

DISTRIBUTION OF OAKS ON THE LAKE CHI-
CAGO BARS IN EVANSTON AND NEW
TRIER TOWNSHIPS

W. G. WATERMAN, NORTHWESTERN UNIVERSITY

This study originated in a class exercise in Forest Ecology, largely on account of the abundant fruiting of the red-black oaks in the summer of 1919. Interest was aroused by the large number of ellipsoid acorns observed and it was decided to investigate the relative number of specimens of *Q. ellipsoidalis* in comparison with those of the other species found in this region. It was also decided to study the relative distribution of the ellipsoid

oak and if possible find some indication of its ecological characteristics. It might be mentioned in passing that *Q. alba* did not fruit at all this year, and *Q. bicolor* Willd. and *Q. macrocarpa* Michx, very sparingly if at all.

The region studied lies within the district surveyed by Miss Simmons and reported in this volume and the particular portion included in this study consists of about fifteen blocks in the northern part of the city of Evanston, containing the ends of the Tolleston and Calumet sand bar ridges just before they disappear owing to erosion by the lake. It was intended to include the Glenwood bar in this study, but it was found that the oaks had been almost entirely removed from it in this region. One small patch at the Gross Point Road and Dempster Street was surveyed and will be described later.

Owing to the time when the study was begun, the acorns had mostly fallen from the trees and consequently the identification of the trees had to be made by an inspection of the acorns as they lay on the ground. Because this region is entirely built up, the acorns in many cases had been removed by raking of lawns, but even in those cases it was usually possible to find a few specimens lying in flower beds or in the spaces between the grass plots and pavements. Great care was observed in relating the acorns to the trees and in many cases it was possible to state only that there were ellipsoid trees in a certain spot without definitely indicating any individuals. Only specimens showing ellipsoid characters were preserved and it is possible that some were rejected which were really ellipsoid so that the numbers accepted represents a minimum rather than a maximum of those really present.

As the writer has not made much study of the ellipsoid oaks and as Trelease's article (Transactions Illinois Academy, Vol. XI.) is still in the printers' hands, the identification of the ellipsoid varieties was a difficult task. Professor Trelease very kindly assisted by identifying a few type specimens which were sent to him. As is known in regard to the ellipsoid oak, the acorns are extremely variable and the range of shape in those studied

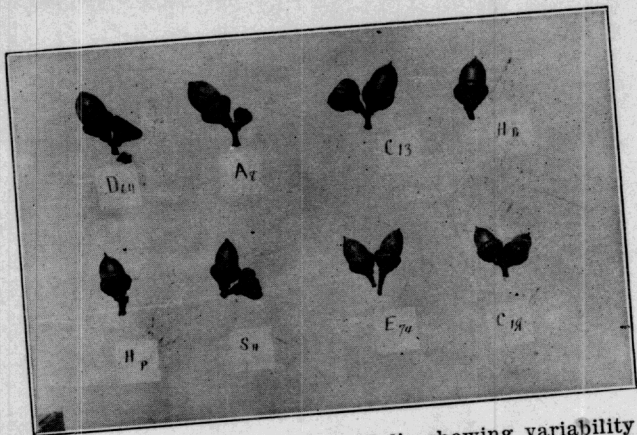


FIG. 1. Acorns of *Q. ellipsoidalis* showing variability in shape

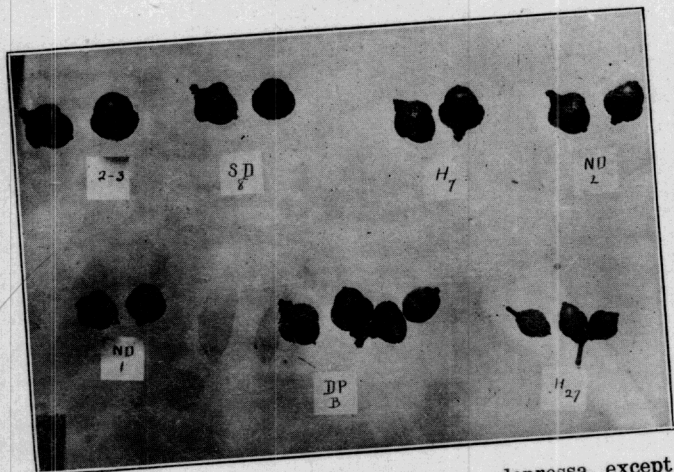


FIG. 2. Acorns of *Q. ellipsoidalis* var. *depressa* except DP-B which is *Q. velutina* and H-27 doubtful

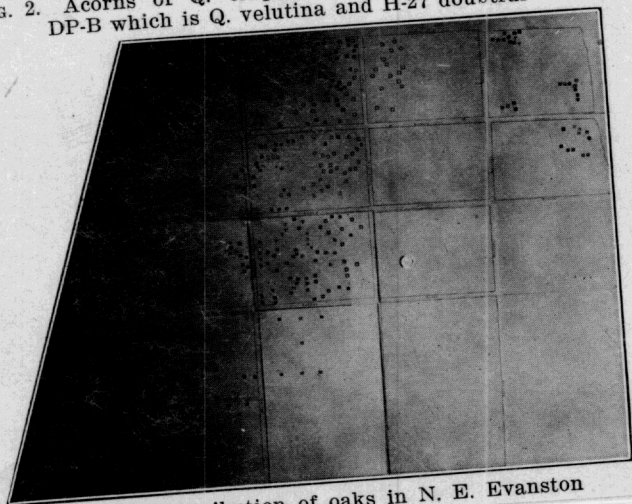


FIG. 3. Distribution of oaks in N. E. Evanston

is shown in Figure 1. In this the type form is that labelled Sh. and E 74. C 19 represents a reduced size due probably to lack of moisture and nutrition in extremely exposed conditions on the sandy ridges. D-64 and A-8 show a characteristic which has always been associated with the red oak (*Quercus rubra*); namely, the bulging of the acorn about in the middle of its length which led to the suspicion that D-64 might be a hybrid.

The variety *depressa* of *Q. ellipsoidalis* is shown in Figure 2. This variety shows characteristics suggesting the black oak (*Quercus velutina*) and some of the specimens found might be hybrids of these two species. In this figure D P a typical black oak is included for the sake of comparison while H-27, very much dwarfed in size, may be either a black or a peculiar ellipsoid.

The distribution of the oaks is shown by the map in Figure 3. The symbols representing the different trees were chosen with some care and experimentation to secure a symbol which would be sufficiently small to fit in with the scale of the map and yet be distinct to the eye. Even with the size adopted it has proved impossible to put one symbol for each tree observed, but instead an attempt has been made to let the number of symbols for each species be proportionate to the actual number of trees of that species found. It was found that only five or six symbols could be relied upon. On account of the small number of symbols available, it was impossible to represent even all the species concerned, to say nothing of the varieties of ellipsoid oak.

A study of the map shows first, the transition from ridge conditions to swamp conditions described by Miss Simmons. In this region no true ellipsoids were found and the oaks were identified only as swamp white (*Quercus bicolor*) or of the red-black type. The ellipsoid oaks were found chiefly on the Calumet bar, although some which are not recorded on the map were observed on the Tolleston bar on the campus of Northwestern University. This is left blank in the lower right hand corner of the map as there was not time to study it thoroughly before the acorns were removed either by

raking or by animals. In the patch of oaks studied on the Glenwood beach (not shown on the map) there were no true ellipsoids observed, but some that possibly were variety *depressa*.

On the Calumet beach two distributional characteristics of the ellipsoid can be observed: first, a tendency to be found mostly along the edges of the sand ridges and secondly, a tendency to segregate in small patches. The red oaks (*Quercus rubra*) are found on the whole in rather more mesophytic conditions, frequently occurring near the swamp white oaks and on the edges of the ridges nearest the intervening depressions. They reach their best development in the lowland forest bordering the flood plains of the Chicago and Desplaines Rivers. The white oaks when found are more usually along the tops of the ridges while the black oaks are the most xerophytic of all.

In conclusion, it may be stated, first, that the number of ellipsoids is much larger than was expected and it is probable that further surveys would show that in general *Quercus ellipsoidalis* is a much more numerous component of our oak forest than has been supposed.

It seems to occupy an intermediate position in regard to mesophytism between the black, white, and bur in the order named on the one hand, and the red and swamp white on the other.

For the reason stated above, this study must be regarded only as a preliminary survey and an intensive study under more exact conditions would give a more detailed knowledge of the distribution of these oaks, but probably would not alter the main conclusions arrived at.

The writer wishes to express his thanks to Professor William Trelease for his assistance in identifying the specimens and to Miss Catharine Blood and Miss Elizabeth Bryant who made the collections.