THE JOURNAL OF THE AMERICAN
CHESTNUT FOUNDATION

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EDITOR'S INTRODUCTION TO THE JOURNAL OF THE AMERICAN CHESTNUT FOUNDATION

This second issue of *The Journal of The American Chestnut Foundation* is part of our continuing effort to keep our members and others informed on the future (and the past) of the American chestnut. We are pleased to present Dr. Fulbright's exciting news of the survival of significant numbers of American chestnuts in Michigan, apparently due in part to locally occurring hypovirulence in the fungus which causes chestnut blight. Dr. Burnham's article tells of a large number of surviving hybrids, and the late Dr. MacDaniels' article describes the experiences and frustrations of an early chestnut researcher. President Rutter reports on a vigorous and aggressive American chestnut grove in Wisconsin, and we also bring your readers good news on support for the work of the Foundation. The core of the Foundation's support remains its members, and the staff of the Foundation wishes to express its appreciation for their loyalty and their highly important financial contributions.

The Editor would like to extend special thanks to Ms. Audrey French who provided proofreading services for this issue. The remaining errors in the text of this issue of *The Journal* were made in material typeset by the Editor after Ms. French completed her excellent work, and she has no responsibility for them.

As noted in our introductory issue, we intend to publish articles of interest to the scientific community and to tree lovers generally. We solicit the contributions of interested readers. If you have something you feel would contribute to the work of The American Chestnut Foundation and would be of interest to people who are concerned about the American chestnut, please send your manuscript to me, in care of Willeke & Daniels, Attorneys and Counselors at Law, Suite 330, 1201 Marquette, Minneapolis, Minnesota 55403-2455. All items accepted for publication will become the copyrighted property of The American Chestnut Foundation.

Donald C. Willeke, Secretary and General Counsel of The American Chestnut Foundation and Editor of *The Journal of The American Chestnut Foundation*

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THE SURVIVAL OF AMERICAN CHESTNUT TREES IN MICHIGAN

BY DENNIS W. FULBRIGHT

ASSOCIATE PROFESSOR, DEPARTMENT OF BOTANY
AND PLANT PATHOLOGY
MICHIGAN STATE UNIVERSITY

The American chestnut tree *(Castanea dentata)* in Michigan has historically been composed of two distihct populations; those in the southeastern corner of the state within the natural range of the American chestnut and those planted as many as 150 years ago throughout the remainder of the state. Today, those American chestnut trees in Michigan within the natural range of the American chestnut are rare and occur as small saplings or understory coppice groups. This population was destroyed by chestnut blight as well as the encroachment of civilization. In contrast, those trees planted by pioneering farmers are still rather common. Most of the trees are mapped and can be found on the western side of Michigan's lower peninsula. The trees range in size from small seedlings to giant patriarchs, more than 5 feet in diameter and over 60 feet tall. That pioneering farmers would plant American chestnut trees around their homesteads tells of the important role this species played in the lives of these early settlers.

Chestnut blight, caused by the fungus *Endothia parasitica* was first discovered in Michigan in 1916 on the campus of the present day Michigan State University. It was found on Paragon Nursery stock which had been shipped into the state from New York and planted in the forest nursery. An eradication program ended this threat until 1927, when chestnut blight was observed in the southeastern (natural range) counties of the state. By 1930 the blight had reached the western side of the state. During the next 50 years the devastating disease spread throughout the state. Finally reaching beyond the 45th parallel in 1977, the blight even found a stand of trees on South Manitou Island, about seven miles from the mainland in Lake Michigan. The blight fungus has infected trees in more than one third of the American chestnut locations in the state. Many of the locations that remain blight free are very close to blighted sites and remain in great jeopardy of contracting the disease.

To understand the current excitement about the chestnut blight situation in Michigan requires that we go back to the early 1970's when Mr. Larry Brewer began mapping chestnut trees as a project with Dr. William Gillis of Hope College. This project grew into an avocation as he located 271 American chestnut sites representing approximately 15,000 trees and saplings. History of the stands and blight information data were collected on each site where possible. Brewer met Mr. James Comp of Cadillac, Michigan, when he discovered that Comp had been mapping trees in the Cadillac area. Together, they mapped nearly all the chestnut sites in Michigan. While Brewer has concentrated his efforts on locating new sites and carefully observing previously mapped trees, Comp established a network of volunteer workers that would collect nuts from healthy trees. The goal was to plant seedlings around mature single trees unable to produce nuts due to the lack of a pollen source. The Wexford County Soil Conservation District now plants and distributes these seedlings each spring.

The work these gentlemen did set the stage for an interesting turn of events. In

1976, after reading about European chestnuts in Italy and France recovering from chestnut blight, Mrs. Priscilla Johnson found American chestnut trees in Rockford, Michigan, that matched the description of the recovering trees in Europe. She sent some of the bark samples to researchers at the Connecticut Agricultural Experiment Station where work on chestnut blight and the recovering European trees was being performed. There, researchers were able to isolate the blight fungus from the bark and determined that the fungus was reduced in its ability to cause disease, just as the blight fungus in Europe's recovering groves had been found to be reduced in its ability to kill chestnut trees. The fungus in this condition is called hypovirulent, the state of being less capable of causing disease.

Dr. Wayne (Dutch) Weidlich, a botanist at Michigan State University had been observing and experimenting with chestnut trees most of his life. His arrival at Michigan State University laid the foundation for a chestnut research program in the Department of Botany and Plant Pathology. With the help of Brewer and Comp, the researchers from Connecticut identified two locations with blight infected, but recovering, American chestnut trees. The fungal strains removed from these locations were found to be hypovirulent, just as were the ones Johnson had sent earlier. Since very little was written about these early findings, Michigan's recovering American chestnuts remained largely unnoticed. However, the hypovirulent strains obtained from these groves of trees have been extensively studied and refereed to in several professional journals.

In 1980 Wiedlich organized a nucleus of botanists and plant pathologists at Michigan State University to begin studying the phenomenon of the recovering American chestnut trees. In 1981 Michigan held a chestnut workshop that brought together Comp and his volunteers, Brewer and his extensive maps, Weidlich and the MSU researchers, several chestnut enthusiasts, and Dr. William MacDonald from West Virginia University. MacDonald helped put the Michigan situation into perspective since he had seen the Michigan trees, the Italian trees, and had performed research on chestnut sprouts in West Virginia Weidlich's presentation at this meeting focused attention on the fact that American chestnut trees in Michigan could be found in three general situations: (1) healthy and uninfected escapees; (2) infected and dying trees; and (3) infected but recovering Or dying very slowly.

Soon after that meeting, the American chestnut program in Michigan began to grow with funding from the Michigan Nut Growers Association, Northern Nut Growers Association, Michigan State University Agricultural Experiment Station, and several individual donations. Funds were also obtained from a biomedical research source because the phenomenon of reducing the virulence of pathogens is a very general concept appealing to all areas of infectious disease research. With these funds research has progressed in four directions. First, with the help of Brewer and Comp, we have isolated hypovirulent strains of the blight fungus from 20 of the 104 infected locations in Michigan. The groves from which these hypovirulent strains have been isolated all show some signs of recovery; some more than others. Brewer believes that recovery may be occurring at an additional 14 sites. Second, we have begun to determine the mode and rate of spread of a selected hypovirulent strain by introducing it into a declining, non-recovering grove. We have continued to follow this experimental introduction since 1982 and we are gaining valuable information as to how this strain will compete with the natural blight in the grove. Third, we have placed great emphasis on the genetic mechanisms of the hypovirulent strains found in Michigan. Hypovirulent strains are infected with a virus-like agent that is somehow involved in

reducing the virulence of the fungus. Our work and the work of others have shown that the virus-like agents isolated from hypovirulent strains in North America are genetically different than those isolated from hypovirulent strains in Europe. We have also demonstrated that most of the virus-like agents in Michigan are genetically similar. Fourth, Dr. Frank Ewers is now looking at the tree's response to infection by normal virulent strains and by hypovirulent strains. Both field and laboratory data are being collected on water conduction through stems with chestnut blight infections.

We believe that this information will help us achieve our overall goal of determining how and why these particular groves of plantation trees have survived infection and to use this new knowledge to help manage chestnut in nonrecovering areas. Additionally, a new collaboration between the Michigan State University and the West Virginia University chestnut research programs will help contrast the recovering groves in Michigan with the nonrecovering sites in West Virginia. This research program should increase our understanding of hypovirulence and its potential for the biological control of chestnut blight.

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RECOLLECTIONS OF A LIFETIME OF WORK WITH THE CHESTNUT

BY L. H. MACDANIELS

[Editor's Note: Professor L. H. MacDaniels, who recently passed away at the age of 97 years, worked and taught at Cornell University. Dr. Charles R. Burnham obtained the manuscript of Dr. MacDaniels' article and edited it for this edition of *The Journal of The American Chestnut Foundation*. It is presented as the views of an early researcher in the quest to restore the American chestnut.]

My experience with the American chestnut began at the turn of the century in northern Ohio in the town of Oberlin. The chestnut did not grow abundantly near the town but was common farther west where the soil is more sandy and somewhat acid. My earliest recollection is roasting chestnuts on top of the wood stove. A cross-shaped cut was made through the shell and the nuts placed on the hot stove and roasted. At that time, the chestnut blight had not been introduced into the United States.

Following high school, I got a job with the Davey Tree Company working in the cities and towns along the lower Hudson River, including Irvington, Ossining and Newburg. Chestnut blight had been introduced into the United States about 1905 and was moving up the Hudson Valley. At the time there were many large estates along the river and it was on these that for the most part the Davey people were working. It was a common practice to fill hollow trees with cement and tape over large cuts with tin. Neither practice was successful, for the methods used did not stop the spread of the wood rotting fungi in the cavities. A particularly troublesome problem was with chestnut trees which were filled with concrete, sometimes using tons of the material. When the blight killed the trees, it was practically impossible to remove them.

When I went to Cornell in 1912, I was much interested in the blight problem. There were many chestnut trees around the Cornell campus and in the surrounding area, particularly in Spencer. In the fall when the nuts were dropping, it was possible to fill your pockets while walking along almost any woodland path. In the area south of Ithaca many large trees had been left in the pastures and nuts could be gathered by the bushel. It was not long, however, before all these trees became infected and the tops died.

In 1922 I acquired several acres of land in Ithaca on which there had been several large chestnut trees, with the stumps still reasonably sound. On each one a series of sprouts would grow to the size of about four or five inches or until the bark cracked at which time apparently the blight spores lodged in the cracks and the fungus gained a foothold. This has been the usual history of sprouts from chestnut stumps.

The destruction of the chestnut forests stimulated much research in an attempt to control the disease. I was concerned directly with the program, mainly because I was able to graft chestnut sprouts in cooperation with Dr. D. S. Welch of the Cornell Plant Pathology Department. At the time Jesse Diller was working in Washington, D.C. on the chestnut bright problem and was trying to find trees that were blight resistant. Much time and effort was spent in finding trees that appeared to be resistant. Scions were obtained from these trees and sent to interested cooperating pathologists in many parts of the country for grafting to determine the determine the degree of resistance. At Cornell work was done at the Arnot Forest where many grafts were made over a period of about three years and many were successful. As far as I am aware, however, none of them had any real resistance.

Dr. W. H. Chandeler, who came to Cornell about 1915, was interested in nut trees and established trial plantings in the Pomology Orchard at Ithaca. In the planting of mixed nut trees there was a native chestnut, also the Japanese chestnut (Castanea crenata) and the American chestnut. The nut problem was neglected for many years and much later, about 1945, a seedling appeared which seemed to be resistant. It grew to a diameter of about ten inches, bore nuts, and seemed promising. I called the tree to the attention of Dr. Welch and sometime later showed it to him. Unfortunately the tree was badly cankered at the base and soon after the top died. [Comment by Dr. Burnham A first generation hybrid with the American chestnut would have only moderate resistance.

On several occasions I have obtained grafted trees of the Chinese chestnut on American stock or on Chinese seedlings only to have them fail after a few years. A grafted tree from Harvey Stokes failed at the graft, but the root stock grew into a straight tree and was somewhat blight resistant. [Comment by Dr. Burnham When I visited Dr. MacDaniels in 1982 at the time of the 75th Anniversary of the Cornell University Plant Breeding Department, Will Provine climbed that tree and obtained flowering branches. Subsequent examination of the leaves showed the mat of hairs typical of the Chinese chestnut. Hence its resistance. It was not the orchard type of Chinese chestnut. Apparently the American chestnut scion grafted on the Chinese stock had died.

I have been much interested in the possibility of securing chestnut cultivars of hybrid origin and learning what is being done at the Connecticut Agriculture Research Station and elsewhere. I also have visited the chestnut orchards in Yugoslavia There, the chestnut trees have been free from blight until very recently and have been an important local source of food In 1960, the blight was just coming into that country and many of the very large trees had typical cankers and were gradually dying. On one trip with a local government forester I was shown a large canker which appeared to be arrested in its spread. In retrospect it might be an example of what Dr. Jaynes had originally reported as hypovirulence. The loss of the European chestnut orchards of Italy and the Balkans is a very serious matter for the local economies.

About 1923 when Chinese trees were introduced into the United States by the Plant Industry Department, I obtained about one hundred trees that were introduced by B. T. Galloway, then head of the USDA Department of Plant Industry. These trees were planted in various locations, many of them in woodland areas and in the Pomology Orchard at Ithaca. They are gone now, some having succumbed to the blight but mostly from *Nectria* cankers. Winter injury has also been an important factor with damage occurring at around -28°F to -30°F. One of these trees planted on my Ithaca lot lived until 1982, when it was in such poor condition that it was removed. It is appropriate to discuss here what the future of the chestnut will be. There are many people selecting or breeding cultivars which hopefully will be of value in developing a chestnut industry.

CHESTNUT HYBRIDS FROM THE USDA-CONNECTICUT BREEDING PROGRAMS

BY CHARLES R. BURNHAM

PROFESSOR EMERITUS
DEPARTMENT OF AGRONOMY AND PLANT GENETICS
UNIVERSITY OF MINNESOTA

The United States Department of Agriculture ("USDA") chestnut breeding program was abandoned and the local plantings destroyed about 1960 because the desired blight-resistant tree with forest-type growth had not been obtained. Relatively few crosses have been made in recent years in the Connecticut program. The original sources of blight resistance were from the Chinese ("C") and/or Japanese ("J") species. They have the same chromosome number as the American ("A") chestnut Hybrids between them were used for additional crosses.

Several sources of hybrids and/or species from those programs exist today. These are:

1. Chestnut species and hybrids on the Graves farm at Hamden, Connecticut. (The Connecticut Agricultural Experiment Station.)
2. Clones of the "Clapper" first backcross tree.
3. USDA C x A F2s grown by Shafer in Indiana.
4. The 15 USDA-Connecticut forest-type test plots of chestnut hybrids.
5. The Fred Russ State Forest Plot, Decatur, Michigan.
6. The Lesesne State Forest planting of hybrids, Charlottesville, Virginia.

Seed from controlled crosses between promising hybrid trees with similar kinds of ancestry has one advantage, *i.e.,* some of the irregular chromosome behavior common to species hybrids will have been lost. Such seeds have the disadvantage that the chance of recovering all of the desired traits of the American chestnut is low. However, many of the trees from the sources listed above are now flowering and can be used immediately in a breeding program.

The first of the above sources, the Graves farm at Hamden, Connecticut. included species and hybrids used in the USDA and Connecticut breeding programs. Certain of those trees have been used for studies of cambial peroxidase isoenzymes as a part of a study of graft incompatibility in chestnuts (Santamour and Jaynes). An inventory of the surviving trees will have to be made.

The so-called "Clapper" first backcross to American chestnut survived the blight for 25 years before succumbing. Graft increases of the Clapper tree exist in several locations and have been used for backcrosses by The American Chestnut Foundation since 1983. The progress of that program was discussed in the first issue of *The Journal of The American Chestnut Foundation,* at 11-12.

Shafer (1966) reported observations on 100 C x A F2s from the USDA program grown in Indiana. At the end of 16 years, five had survived the blight. Two are now flowering and producing F3s that are being grown at several sites.

The last three of the above-listed sources will be discussed in order in greater detail.

THE USDA-CONNECTICUT (DILLER -GRAVES)
FOREST-TYPE TEST PLOTS

Fifteen forest-type test plots that included various chestnut hybrids were established in blight areas in thirteen states. Twelve were established between 1947 and 1954, and one was established in 1958. Thanks to Dr. Frederick H. Berry, a Director of The American Chestnut Foundation, the Foundation has maps of the locations and the planting plans for each. The surviving trees were last evaluated in 1978 (Berry, 1980). Dr. Berry's evaluations and the identifications of most. but not all, of the survivors (based upon information from Drs. Berry and Jaynes) have also been provided to the Foundation. Many of the surviving trees may be of interest to those who wish to develop a hardier blight-resistant chestnut. primarily for nut production. All except Plot No. 15, at Wilton, New Hampshire, included the PI No. 58602 source of Chinese chestnuts, and probably included both "tall" and "orchard" forms. The following table contains the locations of the plantings, the numbers planted, and the number of survivors in 1978 of both the hybrids and the Chinese chestnuts.

Plot	Name	Location	Planted	Hybrids 1978	Chin. 1978
1	Great Mt. Forest	Norfolk, Conn.	131	41	20
2	TV Dam	Norris, Tenn.	132	42	22
3	Glen Helen Nature Res.	Yellow Springs, Ohio	79	28	15
4	Table Rock State Park	Pickens, S. C.	119	30	11
5	Crab Orchard Wildlife Ref.	Carterville, Ill.	99	14	6
6	Upper Perkiomen Val. Pk.	Green Lane, Penn.	99	24	11
7	Fred Russ Forest	Decatur, Mich.	102	16	5
8	Nathan Hale Farm (A)	Coventry, Conn.	90	46	18
9	Nathan Hale Farm (B)	Coventry, Conn.	98	37	6
10	Ouachita National Forest	Glenwood, Ark.	108	23	4
11	Boys Industrial School	Grafton, W. Va.	149	41	19
12	TVA Dam	Guntersville, Ala.	150	35	4
13	State Col. of Forestry	Syracuse, N.Y.	150	10*	7
14	Sinkin Exper. Forest	Salem, Mo.	144	26	16
15	Russell Abbott Forest	Wilton, N.H.	100	28	-

* Part of the planting was removed for a highway.

The author can provide information to interested parties on who to contact to make necessary arrangements to visit the plots.

Controlled crosses between the most promising survivors among hybrids with similar ancestry, within the same plot or in different plots, might be used to produce progeny for further evaluation.

For example, Plot No. 1, at Norfolk, Connecticut. has seven survivors from open-pollinated J x A trees, and seven from open pollination of C x J.A trees.

Plot No. 8, at South Coventry, Connecticut, had four trees from (J x J.A) x C, four from A x (C x J.A), and 11 from C x A, open pollinated, i.e., F2s.

Plot No. 9, the "B" planting at South Coventry, Connecticut. had seven from (J x J.A) x C, four from C x J.A, and at least two from C x A. Both Coventry plots had many Chinese chestnuts from the PI No. 58602 source which included both tall and orchard-type trees'

Plot No. 11, at Grafton, W. Va.. had four from (C x J.A) x (C x JA), five from A x (C x

J.A) and six from J.A x C.

Plot No. 12, at Guntersville, Ala. had 23 from (C x J.A) x (C x J.A).

Plot No. 15, at Wilton, New Hampshire had nine from S-8.J x S-8J, and 10 from (C x J.A) x (C x J.A). 58 is one of Van Fleet's blight resistant selections (USDA).

Similar information on the remaining plots may identify other promising hybrids. One of those plots, the Fred Russ Forest at Decatur, Michigan, is described below.

THE FRED RUSS FOREST PLANTING

The 21 survivors in the Fred Russ Forest planting near Decatur, Michigan, included 14 hybrids that involved Chinese, Japanese and American Chestnuts: eight C x J.A, two J x C.A., one C x (J x J.A), one (C x J.A) x (C x J.A). Two hybrids were J x J.A. Two hybrids were not identified, and five trees were the Pi No. 58602 Chinese source. Since the identified hybrids have American chestnut in their ancestry, I suggested in 1983 that the plot might be used as a seed orchard to produce seedlings in a program designed to produce trees primarily for nut production, selection being for blight resistance and greater hardiness. The source of greater hardiness would be the American chestnut. Plans for further breeding would be aided if comparisons of the hardiness of Chinese, American, and C x A F1s were available.

The plot was renovated through the efforts of Dr. Dennis W. Fulbright of Michigan State University and Greg Kowalski, supervisor of the plot. Planting and distribution is under the supervision of James Hanover, Michigan State University, East Lansing, Michigan (G. Kowalski, personal communication).

THE LESESNE STATE FOREST PLANTING OF HYBRID CHESTNUTS

The largest planting of hybrid chestnuts is in the Lesesne State Forest near Charlottesville, in Virginia Between 1969 and 1976 Dr. Richard A. Jaynes and his associates at the Connecticut Agricultural Experiment Station furnished the seed and seedlings and Dierauf and associates in Virginia also grew seedlings, established them in the Lesesne Forest and cared for the trees. (Jaynes, 1978; Jaynes and Dierauf, 1982). The seed sources were mostly plantings in which the poorer-formed or blight-susceptible trees had been removed (Jaynes, personal communication, February, 1981). The planting included 9,952 seedlings from hybrids from many different sources (open pollination), plus 137 from controlled crosses, 1248 from Chinese chestnuts (423 from orchard types, 825 from "tall" types), and 111 from American chestnuts. The sources of all hybrids, except those from the controlled crosses, were said to represent third to fifth generation selections (Jaynes, 1978). This terminology is explained as follows: progeny from (C x J.A) x A open pollinated, would be considered to be "fourth generation selections" (Jaynes, personal communication). The progeny were not from successive selections from a particular cross or type of cross.

Seedlings from trees that had American chestnut ancestry in both of their parents would have the best chance of being homozygous (true breeding) for some of the genes for at least some of the desired traits of the American chestnut. Four groups of seedlings were of this type, *i.e.,* (1)1783 from (C x J.A) x A, (2)129 from C.A x A (the Clapper tree), (3) 488 from (C x J.A) x (C x J.A), and (4) 62 from (C x J.A) x Clapper (a controlled cross). The extent to which interpollination occurred between trees with the same ancestry probably varied. This could reduce the potential value of their progeny. The 1783 seedlings from three (C x J.A) x A trees are probably the best source. These three trees were described as

having excellent tree form (Jaynes and Dierauf, 1982). A letter from Janes, dated June 10, 1981, stated that the original three trees were near each other and in their prime likely intercrossed Their blight resistance was only fair, but that is to be expected. Since they were from a backcross to the American chestnut (susceptible to blight), the most resistant ones could at best be only hetrozygous for the genes for blight resistance.

These may, possibly, be slight better than F2s from C x A first generation hybrids (F1s), and can be expected to include trees that are homozygous for the genes for blight resistance carried by those three parental blight survivors. Some may have genes for blight resistance from Chinese and Japanese sources. Blight is now rampant in the plantings (Personal observations by David W. French and Thomas Dierauf, November, 1985). In spite of inclement weather during the inspection, French and Dierauf were able, with copies of the original field maps, to identify the most promising trees in one large block with 911 seedlings from the three trees from (C x J.A) x A planted in 1971. Only 33 are judged worth considering further: two are very good, 14 are good, and 17 are judged possible candidates for further evaluation.

Shafer (1966) in Indiana reported similar results for 100 C x A F2s he obtained from the USDA chestnut program. Four reasonably vigorous trees had survived at the end of 14 years and finally only two are producing nuts at the end of 35 years.

The low frequency of promising trees in the Lesesne planting is to be expected The chances of having the desired traits of the American chestnut are only a little better than what might be expected from C x A in the second (F2~ generation, and may be no better.

These are good examples of the large numbers of F2s needed from F1 hybrids. Second generations following successive backcrosses to the recurrent parent (the one being improved) dramatically increase the frequency of trees resembling the recurrent parent, in this case the American chestnut.

The 33 trees mentioned above are flowering and producing nuts. Controlled pollinations between them will produce third-generation (F3) seed that can be used to establish forest-type seed orchards in blight areas in the different ecological zones, *e.g.* northern, middle, and southern areas. Nature will select trees with adequate blight resistance, together with the ability to grow as timber trees. These seed orchards will be sources of improved seed for later plantings.

Other approaches are possible. One is to use the best lesesne trees for crosses with mixtures of pollen from American chestnuts in the different ecological zones. The hybrid seed would be used for plantings within each respective zone. The goal is to ensure recovery of blight resistant American chestnuts adapted to each zone.

Another large block of seedlings from the same (C x J.A) x A source, planted in 1973, will be ready for evaluation in a year or so. Promising trees in the Lesesne plantings will supplement the present backcross breeding programs. Backcrosses have the best chance, by far, of producing American chestnuts with all their desired traits, combined with blight resistance.

Blighted American chestnut trees can be maintained by inoculating them with hypovirulent (diseased) strains of the fungus. Even with the promise this approach offers there remains the need for genetically resistant chestnuts. This goal can be reached only by the backcross breeding program now in progress. Selections for blight resistance must be based upon using virulent strains of the fungus. Trees apparently blight resistant will then be planted in both blight free and blight areas for further evaluation.

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THE PRESIDENT'S MESSAGE

BY PHILIP A. RUTTER

PRESIDENT OF THE AMERICAN
CHESTNUT FOUNDATION

Our tree has become a myth or so I have been told. When I began to investigate that possibility I found there was some truth to it. Several scientists with long-standing familiarity with chestnut biology have expressed the sentiment to me that some of the stories regarding chestnut trees and forests must be exaggerated. "It probably wasn't *that* great. You know how stories tend to grow with each telling." I certainly do. Human nature is familiar to us all. It is very easy to look back on our childhood with rose-colored glasses, and children do tend to remember objects of their early years as larger than life. Most of us can only remember seeing chestnut trees when we were children.

The idea that we might be chasing a mythical ideal which never really existed troubled me deeply. I reread as many of the old scientific studies (which included actual measurements) as I could lay my hands on, trying to satisfy myself that our unicorn had a real basis in fact.

I am perfectly satisfied now that our wonderful tree--the "King of the Forest", the "Eastern Redwood"-has plenty of features to justify our continuing interest and affection. Like most such cases, the facts I have been able to verify fall somewhere between the most grandiose stories and the ordinary tree the skeptics expect. As often happens, I came across some figures that surprised me. Sometimes reality surpasses myth.

I will just mention a few of these myth-reality items here I am actually leading up to a different story.

Height of the tree: It is surprisingly hard to find accounts of anyone actually measuring the trees. There are lots of estimates and guesses. It seems clear that the trees reached 100 feet. but I would have to be convinced that they grew much higher than that. (my readers may consider this a challenge--I would love to be contradicted!)

Diameter at breast height: The most certain measurements made by professional foresters do not get much bigger than nine feet; and I haven't found any photographs of trees visibly larger than that. "Only" nine feet is big enough for me. Lay out a circle 28 feet around, then look up at the tree...

Growth rate: USDA workers put it at 30% faster than oaks on the average.

Age of the trees: Curiously, I have yet to see any ring-counts for big American chestnut trees. How old were those nine-foot trees? 2,000 years is claimed for some chestnut trees in Europe.

Nutritional value of the nut: Here the tree has traditionally been shortchanged. Lots of people "know" that chestnuts do not have any appreciable protein, they are supposed to be all water and starch. That cannot be true, of course, since the nut is a seed, made of cells, which have membranes and protoplasm, so it must have some

protein. In fact. the Connecticut Agricultural Experiment Station in 1982 published an analysis of American chestnuts which stated that the seeds, if totally dry, would contain 16% fat and 17% *protein,* a very respectable amount, better than most corn. I look forward to a flood of mail proving how wrong I am about all these figures. I hope to learn quite a bit!

Now it is time to get to the real story. I spoke about it briefly at the 1985 Annual

Meeting, but I have not gotten it out of my system yet. In fact I was recently reinfected. Last summer Larry Geno, one of the chestnut's best friends, dragged me along with him to visit a stand of American chestnuts in Wisconsin. Actually I had told him about these trees in the first place, but I had always been too busy to go and see them for myself. Overwhelmed by his enthusiasm, I tore myself away from weeding my seedlings and went to see a stand which I knew contained some "big" trees, and "a bunch of little ones."

The reality turned into what was virtually a religious experience for me. There were indeed some big trees, though nothing like the old giants. What was most startling to me was the "bunch of little ones." I have not counted them to be sure, but after my first visit to this stand, I guessed there might be as many as 3,000 saplings (at least 15 feet tail) on this site, and I could not even start to estimate the 1 foot seedlings, which were everywhere.

I recently visited again. Based upon that visit, I have had to revise my guess to more than 5,000 saplings. Most of the trees are very young; probably less than 20 years, although the founding parents are about 100 years oil These young trees, I must emphasize, were not planted. They are the natural reproduction of the older trees, which were planted by an enthusiast. There are also a good number of "poles"--young trees approximately one foot in diameter and 40 feet to 60 feet tail.

There are several important roles this grove will play in the future. One is to help in de-mystifying the tree. Here is a stand, as yet untouched by the blight. where some of the realities can be measured. Another is to improve our understanding of the tree's preferences and requirements. A third is as a show-and-tell site for our remaining skeptics, the people who think we might as well let sleeping giants lie.

The chestnut forests were mostly gone before the science of ecology developed, and while we have many beliefs about chestnut ecology we don't have nearly as many facts as we need to truly understand the tree. Walking through the stand, I could see a few scattered truths, exposed and waiting for any observer. Were chestnuts really "arrow straight," with hardly a branch until the crown? Quite a few of these are. Absolute beauties. Did "big" trees really sprout strongly from the roots when cut? One stump was two feet in diameter (only 60 years old, I counted), with one 10 inch diameter sprout, and four or five more were six inches thick. The owner said the stump was cut 10 years ago.

Walking further, my head buzzed with questions which suddenly might have answers. At one place virtually nothing grows but chestnut saplings. Immediately up-hill the woods is oak and hickory with only a few scattered little chestnut seedlings. Soil difference? Squirrel storage habits? Why here and not there? How fast is that remarkable tree really growing? Just what combination of environmental conditions allows this population to reproduce so explosively? I will not catalog all the questions here. As with many such situations, each question raises others. The point is, here we have a study site where answers can be found. We need to know as much as possible about what makes a healthy population of chestnut grow the way they do, so that when the time comes we can plant blight-resistant seed and trees to the best advantage. Nothing is as dangerous as policies based on wishful thinking or misinformation. They are doomed to failure. Our only friend in forming policy is the truth. We need to find out what it is.

One of the most satisfying things for me when I saw this grove was the knowledge that here is a demonstration, available today, for the doubting Thomases. The *chestnut really was that good--tall,* straight, fast growing, strong sprouting. Most important is the living demonstration that chestnut is not a weakling that will always need special help to survive, an impression some people have gotten from the disaster of the blight.

This site demonstrates unequivocally that given a place that meets its requirements, it needs no help whatsoever to expand its population. In this Wisconsin oak-hickory woods

nothing else can compete with it. It is reasonable to assume the same was true wherever there were pure stands of chestnut. No one will nave to re-plant, tree by tree, the old forests. When the time comes we can turn the blight resistant trees loose in the proper places, and they will take back their old homes--all by themselves. But *we* have to give the chestnut the starting point. The tree cannot do it alone.

Responsibility nags at me now. Having told you about this beautiful grove and the wonderful possibilities it contains, I have to go on. The grove almost certainly will not last. The blight has not found it yet but it probably will. No one can predict when the blight will strike this grove, but the Wisconsin Coordinator for the Foundation recently found the first positively identified case of chestnut blight less than 100 miles away. This chance to study an untouched population is temporary, and we ought to act soon. A few similar sites in Michigan also merit investigation. Unfortunately, there is no money to fund the studies. Funding for the Foundation has recently begun to increase but is still inadequate, even for projects already underway. Please help in what ever way you can.

Philip A. Rutter,

President
The American Chestnut Foundation

FOUNDATION GAINS SUPPORT FROM NURSERYMEN

In an effort to increase the membership of the Foundation, Dr. Cameron Gundersen (Membership Chairman) and President Rutter explored the possibility of cooperation from the various nurserymen who sell chestnuts. Early in the spring of 1985, several of the most prominent national mailorder houses were contacted and asked for help in getting word about the Foundation to people buying chestnuts. Happily, all but one of the houses contacted agreed to help, even though the favor we asked required work and some procedure bending on their parts.

The chore these nurserymen performed for us consisted of packing a Foundation information sheet with each order that included any kind or number of chestnuts; the idea being that persons who have just purchased young chestnut trees might be the very people most interested in seeing that their trees will continue to thrive, and that future trees will have an even better chance. For the nurseries, getting the information sheets packed with the right orders meant considerable effort by the supervisors and the packers; for the Foundation, our contribution consisted of writing and printing the information sheets--some 6,000 of them--sent directly to people who probably held a chestnut tree in their hand while they read it.

We want to thank all the people who helped with this effort, and acknowledge the generous gift of time and effort these public spirited nursery owners and workers made. Their aid is needed right now and is most welcome. Those who gave their help when we asked were: Bear Creek Nursery, W. Atlee Burpee Co., Gurney's, Earl May, Miller's, Rayner Brothers, and Stark Brothers.

If you sell chestnut or other nursery stock and would like to help in this way, please contact either Dr. Gundersen or Mr. Rutter. Likewise, if any of our members have expertise in advertising or public relations and would like to help in the preparation of such information sheets, please get in touch with them. The response to last year's sheets was a little disappointing and we are looking for better ways to get the message across.

P.A.R.

NURSERYMAN MAKES STANDING GIFT TO THE FOUNDATION

Bear Creek Nursery, Northport, Washington, is one of the largest producers of chestnut nursery stock in the country, selling trees both retail and wholesale. The owner, Mr. Larry Geno, is an advocate of what is sometimes called "permaculture"; that is, replacing annual crops with mixtures of fruit-bearing trees and shrubs. If such techniques do prove economic, the benefits could be considerable, as erosion from tillage and wind would be greatly reduced. To encourage people to experiment with these possibilities, Mr. Geno's nursery specializes in the fruit and nut trees which seem to have the most potential along these lines. Chestnuts definitely qualify, and the nursery offers nine different kinds of seedlings, in addition to their large collections of apples, pears, seedling and grafted nuts, berries, windbreak trees, and multipurpose trees and shrubs.

Mr. Geno is a believer in giving a helping hand to worthy projects, and after becoming familiar with the goals and projects of our Foundation last summer, he has decided to donate "*5% of the value of all chestnut trees sold by us*" to the Foundation. He hopes other nurserymen will follow his example and, to some extent, let the chestnut "pay its own way" for the research necessary to make chestnuts a genuinely reliable crop.

The Foundation owes a debt of gratitude to Mr. Geno, and we want to take this opportunity to offer our sincere thanks for his generous support.

STATE COORDINATORS APPOINTED

In the first issue of this *Journal* a plea was made for interested individuals to step forward and give some of their time to help the scientific staff of The American Chestnut Foundation. Keeping track of useful trees and people near them who can gather nuts or pollen, for the whole country, was becoming so time consuming that it was taking time away from other necessary research and planning.

At this writing the Foundation has four volunteers who have agreed to take responsibility for organizing the information about their areas: Dan Stubbs for Minnesota; Greg Miller for Ohio; Bruce Gabel for Wisconsin; and Larry Geno for Washington and the Pacific Northwest. Their addresses are below, and we urge Foundation members in their areas who have information or a desire to actually help with the Foundation's projects to get in touch with them. Keeping track of just one state is a very big job, and they need all the help which Foundation members and other interested persons can give.

We obviously still need coordinators for the rest of the United States. If you have some time and the interest, or if you belong to a group that might be willing to take on the task, please write Philip A. Rutter, President, The American Chestnut Foundation, Badgersett Research Farm, RR 1, Box 118, Canton, MN 55922, or call him at 507-743-8570 for more information.

Mr. Daniel Stubbs
Coordinator for Minnesota
The American Chestnut Foundation
16320 - 154th Street North
Marine on St. Croix, MN 55047
(612-433-3708)

Dr. Greg Miller
Coordinator for Ohio
The American Chestnut Foundation
3276 Empire Road SW
Carrollton, OH 44615

Mr. Larry Geno
Coordinator for Washington
The American Chestnut Foundation
P.O. Drawer 411
Northport, WA 99157

Mr. Bruce Gabel
Coordinator for Wisconsin
The American Chestnut Foundation
RR. 1, Box 25 Holly Road
Bloomington, WI 53804
(608-994-2247)

MINNESOTA DNR HELPING FOUNDATION BREEDING WORK

The Minnesota Department of Natural Resources ("DNR") has recognized the potential of the efforts of The American Chestnut Foundation and is working to provide one of the future needs of the breeding program, more "mother" trees.

Following guidelines set up by the scientific staff of the Foundation, the DNR is planting small groups of seedlings on several of its southeastern Minnesota lands. These plantings are intended to provide a number of single, isolated trees which will be ideal for hybridizing purposes. Because the trees will not pollinate themselves, isolated trees do not require the time consuming bagging of female flowers which must be done wherever there is more than one tree. In addition, these trees are being planted on sites where they can be grown in full sun, so they will bear flowers near the ground. The sites are also selected for accessibility. Many, probably the majority, of surviving chestnut trees are either hard to get to or are so big that reaching the flowers is difficult, dangerous, or impossible. When the DNR's trees start to bear flowers in a few years, it is anticipated that the actual work of making hybrid trees will become much easier.

Another function of these trees is to broaden the genetic variability in the breeding program. Chestnut once occupied quite a few different kinds of growing situations, and if it is to do so once again, the future blight resistant trees need to contain as much variation as possible. At the moment a relatively few trees have actually been used to make the hybrids now growing in Ohio, Virginia, West Virginia, and Tennessee. In the early generations this is not particularly a problem, but as we approach the final goal, it will be better if different trees are used as the American chestnut parent. These DNR plantings will be a significant help at that time.

Having such trees within the original chestnut range would also be extremely helpful. If you are one of those who have been saving the nuts from your local pure American trees, consider planting them as isolated specimens, in full sun and at least one half mile from any other chestnut tree. Keep clear records of when and where they were planted, and where you got the seed. When the survivors start to bear flowers, let us know. It is important to preserve the regional variations of the species.

The Minnesota DNR plantings are being made under the supervision of Mr. Ken Anderson, regional forester for southeastern Minnesota. Seed for the plantings was gathered from still unblighted trees by several volunteers. Among them were Dan Stubbs and Rick Lamon. This is the sort of team work that we need to get the job done.

FOUNDING MEMBERS

An individual becomes a Founding Member of the American Chestnut Foundation upon contribution of $1,000 or more for membership dues. We are a very new organization and the number of these individuals is small, but the importance of their support in these early years cannot be over emphasized. We want to extend our special thanks for their help. The present Founding Members of the Foundation are:

Dr. Charles R. Burnham

Dr. Donald B. Lawrence

Dr. F. John Lewis

Ms. Janet North Prie

GRANTS TO THE FOUNDATION FROM THE LAUREL FOUNDATION AND FROM WALLACE DAYTON

The American Chestnut Foundation is slowly beginning to aquire the funding so desperately needed to effectively pursue the programs which we all hope will lead to the restoration of the chestnut. So far, the majority of our funding has come from our members. Our Foundation received a Christmas present this last year which is a heartening indication that our story is beginning to reach the philanthropic institutions as well. The Laurel Foundation of Pittsburg granted us $15,000 for the coming year, "in support of the American Chestnut Foundation's efforts to restore the chestnut tree to America."

More recently, Mr. Wallace Dayton has granted us $7,5OO for the current year. Mr. Dayton is well known as a generous supporter of worthwhile conservation efforts, but his generosity exceeds his reputation. When he was approached by representatives of the Foundation for help in funding current research he agreed to give $5,000. When the check arrived, however, Foundation personnel were warmly surprised and strongly encouraged to find that he had, without being asked, added $2,500 for operating expenses. It is difficult for the Officers and Directors of the Foundation to express thanks adequately for such generosity or evaluate the boost which Mr. Dayton's expression of confidence has given to the spirits of those working on the restoration of the American chestnut tree.

These grants are deeply appreciated by the Foundation and its members. They did much to pay for some basic necessities in the past breeding season.

DIRECTORS RECEIVE AWARDS

The Foundation has an outstanding Board of Directors and we are pleased when other organizations honor them. Recently three of our directors were so honored.

Dr. Charles R. Burnham, the Founding Director of The American Chestnut Foundation and the person responsible for originating the chestnut breeding program being undertaken by the Foundation was recently elected a Fellow of the Crop Science Society of America in recognition of his outstanding achievements in corn breeding.

Dr. Peter Raven, Director of the Missouri Botanical Garden and a member of the National Geographic Society's Committee for Research and Exploration, was a recipient this past year of one of American science's most prestigious awards, the MacArthur Fellowship. Fellows will receive from $24,000 to $60,000 annually during the next five years to pursue their own creative interests without limitation as to the use of the Fellowship funds. The Fellowship was given in recognition of Dr. Raven's achievements in conservation and botany. "The MacArthur Fellow Program frees outstandingly talented and creative people from the constraints of having to earn a living, conform to traditional career paths, or be accountable to forces other than their own productive instincts and energies. Fellows can pursue whatever they believe is important and relevant, even if that means changing careers midstream," said John E. Corbally, MacArthur Foundation president

Donald Willeke, Esq., Chairman of the Minnesota Shade Tree Advisory Committee, was also honored this past year. He received the Urban Forestry Award from the American Forestry Association at the AFA's annual convention in Traverse City, Michigan. The American Forestry Association is the nation's oldest conservation organization. In presenting the award, AFA Executive Vice President Neil Sampson said that Willeke is "a corporate lawyer in Minneapolis by profession and a crusader for trees by spirit. His talents as a speaker, statesman, and organizer have advanced the status of the trees in Minnesota as well as around the country."

Philip A. Rutter
President of the Foundation

NEW DIRECTORS ELECTED

One of the functions of the Annual Meeting of The American Chestnut Foundation is the election of new Directors. This year, five new Directors were added to the Board of Directors, all for three year terms. Au of them are outstanding additions to our Board, bringing broader regional representation, strong interest in our programs, and nationally recognized expertise in a variety of different areas. The new Directors are:

Dr. John Ellis ton, Connecticut Agricultural Experiment Station, one of the traditional centers of chestnut research. Dr. Elliston is a plant pathologist and hypovirulence researcher.

Dr. Al Ellingboe, University of Wisconsin at Madison. Dr. Ellingboe is a well known plant pathologist with a long standing interest in chestnut

Dr. Dennis Fulbright, University of Michigan. Dr. Fulbright is also a plant pathologist, and has organized an ambitious investigation of the naturally occurring hypovirulent blight strains in Michigan.

Mr. Richard Waybright, Executive Director of the West Virginia Forestry Association. West Virginia was the heart of the commercial chestnut timber area, so Mr. Waybright brings an extra interest to the Board.

Dr. Mark Widrlechner, Iowa State University. Dr. Widrlechner is the horticulturist for the North Central Regional Plant Introduction Station.

We are proud to have such distinguished people join our Board. Welcome!

Anyone may make nominations for the Board of Directors. If you know someone you think would be an asset to your Foundation, please send details about them to: Nominations Committee, The American Chestnut Foundation, Dept. of Plant Pathology, University of Minnesota, St. Paul, MN 55108.