. H., Phelps
Wheatcroft, S. F., Brooklyn
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Studley, Frank P., Matteawan
Bostwick, Henry J., Clifton Springs Sanitarium, Clifton Springs
Wyckoff, C. H., Aurora
Slocum, J. F., 29 Park Street, Buffalo
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Morgan, H. E., Pittsford
Williams & Co., Rose, Miss, Newark
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Hemming, H., Mrs., 59 Walworth St., Brooklyn
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 "Ridgewood Times", Myrtle & Cypress Aves., Brooklyn
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 Hoyle, Louis C., Middletown
 Hall, John, Sec'y, Rochester
 Miller, Francher, L., No. 605 Kirk Block, Syracuse
 Mitchell, F. J., No. 44 W. 98th St.
 Leggett & Co., Francis H., Franklin, Hudson & Leonard Sts.
 Krizan, Jos., No. 521 E. 72nd Street
 Jaburg Bros., No. 10-12 Leonard St.
 Mathans, J. A., White Plains
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 Hewitt, R., Ardsley on Hudson
 Evans, J. C., Lockport
 Hessinger, M. A., No. 102 West 102d St.
 Wetbeck, J. B., Care of Worcester Salt Co., No. 71 & No. 73 Murray St.
 Scott, Thomas C., No. 372 Chenango St., Binghamton

Dye, Walter A., Garden City
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Brown, Carl W., Ripley, Chautauqua Co.
Teran, T. Mrs., Hotel Calvert, New York City
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Banks, E. M., No. 342 West 45th St., New York City
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Gawey, Gerald, No. 347 W. 19th St.
Maynard, A. R., Waterloo
Johnson, M., No. 540 W. 146th St.
Strawn, T. C., No. 355 W. 55th St.
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OHIO

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McEwen, Will J., No. 755 Wilson Ave., Columbus
Miller, Wm., Gypsum
Marshall, Robert, No. 23 Hollister St., Cincinnati
Longsworth, I. R., Lima
Kiser, Frank A., Fremont
Goetz, C. H., Columbus
Draine, F. J., 2411 Detroit Ave., Toledo
Cochran, J. H., Napoleon
Bundy, C. C., No. 1356 Mt. Vernon Ave., Columbus
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Poston, E. M., President, New York Coal Co., Columbus
Rodgers, A. S., Springfield Gas Engine Co., Springfield
Jeffers, F. A., Monroe Bank Building, Woodsfield
Kennedy, C. S., No. 412 Monroe St., East Liverpool
Crawford Co., M., Cuyahoga Falls
Hoyt, C. H., Cleveland
Ashbrook, Wm. A., Hon., Johnstown
Johnston, I. B., Station K., Cincinnati
Stasel, A. A., No. 25½ S. Third St., Newark
Book, G. M., Bloomdale
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Anderson, A. J., "Ohio Farmer", Cleveland
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Lohman, E., Greenville
Ewart, Mortimer, Mogadore
Schumacher, Arlin, Pandora
Yunck, Ed. G., 710 Central Ave., Sandusky
Nellis, A. S. Byrne, Dr., Cor. Third & Webb Sts., Dayton
Rogers, W. B., St. Stanislaus' House of Retreat, Cleveland
Parrott, Frances, Miss, R. D. 12, Dayton
Rector, J. M., Dr., Columbus
Lauder, Ed., Dr., 1012 Prospect Ave., S. E., Cleveland

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OREGON

Robinson, C. A., R.F.D. 1, Carlton, Yamhill Co.
Oregon R. R. & Navigation Co., Portland
Power, Frank W., Sec'y State Horticultural Society, Orenco

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Deer, G. N., Ancon, C. Z.

PENNSYLVANIA

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Hutchinson, Mahlon, 138 South 15th Street, Philadelphia
Taylor, C. B., Philadelphia
Townsend, C. W., Pittsburg
Allen, Carl G., Williamsport
Hall, L. C., Avonia
Sober, C. K., Lewisburg
Foley, John, Forester Penn. R. R. Co., Broad St. Sta., Philadelphia
Mann, Chas. S., Hatboro, Montgomery Co., R. D. 1
Springer, Willard, Jr., Forest Asst. Pa. R. R. Broad St. Sta. Philadelphia
Peck, Wm. H., Care of Third Nat. Bank, Scranton
Riehl, H. F., Manheim
Hildebrand, F. B., Duquesne
Wolford, C. H., Prin. Duquesne Public Schools, Duquesne
Motts, Sarah E., 533 S. Hanover St., Carlisle
Watts, R. L., Prof. of Horticulture, State College
Hebbin, T. T., McKeesport
Ballou, C. S., Potter Co.
Marsden, Biddle R., Dr., Chestnut Hill, Philadelphia
Fenstermacher, P. S., Care of Harry C. Tripler, Young Bldg., Allentown
Keeler, Asa S., Tunckhannock
Hess, Frank P., Jr., 31 N. Walnut St., Mt. Carmel
George, W. H., Edgewood, Bucks Co.
Scott & Hill, Erie
St. Francis, J., 21 Scott Block, Erie
Wilt, Edwin M., No. 816 Brooklyn St., Philadelphia
Wright, W. J., State College
Scott, W. M., No. 824 Centennial Ave., Sewickley
Small, Norbert, Edgegrove
Schotte, T. B., Kittanning
Kirkpatrick, F. L., No. 273 Eleventh St., Philadelphia
Gochnauer, Benj. H., Lancaster, R. F. D. No. 7
Engle, E. B., Marietta
Cook, Dr., George R., Johnston
Chalmers, W. J., Vanport, Beaver Co.
Cahalan, Jno. A., No. 1524 Chestnut St., Philadelphia
DeWeese, D. M., No. 51 Logan Ave., Sharon
Doan, J. L., School of Horticulture, Ambler.
Keystone Wood Co., Williamsport
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Hassell, H. W., Dr., Medical Department, Eastern State Penitentiary, Philadelphia
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Palmer, C. L., Dr., P. O. Box, Mt. Lebanon
Spear, James, Jr., Wallingford
Hoerner, William S., Chambersburg
Hazel, Boyd E., Box No. 57, Madisonburg
Stover, C. J., Ambler
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Richards, A. C., Schellsburg
Stocks, George, No. 1128 Heberton, Pittsburgh
Rhoads, Dr., J. N., No. 1635 S. Broad St., Philadelphia
Quimby, C. S., R. F. D. 3, Phoenixville

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Heaton, H. W., M.D., No. 2 Iron's Block, Providence
Winslow, Ernest L., Providence
Bronsdon, M. H., Chief Engineer, The Rhode Island Co., Providence

TEXAS

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Edward, Chas. L., Dallas
Kyle, E. J., Prof, of Horticulture, College Station
Anderson, J. H., Brighton
Canada, J. W., Houston

UTAH

Hansen, O. K., Dr., Provo
Hughes, M. A., Dr., Judge Bldg., Salt Lake City

VERMONT

Woodman, J. S., So. Royalton
Cummings, M. B., Sec'y State Horticultural Society, Burlington
Parrish, John S., Eastham, Albermarle Co.
Blue, C. E., Ridgeway, Charlottesville
Haynes, I. J., Manakin

VIRGINIA

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Catlett, Carter, Gloucester

WASHINGTON

Washington Nursery Co., Toppenish
Shomaker, Joel, Nellita
Moody, Robert, Everett
Stuart, John A., Christopher Nurseries, Christopher
Davis, Pauline, Miss, Box 415, Pullman
May, Walter, 456 Empire Bldg., Okanogan
Western Farmer, Spokane
March, G. L., Kennewick

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WEST VIRGINIA

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DISTRICT OF COLUMBIA

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Coville, Fred. V., Prof., Bur. Plant Industry, Washington
Clinton, L. A., Prof., Dept, of Agric., Washington
Stabler, Albert, Ins. Agt., Washington
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Life & Health, Takoma Park Sta., Washington

EXTRACTS FROM LETTERS FROM STATE VICE-PRESIDENTS AND OTHERS

A well-known nut grower in Delaware writes: "We have given the filberts a thorough test and found them one of the most unprofitable nuts ever tested. At one time we had under test about 15 distinct varieties. After several years tests they all succumbed to the blight; a blight that attacked the old wood and killed it. Some of our bushes or trees got as much as six inches in diameter before they were entirely killed back. Possibly by thorough spraying from the setting of trees a success might be made. Some varieties tested were very prolific and of fine quality. We succeeded in getting a fine lot of walnuts from the tree southeast of the potato house by applying pollen. They are as fine and as well filled and as large as any I have ever seen. Several of our crosses had a few nuts this year, most of them are rather thick shelled. The trees though seem to be perfectly hardy. We have several Japan walnut trees bearing this year some of which I

consider first class, equal to the best shellbarks or pecans in cracking quality; besides they are so very prolific, producing as many as a dozen in a cluster. We can show specimens from several distinct varieties or types. The Cordiformis seems to be one of the best. We also have some very fine black walnuts. One of our seedlings from the select nuts produces the largest walnuts that I have ever seen. The tree did not have very many on it this year. Several of the other seedlings from the same planting produced fine nuts with good cracking qualities. We also had several pecan trees to bear a few nuts this year; most of the nuts were rather small but of fine quality, very thin shells and well filled. Our Japan chestnuts bore quite full.

I think it possible to produce Persian walnuts successfully in our locality. I also think the Japan walnut offers a good field for investigation."

FROM THE STATE VICE-PRESIDENT FOR COLORADO

Dec. 11, 1912.

So far as I can learn only two attempts have been made in this state to grow nuts. The first one consists in the setting out of about one hundred Japanese walnuts by the Antlers Orchard Co. Their place is on the western slope in the fruit district and I am informed that the first winter the tops were killed but new shoots put out from the roots and the trees did well this year.

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The other attempt is one I made last spring. I set out a few pecan trees as an experiment near Colorado Springs. Six of the seven trees lived and put out some leaves but did not make much growth. If they survive the winter I purpose planting more pecans and some other nuts,—chestnuts, black walnuts and possibly Persian walnuts.

Hilton, N. Y.
Nov. 29, 1912.

Dear Sir:

In reply to your inquiry I am inclosing notes on walnut culture in this locality. This noble fruit is not generally known here. I do not know of more than twelve or fifteen bearing trees in my county. Of these all are without doubt seedlings, and are located in places where the peach will thrive. The soil in which they grow is varied: Dunkirk fine sand, Dunkirk silt loam, Ontario fine sand loam, and Ontario loam. (See soil survey of *Monroe county*, N. Y. U. S. Dept. Agriculture.) The altitude is comparatively low. The highest point in the county is only 682 ft. above lake Ontario, and the average elevation is not more than 300 ft. The "Holden" walnuts are growing at a still lower level. This tree, considering its surroundings and location, had a good crop this year. Standing on the lawn uncultivated and unfertilized, hemmed in on three sides by other trees, it gave us at least three bushels of fine nuts.

The wood showed no injury after last winter's intense cold. Growth started in the spring just as the apple blossoms came out. The catkins are very large, at least much larger than those on the other trees we have, and hang on longer. One of our trees loses its male blossoms before the female bloom appears, but the "Holden" is the last to lose them. About half of the clusters of fruit have two or three nuts in them. We began harvesting the nuts Sept. 15th, just four months from the blossom. The dropping continued for a month, prolonged on account of lack of frost.

Last week the Rochester Democrat and Chronicle reported the appearance of the first load of English walnuts ever brought on the local market. They were grown on fifteen year old seedlings, at East Avon, N. Y., by Adelbert Thompson. His orchard is said to contain 200 trees. It seems very probable that the next twenty-five years will see the development of Persian walnut growing, to commercial proportions, in those localities in the state where the peach will grow.

I had a little experience last spring with southern grown walnut trees. Last spring I received from Louisiana eleven trees of the "Holden" variety grafted on black walnut stocks. They were fine trees, the largest at least eight feet tall. Six of these I set out in my own orchards and gave them intensive care and cultivation, but alas, growth was weak and at last they died. If I were to deduce any conclusions it would be that there is too great a difference between Louisiana and New York conditions.

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FROM THE SECRETARY OF THE MINNESOTA STATE HORTICULTURAL SOCIETY

Dear Sir:—

I am addressing you as secretary of the Northern Nut Growers' Association in hopes that you can refer me to some one, perhaps a member of your society, in this part of the country to whom we can appeal to take part at the coming annual meeting of this society as champion of nut growing. While in our state we cannot successfully grow pecans, nor perhaps the sweet chestnut and some other nuts, yet some varieties do well with us and a larger interest in their growing should be stimulated.

Yours very truly,

*** END OF THE PROJECT GUTENBERG EBOOK NORTHERN NUT GROWERS ASSOCIATION,
REPORT OF THE PROCEEDINGS AT THE THIRD ANNUAL MEETING ***

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