

# THE MATURE OAK FOREST OF METTLER'S WOODS

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Vegetation is constantly changing. Some of the major and most dramatic changes are those that accompany pronounced climatic fluctuation. Man's influence on vegetation can likewise be great. Thus, the past history of Mettler's Woods, now dedicated as the William L. Hutcheson Memorial Forest, has reflected both climatic and human influences, and its present composition and structure are a result of them. The plan for the future is that human interference will be at a minimum, allowing the physical environment full play on the further development of the vegetation.

In the not far distant past, vegetationally speaking, an altogether different type of vegetation must have occupied the area on which the Hutcheson Forest now stands. We are only a few miles south of the terminal moraine formed by the continental glacier in late Pleistocene. The ice reached as far south as Metuchen during the Tazewell stage of Wisconsin time (MacClintock 1954). On the basis of determinations of the age of the Tazewell glacial drift in the midwest this was in the neighborhood of 20,000 years ago (Flint and Rubin 1955). The great mass of ice this close to our area must have had a pronounced effect on the climate here. It is entirely possible that treeless arctic tundra occupied the area at that time. Wolfe (1953) has found evidence that the ground may have been perennially frozen. He describes soil structures of a sort that are being formed today in the treeless areas of Alaska. Direct evidence of such an arctic tundra in the form of fossil plant remains has not yet been found. However, there is direct evidence that the first forests to invade the land around Plainfield after it was left clear by the melting ice was a forest of pine, spruce, and fir. Seeds of these trees must have come from our area since, in the northward migration of forests, this area must have become forested first. Spruce and fir even occurred in the forests of the coastal plain section of the State (Patzger 1945). The details of vegetation since that time are not certain, but undoubtedly climate fluctuations known to have taken place since the ice melted must have had their influence here, as we know they did in the northwestern section of New Jersey (Niering 1953).

Some time after the continental glacier had receded and probably after the boreal forests had migrated northward, giving way to broadleaf forests, the Indians came into the picture. There is some information in the literature concerning the influence of the Indians on forest vegetation (Day 1953). Of particular importance was their practice of allowing fires to burn through the forests. Such reports from historical records are substantiated by study of the forest. Careful examination of a cross-section of the base of a large tree lost in a severe storm in 1950 showed fire scars occurring at roughly ten-year intervals up to 1711 (Buell, Buell and Small 1954). The tree started to grow in 1627. The land was settled by white men in 1701. No fire of sufficient intensity to leave a scar occurred after 1711. It would be unwise to place too much weight on evidence from one tree, but its agreement with the historical record is significant.

Such long-continued subjection of an area to repeated burning inevitably must result in the exclusion of less fire-resistant species and the dominance of those not so readily destroyed by fire. Thus the Hutcheson Forest, like forests in some other parts of the country, may be oak-dominated because of a past history involving fire (Cottam 1949, Egger 1938).

The period of white man's occupation has, in the life of the forest, been brief. There are a few bits of information from written records, from word of mouth, and from the study of the woods itself that give some idea of its history since 1701. We know that this land was settled by members of a Dutch company and has since been owned by members of the company or their direct descendants. Action during the Revolutionary War took place on the property, presumably in the immediate vicinity of the woods, if not in it (McCormick 1953). This could have had a temporary influence on the woods.

That the woods in general has been subjected to a minimum of human disturbance is confirmed by a statement made by the recent owner, Mr. Thomas Mettler. According to him, it has been a tradition in his family that much of the woods, particularly the eastern part, has never been cut and cleared, although fallen trees have often been salvaged for firewood. Furthermore, the tree whose basal cross-section was used in the study of fire history already mentioned started to grow in 1627 and was a tall forest grown tree with a clear trunk branching at a considerable height from the ground. There is one tree still larger standing and numerous others approaching its size. The particular section of the woods where these trees are has certainly been forested since the Indians lived in this area.

The storm of November 25, 1950, probably had a greater effect on the woods than any previous storm in history and perhaps more than any other single event in the history of the forest. Catastrophe resulting from natural phenomena plays a normal role in the dynamics of a forest, and that storm was indeed a catastrophe. It caused not only considerable breakage in the tree tops, but toppled a good number of trees. The most unfortunate result of the storm stemmed from the great economic value of the damaged timber. Salvaging operations were carried out. It is fortunate that sections of the oldest part of the woods were left relatively untouched by that storm.

Both the storm and the concomitant salvage operations resulted locally in pronounced changes. The introduction of sunlight to formerly densely shaded spots stimulated the growth of many plants which had not grown there before. Many plants that had merely existed in the woods now grew, flowered, and produced fruit luxuriantly; and, perhaps most significantly, oak seedlings, which had been suppressed, responded to the introduction of light and grew rapidly.

The woods as it stands today may be viewed in two ways: first, its variable pattern over the area that it occupies; and second, its vertical structure as a forest community. In its present areal pattern the woods covers about 65 acres of land. Surrounding much of it there is a buffer zone of fields totaling in area about 71 acres. Although it is predominantly an oak woods throughout, there are some rather marked variations within it. Of greatest value as a natural area is the eastern end, in area roughly

one third of the woods. Being farthest from the homesites of the owner, it has, during the course of time, been less frequently subject to the salvaging of fallen logs for firewood as well as other casual disturbance.

Good drainage is characteristic of most of the area and is reflected in the type of vegetation. There are two major areas of poor drainage where the water table is very high during wet seasons. One of them is in the eastern section where a broad, low area along the brook supports, among other species, occasional pin oaks, swamp white oaks, and thickets of spice bush. The other area is at the western end where there is a young woods with considerable pin oak.

The predominant trees of the forest are oaks: white, black, and red. Red hickory occurs frequently, as do beech and white ash. Sugar maple is present, but, like several other species, it is represented by relatively few individuals. As it stands today, the woods throughout can be thought of as a mature oak forest.

Viewed from the adjacent field, two distinct layers or strata show up, the high canopy of the tall trees and, beneath it, a continuous dogwood layer. The top of the forest reaches to over 90 feet, the dogwoods to about 35 to 40 feet. Within the forest one sees the clear oak stems disappear through the dogwood foliage, the first big branches spreading out about 50 feet above the ground. Shrubs form a layer from about four to eight feet high, the height varying with the species: the maple-leaved viburnum of the well-drained parts is a low shrub; the spice bush and arrow-wood are taller. An herb layer, generally lower than the shrubs, one to two feet high, is very striking in the spring and early summer when the May apple is present, but by late summer the May apple dies down and the remaining herbs are comparatively few and scattered.

A layer of mosses, reaching at most a few inches high, is the lowest layer of the forest. But this layer in the Hutcheson Forest is not conspicuous. Mosses are restricted to little clumps here and there, especially on exposed soil turned up by roots of fallen trees. Most of the ground is covered by the litter of leaves fallen from the trees and shrubs in past years.

Below ground there is likewise a certain amount of stratification of underground parts of the plants. They extend as far as the soil goes, in places 40 inches or more, to the shale rock below. Some tree roots even grow into the shale to a total depth of about six feet.

These are the interdependent layers which, together with their dependent animal populations, make up the complex community that is the mature oak forest of Mettler's Woods.

A few detailed studies have been made which were concerned, at least in part, with vegetation and environment of this community (Bard 1952, Schneider 1952, Buell, Buell and Small, 1954, Sparkes and Buell 1955, Anderson 1955). There is much more to be learned about this community as it stands now, to say nothing about its future development.

The immediate future, the next 50 to 100 years, can be reasonably predicted through careful study of the present forest, using techniques of the ecologist and the forester. The distant future, 5000 to 10,000 years, cannot be predicted, even if preservation continues, since vegetation is

so largely dependent upon climate; and, though we can expect climate to change profoundly as it has in the past, we cannot anticipate the direction of its change.

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