NOTES ON NUT BEARING TREES OF ILLINOIS

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An increasing interest is being shown in the growing of nuts in Illinois. Part of this interest has been aroused by reports of the commercially profitable nut industry in the South where the so-called "paper shell" pecan is grown, or in the extreme West, where extensive orchards of the Persian (English) walnut are found. Many are asking whether these nuts can be grown in Illinois either about the home or on a commercial scale as other fruits are grown. Many native nut trees bearing edible nuts are to be found scattered over the state, but comparatively little attention has been paid to them, the general sentiment being that better varieties were available from outside. While this is in some cases true there is danger in importing species not adapted to our locality. It is, therefore, highly important that an intelligent interest be aroused looking toward the conservation and improvement of our native nut trees as well as the introduction of desirable varieties from other countries.

In order to study the whole situation with reference to the needs and possibilities of nut growing in Illinois, a general survey of the occurrence and distribution of native and introduced nut trees in this state is being made by the writer. Considerable valuable information has been very kindly furnished regarding the nut trees native to the state by Mr. R. B. Miller, State Forester, from his extensive records. Dr. L. H. Smith and assistants in the Soil Survey work in the College of Agriculture at the Experiment Station have been very helpful in listing the numerous genera and species of nut trees as they have located them in checking up on the flora in making up soil maps of the different counties. Colleagues in the Department of Horticulture have also added to our list of nut trees as they have observed them. An extensive correspondence among the members of the Northern Nut Growers Association, county farm advisors, and others interested in nut growing in the state has been of assistance.

It is hoped that we will be able to prepare a detailed county map of the state showing (1) the native range of the most important nut bearing trees, and (2) the most important areas where such trees are being successfully grown outside their natural range because of local conditions favorable for growth and fruiting. Much of this information is in process of tabulation and no definite conclusions can be drawn as yet in answer to all questions being asked.

A number of interesting facts have, however, been gathered and are here submitted in the nature of a progress report.

Nut bearing trees native to Illinois include the shell bark hickory, Hicoria laciniosa, [1](C. laciniosa Cy), the shag bark hickory, H. ovata, (C. ovata Cy), the mockernut, H. alba, (C. alba Cy), the bitternut, H. cordiformis, (C. cordiformis Cy), the pecan, H. pecan, (C. pecan Cy), the American sweet chestnut, Castanea dentata, the black walnut, Juglans nigra, the butternut or white walnut, J. cinerea, the beech, Fagus americana, (F. grandifolia Cy-Ag.)[2]. Smaller trees or large shrub like forms include the Chinquapin chestnut, C. pumila, and the American hazelnut, Corylus americana.

A number of hickory and walnut species hybridize rather freely. There are some excellent hybrid varieties showing indications of the pecan-shell bark hickory and the shag bark-bitter nut cross.

Nut bearing trees not native to Illinois, but varieties which are promising for planting in different sections, include the European filbert, C. avellana, the Japanese walnut, J. sieboldiana, the Chinese walnut, J. cathayensis, and the Japanese heart nut or flat nut, J. cordiformis.

Nut bearing trees not considered desirable for general planting in this state include the English (Persian) walnut, J. regia, and horticultural varieties of the so-called "paper shell" southern pecan. The former is not as hardy in wood or bud as the black walnut and is often killed back to the ground. This so-called winter injur

(1) Standardized Plant Names—1923—American Joint Committee of Horticultural Nomenclature-Salem, Mass., is here used as authority.

(2) The pignut (C. glabra Cy. C. porcina) is not included in the above list since (1) it is not commonly edible, and (2) it is probable that the true pignut is not found west of the Alleghenies although this is one of the hickory species which has been much split up by systematic botanists.

is probably due as much to unfavorable climatic conditions found in Illinois during late summer and fall as to low winter temperatures. The southern varieties of the pecan are often winter killed at the tips. In favorable seasons they will grow vigorously but seldom mature any nuts. Trees growing in Pulaski County, in extreme southern Illinois, bear occasional nuts but they are not well filled out and do not ripen.

General Considerations:

Many people do not realize that nut varieties do not come true to type from seed any more than do apples. Like other fruit trees, therefore, nut trees have to be propagated by budding or grafting. Seedling trees of doubtful value will result from planting of nuts no matter how desirable were the nuts. These trees will very seldom produce nuts as good as the parent and will, if they bear at all, be very slow in beginning. Because of this difficulty it is desirable to grow named varieties, propagated by reputable nurserymen, or to work over seedling trees with scions or buds with stock of a named variety.

Nut growing is comparatively recent and few nurserymen have devoted much attention to the propagation of named varieties. Many nurseries show photographs of superior nut varieties in their catalogs but list for sale practically nothing but seedlings. This is unfortunate in that it is disappointing and expensive for the purchaser to buy trees and care for them with the mistaken idea that he is getting good varieties.

Nut varieties worthy of general propagation and distribution must have certain valuable qualities. First of all the parent tree should be healthy and vigorous with no inherent fault as to its growth habit. The ideal tree is a regular bearer and at least moderately productive. The nuts should ripen early and be of good size and easy to crack, with a fairly thin shell, with a fair proportion of meat to the amount of shell. They should be quite resistant to the attack of insects and diseases. Some chestnut hybrids in southern Illinois, for example, are more resistant to the chestnut weevil than others

growing close beside them. The nut meats should be plump, of good color, rich flavor, and high quality.

Nut trees are more difficult to propagate than some other fruit trees and are, therefore, somewhat more expensive to buy. They should be planted at considerable distances apart, however. The initial expense involved will then be less than in planting an area to other fruit trees.

The Black Walnut:

The chief native nut tree of Illinois and the one to be most recommended for general planting is the black walnut. It is found growing wild throughout the length and breadth of the state where soil conditions are suitable. This species is adapted to a deep, moist but well drained soil such as is usually found on the so-called prairie types in Illinois. The soil must be rich for best results as the walnut is a very heavy feeder.

Its chief commercial importance has, in the past, resulted from the excellent qualities of the wood. This was used for many purposes ranging from fence rails to the finest cabinet work. Many trees have been cut for the lumber which should have been left to bear nuts.

Quite recently improved horticultural varieties of the black walnut, such as the Thomas and Stabler, have been found and are being propagated and sold for general planting. Considerable interest has been taken in the commercial possibilities of the black walnut, especially in southern Illinois. The late Mr. E. A. Riehl of Alton, the best informed man in the state on the growing of nuts, told the writer in 1924 that he secured ten pounds of meats to the bushel of Thomas black walnuts and could not supply the demand of the trade at a sale price of one dollar a pound. Commercial cracking machinery just placed on the market cracks the meats much more easily and cheaply than it was formerly done by hand.

The named varieties sell for higher prices because of their easier cracking quality, larger size and better flavor. The kernels of the black walnut are the most desirable for many purposes, especially in cooking and candy making. The black walnut is the only nut meat

which retains its full flavor upon cooking. The meat is more palatable and lighter in color if the nuts are allowed to cure properly and the husk is removed from the shell before it stains the meat a dark color. With the possibilities of increased consumption of nuts as food practically unlimited there is a bright future for the black walnut industry in this state.

A number of interested fruit growers in Union and Pulaski counties are top working seedling walnut trees, growing on hillsides or other out of the way places, to desirable varieties. They use a modified bark graft as a rule. It is usually safer to cut back the tree a few days before it is to be top worked and then to protect the young scion for a few weeks after grafting by bagging. It is desirable to support the vigorously growing scion the first season by tying it to a lath which has been fastened to the stock. Black walnuts begin to bear early. The writer saw, in Williamson County in October, 1924, a grafted tree of the Thomas variety at four years of age bearing thirty-nine nuts. (Plate 1, Fig. 1.) The species is well known as a long lived tree, and properly cared for it should increase in productivity annually for many years.

The Butternut or White Walnut:

This species is found in all parts of the state though not as commonly as the black walnut. It will grow on a variety of soils but succeeds best when planted on a rich, well drained, gravelly loam. It has been found locally in ravines and along streams where the soil is loose. Compact soils are not favorable for its growth.

The tree is much smaller in size than the black walnut, not as healthy or vigorous and varying greatly in productiveness. The nut has somewhat the same qualities as the black walnut with a rough thick shell, rather more difficult to crack. Some people like the flavor of the meat better than that of the black. Promising varieties originating in the East, such as the Manchester, should be tried out under our conditions.

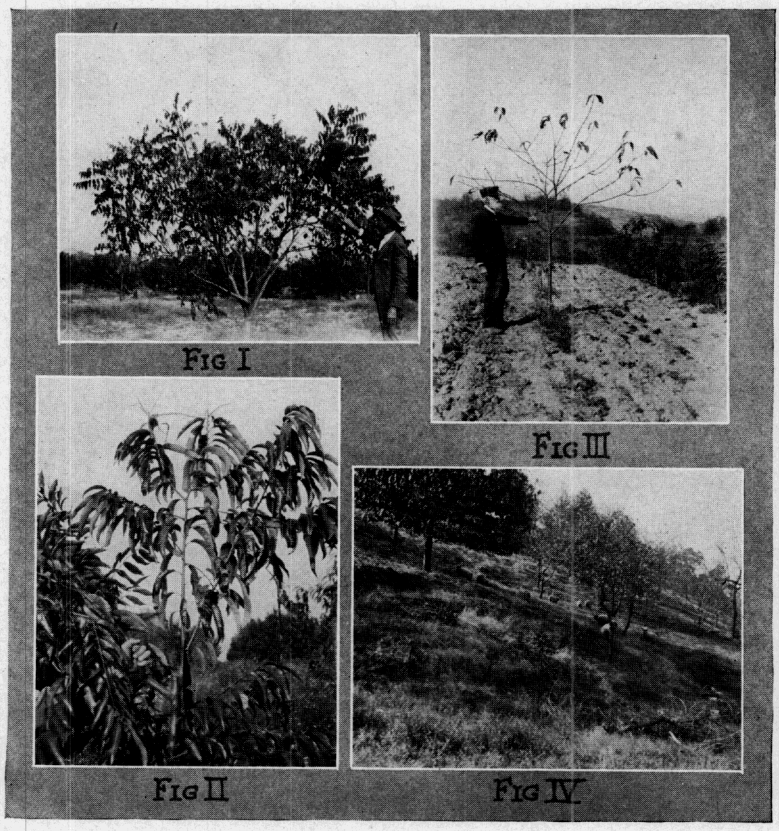

PLATE I.

Fig. 1. Thomas Black Walnut four years old bearing 39 nuts.
Fig. II. Chestnut graft (Boone variety) bearing same season.
Fig. III. Fuller Chestnut five years from graft bearing 31 burrs.
Fig. IV. Sheep, bluegrass and chestnut trees, Riehl Homestead, Alton.

Japanese Walnut Including the Heart Nut:

The Japanese walnuts have been introduced into various sections of the state especially through the central and southern counties. They are characterized by a rapid growth, beauty of form and foliage and early bearing. It is claimed that they are hardier than the black walnut.

Mr. C. A. Reed, Nut Culturist for the United States Department of Agriculture, highly recommends the Heart Nut as a promising sort for Illinois. The nuts are medium sized, distinctly heart shaped, with a thin shell and a kernel of good quality. They crack easily with one tap of the hammer and the kernel can often be removed entire from the shell. The Lancaster is considered one of the best varieties. (Plate 3, Fig. III.) The other type, J. sieboldiana, is a smooth shelled nut resembling the butternut in shape. It is superior in some respects to the butternut but has not as yet shown sufficient promise for general planting, although it has been fruited by Mr. Riehl at Alton.

The Chinese Walnut:

This nut is being grown experimentally in the eastern and northern states. It may prove hardier than the Persian (English) walnut and take its place as a commercial sort for this state. The nuts are said to be very large, with a shell somewhat midway in thickness between the English and black walnut. The kernel is reported to have a fine flavor. We are attempting its culture in the state.

The American Sweet Chestnut:

The chestnut is native to the state, being found in Olmstead, in Pulaski County as reported by Trelease[1]. It is reported from other counties mostly in central Illinois though it is probable that there are no other native stands of this species. It succeeds best on a well drained soil on sunny ridges, even in rather dry and rocky situations. It will not grow in wet soil or in soil under-

(1) Trelease, Wm., Trans. Ill. Acad. Sci., 10 :1917, 143-145.

lain with hard pan. Limestone soils are not desirable. Chestnut trees, blue grass and sheep make an excellent agricultural combination. (Plate 1, Fig. IV.)

It grows rapidly to a large tree and produces large crops of nuts early. In the fall of 1924 Mr. Riehl showed me a young chestnut tree of the Fuller variety, five years from the graft, which had produced thirty-one burrs, three nuts to the burr. Chestnut trees in southern Illinois at the Endicott homestead near Villa Ridge were coming into profitable bearing at six years of age. Mr. R. B. Endicott told me in 1917 that his three largest trees of the Boone, Blair, and Riehl varieties had made an average for the last four years of better than one hundred pounds of nuts per tree. They were then eighteen years old. Last fall, 1924, Mr. Endicott told me that he was harvesting about 160 pounds per tree. At the wholesale price of thirty-five cents per pound, on the Chicago market, his gross profits last year were over fifty-five dollars ($55.00) per tree. The chestnut blossoms late in spring and is seldom caught by a late frost. Mr. Endicott's trees have failed to bear a crop but one year since planted.

The varieties mentioned are hybrids between the Japanese and native species. The Fuller variety first propagated by Mr. Riehl is superior to these in the quality of its nut.

The only objection to the more general planting of these improved varieties of chestnuts in Illinois is that they may be at some future time infected with the chestnut bark disease which is fatal to the tree. As far as we know, however, this disease is not present in the sections east of us and there are very wide barriers to its western migration. There is no reason for importing other varieties since the Boone and Fuller are equal to any being grown in the East.

The Chinquapin Chestnut:

This species grows locally, especially in southern Illinois, under similar conditions to the American Sweet Chestnut. Usually of shrubby bush-like growth, it has some advantage over a larger tree in matters of propa-

gation. It bears a much smaller nut than the native sweet but it comes into bearing very early and the nuts are of excellent quality. It makes an ornamental little tree and pleases the children to have one for their own.

The Pecan Hickory:

In the minds of many people the pecan is placed first from the point of view of the quality of the nuts produced. Native to Illinois, the pecan is found growing abundantly all over the state where conditions are favorable. It is quite generally restricted to bottom lands especially over southern and southeastern Illinois, along the Kaskaskia and Ohio Rivers and their tributaries. Other productive stands are found along the Illinois River at least as far north as Peoria County and along the Mississippi through Jo Daviess County. It is most common on bottom land subject to overflow at the time of the spring floods. This fact may partially explain the general distribution of the pecan through the dispersal of the nuts by flood waters. It has been found, however, that pecans will grow well on higher land. Since the pecan has a long tap root, soils underlain with rock or hardpan, which comes near the surface, must be avoided in planting.

In Illinois, varieties only of northern or local origin should be considered for planting or top working on seedling trees. None of the so-called "paper shell" or southern pecans are sufficiently hardy to recommend them. Mr. S. W. Snyder of Center Point, Iowa, a recognized authority on the propagation and care of nuts, writes me that "nature planted pecans in Iowa up to the forty-first degree of latitude". Such varieties native to Iowa include Witte, Campbell, and Oberman. Mr. Snyder writes that "these varieties while not so large as those found growing farther south, yet are large enough to be desirable, and when it comes to quality, freshness of cracking and thin shells they cannot be surpassed by any." Mr. Riehl believed that pecans will not be hardy and productive in Illinois as a commercial proposition north of the thirty-ninth degree. Alton, Mr. Reihl's home, is just south of this line.

It is true that north of Alton in Calhoun County, native pecans are common, grow vigorously, and bear well some years. The late frost last spring cut down the crop materially. This often happens in that section. However, many excellent varieties originating in southern Indiana can be planted with fair promise of success in southern Illinois, south of the thirty-ninth degree of latitude. These include the Niblack, Busseron, and Posey. While not as large as the southern types, these varieties have a fairly thin shell of excellent cracking quality with plump kernels of rich flavor. The Posey is said to be the easiest of the three to crack and is of good size.

The Shagbark Hickory:

This species is the most valuable of the hickories for Illinois planting excepting the pecan. It is found well distributed over the state, sometimes on low lying sandy loams along the river bottoms. It is also found commonly on the rolling uplands, especially on the sides of the hills, associated there with the shellbark. This soil type is commonly known as yellow gray silt loam on undulating timber land. The tree is very promising for selection and improvement. The nut varies greatly in size and shape and cracking quality. (Plate 2, Fig. II.) Some strains have exceptionally thin shells. The varieties Hales and Vest are highly recommended.

The Shell Bark Hickory:

Sometimes called the big shell bark or King Nut, this species is found native over the state at least as far north as Peoria County. It more often prefers the low lying river and creek bottoms, and like the pecan does not suffer from an occasional overflow if not too long continued. The tree and nut (Plate 2, Fig. III) are both larger than the shagbark. The nut is thicker shelled and the kernel, though good in quality, is not so much sought after as the shagbark. The Weiker variety is probably a cross between the shagbark and the shell bark and is a promising one.

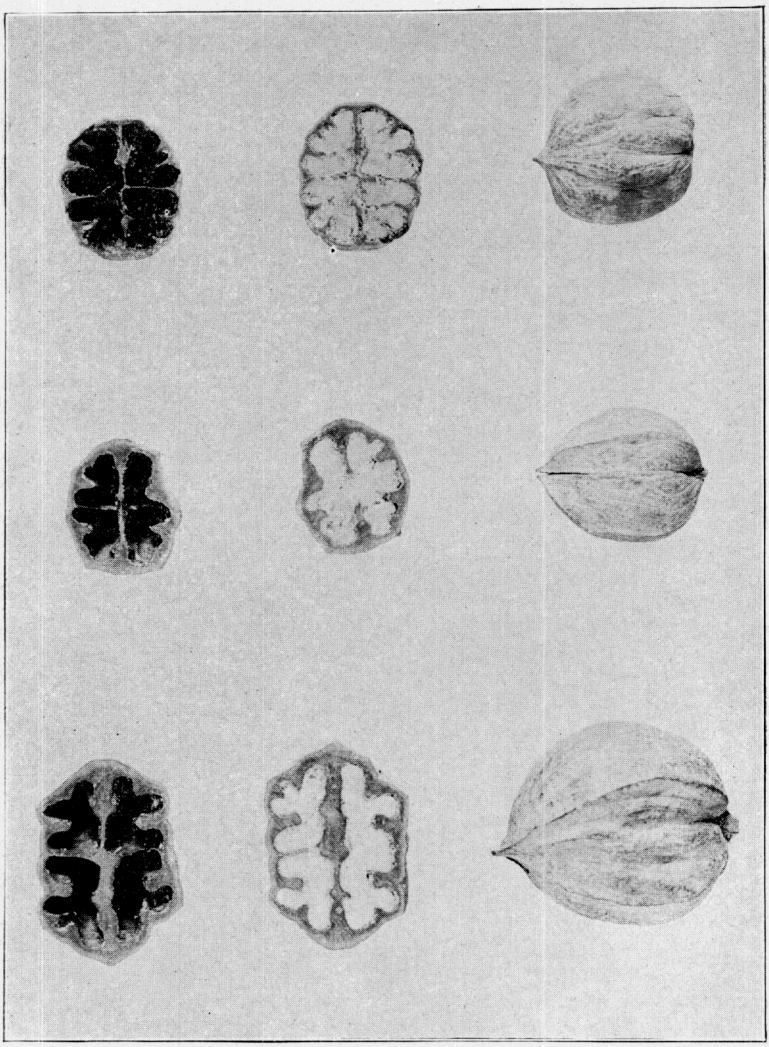

PLATE II.

Fig. I. Upper row. "Laney," Shagbark bitter nut cross.
Fig. II. Center Row. Seedling—Shagbark Hickory.
Fig. III. Lower row. Seedling—Shellbark Hickory.

The Mockernut and Bitter Nut:

These two hickories are found growing quite generally over the state. They appear to adapt themselves to their environment, growing both in the lowlands and upland or prairie types of soil. The nuts are comparatively small and of little value for human food.

The bitter nut is chiefly valuable as a parent in hybridizing with the shagbark hickory.

The pure shagbark, while it bears nuts of fine flavor, is of such slow growth that it is recommended by J. F. Jones of Lancaster, Pennsylvania, (one of the best known nut nurserymen) to plant hybrid varieties from the shagbark-bitter nut cross. He says that these hybrids are rapid growers and bear excellent crops in six years from grafts. He recommends the Beaver variety from Pennsylvania, the Fairbanks from Iowa and the Laney (Plate 2, Fig. I) from New York.

The American Beech:

This species is found widely distributed, often being found in the prairie as well as the dry sandy regions. It is a common tree on high ground, although it is sometimes found at much lower levels. It has not been commonly thought of as a nut bearing tree although the nuts are of excellent quality. The nut is too small. It is possible that it may be improved. It is understood that the tree does not take kindly to domestication and special pains are necessary in transplanting.

The American Hazel:

This species grows wild throughout the state. A moderately rich, well drained soil and freedom from mild periods in winter and no late frosts are requirements for the successful culture of the hazel. Both staminate and pistillate catkins develop in fall and are ready to open with the approach of mild weather in winter or early spring. The planting of different varieties to provide cross pollination is essential. No desirable named varieties have been originated from the native species worth propagating, excepting possibly the Rush. From the

European species, however, as well as from hybrids of the American and European species, a number of excellent varieties have been secured showing promise for commercial culture in Illinois. Judge Potter of Marion is growing the Dorrton variety of French origin successfully. (Plate 3, Fig. II.) Other varieties worth trying out are the Barcelona, Daviana, DuChilly and Globe.

Where Nut Trees May Be Used to Advantage:

Nut trees of suitable species and varieties should be more generally planted in Illinois.

(1) On otherwise waste land. There are many areas especially in southern and western Illinois which are not easily or profitably cultivated. Where the soil is suitable, it is highly desirable that chestnuts, walnuts, and hickories be planted there. Soil erosion is a serious factor in limiting the planting of agricultural crops in southern Illinois. Nut trees on rolling ground often effectively prevent soil erosion and bring in highly profitable returns. Reforestation with nut trees bearing edible nuts is highly commendable. The trees may be used primarily for their timber while the nuts will be worth considering as a side issue.

(2) As a Commercial Proposition: Commercial plantations of chestnuts, walnuts, and perhaps pecans in southern Illinois should be tried out. Chestnut orchards in Villa Ridge cultivated like fruit trees, and in Alton on steep hillsides (Plate 1, Fig. IV) have already proven a commercial success. At Marion are the beginnings of a commercial planting of pecans, chestnuts, and black walnuts. J. F. Wilkinson of Rockport, Indiana, a nurseryman of considerable experience in propagating nut trees, believes that orchards of nut trees interplanted with apples and other fruits will be profitable and more permanent than where no nut trees are used. Experimental evidence not as yet available will be necessary before recommendations can be made.

(3) Trees for the Home Grounds: There are various places about the home both in the city and country where shade trees might be both useful and ornamental. Why

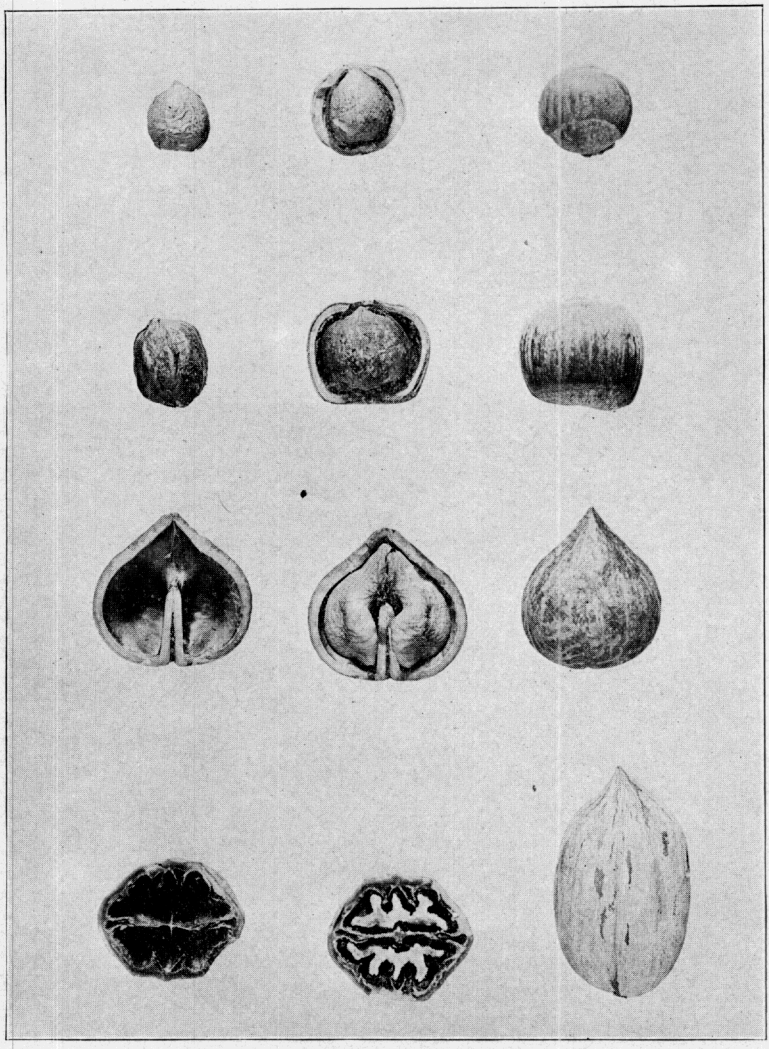

PLATE III.

Fig. I. (Upper row). Native Hazelnut.
Fig. II. French Filbert, variety "Dorrton."
Fig. III. Heart nut, variety "Lancaster."
Fig. IV. (Lower row.) Hickory-Pecan Hybrid, variety "Rockville."

should we not start now increasing our potential food supply? The future will show its need.

(4) As Roadside, Street and Park Trees: Little attention has been paid to the wonderful possibilities for using nut trees where the soil and site are suitable for beautifying our roadsides, streets, and parks with various hardy species, both the best varieties of the native as well as the introduced species. In Michigan nut trees are being planted along the highways. We should do this in Illinois.