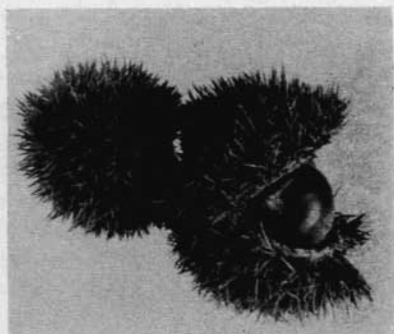


Fig. 1. An American chestnut, *Castanea dentata*, in Mecosta Co., Michigan.



Fig. 2. Flowers of the American chestnut (reduced 3x).

Fig. 3. Fruit of the American chestnut (reduced 2x)



Chestnut Blossoms in Michigan

by Marion Isabelle Whitney

The sight of an American chestnut tree in full bloom is rare today, now some 45 years after the peak of the great epidemic which nearly wiped out the species. Two trees, which apparently weathered the epidemic and presumably are disease resistant, were found in bloom during July 1966 near Borland, Michigan, 0.8 miles east of highway 131 on County Road 548 in Mecosta County. When found both large trees were very impressively covered with long golden catkins (See Figs. 1 and 2).

Only a few such trees are known to exist. The younger generation of Americans scarcely knows this handsome tree, which once was one of the glories of the American scene as well as being one of the most useful and versatile of American trees. It was an important crop tree from the standpoint of its nuts, its wood and its bark. Even today the lumber in dead chestnut plantations and dead forests is still useful for very expensive paneling, called pecky chestnut paneling. The limbs and stumps are useful for the tannin they contain. In the past the wood was used for core-stock, interior finish, cabinet work, caskets and other refined purposes. Because of its resistance to decay it was used below and above ground where durability was a requisite. It was used for posts, utility poles, mine props, house timbers, railway ties and other purposes where resistance to decay was important. It was a source of tanning extract, both from its bark and its wood. Its nuts were very valuable food for squirrels, deer, mice, birds and men. It was a highly prized ornamental and shade tree, a friend to the traveler. Longfellow endeared it to the early American scene with his lines, "Under the spreading chestnut tree the village smithy stands." Today, young Americans scarcely know the meaning of chestnut or smithy. Disease destroyed the groves and forest and ornamental trees and nearly destroyed the species. Our changed mode of locomotion made obsolete the smithy.

The American chestnut, *Castanea dentata* (Marsh) Borkh., was native to Eastern America from southern Ontario to Southern Appalachia and from Maine to Illinois. Its greatest pure stands were in the Appalachians where Donald Culross Peattie described the blooming forest, as seen from the mountain tops, as looking like "... a sea with white combers plowing across ..." Then came the great epidemic, caused by the fungus *Endothia parasitica*, a native of China and indigenous to Chinese chestnut trees, which have lived with the disease long enough to develop a tolerance to it. Following the rampaging pattern common to parasitism with the invasion of a new host which has had no prior history of the parasite and has developed no immunity, this fungus-parasite took only about 35 years to destroy millions of this glorious species of tree.

It is thought that the disease came to the American chestnut trees from chestnut nursery stock imported in the 1890's from China and later from Japan. The first of such trees were planted on Long Island, New

York. The disease was first discovered and identified in America at the Bronx Zoo in 1904 by H. W. Merkel, forester for the New York Zoological Society. He noted trees whose tops were dying back and on which cankers were appearing on the bark. Oriental varieties of the chestnut had been planted near the American chestnut in the park. The disease was identified by Dr. W. A. Murrill of the New York Botanical Garden.

The fungus destroyed the trees by killing the inner bark. It produced spores which were spread by wind and feet of birds and insects. On the trees the spores sprouted and sent mycelia through cracks and wounds into the plant tissue, where their growth clogged sap conduits. In a later stage mycelia produced external cankers, which often engirdled the tree trunks and produced the spores. Soon the disease spread to neighboring trees. It traveled about 25 miles per year. Between 1913 and 1923 it invaded and destroyed the great chestnut forests of the Southern Appalachians. Neither chemical spray nor cutting of belts of timber to isolate the disease were effective. By the 1930's the whole range of the chestnut was invaded and millions of trees stood dead. A few tough trees here and there escaped death within the natural range, and a few which had been planted in states beyond its range survived. Often the roots of the great forest trees sent up sprouts, which in turn became diseased and acted as a reserve for the disease organism, which made restoration of the species difficult. It is said that only about 180 positive identifications of surviving trees had been made up to the early 1960's, when appeals were sent out to report any survivors of the epidemic.

Efforts at restoration were begun by the U. S. Forest Service. Survivors of the blight were sought with the hope of developing a blight-resistant strain through cross-breeding with healthy Asian stock. Also, scions were cut from the survivors for grafting onto chestnuts of other species, particularly onto healthy rootstocks of the Chinese variety. Successful crosses have been made with the Oriental and chinquapin stocks. Crossing was slow work. Much of it had to be done with the aid of tall ladders. The trees are monoecious. Catkins appear in June or July long after the tree has leaved out. The catkins are of two sorts. The staminate kind is large and showy. The other type is smaller and has both pistillate and staminate flowers. As the accompanying illustration shows, the entire tree is covered with catkins. The task of cross-breeding involves selecting those catkins which can be reached, hand pollinating, cutting away the staminate parts and covering with bags to keep out stray pollen and later with screen to keep out the squirrels. Nursery stock of the new hybrids is beginning to be sold. Some of the trees have reached 40 feet and have borne fruit. The task of hybridizing still continues. Several experimental stations and cooperating investigators are at work on the task. Nuts are gathered in several states and sent to the experimental stations. Some of the Michigan trees are involved in the task of restoration. Two small trees on Beaver Island in Lake Michigan produce a few nuts each year. They are carefully gathered while they are still viable. The Conservation Officer then sends them to one of the several

experimental stations.¹

The chestnut was never very abundant in Michigan. The natural range in Michigan was limited to the southeastern part of the state. It ranged only as far north as St. Clair County, just north of Detroit. It was planted elsewhere, however, and survived until the blight invaded Michigan. There are still several trees widely scattered over the state. One of these is at Shepherd, Michigan. Two are on Beaver Island, several occur around Grand Traverse Bay. The photograph of the bur (Fig. 3) is from one of the trees in Traverse City. Several other trees are known in Michigan; a notable specimen still thrives on the Michigan State University campus at East Lansing. Presumably the two large trees near Borland, Michigan were planted there, since this is north of their normal range in Michigan. The tree will grow on a variety of soils from sandy loam to rocky hillsides. Its best growth is attained on loose, loamy soil either acid or neutral. It does less well on alkaline soil, which may account for its limited range in Michigan, for the glaciers brought a great deal of calcium carbonate into the state. Also, for the same reason, its distribution on the Atlantic coastal plain was limited where calcareous Cretaceous rocks occur and influence the alkaline content of the soil.

The normal mature size of the American chestnut was about 80 feet tall and 3 or 4 feet in diameter. In the Allegheny Mountains it has been known to reach 120 feet in height and 10 feet in diameter. It grows faster than oak. In a crowded forest it produces a straight, clear trunk with rounded or pyramidal crown. In the open it branches near the ground and tends to spread. Its bark is smooth and dark brown in the early stages. Later it has long flattened ridges and deep furrows, is hard and scaly and grayish-brown in color. The leaves are entire, dentate, glossy, dark green, 6 to 8 inches long and drooping. Its catkins are of two types. One is a long, pencil-like structure, 6-8 inches in length, showy, creamy-yellow in color and entirely staminate. The other is shorter, less conspicuous and has green pistillate flowers at its base with scattered staminate flowers. Some of the latter type are shown in Fig. 1. The bur (see Fig. 3) is brown in color, 1.5 to 2.5 inches across when ripe. It develops very rapidly, becoming full size by mid-August. It is covered with branched spines arising from a woody husk, which is lined with a soft down. It splits into four parts and bears one to three nuts. The nuts ripen after the first frost, are 0.5 to 1 inch across, brown in color and turbonate in shape but flattened on one or more sides. The wood is weak, coarse and porous but durable. For the core of furniture paneling it had no peer because it took glue exceptionally well.

The loss of the chestnut tree was one of the greatest forest tragedies ever known. Let us cherish what is left to us of this beautiful and useful tree and make every effort to bring back to the American scene a disease-resistant hybrid.

¹In an article in the April 1963 *Reader's Digest*, the author J. C. Furnas requested that when a native tree more than 8 inches in diameter at breast height was found that twigs and leaves or a snapshot should be sent to Dr. Jesse D. Diller, Northeastern Forest Experiment Station, 102 Motors Ave., Upper Darby, Pa. or to Dr. Richard A. Joynes, Connecticut Agricultural Station, Box 1106, New Haven 4, Connecticut.
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