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International Oaks

The Journal of the International Oak Society



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*Our 2011 Oak Gallery -
Historic Illustrations of Oaks*



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The International Oak Society

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Cover photos:

Front: *Quercus chrysolepsis* Liebm. or Uncle Oak, of Palomar Mountain
photo©Guy Sternberg

Back: *Quercus alentejana* (a new species) foliage and fruits
photos©Michel Timacheff

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Message from Your Editor

We are in a time of transition, on our planet and in our organization. We are facing a frighteningly destabilizing climate, along with (and due in part to) population pressure never before seen in human history. Movement of invasive exotic organisms is destroying natural ecosystems. Weapons development and distribution has reached an alarming level. Economic crises and misdirected religious zeal are making Earth a very dangerous place. Our growing ability to modify our environment genetically, chemically and physically is outpacing our concomitant knowledge of the effects of our actions, reasonable caution, and the buffering capacity of our planet.

In another irreversible transition, as of our journal publication date we lost three outstanding oak people this past year. George Ware, the keynote speaker at our very first conference; Dick van Hoey Smith (see inside back cover), founding member and first recipient of our Lifetime Service Award; and Hugues Vaucher, author of the famous book on tree bark. Our board is in transition as well, with most of the experienced “old guard” retiring from service recently or soon. As we continue to grow as an organization we seek new energy and fresh ideas from our members. I hope some of you will see this as your opportunity to do what you can do best to make the world a better place: step forward and contribute more of your time and talent to the Oak Society and its mission. Contact any board member (refer to the new member directory being published now) with your offer to become more involved.

As an incentive, we offer some outstanding material in this issue of our journal. I won't try to summarize everything here because you can read the table of contents. I extend my heartfelt personal appreciation to all who authored, reviewed, and assisted in other ways with this publication. You will see here our best efforts to provide a useful mix of popular and scholarly work. Our annual oak gallery this time features the art of our ancestors (see inside front cover). Hopefully, when you finish this issue it will be reason enough to say, “Yes, the IOS is the world leader on a subject of high interest to me, so I resolve to become more involved and help push the wagon!”

Read on, and enjoy—and remember to ink the Seventh Triennial IOS Conference in France into your calendar for October 2012!

Guy Sternberg



Quercus macrocarpa group in northern Illinois

photo©Guy Sternberg

Paternity and Pollination in Oaks: Answers Blowin' in the Wind

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Pollination is an important component of the biology of oaks and other plants. The distance and direction of pollen movement determine the reproductive neighborhood for each plant, and the genetic diversity of each tree's acorn crop will be the result of the diversity of the pollen that reaches that tree. Pollination patterns will also determine impacts of forest fragmentation, because pollination shapes the reproductive connectivity of woodlands and isolated stands across the landscape. In oaks, which have wind-dispersed pollen, pollen is likely to be responsible for more gene flow than the dispersal of relatively large acorns. Despite its importance in many areas of plant science, pollination has been an extremely difficult phenomenon to investigate. Researchers have attempted to track the physical movement of wind-dispersed pollen using traps (Caron and Leblanc 1992; Greenwood 1986) and wind tunnels (Tonsor 1985), but there are substantial logistical problems with such studies. In the field, it is almost impossible to track pollen from source to destination, and pollen traps will intercept pollen from multiple, unknown sources. More importantly, even if the physical movement of pollen can be tracked, it is the actual pattern of fertilization that is usually of interest, rather than pollen movement itself.

Fortunately, oaks have served as a model system for the development of new approaches to the study of pollination. Beginning in the mid-1990s, a new class of genetic markers called DNA microsatellites has been brought to bear on the question of pollination (Ashley 2010). Oaks were among the first plants to be studied using this novel approach (Dow and Ashley 1996, 1998b; Streiff et al. 1999). Microsatellites are short, tandem repeats of one to six nucleotides that are found scattered around the noncoding regions of the genomes of plants and animals. Microsatellite loci are highly variable due to mutations involving the number of repeating units (Akkaya et al. 1992; Ashley and Dow 1994; Weber and May 1989). Microsatellites exhibit straightforward Mendelian inheritance, and this combined with their hypervariability provide a rich source of genetic information for distinguishing individuals genetically and also allows the inference of parentage (Ashley and Dow 1994).

The ability to infer parentage to seeds provides a way to track pollination patterns directly (reviewed in Ashley 2010). Specifically, paternity assignment allows a researcher to identify the sire of a seed, and therefore provides a way to retrace the exact distance and direction of a successful pollination event. At every microsatellite locus, an acorn will have two alleles, one inherited from the seed parent (the maternal allele), and one from the pollen donor (the paternal allele). Because the seed parent has been genotyped, the maternal allele at

each microsatellite locus is identified, and the genotypes of all the adult trees in the stand are examined to find one (and hopefully only one) that could have contributed all the paternal alleles. Alternatively, all the trees in the stand may be excluded as possible sires, and thus the researcher can conclude that pollen came from outside the stand, and represents a pollen immigration event. By sampling all the nearby oaks in a stand, and assigning paternity to a sample of acorns, within-stand pollination patterns can be characterized precisely, and the pollen immigration rate into the stand can also be measured.

This approach was first used to study pollination in a relatively isolated stand of bur oak, *Quercus macrocarpa* Michx., in northeastern Illinois (Dow and Ashley 1996, 1998b). The stand consisted of 67 mature trees, all of which were genotyped at several microsatellite loci, and 300 acorns from three seed trees were also genotyped. The results were surprising and unpredicted. Over half the acorns had no father in the stand, which indicated that the pollen donors were outside the stand. There were no other bur oaks with 150 m of the stand, so the average pollination distance was greater than 150 meters! For the within-stand pollinations, the pollen donors were distributed nearly randomly in the stand, with little or no pollination advantage for neighboring trees. Also, no directional bias to pollination was observed, so prevailing wind direction played at most a minor role in shaping pollination patterns (Dow and Ashley 1998a).

Why were these results so surprising? The classic view of wind-dispersed pollen suggested the pollen from a source tree formed a steep, leptokurtic distribution surrounding the source (Levin and Kerster 1974), with pollen dissipating quickly in the air column. As a result, most pollinations were thought to occur between neighboring individuals (Ehrlich and Raven 1969). The dispersal kernel, that is the frequency distribution of the dispersal distances, was thought to have a thin tail, so pollen immigration from outside the stand would only rarely occur. However, the work of Dow and Ashley (1996; 1998a; 1998b) on *Q. macrocarpa* showed that pollen immigration was extremely common, and within the stand, pollinations occurred almost irrespective of the distance between two trees.

Since these first studies on *Q. macrocarpa*, paternity assignment using microsatellites has been applied to oaks in at least ten different studies involving seven species of oaks (Table 1). With few exceptions, the results from the early studies on bur oak have been supported. Craft and Ashley (2010) extended Dow and Ashley's work on *Q. macrocarpa* in Illinois. They studied pollination at three additional sites, two extremely isolated remnant savanna stands, and one patch in a continuous forest. One of the isolated sites, Burnham Prairie, is in a prairie remnant surrounded by rail yards, industry, and residential areas on the southeast side of Chicago. The second isolated site, Goose Lake Prairie, is comprised of 26 trees isolated in the largest prairie remnant in Illinois, surrounded by a largely agricultural landscape. Although the landscape surrounding each site differs markedly, at both sites just over half of the acorns sampled had no father in the stand, indicating pollination distances of hundreds of meters. At a third site, Cranberry Slough, which is within the Cook County Forest Preserve District, pollination within a larger continuous forest was studied. Outside pollinations were slightly lower at this site, but they were still quite high at 47%. At all sites, correlated paternity was very low; in other words, most acorns collected from a

Table 1. Studies that use microsatellites and parentage assignment to study pollination in oaks

Species	Pollen Immigration	Distance	Reference
<i>Quercus macrocarpa</i>	47-58%	Mean 42 to 70m within stand, >>100 m from outside	Craft and Ashley, in press
<i>Q. macrocarpa</i>	71% from >150m	Mean 77m within stand	Dow and Ashley, 1996
<i>Q. macrocarpa</i>	57% from >150m	Mean 76m within stand	Dow and Ashley, 1998a
<i>Q. petraea</i>	69%	Means 22-58m within stand for individual trees	Streiff et al., 1999
<i>Q. petraea</i>	38%	Mean 92m within stand	Valbuena-Carabaña et al., 2005
<i>Q. pyrenaica</i>	34%	Mean 270m within stand	Valbuena-Carabaña et al., 2005
<i>Q. robur</i>	65%	Means 18-64m within stand for individual trees	Streiff et al., 1999
<i>Q. salicina</i>	52.2%	Mean 66.7m within stand	Nakanishi et al., 2004
<i>Q. salicina</i>	52.1%	Mean 69.2m within stand	Nakanishi et al., 2009
<i>Q. lobata</i>	~20%	Mean 114m within study site	Pluess et al., 2009
<i>Q. lobata</i>	70%	Mean 112m within study site, >200 m from outside	Abraham et al., submitted
<i>Q. semiserrata</i>	~30%	Mean 52 within stand, up to 570 within stand	Pakkad et al., 2008

maternal tree had a different father. Thus, the genetic diversity of acorn crops of trees is very high, even for trees in isolated stands.

Another early study examined pollination by paternity assignment in two European oaks. Streiff et al. (1999) studied a mixed stand of *Quercus petraea* (Matt.) Liebl. and *Q. robur* L. in northwest France. Acorns collected from seven of thirteen trees at their study site showed an excess of nearby matings. However, of the 984 acorns sampled, 69% of those from *Q. petraea* and 65% of those from *Q. robur* had no father in the stand, again demonstrating very high levels of pollen immigration over substantial distances. The stand was part of larger forest, suggesting that high levels of pollen immigration are a common feature for both isolated stands and in continuous woodlands. A more recent study looked at pollination and hybridization in a mixed stand of *Q. pyrenaica* Willd. and *Q. petraea* in Spain, near the southernmost limit of the latter species' range (Valbuena-Carabaña et al. 2005). Somewhat lower, but still substantial, levels of pollen immigration were found, 38% and 34% for *Q. petraea* and *Q. pyrenaica*, respectively. Within the stand, pollination distances of up to 381 m were documented.

Two parentage studies have recently been conducted on *Quercus lobata* Née, one of the largest oaks and an important component of many California oak woodlands (Abraham et al. 2010; Pluess et al. 2009). Pluess et al. (2009) studied *Q. lobata* at a site in Santa Barbara County, near the southern limit of the species range, where trees were widely dispersed in the landscape. These authors report that 81.5% of pollen donors were found within 250 m of maternal trees, with an average pollination distance of 114.1 m. Somewhat different results were found in a study of *Q. lobata* at Hastings Reservation in central coastal California, a site where oaks grow at higher densities (Abraham et al. 2010). At this site, only 30% of pollen donors were identified within 200 m of maternal trees. Together these results suggest that within a species, the densities and distributions of conspecific trees may greatly influence pollination distances and patterns.

Paternity studies on Asian oaks have also been conducted. Nakanishi et al. (2004; 2009) studied pollen dispersal in *Quercus salicina* Blume in the Tatera Forest Reserve, Japan. Average pollination distances within their study site were approximately 68 m, somewhat less than other studies of oaks. However, the estimated pollen immigration rate, 52%, was similar to that reported in European and American oaks. The pollen immigration rate reported for *Quercus semiserrata* Roxb. for a study site in Thailand was approximately 30%, with a mean pollination distances within the stand of 52m (Pakkad et al. 2008). These authors also documented an impressive pollination event of 570 m within their study site.

The relatively high rates of long distance pollination documented by paternity studies in oaks provide an explanation for the high inferred rates of gene flow that are typically found in population genetic studies of oaks. Pollen-mediated gene flow over large spatial scales likely prevents populations from becoming genetically differentiated, even for highly fragmented populations (Craft and Ashley 2007) or populations on the periphery of the species range (Marsico et al. 2009; Muir et al. 2004). Wind-pollinated oaks may be quite resilient to the negative genetic consequences of habitat fragmentation.

In conclusion, two nearby oaks may be more likely to mate than two more distant oaks, but microsatellite paternity studies have shown that distance alone explains very little about pollination. Pollination in oaks and other trees appears to be a complex phenomenon that may involve processes including flowering phenology, pollen properties, or perhaps even mate choice (Craft et al. 2009). Long distance pollination over hundreds of meters is common in oaks, and often over half the acorns have fathers from outside the stand. Wind pollination in oaks seems to be extraordinarily efficient at producing highly outbred individuals, yielding diverse acorn crops, and ensuring high rates of gene flow. The detailed but fascinating picture of pollination that is emerging could only be obtained using new tools of molecular genetics.

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Oak Diversity and Ecology on the Island of Martha's Vineyard

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Martha's Vineyard is many things: a place of magical beauty, a historical landscape, an environmental habitat, a summer vacation spot, a year-round home. The island has witnessed wide-scale deforestation several times since its settlement by Europeans in 1602; yet, remarkably, existing habitats rich in biodiversity speak to the resiliency of nature. In fact, despite repeated disturbances, both anthropogenic and natural (hurricanes and fire), the island supports the rarest ecosystem (sand plain) found in Massachusetts (Barbour, H., Simmons, T, Swain, P, and Woolsey, H. 1998). In particular, the scrub oak (*Quercus ilicifolia* Wangenh.) dominates frost bottoms and outwash plains sustaining globally rare lepidopteron species, and formerly supported the existence of an extinct ground-dwelling bird, a lesson for future generations on the importance of habitat preservation.

European Settlement and Early Land Transformation

In 1602 the British merchant sailor Bartholomew Gosnold arrived in North America having made the six-week boat journey from Falmouth, England. Landing on the nearby mainland the crew found abundant codfish and Gosnold named the land Cape Cod. Further exploration of the chain of nearby islands immediately southwest of Cape Cod included a brief stopover on Cuttyhunk Island, also named by Gosnold. The principle mission was to map and explore the region and it included a dedicated effort to procure the roots of sassafras (*Sassafras albidum* (Nutt.) Nees) which were believed at the time to be medicinally valuable (Banks, 1917).

Upon reaching New England, Gosnold and his crew were approached and greeted by the aboriginal inhabitants of the region, the Wampanoag tribe, and they traded back and forth. Gosnold would eventually land and name the island of Martha's Vineyard. A report from the ship's journal reads, "an incredible store of vines, as well in the woodie part of the Island, where they run upon every tree, as upon the outward parts, that we could not goe for treading upon them." (Banks, 1917).

The wild vines on the island still persist today and the designation of Martha's Vineyard is in tribute to Gosnold's wife's grandmother, Martha Golding, and his infant daughter, who died in 1598 prior to the journey (Bachler and Thurston, 2007).

Gosnold and his crew would explore for less than a month, then depart back to England. He would never return to the region but would eventually sail back to North America in 1607 to found Jamestown, Virginia, and begin the colonization of America. Gosnold died in Jamestown during the winter of 1609-10.

Geology and Edaphic Conditions

The topography and soils of Martha's Vineyard are the result of past glacial episodes that produced a band of terminal moraines stretching across south coastal Massachusetts, Rhode Island, and Long Island, NY. Today the two principle landforms found on Martha's Vineyard are the raised moraines and the flat outwash plains. Both are characterized by free-draining, gravelly, acidic soils, poor in organic matter and coarse in texture.

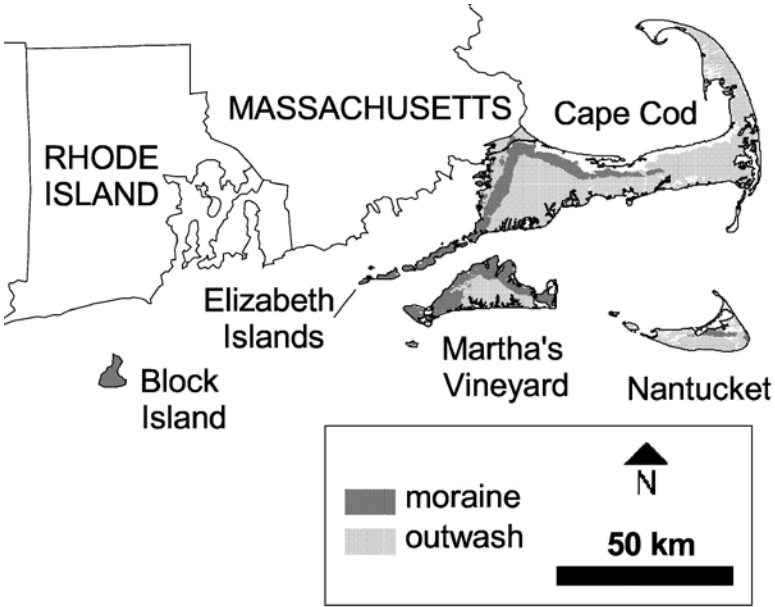
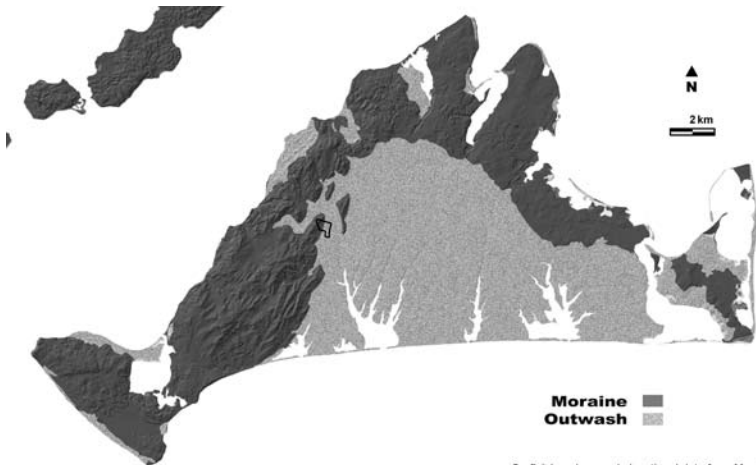


Figure 1. Map of the coastal region from Cape Cod, MA to Long Island, NY. (Motzkin, G, and D. R. Foster, 2002).

The island's forest cover is dominated by oaks. The distribution of oak species is strongly influenced by the soils and exposure to the marine climate.

Oak Diversity and Ecology

Martha's Vineyard supports 6 species of oak and 4 documented hybrids. Given the influence of geology, topography, elevation, and exposure to wind and salt, oak habitat is varied on Martha's Vineyard. With a maximum elevation of only 311 feet above sea level, the moraine forests support a dominant canopy of black oak (*Quercus velutina* Lam.) and white oak (*Quercus alba* L.). The vast outwash plains of the interior of the Island are dominated by scrub oak, (*Quercus ilicifolia* Wangenh.), post oak (*Quercus stellata* Wangenh.), and to a lesser extent the dwarf chinkapin oak (*Quercus prinoides* Willd.). Scarlet oak (*Quercus coccinea*



Surficial geology and elevational data from MassGIS

Figure 2. Surface Geology of Martha's Vineyard. Darkened outline represents the Polly Hill Arboretum.

Münchh.) is the least common oak and it appears sporadically as isolated trees. This species is abundant on nearby Cape Cod.

The appearance of the post oak on Martha's Vineyard represents one of its northernmost populations on the continent. The trees are often found as ancient oak stools from repeated cutting for firewood or the result of stump sprouts from past episodes of fire. Although tree ring counts provide estimates up to 80 years of age, the nature and quantity of stool formation suggest that some post oak stands date back before European settlement. The dwarf chinkapin oak is a woodland edge tree and rarely reaches over 1.5m (c. 5ft.) in height. It is not abundant but grows side-by-side with scrub oak in the outwash plains and as an understory tree in the morainal woodlands of the island. The white oak does not obtain the grandeur of specimens found on the mainland. Hurricane force winds, ocean salt, and dry soils produce trees that grow wider than tall, although some achieve spectacular forms.

The black oak is the most common species on the island, appearing in woodland moraines, outwash plains, and coastal seaside areas. Typically considered an upland species of dry forest or sand dune, on the island it abuts the ocean and is tolerant of tidal fluctuations of brackish water. Perhaps the tallest naturally occurring trees on the island, black oaks can also display a short spreading habit.

The scarlet oak is an unusual tree to find in great number anywhere on the island and it is more commonly found as separate isolated trees, never in groves.

The scrub oak is often maligned as the tree of the barren lands. Historical accounts of the great monoculture of scrub oak in the outwash plains describe a tree of little value, and a sign of lowlands frequented by frost. "A barren ragged plain of no town." (Athearn, 1698). The outwash plains remained, both before and after European settlement, a sort of no man's land. With scarce access to water and drought-prone soils, they provided little incentive for growing agricultural



Figure 3. Wide-spreading Form of White Oak on Martha's Vineyard. Photo by the author.



Figure 4. Wind-induced Spreading Form of Black Oak. Photo by the author.

crops or supporting grazing animals. Agriculture in the form of crop or livestock production occurred historically on the perimeter of the island. Despite its perceived lack of value, the outwash plain on Martha's Vineyard would later become valued primarily as the last breeding ground of a now extinct bird, the heath hen.



Figure 5. *The Male Heath Hen*. Photograph by Dr. George W. Field. (Gross 1928).

The Heath Hen Reservation and the establishment of the Manuel F. Correllus State Forest

In 1908, the Commonwealth of Massachusetts purchased 612 acres in the central portion of the island in an effort to conserve the last remaining population of heath hen (*Tympanuchus cupido cupido* L.). Considered at the time a subspecies of the greater western prairie chicken, it was abundant in coastal North America from Maine to Virginia at the time of European settlement. Through the combined effects of habitat loss and hunting to near extinction, by 1870 the remaining populations of heath hen found refuge on the great plains of Martha's Vineyard. The story of the heath hen and the efforts to save it was compiled by Dr. Alfred O. Gross in his book titled, *The Heath Hen*, published in 1928. The introduction

frames the situation as it existed in the last years of the heath hens existence on Martha's Vineyard.

“In the history of the animal kingdom, species of animals that have been unable to adapt themselves to the changing conditions of their environment have become extinct. Even within the memory of man, species of birds that at one time were eminently successful in the competition for existence have completely disappeared....When the first colonists came to our shores the heath hen was abundant in many places in New England and the Middle Atlantic States but it was unable to adapt itself to the new conditions imposed by civilization. It was soon driven out from place after place and by the middle of the nineteenth century it was forced to entrench in its last stronghold on Martha's Vineyard. There on the sandy scrub-oak plains in the central portion of the island, the Heath Hen has up to the present withstood the encroachments of man.” (Gross 1928).

An ornithologist, Gross would study the habits of the last 100 Heath Hens in existence and among his noteworthy findings was the use of scrub oak acorns as its major food source. While good intentions and efforts were made to save the Heath Hen, the last male bird died in 1932, signifying the extinction of this unique bird. Despite the failed efforts to preserve the heath hen, in subsequent years the Commonwealth of Massachusetts would add adjacent parcels of conservation land and would eventually turn over the ownership to the Massachusetts Department of Conservation. Today the Manuel F. Correllus State Forest consists of a total land area of just over 5200 acres. Island conservationists consider it the crown jewel of conservation lands on the island. Rich habitats comprised of sandplain grasslands, frost bottoms, and pitch pine forest are found within its boundaries. The central location provides protection of the one freshwater aquifer that provides drinking water for island inhabitants.

Interspecific Hybrids on Martha's Vineyard

The pioneering botanical work of Alfred Rehder and Ernest Palmer of the Arnold Arboretum left a strong legacy in the New England region. In 1901 Rehder published work describing the hybrid oaks of New England, most found within the Boston area. His work would eventually extend to Cape Cod, Martha's Vineyard, and Nantucket Island. Later Palmer would delve deeper into the complex nature of the introgression of sympatric oak species and their highly variable offspring (Palmer 1937, 1948).

Taxonomists struggle with the concept of “mongrel” populations of plants, yet Rehder and Palmer created type specimens in an attempt to define as best they could these hybrid groups of trees (Hill, P. and Buck, P. 1980). Taxonomists approach these hybrids with the overlying concept of the nothotaxon. The most current International Code for Botanical Nomenclature defines nothotaxon as “when all the parent taxa can be postulated or are known, a nothotaxon is circumscribed so as to include all individuals (as far as they can be recognized) derived from the crossing of representatives of the stated parent taxa (i.e. not only the F1 but subsequent filial generations and also back-crosses and combinations of these).” (ICBN 2006).

This concept has wide application on Martha's Vineyard. Personal observations and botanical voucher collections reveal a wide spectrum of morphological expressions, some grading more heavily to one parent versus the other.

The first hybrid described by Rehder in 1901 (*Quercus × rehderi* Trel.) is a hybrid between black and scrub oak; it is common on Martha's Vineyard (Trelease, W., 1924). The remaining hybrids were all described by Palmer and are much more difficult to circumscribe. The table that follows outlines the documented hybrids found on Martha's Vineyard with voucher specimens that exist in New England herbaria, including the Polly Hill Arboretum (PHA).

<i>Quercus × rehderi</i> Trel. (<i>Q. ilicifolia</i> × <i>Q. velutina</i>)	Rehder Hybrid Oak
<i>Quercus × faxoni</i> Trel. (<i>Q. alba</i> × <i>Q. prinoides</i>)	Faxon Hybrid Oak
<i>Quercus × fontana</i> Laughlin (<i>Q. coccinea</i> × <i>Q. velutina</i>)	
<i>Quercus × fernowi</i> Trel. (<i>Q. alba</i> × <i>Q. stellata</i>)	Fernow Hybrid Oak
<i>Quercus × stelloides</i> E. J. Palmer (<i>Q. prinoides</i> × <i>Q. stellata</i>)	

Figure 6. Interspecific oak hybrids documented by New England herbaria. (Angelo R. and Boufford, D., 2010).

Recent Oak Mortality and Climate Change Implications

In recent years a native insect pest, fall cankerworm (*Alsophila pomataria* (Harris)), has caused significant damage on the island. An estimated 40% tree mortality occurred in the PHA natural areas as a result of 3 successive years of defoliation (2005, 2006, 2007) combined with summer drought. A study of the long-term forest dynamics of the PHA woodlands (40 acres – 16 hectares) has been initiated in collaboration with the Harvard Forest of Harvard University. PHA is confident that the local study of our woodland can inform or provide a perspective on island-wide conservation of oak forests for the future. Nine study plots have been designated at the Arboretum and an additional 11 plots on neighboring conservation property. Key aspects of the study will include forest succession, soil nitrogen availability, monitoring of populations of defoliating insects and keystone soil invertebrates (ants and beetles), and recording environmental variables such as light and temperature.

Many questions remain as to the intensity of the insect outbreak and the significant collapse of our mature oak forest. While global climate change continues to be debated, one way to engage in the process is the long-term



Figure 7. Author in the midst of oaks lost to fall cankerworm. Polly Hill Arboretum, 2009.

ecological study of our oak woodland. We look forward to sharing our findings in the years ahead.

This paper is a revised version of a presentation given by the author at the 6th International Oak Conference 20-22, October 2009, Puebla, Mexico.

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A Botanic Oak Collection Recruited for Science

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What do you do if you are a geneticist studying the evolution of the genus *Quercus* and in great need of DNA samples of several hundred different oak species found nearly everywhere in the northern hemisphere from 0 to 4500 metres above sea level?

For Antoine Kremer, Research Director at l'Unité Mixte de Recherche BIOGECO (INRA, Université de Bordeaux) and François Hubert, who is preparing his doctoral thesis, the solution is at hand: not two hours from their laboratory in Pierroton near the city of Bordeaux, the oak collection at l'Arboretum des Pouyouleix (St. Jory de Chalais) offers a vast choice of botanic species of oak, grown from wild-collected seeds and for which the seed collection data has been scrupulously recorded.

Created in 2003 by Béatrice Chassé and Gérard Lionet, l'Arboretum des Pouyouleix covers 25 ha in the north Dordogne region of France. Bordered on one side by the river Côte, the altitudinal variation is from 270 to 210 m above sea level. Situated between the Aquitaine basin and the Massif Central, it is a metamorphic region in which the soils are largely the product of mineral decomposition. There are different soil types locally at the Arboretum (although the pH is always below 7): in the valleys as well as alongside the river the soil is rich and deep, whilst in other places the soil is sandier and shallower, and still others are composed of a coarse clay. Over the past 7 years rain fall has varied from 716 mm (2005) to 1021 mm (2007). The Arboretum is at the northern limit of USDA Hardiness Zone 8.

The wild-collected biological resources that are now available in the oak collection at the Arboretum des Pouyouleix represent an invaluable contribution to the research in progress in the phylogeny of the genus *Quercus*. "This Arboretum is a clear demonstration of the scientific value of a botanic oak collection" declares Antoine Kremer, underlining the importance of the work carried out by Béatrice Chassé and Gérard Lionet over the past 7 years.

Systematics

Systematics is that branch of biology that attempts to classify living things. Since Linnaeus (1707-1778) and up until very recently, all living things were classified based on morphological criteria. Thus, much as one would separate out forks, knives and spoons, systematics identifies separate categories for frogs, dinosaurs, human beings and so on for birds, roses, baobabs, etc...

As of the second half of the 19th century, two major events have greatly influenced the science of systematics. The first one is the formulation of the theory of evolution and its central fact that all species are related, and the second is the development of the science of genetics based on the discovery of DNA (deoxyribonucleic acid).

With the advent of genetics, criteria for classification are based on “the content” of the genome (genomics is thus the study of living organisms based on their genome). DNA is a macromolecule shared by all living organisms and whose architecture and component molecules are identical but the physical sequence of which is different and specific for each species. The “content” of a genome



Quercus hintoniorum, one of the rare oaks from Mexico being established at Arboretum des Pouyouleix. The leaves are put into tea bags that are placed in a box containing silica gel that ensures slow and uniform desiccation. Using a specific technique, the leaves will be ground to extract the DNA.

is thus the DNA it contains but more specifically the precise sequence of these component molecules, traditionally represented by the first letter of their names : A(denine), T(hymine), C(ytosine), G(uanine). Molecular systematics is based on the comparative study of the specific sequences (i.e., the genetic code) of each species.



Arboretum des Pouyouleix



Researchers François Hubert and Antoine Kremer at work at the arboretum with oak seedlings from seeds collected by Béatrice Chassé in Autumn 2009 in Mexico. A few leaves of each species is sufficient to extract the quantity of DNA needed.

Phylogeny and evolutionary history

Phylogeny is the science that tries to reconstruct species' genealogy, in other words their shared evolutionary history. The discovery of the genetic code was a revolution for phylogeny because the universality of the genetic code is a key instrument in this reconstruction. Put simply, the degree of difference between the genetic codes of two species can tell us a part of their evolutionary history.

This history is often reconstructed using information from different disciplines (phylogeny, paleontology, paleoclimatology, etc.). It is a synthesis of knowledge acquired in different domains, and frequently scientists propose multiple scenarios because this knowledge is incomplete.

Oaks

In the world of trees, the genus *Quercus* (the latin word for oak which comes from the Celtic, *kaër quez*, and means "beautiful tree") is second only to the genus *Eucalyptus* in the number of species that compose it. The American oak (*Quercus rubra* L.), as it is called in Europe, is only one of the 244 species of oak spread across the United States of America, Mexico and Central America. In Asia, there are 183 and in Europe, poor cousin in this story, only 38. These numbers change quite frequently as taxonomists do their work, but this gives a good idea of order of magnitude per geographic region.

By studying the genetic differences in several specific DNA sequences of each of these species, M. Kremer and his team are trying to understand how they have differentiated in order to reconstruct their evolutionary history. This project is part of a larger program whose objective is the reconstruction of the evolutionary history of oaks and pines. It is financed by l'ANR (Agence Nationale pour la Recherche) and coordinated by Alain Franc (Directeur de recherches à l'INRA à l'UMR BIOGECO).

"Phylogenetic reconstruction is all the more precise if it is based on great number of species. That we have at our disposal at l'Arboretum des Pouyouleix such a vast collection of oaks is particularly valuable" adds Antoine Kremer.

As of the summer of 2010, the botanic oak collection at l'Arboretum des Pouyouleix included 240 species of this genus. But not all of the trees can participate in this project.

"Of the 240 taxa represented in the collection, we only have precise provenance information for about 150. For phylogenetic research this information is vital" explains Béatrice Chassé. "Shortly after the creation of the Arboretum we understood that the quality of our collection depended on planting trees grown from seeds collected in the wild where the species live. Most of the time, nurseries do not have this information. Since 2006, through seed-collecting expeditions and exchange we can furnish a precise "address" for all of our trees. Today, this makes our Arboretum a useful tool for the science of evolution."

Many thanks to M. Antoine Kremer for his comments and contribution.

Managing Change in an Illinois Oak Woodland

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Introduction

Oaks and the forests and grasslands they have historically dominated in northern temperate and subtropical zones are important for biodiversity. Their conservation is a global issue, as evident on many of the field trips and excursions of the IOS.

IOS members on the Yunnan, China trip in 1998 witnessed the recent loss of oaks and serious erosion due to deforestation. Wholesale timbering of Madrean oak forests in northern Mexico [Fisher 1994] a few decades ago led to the extinction of the Imperial Woodpecker (*Campephilus imperialis* Gould). Forest destruction has eliminated our own Ivory-billed Woodpecker (*Campephilus principalis* L.), Carolina Parakeet (*Conuropsis carolinensis* L.) and Passenger Pigeon (*Ectopistes migratorius* L.). Oaks are keystone species in the forests of Illinois. Oaks comprise a diverse genus, kings and commoners of their realm, a passion and challenge for all quercophiles. We venerate the few ancient giants, the kings that remain and their place in history, as attested by many a journal paper. This paper deals with the commoners that remain at the Henry Eilers Shoal Creek Conservation Area (HESCCA) near Litchfield in Montgomery County, Illinois.

Location and Description

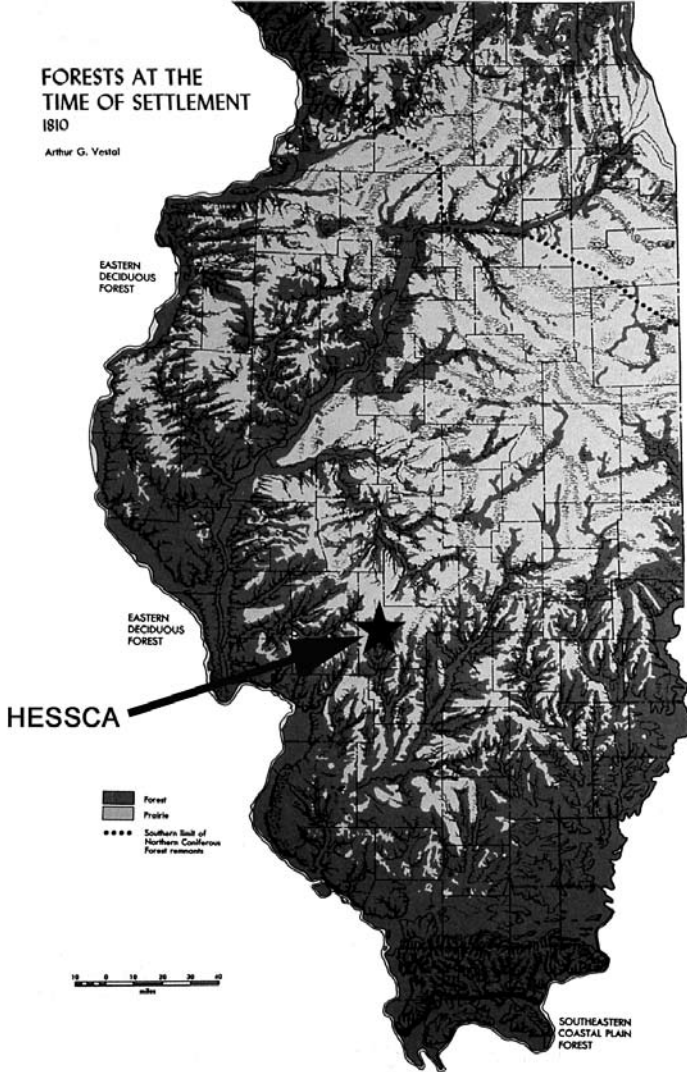
HESCCA is located in the very northwest sector of the Effingham Section of the Southern Till Plain Natural Division. [Schwegman 1973]. It was shaped primarily by Illinoian glaciation several hundred thousand years ago. Only a few miles to the north is the Grand Prairie Division laid down by Wisconsinian glaciation some ten thousand years ago. Its soils are far more productive than the much older leached till plain soils to the south. Just to the west is the Western Forest Division with its own distinctive natural elements. The preserve consists of a strongly dissected till plain segment on the east side of Lake Yaeger, located near Litchfield, Illinois. Elevation at the preserve ranges from 195 m to 230 m. The impoundment was built in the early 1960's by damming the west fork of Shoal Creek. Steep slopes, primarily west facing, occur next to the lake and in the complex interior ravine systems. They grade into gently sloping or relatively level broad ridge tops.

Pennsylvanian age sandstone and shale outcroppings are common, resulting in occasional steep bluffs and intermittent waterfalls. The Shoal Creek Limestone formation is now submerged by the lake but may continue to influence the soil pH locally. Bedrocks are overlain with poorly drained acid glacial till soils of Hickory and Hosmer clay loams and some loess. The original General Land Office Survey Notes reveal a narrow band of forest bordering Shoal Creek, terminating a few

STATE OF ILLINOIS

FORESTS AT THE TIME OF SETTLEMENT 1810

Arthur G. Vestal



miles to the north. The site is in a former forest – prairie transition zone and at the juncture of three different natural divisions, a geographic position that has undoubtedly contributed to its exceptional biodiversity.

Resource

The HESCCA is owned by the City of Litchfield and was set aside by council resolution in 1990 following previously failed attempts at protection. Prior preservation efforts had focused on the protection of rare species which was rather typical at the time.

We changed our tactics by emphasizing recreation, tourism and nature education in our outreach to the local community. All of our local news media became consistent supporters. This proved to be an effective way to work with elected officials whose primary focus is on economic growth. An early supporter, the Litchfield Rotary Club sponsored a nature trail; the club continues to update our trail guides. They also maintain a series of Bluebird boxes that have fledged over 700 birds. From the very onset of this project much guidance and help came from the Illinois Chapter of the Nature Conservancy with its science driven approach to natural lands management. Their support continues to this day with funding for management activities provided through their partnership in the Illinois Volunteer Stewardship Network. In 1992 local community leaders and supporters from nearby communities formed the Shoal Creek Volunteers, a 501(c)3 chartered corporation. It is dedicated to natural areas preservation at the local level with a focus on HESCCA. An occasional newsletter and news releases in the local media are means of keeping the public informed.

The organization's mission statement and action plan have served us well. They were written with a focus on management activities that enhance biodiversity. It has been said if you don't know where you are going, any road will take you there.

From the beginning it was deemed important that biological and historical research at the local level on forest communities in this part of the Midwest, where oaks are keystone species, should form the basis of all our activities. Ongoing documentation and inventory of the site's natural resources has resulted in impressive species lists. In addition, efforts to utilize the site as a last refuge for species and genotypes that are becoming increasingly rare or virtually extirpated in this part of Illinois have met with considerable success.

We have also been beneficiaries of various researchers who continue to conduct studies at the site. In addition the efforts of local citizen biologists have resulted in impressive species lists. The number of plant species recorded and vouchered so far is well over 700, with over 600 of them native, including several state listed species. A total of 65 fungal species were documented in 1994. 75 breeding bird species have been recorded, including the American bald eagle (*Haliaeetus leucocephalus* L.). Reptiles are reclusive, but approximately 10 species have been seen. This extraordinary biological richness remains despite nearly 200 years of intense resource pressure. It is a testimony to the resiliency of a healthy oak-hickory woodland community.

Historical and Ecological Notes

Native Americans influenced the land everywhere since the ice ages. Numerous archeological sites were inundated by the impoundment of Shoal Creek. The first maps indicated a large treeless area in its floodplain that may well have been a farming site of the aboriginal inhabitants. Arrowheads and stone axes found along lake shore lines are indications of a sizable population at various times. As European diseases and warfare decimated their numbers, Native American influence on the local landscape may have already been diminished at the time of local settlement [Mann 2005].

Fire, their primary land management tool, continued well into the early settlement decades and is documented in reminiscences by settlers in local newspapers and from the first history of the county. These accounts corroborate a long list of similar reports in nearby Missouri [Ladd 1991]. In a story published in the *Montgomery News*, 3-20, 1908, the writer E. C. Cline reminisced on his boyhood, no date given: 'The old time prairie fire usually at night that swept from Staunton [just south of here, ed.] northward past Zanesville [just north of here and long gone, ed.] and through the boundless prairies east and north of Springfield was a spectacle the grandeur of which the present generation can have no conception'. Change came quickly, as in one generation the prairie disappeared forever. This local account from D. Jackson's 'Break Time' account in the *Litchfield News Herald*, 10-25-1996 cites a letter from the grandson of one of the first settler families in N. Litchfield Township. J. Crawford: 'It was settled mostly between 1850 and 1860. That was the time that the prairie grass and rosinweed vanished.'

At the same time the European immigrants and their descendants used the woods heavily for pasturage as they had for millennia in their old countries. A



Prescribed fire in an upland forest ravine system at HESCCA photo©Henry Eilers

German immigrant, Adolphus Ammann, wrote: 'They could find enough grass in the woods (in the winter). The cattle and the pigs live through summer and winter, and day and night, in the woods' ["The Passing Frontier; Pioneer Life; Travels in Illinois, 1819"]. Another account: 'Hogs will live & get fat in the Woods and Prairies. I have seen some as fat upon Hickorynuts, Acorns, Pecons & Walnuts, as ever I did those that were fattened on corn.' A local resident reminisced: 'Our house was on one of the regularly traveled roads to St. Louis. People from Christian County [to the north] had to travel that road and our house was a regular stopping place. I have seen hundreds of droves of hogs go by our house that were being driven to St. Louis. [P. Walter, 1844].

We have collected numerous other local accounts pertaining to hogs (*Sus domestica* L.) during that time. The Shoal Creek region is mentioned numerous times as it was apparently crossed by the Vincennes – St Louis Trace that was frequented by the earliest travelers. Hogs [pigs] were the most important free range livestock in the early 1800's. Over 400,000 head were driven annually in the late fall from nearby Effingham County to the Markets in St. Louis, Missouri [History of Effingham County]. It can be assumed that the numbers for our county would have been similar. Soon thereafter as wire fencing became available, it spelled the end of the free range. Cattle (*Bos taurus* L.) and hogs were then segregated at some time in the woods, with hogs largely occupying the most heavily dissected terrain. Until very recently this was a common practice. Barbed wire and wire mesh fence remnants remain to this day, mostly imbedded in our largest trees.

'Reading the Landscape of America', [Watts 1957] helps us interpret what we see today. Hogs in this area until the rather recent emphasis on confinement feeding, were preferably 'run' on rough terrain for at least two reasons. One, that land was otherwise of low economic value; second, hog waste would easily wash off the site. This was important as hogs are quite disease prone. The legacy has been severe erosion, still very much visible. Alien to the American landscape, hogs would have been especially hard on ground flora with underground storage structures. This is borne out by the nearby Roberts Cemetery Savanna Nature Preserve, which is covered with a carpet of wild hyacinth (*Camassia scilloides* Lindl.) in the spring, and other geophytes that are comparatively uncommon at HESCCA.

Consisting primarily of early successional species some of the native flora has reestablished itself here over the decades. In the flood plain some of the dominant woody species today are sycamore (*Platanus occidentalis* L.), box elder (*Acer negundo* L.), soft maple (*Acer saccharinum* L.), cottonwood (*Populus deltoides* Marsh), shingle oak (*Quercus imbricaria* Michx.) and river birch (*Betulus nigra* L.). Of these shingle oak is especially abundant. A few very large trees of several species survive below the dam in what was a major part of the construction staging area. Here also remnants of the rich mesic floodplain shrub and ground flora have survived. They serve as a restoration guide for this community. I remember a huge river birch over 3 feet across on the steep creek bank. Only the stump remained as a mute testimony for many years later. It may have been, if my memory serves me correctly. The degradation and folly of this specific 'improvement' project has been eloquently described by a renowned writer [John Madsen 1973].

Below the dam are also some of the largest *Quercus alba*, *Q. velutina* and *Q. stellata*. They occur on the first ridge in a more or less straight line. On close examination one encounters heavy gauge wire remnants deeply imbedded in the trees. This is most likely the oldest fence remnant at HESCCA. It saved the trees as they would have been unacceptable at the saw mills. Abundant massive stubs remain where excessive shading has occurred by more recent tree recruitment. Some trees still have a few very large remaining low branches mostly on one side. Here also is a significant linear soil depression. In attempting to 'read the landscape', our conclusion is that this erosional feature was caused by cattle. They like to walk fence lines as they look for shade or that greener grass on the other side. Elsewhere remnant fence lines are associated with noticeable broad ridges. These may be partially due to deposition by wind blown soil but primarily severe erosion caused by plowing patterns and animal overstocking.

Plant Communities

Upland Forest

HESCCA is actually a microcosm of several woodland categories representative of the Central Hardwood Region. Oak-Hickory woodland constitutes by far the far the most common community type. As such it exhibits considerable diversity, often differing from one ridge or ravine to another [Roberts 1995]. This may be due to subtle changes over the last two hundred years in soils, aspect or past land use practices or a combination of all of these factors. By far the most dominant trees are hickories (*Carya cordiformis* Koch, *C. ovata* Koch and *C. tomentosa* Nutt.) and oak species. White oak (*Quercus alba* L.) is the most wide spread species and exists in a wide variety of age classes. It also occurs with varying frequency in all other communities. Black oak (*Quercus velutina* Lam.) is similarly widely distributed, but is a more efficient invader of disturbed agricultural sites. Red oak (*Quercus rubra* L.) is also common on slopes of the dendritic ravine systems, including a few large trees. Chestnut oak (*Quercus muhlenbergii* Engelm.) is less frequent and scattered throughout the valleys. Bur Oak (*Quercus macrocarpa* Michx.) occurs locally, as do other oak species covered in more detail elsewhere.

Floodplain

A remnant floodplain stretches along the low-gradient Shoal Creek south below the lake dam. During dam construction and creek channelization it was severely disturbed [Line 1973]. In spite of that it has retained a large number of mesic species not found elsewhere at HESCCA; it has responded well to restoration activities. Early successional species dominate, including large numbers of shingle oak (*Quercus imbricaria* Michx.). Most seem to have been recruited since the construction of the dam and are uniformly small in size. A few medium sized bur oaks exist. Large numbers of spindly small red, white, pin and bur oak trees 2-10' tall exist in the under-story. The occurrence of swamp white oak (*Quercus bicolor* Willd.) is notable. This species barely escaped extirpation on HESCCA. A very few individuals exist here and are found nowhere else on the preserve.



Flatwoods community



Upland oak forest



Floodplain forest (during high water)

all photos©Henry Eilers

Flatwoods

Barrens and flatwoods have been considered by numerous researchers as sub-categories of savannas [Madany 1981]. Except for earlier records by Meade and Short, the floristic record for barrens has remained meager until recently. In this most northern location of a southern flatwoods community the soils are seasonally wet and even inundated at times due to its argyllic soils, locally referred to as 'hard pan'. It becomes a rather xeric community during the hot, dry summer. The ground flora includes a remarkable blend of wetland and drought tolerant species. A unique feature is the dominance of pin oak (*Quercus palustris* Muenchh.), often in close proximity to black oak (*Quercus velutina* Lam.), post oak (*Quercus stellata* Wangh.) and blackjack oak (*Quercus marilandica* Muenchh.). The latter two are at the northern limits of their range here. The state listed Buffalo Clover (*Trifolium reflexum* L.) occurs here sporadically, apparently depending on fire disturbance.

Barrens

A shallow layer of soil caps sandstone bedrock on dry ridge tops above the former Shoal Creek Valley on south and west facing slopes. The woody vegetation is sparse and consists mostly of stunted xerophytic oaks. These trees with their sinuous trunks may be some of the oldest trees at HESCCA [Pederson 2010]. White and black oak are present here in addition to dominant post and blackjack oaks. The ground layer is rich in prairie grasses, other graminoids and forbs. It includes a number of species with Ozarkian affinities [Schwegman, personal communication].

Two such areas at HESCCA were recognized as some of the best remaining samples of this community type in the state by the Illinois Natural Area Inventory conducted by the Illinois Nature Preserves Commission. We have photos from around 1900 showing local families in their Victorian finery at these two sites. These INAI sites were at that time local excursion destinations for picnic outings. The Rocky Hollow Barrens site once sat above a limestone quarry but is now under the water of the lake. The Central Barrens site is situated high above 'The Cave,' a rock shelter also submerged. Maybe occasional weekend recreational use over multiple decades kept these areas open enough to retain their unique diversity. Is this an explanation or just speculation? It certainly sounds plausible.

Old Fields

Most of these former croplands and pasturelands had been long abandoned by the time the lake was built. Today they are a mix of shrub expanses, consisting of *Salix humilis* Marsh., *Corylus americana* L., *Rhus glabra* L. and *Rhus copallina* L., *Viburnum prunifolium* L., *Prunus americana* Marsh. and *Prunus mexicana* Wats., *Cornus drummondii* Mey., vines and brambles. They include prairie-like areas. I speculate that this site was a flatwoods community in pre-settlement times because most tree species typical for this community are present nearby. Black cherry (*Prunus serotina* Ehrh.), white ash (*Fraxinus americana* L.), slippery elm (*Ulmus rubra* Muhl.), sassafras (*Sassafras albidum* (Nutt.) Nees) and shingle

oak have been the major invaders. Hickories and several other oaks, such as black, post and pin oak, are also recruiting in small numbers. This successional community is the most species rich with invasive and listed native species often growing side by side. One of the latter is the state endangered savanna blazing star (*Liatris scariosa* var. *niewlandii* Lunell) that triggered the protection effort for this site over 30 years ago.

Wetlands: seep and sedge meadow

A small treeless seep occurs on a south facing slope. The lime rich water precipitates out as a layer of tuff. This area has its own unique assembly of species, including the very rare swamp metal mark butterfly (*Calaphelis mutica* McAlpine), which has been proposed for federal listing. A sedge meadow depression is part of a much larger area that extends into a neighboring farm field. The ground layer is dominated by a coarse rhizomatous sedge (*Carex hyalenolepis* Steud.) and blue-joint grass (*Calamagrostis canadensis* Michx.). Out of this meadow-like expanse rises a stand of pin oak having huge buttressed bases. Some of them are over 107 cm dbh.

Invasive Species

In hindsight, not all plant introductions were beneficial. Today silky lespedeza (*Lespedeza cuneata* [Dum.-Cours.], Don) is one of our most noxious weeds in open areas. It must have seemed like a miracle plant as it established easily on the most impoverished sites. Only a few years ago wildlife management professionals expressed to me that it was a great plant. Never mind that its high tannin content prevents both foliage and its abundant seed from being consumed by our wildlife. Honeysuckles (*Lonicera japonica* Thunb., *L. mackii* Rupr. Maxim. and *L. × bella* Zabel), autumn olive (*Eleagnus umbellata* Thunb.) and multiflora rose (*Rosa multiflora* Thunb.) were also deemed good for wildlife. As one senior official wrote in a rebuttal: 'even multiflora rose has its redeeming value'. Crown Vetch (*Coronaria varia* L.) was introduced along Shoal Creek during the channelization project and is a problem only in open areas. There it dominates along with the native but equally aggressive Canada goldenrod (*Solidago altissima* L.).

Many parts of our woodlands, often the ones with better soils, are dominated by a few species that are unpalatable to farm animals. Black Snakeroot (*Sanicula gregaria* Bickn.), May apple (*Podophyllum peltatum* L.) and several boneset species (*Eupatorium* spp.) have formed monocultures. In areas with heavier leaf cover woody vines prevailed, primarily poison ivy (*Rhus radicans* L.) and Virginia creeper (*Parthenocissus quinquefolia* (L.) Planch.). A thick, slowly decaying leaf layer can be detrimental to low growing species. In the early days of our management efforts we would often discover a small island of herbaceous diversity on the slightly mounded base around old oak trees. These had been kept free of leaf accumulation by winds funneling up the ravine systems.

Elsewhere, species of blackberry and black raspberry (*Rubus* spp.) form thickets. Gooseberry (*Ribes missouriense* L.), certainly a disturbance species and common in nearby woodlands, is represented by only a few individuals. A



Communities at HESCCA - Top: Upland ravines, Center: Barrens
Bottom: Pin oak pothole, sedge meadow all photos©Henry Eilers

major presence in many areas is sassafras. It also an enigma, as we have seen no information as to how it might have fit into pre-settlement communities.

New Threats

Today we are facing a whole new set of influences. We have lost all large elm trees due to Dutch elm disease. Only two Butternut trees (*Juglans cinerea* L.) remain and both have cankers. Dogwood (*Cornus florida* L.), with limited numbers to begin with, has become seriously infected by anthracnose in the last few years. Japanese beetle (*Popillia japonica* Newman) is present in huge numbers. Most of the abundant shingle oak trees in the successional communities are loaded with gouty oak gall. The weight of the galls increases the species' susceptibility to limb breakage in ice storms, such as one that occurred in 2008. Numerous trees, even small ones are declining in vigor or have died. Pin oak is becoming infested with the similar horny oak gall in the last few years.

What is the role of these pathogens in the woodland scheme? Where is the balance? What is the balance?

In the last twenty years we have seen varying degrees of damage by drift from agricultural herbicides. It has been expressed as oak leaf tatters and foliar distortion on every grape vine, redbud and certain herbaceous species. One year all goat's-rue colonies (*Tephrosia virginiana* (L.) Pers.) failed to flower, and the foliage was chlorotic with sclerotic margins. It is a fairly safe assumption that nutrient loading from volatilizing heavy nitrogen applications is a negative factor also. Railroad prairie remnants, where 50 years ago white and purple prairie clovers (*Petalostemum* spp.) thrived, have completely disappeared for just that reason. Whippoorwill (*Caprimulgus vociferous* A. Wilson), a commonly heard bird just a few years ago, seems to have disappeared. During the same period luna and giant silk moths seem to have disappeared as well. It used to be difficult to find an oak leaf without herbivory, as I remember from assisting school children with their biology leaf collection projects. Not so today— intact foliage is now the norm. All three observations may be tied together. It has been suggested that a predatory fly introduced for gypsy moth control may be the reason, as it changed its food preference to native moths. [Bouseman, Sternburg 2002]. Talk of potential cascading effects.

The last logging event occurred when the often reluctant land owners were forced to sell to the City of Litchfield the land needed for the new lake in the late 1950's. They must have logged all salable timber. A few stumps and one tree top, most likely from a scruffy blackjack oak in the flatwoods, remain to this day. It must have yielded a very small saw log. The latter survived initial burns because of low fuel loads there. We have since protected it and other such survivors during our prescribed burns. Other stumps are associated with still living and mostly multiple trunked white and black oak trees. Most of the time only a central cavity remains today in lieu of the stump. Logging on at least one property occurred in 1931, according to an obituary, that listed death due to a logging event.

The first Montgomery County atlas from 1889 shows a series of 10 acre sized woodland tracts to the north of Rocky Hollow Trail. One of the owners was J. B. Turner, a famous land owner with large holdings from the nearby Butler

'flats'. This small tract ownership was an enigma for me until I received a pioneer account from John Heaton, a friend from Palatine, Illinois. It was written by an ancestor in Iowa and detailed the importance of just such a tract to their family on the prairie, where trees were lacking. Such woods were a source of building material, fencing and fuel, all vital to their survival. Certainly that could explain the above ownership anomaly. Here, at the edge of the treeless prairie, ownership of timberlands meant a steady source of income. No doubt the resource was heavily exploited and early on, along with grazing pressure led to changes in forest structure.

Numerous local accounts from around 1900 bemoaned the quick decline in game species during their life time, from passenger pigeons and wild turkeys (*Meleagris gallopavo* L.) to whitetail deer (*Odocoileus virginianus* Zimmerman) and beaver (*Castor canadensis* Kuhl). Of these, beaver, turkey and deer have since then made a major comeback. The latter have, due to excessive numbers, become a major pest for us. Too much of a good thing can be bad. We have attempted to protect rare species with fencing, with partial success. The palatable early spring flora, liliaceous plants in particular, are being devastated by deer herbivory. Beaver and turkey so far appear to have positive effects. It's all in the numbers.

After cessation of grazing and/or logging, massive recruitment of trees occurred in many areas. This often resulted in dense even aged stands of spindly oak and hickory trees on the relatively flat uplands. Some of these have been measured at over 12 m tall, with only 5-10 cm dbh trunks. A large number are multiple trunked. Some grew from logging stumps; most were released from grub sprouts in the shrub and ground layer.

The current tree quality of our surviving larger trees widely scattered through ravines and uplands may reflect past high grading practices. Many of these older trees have sinuous trunks or are otherwise misshapen. [Pederson 2010]. Elsewhere the knobby trunks and remaining low branches may identify individuals that had little shade competition during many decades of intense grazing. That could make them well over 100 years old.

Extrapolating from the position and condition of wire remnants protruding from their trunks, similar open grown fence line oaks may be of the same age category. They are certainly some of our largest trees. The largest white oak has a circumference of 312 cm; a post oak trunk from a cluster of three, 184 cm; a black oak 262 cm. A solitary blackjack oak elsewhere measured only 160 cm. We have done no coring of trees. In attempting to count rings of felled trees, most of the oaks and maple trees seem to date to the early 1900's. This was a surprising result as the diameter of the cut surfaces ranged widely from 10 cm to nearly 60 cm. Sugar maple (*Acer saccharum* Marsh) invaded uplands in huge numbers at various times. Due to their shade tolerance and faster growth rate they have been out-competing the oaks and hickories.

To our surprise we have seen no seedling recruitment in 20 years of monitoring, not even one, in spite of occasional large seed crops. Elsewhere I have observed maple seedlings forming a dense ground cover in previously pastured woodland. White oaks experienced a similar germination event a few years ago in numerous locations at HESCCA, with populations averaging 100 seedlings per



Young maples dominate the understory below an old *Quercus alba* wolf tree at HESCCA. photo©Henry Eilers

1/sq.m. They had thinned out to 25/sqm three-fourth two years later. Their size in the ground layer remained about the same. No other oak species has exhibited similar recruitment. Even in years of heavy mast production, other oak species and hickories, too, have recruited consistently but in relatively small numbers. Occasionally there will be a cluster of seedlings where blue jays or rodents had cached acorns or nuts.

Management and Restoration

The loss of diversity in our woodland community continues today [Taft 1999]. From the beginning our goals were to recapture as much as possible the elements and structure of the pre-settlement landscape. This is, of course, a rather elusive reference point. Some resulting criticism forced us to consider some of those arguments: 'there has always been change'; 'let nature take its course'. 'Man is a part of nature, not apart from it.' We can hurt or we can heal. Sometimes that goes together in the real world where we operate. All disturbance regimes involve some degree of 'harm', whether caused by climate, weather events, disease, parasites or other biological agents. Only man can choose some degree of short-term 'harm' to achieve greater long-term good. A bur oak may be a bur oak from a taxonomic view, but certainly varies widely across its continent wide range. At the local level the only stand of sky-blue aster (*Aster laevis* L.) at HESCCA is visually quite distinct from prairie populations elsewhere. Its survival depends on us.

Considered the father of wildlife management, Aldo Leopold spoke rather eloquently to land management issues. In his books: 'Land Ethic' and 'Sand County Almanac', 1949, he caught succinctly the framework in which we should operate. The sudden arrival of Europeans on the continent led to many drastic and irreversible changes on the continent. Most important in restoration has been the reintroduction of fire. Other major activities are the control of invasive species, growing plants and harvesting seeds for biodiversity enhancement, selective thinning of woody plants, photo documentation and maintaining journal entries.

Prescribed Burns

A great body of scientific literature about fires in natural systems exists. Sediment records in neighboring Fayette County, going back 130,000 years, indicate the frequent nature of fire even in interglacial periods [Teed 2002]. Lightning caused ignition is still occurring today. Most fires in the mid-west historically were anthropogenic in nature. Fire's reputation in land management is only slowly being restored. 'Smokey Bear' was great PR, but poor science. It was a convergence of poor timbering practices, excessive grazing and certainly misuse of fire that led to catastrophic fire events. The scapegoat became fire. Fire frequency, season of the year, intensity and scale have always varied greatly over time and space.

Our first attempt at fire in the woods was a small scale burn in the late 1980's on the Central Barrens ridge under the direction of W. McClain from the Illinois Department of Natural Resources [Schwegman 1995]. The results were amazing. Based in part on this experience, we, the Shoal Creek Volunteers, included all of the 260 acre area in our burn plan. We attempt to burn some portion of the preserve

every year either in the spring or fall. Some years weather conditions make any burn impossible. The intensity of burns has varied much, depending on the time of year, wind direction and velocity, ambient air temperature and humidity

Multiple trunked trees often have a dead member or basal cavity, which is an entry point for fire. Logging damage persists to this day. Heavy woody fuels had accumulated at the base of many trees over the years. Major droughts in past decades, often two years back to back, set trees up for fungal attacks, usually first visible at their bases. The partially decayed remnants of bark and fungal bodies create highly flammable tinder. A severe ice storm in the winter of 2008 contributed additional material, especially from black oaks, which have relatively brittle wood. Large pin oaks form skirts of short branches that accumulate around the base as they die. Pin oaks have relatively thin bark at maturity and are therefore vulnerable to damage from such accumulations. These are just some of the reasons that predispose trees to fire injury. By comparison, even much younger healthy post and blackjack oaks with their thick, blocky bark are very fire resistant.

Historic burn frequency for similar woods has been reported as every 1-4 years [Johnson, Guyette 1994, 1997]. Under such a burn regimen in a less damaged ecosystem such damage would be minimal. Fire may also aid oak recruitment by influencing rodent feeding [Lorimer 1985]. More frequent burns lead to an increase in the ground flora and its diversity which in turn may increase carbon sequestration [Wilhelm, personal comm.]. Excessive stocking rates predispose many oaks to root rot infections. Root rot (*Armillaria* spp.) is quite common in black oak and to a lesser degree in other species [Jacobs 2002]. This combination of thinning factors is a good thing for long-term ecological health of woodlands.

Flame length during a back burn is often only 15-50 cm (6-18") in open woods, with primarily leaves and short graminoids as a fuel. That can however become a brief wall of flame as a head fire races on strong air currents through the convoluted ravine systems. Here we often find large areas that are covered with species of mosses and lichens to the exclusion of higher plants. These exposed slopes and ridges are usually kept free of major fuel accumulations by the same winds. Barrens areas and others dominated by prairie grasses will burn explosively under favorable conditions. The larger trees here survive fires readily due to the rather brief exposure. The very abundant oak and hickory grubs are top killed. Vigorous new shoots arise in abundance from the base and can flush several times during a favorable growing season. White, black, post and blackjack oaks all show a remarkable range of red colors during this flushing period. Their fall colors are even more spectacular. Grown as cutback shrubs these oak species would do justice to any horticultural setting.

The grassland forbs and prairie grasses in this area have thrived on the fire regimen. We have identified more barrens type areas along some of the lake inlets by the presence of a few prairie grasses, conservative forbs such as puccoon (*Lithospermum canescens* (Michx.) Lehm.), butterfly-weed (*Asclepias tuberosa* L.) and others. Here fire management has been combined with canopy reduction [McCarty 1998]. Fire in the various old fields at times will not carry and at other times be a 20' tall roaring wall of flames. That is an interesting degree of variability, and we have not made any decision as to the future of these areas. A good tree cover would help us manage the relatively shade intolerant silky lespedeza. We

would, however, likely lose a number of introduced but conservative species and also birds that favor shrub-lands. Habitat for certain butterflies is also an issue.

The floodplain forest has burnt well only a few times and then rather erratically. It lacks a good fuel matrix in most areas, as the flat and very hygroscopic leaves of most of the species here burn well only under the driest conditions. Even though the foliage of other oak species provides a good fuel base, shingle oak does not and therefore fits in well with the other floodplain species. Woodland annuals germinate in fall and winter and these species would not survive frequent burns. It is likely that occasional burns do favor the recruitment of species, especially graminoids. Orchids have done well under the burn regime. Hawks, owls and even eagles have been seen patrolling the fire lines and indicate that animals also benefit.

Invasive Species Control

“Invasives, whether native or introduced, function like cancer to the ecosystem. They grow uncontrollably and drive many other species to extinction. Burning, using herbicides and other forms of vegetation management are tools to return natural communities to better health” [quote: Packard 2007]. It is unlikely that multiflora rose, the three honeysuckle species or autumn olive were planted intentionally. Even after 20 years of effort to control them, they continue to be a factor in the more disturbed border areas. Fire is not a very effective control once they are well established. The thin canes of the rose do kill back, but can re-grow from an often massive base to well over 10' in length in just one season. Japanese honeysuckle stays green into the winter, but will top kill under ideal conditions. It is easily suppressed but not eliminated. The others will top kill only in juvenile growth stages. Several major populations were pulled years ago by work camp trustees of the Vandalia Correctional Facility.

By far the most progress has been made by a one day Earth Day project in each of the last four years by Susan Shelton's biology classes from the Litchfield High School. It involved digging out honeysuckle and rose, but not the tough rooted autumn olive. That has been fairly easy to eliminate by a basal spray application of Garlon – 4. It is a surefire control method and also works well on roses. Honeysuckle shrubs especially in older sizes are far more resistant and some have required multiple applications over the years for a complete kill. Many thousands have been eliminated, but recruitment from abundant seed dispersal by birds will be a continual problem. Treated areas are priority sites for reintroduction of conservative species, especially woodland grasses and forbs.

An overabundance of shingle oak still needs to be reduced. We started by double girdling the trunks by chainsaw and treating the cuts with Garlon – 4. Without this additional step the cuts will often heal over. Some cottonwood trees have also been girdled in order to liberate much smaller desirable trees in the under-story. Dense local colonies of white ash and a rather persistent infestation of Black locust (*Robinia pseudacacia* L.) have been nearly eliminated.

The major native invader of our oak forests by far is sugar maple (*Acer saccharum* Marsh.) [Ebinger 1986]. Some years over one thousand trees were girdled or felled. We retained three stands and a number of old individuals. Dead



Native herbaceous plants and oak seedlings establish where overstory maples have been girdled (foreground) photo©Henry Eilers

maples fall over and disintegrate in only a few years. This is in contrast to the oaks that we have girdled in incipient barrens sites that needed to be opened up. Many of these trees are still standing after some fifteen years. Other oak remnants go back over 50 years as reported above. The result has been a far more open woodland and a still recovering ground layer. The remaining maple stands have a



A good mast year for *Quercus alba* may result in strong recruitment where the dense shade of maples has been removed. photo©Henry Eilers

woodland floor nearly devoid of vegetation and continue to be subject to erosion. They are stark reminders of a tree in the wrong place.

The control of our most invasive species, silky lespedeza, with herbicides is not an option for us as much of the stands are associated with desirable species. We have seen noticeable reduction where the hemi-parasitic wood betony (*Pedicularis canadensis* L.) had vigorous populations and where dodder (*Cuscuta* spp.) entwined them. Introducing both species may have merit, but our results have been mixed so far.

Seeding and Planting

Seeds of forbs and grasses are annually collected on site, as well as in native plant gardens by volunteers. They have been planted everywhere in HESCCA as the need arose. The only exceptions have been the two barrens INAI sites. The most disturbed sites have been the major recipients of seed and plants. Some species have been introduced successfully from elsewhere especially wetland plants. We planted garden raised one year seedlings of red, bur, blackjack and post oaks in the old fields some fifteen years ago. Some red and bur oaks are now well over 10' tall. The slower growing post and blackjack oaks are still less than 1' tall, spindly and hard to find. Planting additional seedlings of *Salix humilis* and *Corylus americana* has also been successful.

We failed to establish southern black haw viburnum (*Viburnum rufidulum* Raf.), which occurs elsewhere in the county. Several pawpaw (*Asimina triloba* (L.) Dunal) seedlings have been added for genetic diversity in the Shoal Creek floodplain near a large clonal population that has never produced fruit. It is hoped that garden raised seedlings of swamp white oak will add to its population. The acorns are being collected from a site nearby. Nuts of shellbark hickory (*Carya laciniosa* (Michx.) Loud.) have been collected in the nearby Cahokia Creek drainage. The seedlings produced have also been introduced here as the species is disappearing locally.

Conclusion

Recovery in twenty years has been remarkable and is a source of pride for the community. The oaks are all regenerating well and assure good structural and species diversity for the future. The woods are more open in appearance. There is a rich dense herbaceous cover. Erosion has essentially stopped. Very little run-off is observed, even in major rain events. Most ravine rivulets run crystal clear and more consistently. Places such as HESCCA are the last refuges for local biological diversity.

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Editor's note: Author and IOS member Henry "Weeds" Eilers is famous in Illinois for his conservation efforts and ecological knowledge. The Henry Eilers Shoal Creek Conservation Area (HESCCA) was named for him in honor of his work with the site and with natural areas region-wide.

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Henry "Weeds" Eilers with *Quercus palustris* at HESCCA
photo by Eike Jablonski

The Collection of Oak Trees of Mexico and Central America in Iturraran Botanical Gardens

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Overview

Iturraran Botanical Gardens occupy 25 hectares of the northern area of Spain's Pagoeta Natural Park. They extend along the slopes of the Iturraran hill upon the former hay meadows belonging to the farmhouse of the same name, currently the Reception Centre of the Park. The minimum altitude is 130 m above sea level, and the maximum is 220 m. Within its bounds there are indigenous wooded copses of *Quercus robur* and other non-coniferous species.

Annual precipitation ranges from 140 to 160 cm/year. The maximum temperatures can reach 30° C on some days of summer and even during periods of southern winds on isolated days from October to March; the winter minimums fall to -3° C or -5° C, occasionally registering as low as -7° C. Frosty days are few and they do not last long. It may snow several days each year.

Soils are fairly shallow, with a calcareous substratum, but acidified by the abundant rainfall. In general, the pH is neutral due to their action.

Collections

The first plantations date back to late 1987. There are currently approximately 5,000 different taxa, the majority being trees and shrubs. There are around 3,000 species, including around 300 species from the genus *Quercus*; 100 of them are from Mexico and Central America.



Quercus costaricensis

photo©Francisco Garcia

Oaks from Mexico and southern USA	Oaks from Mexico	Oaks from Mexico and Central America	Oaks from Central America and northern South America
<i>Quercus agrifolia</i>	<i>Quercus acherdophylla</i>	<i>Quercus acatenangensis</i>	<i>Quercus copeyensis</i> *(1)
<i>Quercus emoryi</i>	<i>Quercus acutifolia</i>	<i>Quercus candicans</i>	<i>Quercus costaricensis</i>
<i>Quercus gravesii</i>	<i>Quercus affinis</i>	<i>Quercus castanea</i>	<i>Quercus cubana</i>
<i>Quercus hypoleucoides</i>	<i>Quercus canbyi</i>	<i>Quercus cortesii</i>	<i>Quercus eugenifolia</i>
<i>Quercus viminea</i>	<i>Quercus coccolobifolia</i>	<i>Quercus crassifolia</i>	<i>Quercus humboldtii</i>
<i>Quercus ajoensis</i>	<i>Quercus conspersa</i>	<i>Quercus crispifolia</i>	<i>Quercus irazuensis</i> *(2)
<i>Quercus arizonica</i>	<i>Quercus crassipes</i>	<i>Quercus crispipilis</i>	<i>Quercus rapurahuensis</i>
<i>Quercus cornelius-mulleri</i>	<i>Quercus cupreata</i>	<i>Quercus elliptica</i>	<i>Quercus seemannii</i>
<i>Quercus dumosa</i>	<i>Quercus depressa</i>	<i>Quercus sapotifolia</i>	<i>Quercus strombocarpa</i> *(3)
<i>Quercus engelmannii</i>	<i>Quercus deserticola</i>	<i>Quercus skinneri</i>	<i>Quercus tristis</i> *(4)
<i>Quercus fusiformis</i>	<i>Quercus durifolia</i>	<i>Quercus corrugata</i>	
<i>Quercus gambelii</i>	<i>Quercus x dysophylla</i>	<i>Quercus insignis</i>	
<i>Quercus grisea</i>	<i>Quercus eduardi</i>	<i>Quercus lancifolia</i>	
<i>Quercus laceyi</i>	<i>Quercus germana</i>	<i>Quercus oleoides</i>	
<i>Quercus mohriana</i>	<i>Quercus glabrescens</i>	<i>Quercus oocarpa</i>	
<i>Quercus muehlenbergii</i>	<i>Quercus glaucescens</i>	<i>Quercus peduncularis</i>	
<i>Quercus oblongifolia</i>	<i>Quercus glaucoides</i>	<i>Quercus polymorpha</i>	
<i>Quercus pungens</i>	<i>Quercus greggii</i>		
<i>Quercus sinuata</i>	<i>Quercus hintonii</i>		
<i>Quercus turbinella</i>	<i>Quercus hintoniorum</i>		
<i>Quercus x undulata</i>	<i>Quercus hirtifolia</i>		
<i>Quercus vaseyana</i>	<i>Quercus laeta</i>		
<i>Quercus chrysolepis</i>	<i>Quercus laurina</i>		
<i>Quercus tomentella</i>	<i>Quercus leiophylla</i>		
	<i>Quercus liebmannii</i>		
	<i>Quercus macvaughii</i>		
	<i>Quercus magnoliifolia</i>		
	<i>Quercus martinezii</i>		
	<i>Quercus microphylla</i>		
	<i>Quercus mexicana</i>		
	<i>Quercus planipocula</i>		
	<i>Quercus obtusata</i>		
	<i>Quercus potosina</i>		
	<i>Quercus pinnativenulosa</i>		
	<i>Quercus prainiana</i>		
	<i>Quercus rysophylla</i>		
	<i>Quercus pringlei</i>		
	<i>Quercus salicifolia</i>		
	<i>Quercus resinosa</i>		
	<i>Quercus sartorii</i>		
	<i>Quercus scytophylla</i>		
	<i>Quercus sideroxylla</i>		
	<i>Quercus tarahumara</i>		
	<i>Quercus subspathulata</i>		
	<i>Quercus urbanii</i>		
	<i>Quercus xalapensis</i>		

- * (1) *Quercus copeyensis* is sometimes regarded as a synonym of *Q. bumelioides*, which is distributed from southern Mexico to Panama.
- * (2) *Quercus irazuensis* can be considered as a form of *Q. costaricensis*, from which it is differentiated by its non-rounded apex, its less rigid leaf blade and its less dense hairs.
- * (3) *Quercus strombocarpa* is considered to be a synonym of *Q. insignis*, but the example in Iturraran is differentiated from this one by its very conical acorn, its origin, southern Costa Rica, its lesser resistance to cold and for being very susceptible to *Oidium*.
- * (4) *Quercus tristis*, from Guatemala, is considered to be a synonym of *Q. castanea*, but the leaves are glabrescent even when young and those of the latter are tomentose.

Notable species

Some of the species of oaks in Iturraran are quite rare in cultivation. Outstanding among these are:

- Quercus coccolobifolia* Trel., native species of western Mexico, Western Sierra Madre: In Iturraran there is one young plant, from Bosque La Primavera (Forest of the Spring) in Jalisco.
- Quercus copeyensis* C.H. Mull., native of Costa Rica and Panama: two young plants from Cordillera Central in Costa Rica.
- Quercus corrugata* Hook., from central Mexico as far as Panama: There are various examples in Iturraran: two from Villa Mills in Costa Rica and four from Cuetzalan, Puebla, Mexico.
- Quercus costaricensis* Liebm., from Costa and Panama: two examples from the slopes of Volcán Irazú, in Costa Rica, the largest reaching 8 m tall; another two examples planted later come from Villa Mills, also in Costa Rica.
- Quercus cubana* A. Rich., from the island of Cuba: one young example coming from an exchange with Atlántico Botanical Gardens, in Gijón, Spain.
- Quercus elliptica* Née, from southern Mexico and Guatemala: one example from southern Oaxaca, near Cerro La Mojonera.
- Quercus excelsa* Liebm., from central and eastern Mexico: two examples from Xalapa, Veracruz, Mexico, the largest reaching 3 m tall.
- Quercus glaucooides* M. Martens & Galeotti, from central and southern Mexico: two young examples from the area surrounding Taxco, Guerrero, Mexico.
- Quercus gulielmi-treleasei* C.H. Mull., native of Costa Rica: one example reaching 7 m tall, from Cerro Chirripó, in Costa Rica.
- Quercus hintonii* E.F. Warb., native of the State of Mexico, in critical danger of extinction: one young example, from Tejupilco.
- Quercus humboldtii* Bonpl., from southern Panama and Colombia: one example, from the Bogotá Botanical Gardens, in Colombia.
- Quercus insignis* M. Martens & Galeotti, from southern Mexico to Panama: five examples from different collections carried out in Huatusco, Veracruz, Mexico. The largest reaches 8 m tall.

Quercus macvaughii Spellenb., from north-western Mexico: one young example, from Sierra Tarahumara, in Chihuahua, Mexico.

Quercus magnoliifolia Née, from western Mexico: two young examples, from Ixtlán de Juarez, in Oaxaca, Mexico.

Quercus martinezii C.H. Mull., from western Mexico: one young example, from Cerro Huixteco, Taxco, Guerrero, Mexico.

Quercus oleoides var *australis* Trel., from Costa Rica: one example 2 m tall, from the area around Liberia, Costa Rica, at an altitude of 550 m.

Quercus rapurahuensis Pitter ex Trel., from Costa Rica and Panama: seven



Quercus insignis

photo©Francisco Garcia

- examples, the largest 4 m tall, from San Gerardo de Dota, in Costa Rica.
- Quercus seemanni* Liebm., from Costa Rica and Panama: two examples, the tallest 4 m, from San Gerardo de Dota, Costa Rica.
- Quercus skinneri* Benth., from southern Mexico as far as Honduras: two examples, the largest 3 m tall, from the shores of Lake Atitlán, in Guatemala.
- Quercus tarahumara* Spellenb. et al., from north-western Mexico: one plant, from the Sierra Tarahumara, in Sonora, Mexico.
- Quercus urbanii* Trel., from northern, eastern and central Mexico: one young example from Taxco, Guerrero, Mexico.
- Quercus xalapensis* Bonpl., from southern Mexico to Guatemala: three examples from Xalapa, Veracruz, Mexico, the largest reaching 2 m tall.

Reviewed and edited by Béatrice Chassé and Allen Coombes



Quercus gulielmitreleae

photo©Francisco Garcia



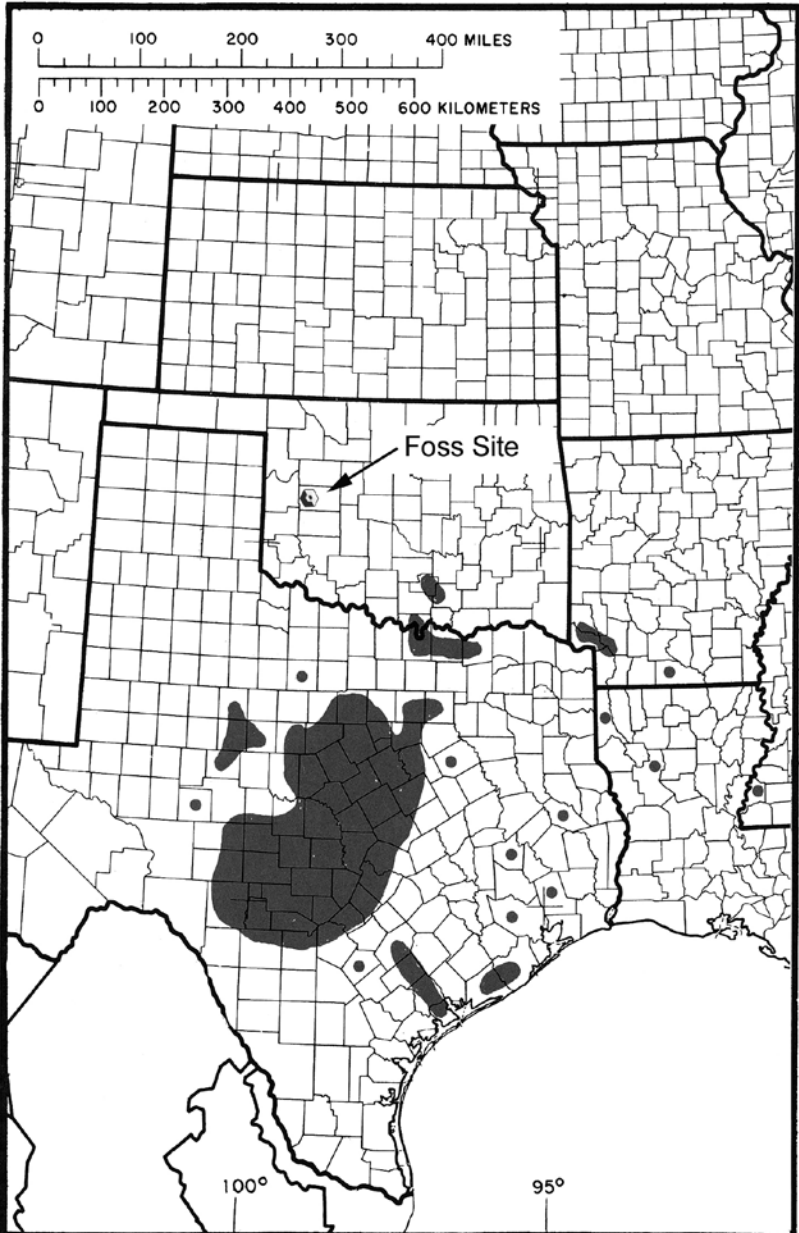
Quercus rapurahuensis

photo©Francisco Garcia



Quercus oleoides

photo©Francisco Garcia



Quercus sinuata, incl. var. *breviloba*, Dr. Elbert Little, USFS, 1977 (as *Q. durandii*)

**A new Oklahoma station for
Quercus sinuata Walt.
var. *brevifolia* (Tor.) C. H. Muller**

Allan R. Taylor
787 17th Street
Boulder, CO 80302 USA

A previously unreported station for *Quercus sinuata* Walt. var. *brevifolia* (Tor.) C. H. Muller, the Bigelow oak, has recently been identified in southwestern Custer County, Oklahoma. The population is a disjunct, located around 150 miles northwest of the nearest population of this taxon in the Arbuckle Mountains of south-central Oklahoma. That population is also a disjunct. The principal distribution of this taxon is farther south still, in central Texas and in three north Mexican states: Coahuila, Nuevo Leon, and Tamaulipas (see range map).

The Custer County population is small: fewer than 100 individuals growing on a low hill north of the community of Foss, Oklahoma. Specifically, it is just to the north of eastbound Highway 73, perhaps ¼ mile east of its intersection with northbound Highway 44. The trees are located on private land, but it is possible to gain permission to visit the land through Steve Bieberich, owner of the Sunshine Nursery in Clinton, Oklahoma. It is thanks to Steve that I first learned of the population.

There are also a few hybrid oaks on the site, recognizable by their greater height and different leaf morphology. These are presumably hybrids between the Bigelow oak and the post oak, *Quercus stellata* Wengh.

The substrate at the Foss site is the red Permian sandstone-derived soil typical for this part of western Oklahoma. Occurrence of the Bigelow oak on this kind of substrate is unusual; it normally prefers soils derived from limestone. It may well be that the site is underlain by limestone, dolomite, or gypsum accessible to roots or through ground water.

There are no known additional occurrences of *Q. sinuata* var. *brevifolia* in the immediate area, but a thorough survey has not been done.

This isolated population is probably a survival from an earlier period, when conditions may have been favorable for continuous distribution northward from the present center of distribution for the species in central Texas. Changing climatic conditions would have removed the linking populations of the species, leaving the present remnant where it is now found. Persons knowledgeable about paleobotany and geology in the Southern Plains might be able to solve the interesting puzzle of how this small disjunct population got where it is today, and why it has survived until the present.

Thanks to Bruce Hoagland of the Oklahoma Natural Heritage Inventory for confirming my species identification and to Guy Sternberg of the International Oak Society for help in preparation of the distribution map and also for advice in the preparation of this report. .



Two trees with shallowly lobed leaves at the Foss well site photos©Allan Taylor



Distinctly lobed leaf form at the Foss well site

photo©Allan Taylor



Developing acorns at the Foss well site

photo©Allan Taylor



Quercus sinuata var. *breviloba* in habitat at the Foss well site

photo©Allan Taylor

A Wedding Under Oaks

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The year 2010 was a special one for IOS oak lovers David Kusnierz and Edith Makra. They met two years ago and their shared love of trees was a big part of their courtship. When they decided to get married on June 20, 2010, they both agreed it would have to be an oak-centric wedding. Indeed it was.



They were married on Herrick Lake at the Herrick Lake Forest Preserve in Wheaton, IL. They took their vows under two large *Quercus xbebbiana* Schneid. that stand near the lake's edge. Edith's hair was highlighted with a garland of oak leaves studded with yellowwood flowers while David sported a corsage of small oak leaves and an acorn. Edith made her own wedding gown in white linen with a simple row of oak leaves. Their vows centered in on their shared love of trees. Here is an excerpt from the ceremony: " David and Edith were drawn to these two magnificent oak trees as a fitting altar for their marriage. These two trees have stood here for many, many years, enduring storms and drought, as well as sunshine and the sweet spring rains that bring life and growth. Together. Together, these two trees have shared the years. And now David and Edith will join their lives by sharing the most solemn vows that a man and a woman can share. These vows will endure like the majestic oaks under which we stand."







photo©Guy Sternberg

They exchanged wedding bands of cast gold with acorns and oak leaves all around each ring. Upon completion of the ceremony, David and Edith were rowed across the lake in a boat festooned with oak leaves and branches. On the other side, they began the reception which took place in a stone-pillared pavilion that was decorated with fabric and strewn with oak leaves and branches. Each table had a center piece created entirely of oak stems and branches.

David and Edith also practice what they preach. Edith is the Community Trees Advocate at the Morton Arboretum in Lisle, Illinois, and David is an entomology research assistant there. They are still blissfully married and continue to share their love of trees and each other.

My Favorite Plant: *Quercus pontica*

J. R. P. van Hoey Smith

Director Emeritus, Arboretum Trompenburg

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3062PC Rotterdam, The Netherlands

When asked what is your favorite plant, I have no difficulty saying immediately *Quercus pontica* K.Koch. This tree has given to my wife and me such nice memories that it should be regarded as my most beloved plant.

This has many reasons: the beautifully serrate, large leaf, like a broad leaf of *Castanea sativa*, that moreover beautifully colors yellow in autumn; the habit of growing from ground level as several stems; the huge, striped buds; the big acorns which already in August are mature and develop on seedlings of only ten years of age; and the spherical habit of the tree. In addition, the male catkins are fully 20 cm long. The clearly visible female flowers are typical for oaks, with their three facets, and may be admired on the small trees at eye level.

This species will not grow very tall. At maturity it will be about 8 m high on a favorable site, with a comparable crown spread. The seedlings I brought from Kara Dag in Turkey fruited after only 10 years of growth. How I met this most interesting oak, and what happened after my first acquaintance, is an interesting story.

In 1939 I finished secondary school in five years, at 17 years old, and my father was so happy that he awarded me 100 Dutch Guilders (quite a sum in those times). However, he made the provision that for that amount I had to buy trees for his garden, the Arboretum Trompenburg. From the four hectares there, 400 dying elms had been removed in the years 1920-1930. The average diameter of these trees was one meter!

My father was also on the board of management of the Rotterdam Zoo, which was moving from the town center to Blijdorp, and that area had to be planted with trees and shrubs. The curator was allowed to use his car plus driver, and I was allowed to join him in order to spend my *f* 100. We visited many nurseries in Holland and also abroad. Today, ten trees I bought with that *f* 100 are still growing in the Arboretum.

At the Hesse Nursery in Germany I first saw *Q. pontica* and immediately fell in love with it. I bought two of them, and these were planted to the right and left of a bridge to the present Goldfish Pond. One died, however, and the other could not be maintained there owing to its increasing size and to the loss of symmetry of the design. In January 1964 it was transplanted to the middle of a large lawn after having been prepared for this operation for three years. The first year involved digging around and cutting off half of the largest roots and backfilling the excavation again. The second year, the remaining half of the biggest roots received the same treatment, and the third year enough new roots were present so it was dug out during a period of frost. Every evening the rootball was watered to form a solidly frozen ball, easy to transport. Now it has developed nicely into a solitary tree with measurements of eight by eight meters.



Quercus pontica with its beautifully serrate, large leaf that colors yellow in fall
photo©Guy Sternberg



Our head gardener supervises the transport of the Hesse *Quercus pontica* with its frozen root ball in 1964
photo©J.R.P. van Hoey Smith

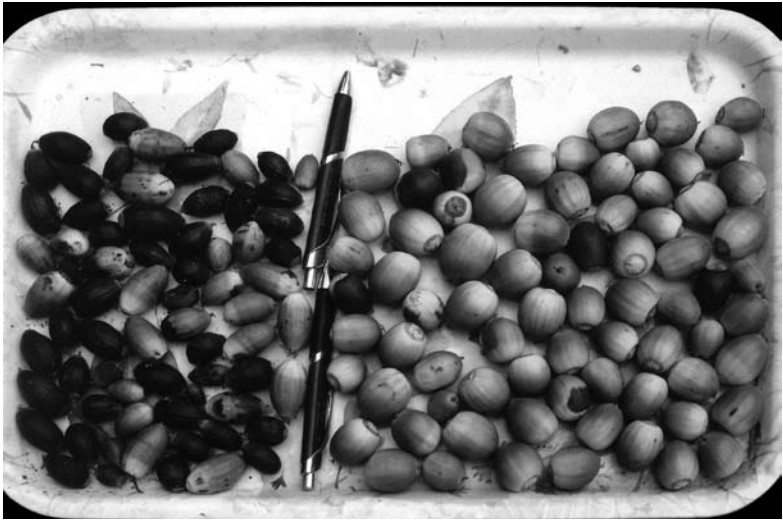
Considering all of its good features, I wanted to see this oak in its natural habitat. Hayrettin Karaca of Istanbul was vice president of the International Dendrology Society then, and I was president, and I contacted him asking whether he could organize a trip to North East Turkey in October 1988. We left Istanbul in two Land Rovers. En route we visited an isolated area where *Cedrus libani* was growing. In Turkey this tree only grows near the south coast, mainly in the Taurus Mountains. We spent the night in Artvin, where nobody could tell us the place to find *Q. pontica*. We then went to the Forestry Commission. They referred us to their branch office in Cargiranhaya. We arrived there, and the next morning they would bring us to our goal.



In the foreground are seen *Quercus pontica*; in the background are the spires of *Picea orientalis*, with Russia in the distance photo©J.R.P. van Hoey Smith

That morning, however, Karaca had other plans, and my wife and I got a special guide who would bring us to a place high in the mountains where *Q. pontica* should grow. We spent the night in a guest house of the Forestry Commission, and the following morning we were fetched by an official in a military uniform. In Turkey, all foresters are in the military service and even carry weapons. However, we did not go up the mountain, but down into the town. In front of his house we stopped; he whistled loudly and out of the house came his wife, and from the street his six children. He pointed to my camera and I had to take pictures first. After that we went up.

Over unimaginably bad roads with the deepest ruts we went. The bottom of the car regularly hit the soil. We continued up, fearing all the time that we would have to stop. We reached 1400 m. and luckily saw the first *Q. pontica*! Out of the car, we spotted an entire hillside covered with *Q. pontica* interspersed with compact, dark green, and pyramidal *Picea orientalis*. It was an incredible sight, with Russia in the background.



Seeds of the Hesse tree at left; the Kara Dag tree at right photo©van Hoey Smith

We were very lucky. It was just the right time for collecting acorns, and all, including the guide, collected as many as they could. It struck me immediately that these acorns were fully round whereas those from our arboretum from the Hesse Nursery are oval. The undergrowth consisted of *Sorbus aucuparia*, *Ilex colchica*, *Prunus laurocerasus*, *Sambucus racemosa*, and *Vaccinium arctostaphylos*. The last, between all the others, was over 2 m. high.

Q. pontica in the Kara Dag mountains are much in danger. By clear felling they are replaced by *Abies nordmanniana* and *Picea orientalis*. The small clubs of *Q. pontica* are transported down to a factory which produces chipboard.

The seedlings of the Kara Dag form have much bigger leaves than those of the Hesse tree, and the acorns are round. The 10-year-old seedlings fruit already, and I ascertained that even the seeds of the second generation show the same properties. I named this form *Q. pontica* 'Kara Dag', but is this correct? Should it not be a subspecies or a variety rather than a cultivar? Who can tell me? After all, at Kara Dag the plants have the same big leaves and the same round acorns as those in the second generation.

After this splendid and memorable visit, we went up to 1650 m. But there the acorns were only half sized and were not ripe enough to collect. However, we drove through a forest of *Fagus orientalis* and I collected some rooted seedlings. In the Arboretum Trompenburg these developed beautifully with very large leaves which bear dense hairs on both sides and also on the young shoots. The seedlings were just collected, not selected, but their buds and leaves are twice the size of those of *F. sylvatica*. At every tour through the garden I draw the attention of the group to this beech. In the nurseries I fear they only sell the hybrid of *F. sylvatica* × *F. orientalis* (*Fagus* × *moesiaca*) which has a somewhat bigger leaf than *F. sylvatica*.

Back in time, we waited for the other group. In a corner, four officials were playing bridge. We watched them and determined that they were playing very well. Our hunger in the meantime also increased. We pointed to our mouth and my wife made an egg with her hands. They understood, and soon 2 plates, each with two eggs, came from the kitchen. We waited outside on a bench in front of the hospital. A doctor came along who had studied in Holland and we had a nice conversation in Dutch. At last the other group came.

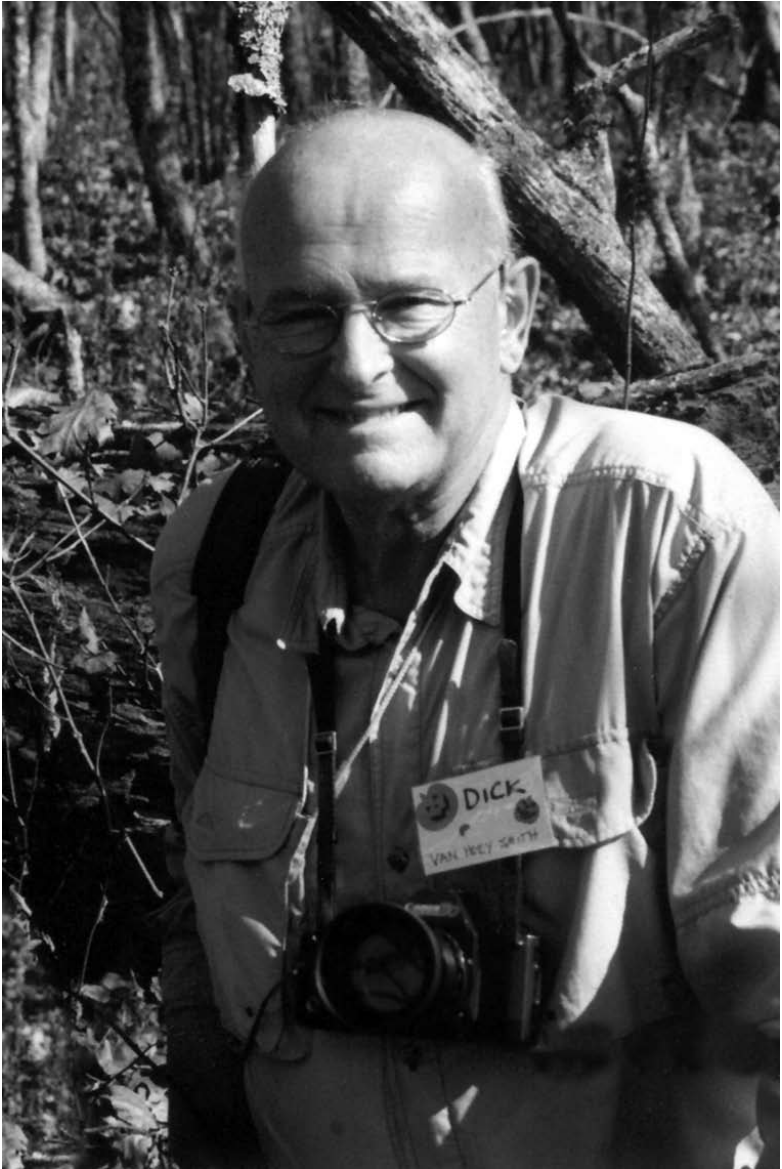
Every year I collect many acorns from my Hesse specimen and some less of the Kara Dag form. As usual with acorns, they must be sown immediately as they make the same year already a 10 cm taproot.

Editor's note: This paper was adapted and translated from an article prepared for *ARBOR VITAE*, the quarterly of the Dutch Dendrology Society. We publish it posthumously in tribute to our respected author and founding member, who passed away on 21 December of 2010. Dick van Hoey Smith lives on for us via his world-renowned Arboretum Trompenburg, his life's work. But he can never be replaced for those of us who knew and loved him, and learned from him.



Our 70-year-old *Quercus pontica* grows solitary on the lawn

photo©J.R.P. van Hoey Smith



J. R. P. "Dick" van Hoey Smith

photo by Mike Tyner

9490 Kilometres Across Mexico

Béatrice Chassé

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After several months preparation – consisting mainly of searching for any and all information about where to find about 40 oak species in northern Mexico and planning a feasible itinerary for a three to four week botanic road movie – here I am in Mexico, en route to our first stop...



Quercus carmenensis C. H. Muller 1937

After an eight-hour drive from Monterrey, where I had arrived late two nights before (14 September), yesterday being spent in the car, I have at my feet, from 2335 m, a splendid view of that small piece of the Area Protegida Maderas Del Carmen that we have driven through this morning. We are practically at the American border in that part of the Sierra Madre Oriental (Coahuila) called La Sierra del Carmen.

Quercus carmenensis C. H. Muller grows here (reported also in the Chisos Mts. on the other side of the border). But many other oaks as well, e.g., *Q. gravesii* Sudw., *Q. hypoleuroides* A. Camus, *Q. grisea* Liebm., *Q. mohriana* Buckley ex

Rydb., *Q. arizonica* Sargent, and *Q. intricata* Trel. Climbing up to this pine-oak forest from the grasslands below dominated by *Yucca carnerosana* Trel. and *Y. thomsoniana* Trel., we pass, amongst others, *Cercocarpus*, *Arbutus*, *Buddleja*, *Fraxinus*, *Carya*, *Garrya ovata* Benth., *Juniperus deppeana* Steud., *Pinus cembroides* Zucc., *Salvia*, *Ipomea*, and *Pseudotsuga menziesii* (Mirb.) Franco.

Usually a small shrub or tree from 50 cm to 2 m, *Q. carmenensis* can also grow to 12 m tall. Here, there are quite a few individuals between 3 and 6 m tall. At 2335 m where we start back down there is a magnificent *Q. hypoleucoides* growing against a background of *Abies coahuilensis* Johnst. and *Pinus pseudostrobus* Lindley.

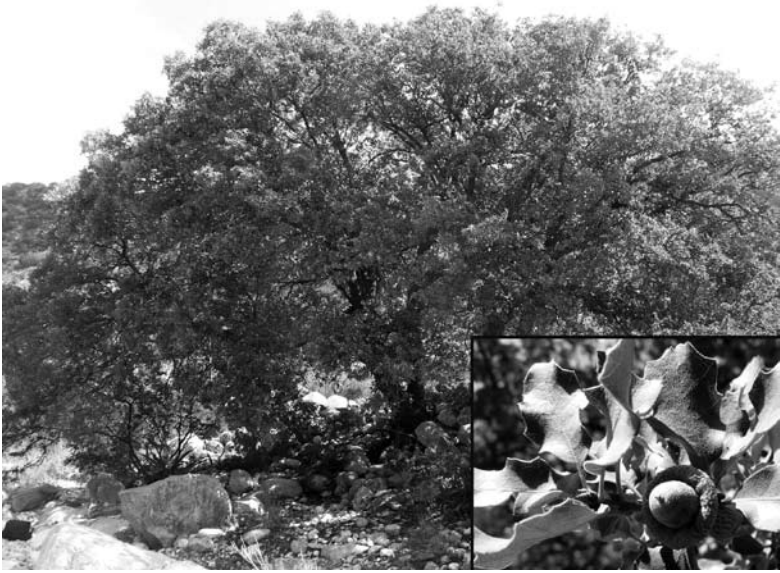
We had spent the night of 15 September at Pilares, the center of operations of the El Carmen Conservation Initiative, a vast project financed by Cemex, a Mexican cement and building materials company. Rubén Maroquín, my guide, driver and companion in this adventure used to be employed by this company and so it is thanks to him that I had the privilege of visiting this spectacular area. The Director, Billy Pat McKinney, explained to us that until recently they had been very discreet in their activities but were keen now to encourage collaboration. For example, the baseline inventory of the flora has not yet been done – wouldn't this be an interesting project for a group of enthusiastic botanists... if only for the oaks?

We leave the Area Protegida Maderas Del Carmen a few hours before nightfall in order to reach the military check-point on the road to Melchior Muzquíz before dark. We are headed towards the Sierra del Gloria near the city of Monclova.



Quercus carmenensis

photo©Béatrice Chassé



Quercus invaginata

photo©Béatrice Chassé

***Quercus invaginata* Trelease 1924**

One of the prettiest little trees I will have seen during this trip, *Q. invaginata* surprises most by its extremely revolute acorn cap and elegant pubescence. It was interesting to see so much variation in the acorn cap of *Q. invaginata*: from the textbook form to those with nearly non revolute margins, and this sometimes on different branches of the same individual.

There were no other oaks growing where we found several groups of these trees. Growing with them : *Vauquelinia corymbosa* Humb. & Bonpl., *Dasyllirion cedrosanum* Trel., *Sophora secundiflora* Lag. ex DC. and *Cercocarpus montanus* Raf., amongst others.

To find *Q. invaginata* we had to drive through an active quarry with huge trucks in constant movement, enormous clouds of thick, white dust and the occasional explosion. After having told us that we had to park our vehicle and continue on foot for about 5 km to reach the canyon we were looking for, the foreman of the quarry, seeing us get out of the car and get our gear together, changed his mind and let us drive a bit further down the road to park "...just past the little shack where we store the dynamite" said he! This shortened our walk nearly 3 kms – not insignificant as the temperature was close to 45° C in the sun and there was no shade anywhere!

We head further south towards the city of Saltillo in the state of Coahuila where we will first meet up with Zilmar Zamora, a student of Dr. Juan Encina (Universidad Autonoma Agraria Antonio Narro) who will prove to be an important asset over the next two days during our explorations in the Sierra Zapalinamé, the Sierra Hermosa, the Sierra Arteaga and the Sierra Duraznillo.

The night before, unfortunately arriving after dark in the town of Melchior Muzquíz, we had the very unpleasant experience of being stopped by the local police and although Saltillo, where we are headed, is a large city and the risk of this kind of behavior is lower, we are keen to arrive before nightfall. According to most Mexicans, of the triad of possible bad encounters in Mexico (police – military – drug dealer) the one to be avoided the most is the police. We will in the weeks to come have several such encounters but thanks to Rubén's tact nothing more serious than an overproduction of adrenalin ever occurred.

***Quercus coahuilensis* Nixon & C. H. Muller 1993**

Leaving Saltillo going south our first stop is at Rancho Los Angeles where we find large populations of *Q. pringlei* Seemen ex Loes, *Q. striatula* Trel. and *Q. cordifolia* Trel. (these last two are considered by some authors as synonymous).

Heading still further south west in the direction of Buñuelos we stop near Carneros in La Sierra de la Concordia in a typical "matorral xerófilo." We find amongst others *Larrea tridentata* Cav., *Prosopis*, *Cylindropuntia imbricata* (Haw.) A. DC., several species of *Yucca* and the treacherous *Agave lechuguilla* Torr. Between ankle and mid-calf height, however careful you are walking about, you can't help but injure yourself on those very pointed leaves. At the end of the day,

from the knee down we all had countless little holes decorating the bottom of our legs. Here we are looking for *Q. intricata* which in the end we do not find.

Continuing south towards Santa Victoria we are on the way to *Q. coahuilensis*. This species was considered to be the same as *Q. hypoxantha* Trel. until 1993. After some difficulty finding the area where we are intending to explore, we arrive very late in the afternoon and have to climb the Canon Piñaliso in the Sierra Playa Madero from about 2100 m to around 2600 m. As it



Quercus hypoxantha

photo©Béatrice Chassé

is late, we agree that at least half an hour before sundown we have to be headed back down. In the end, only Zilmar managed to reach the top in time – bringing down with him leaf samples but no acorns. We drive back to Santa Victoria the way we came, through a magnificent *Q. grisea* woodland.

The oaks of Diamante, Sierra Hermosa

Of all of the different places I was to go in Coahuila, Diamante (where we are headed the next morning) was one of the most interesting and beautiful. As we climb, here we find : *Q. pringlei*, *Q. gentryi* C. H. Muller, *Q. hypoxantha*, *Q. saltillensis* Trel., and *Q. sideroxylo* Humb. & Bonpl. Unfortunately, we are in the pouring rain and it is next to impossible to take notes or photographs.

Q. pringlei is most abundant from 2250 to 2350 m. This species shows enormous variation in leaf form (from completely entire to lobed and with or without teeth) but very little in general habit. *Q. hypoxantha* is a shrub or small tree of up to 7.5 m with a lovely yellow-orange tomentum on the underside of the leaf. The *Q. hypoxantha* populations here are dominant between 2300 and 2500 m and the trees are rarely more than 2 to 3 m tall.

Growing here at the lower altitudes there is *Pinus cembroides*, *Yucca carnerosana*, *Rhus virens* Lindh. ex A. Gray, *Dasyllirion*, *Nolina*, and *Fraxinus*, and as we go higher up we also find *Arbutus glandulosa* Mart. & Gal. and *A. xalapensis* Kunth., *Arctostaphylos*, *Pinus teocote* Schldtl. & Cham., *P. greggii* Engelm. ex Parl., *P. strobiformis* Engelm., and others.

Hurricane Karl, which arrived in Mexico at about the same time as I did, wreaking havoc in the states of Vera Cruz and Tabasco, has also brought enormous amounts of rain in many other parts of Mexico, especially in Nuevo León and Coahuila. Massive erosion, due to abusive building practices, badly engineered sewer systems and poorly managed garbage disposal, transforms the streets of many Mexican cities into small rivers in such rainfall. Thus we find the streets of Saltillo as we head back there to spend our second night in Coahuila.

Quercus saltillensis Trelease 1924

Today we are headed for Mesas de Las Tablas in the Sierra Arteagea. The road we take from Saltillo is lined with *Pinus cembroides*, with here and there different species of *Yucca*, *Arbutus xalapensis* and *Pinus greggii*. A little further on we start to see apple orchards. It was rather a surprise to see mixed plantations of corn and apples.

Shortly after entering San Antonio de los Alazanes we find *Q. mexicana* Bonpl. and *Q. greggii* (A. DC) Trel. growing with *Pseudotsuga menziesii*, *Abies vejarii* Martinez and *Salix babylonica* L. We are at an elevation of 2622 m. Along this beautiful road that goes to Mesas de Las Tablas we find *Q. saltillensis*, *Q. hintoniorum* Nixon & C. H. Muller, *Q. greggii*, *Crataegus mexicana* Moc. & Sessé and *Prunus mexicana* S. Watson, between 2600 and 2850 m. *Q. saltillensis* is a very beautiful, elegant tree with its characteristically striped acorns and glossy green leaves that can be entire or lobed.

At 2836 m we find majestic *Pinus stylesii*, which at the time we identify as *P. ayacahuite* Ehrenb. ex Schldtl. but according to Thierry Lamant, based on the

size of the seeds and the wings, these trees belong to the former, newly-named species.

***Quercus edwardsiae* C. H. Muller 1942**

I spend the morning of 21 September sorting leaf samples and acorns while Rubén goes again to look for *Q. intricata* near Carreros. We leave Saltillo at noon with leaf samples and acorns in good shape but still no *Q. intricata*.

Monterrey is a short drive from Saltillo and when we arrive there we head for the Chipinque Reserva Ecológica. Here the damage due to the massive amounts of rain that have fallen these past few days is enormous. In some places whole pieces of the road have disappeared and there are impressive quantities of fallen rock and trees nearly everywhere.

Here we find many oaks that have become fairly common in cultivation in Europe, and so it is with some emotion that I finally see these species growing in their natural habitat. It is always surprising to see how much variation can be found in taxa that one is used to seeing only in collections, with the limited variation this implies.

Q. canbyi Trel., *Q. laceyi* Small, *Q. rysophylla* Weath., *Q. polymorpha* Schltld. & Cham., and *Q. laeta* Liebm. grow here with *Pinus pseudostrabus*, *P. teocote*, *Cercis canadensis* L. and *Carya*. Here we also find *Q. edwardsiae* - considered

by Susana Valencia as distinct from *Q. laceyi* in Nuevo León. There is a difference in acorn shape and maturation: all of the *Q. laceyi* acorns had already fallen some time ago whereas the acorns of *Q. edwardsiae* were still fairly green and on the trees. We were to find the same thing a few days later in Bosque Escuela in Iturbide (Nuevo León).



Quercus coccolobifolia

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***Q. coccolobifolia* Trelease 1927**

On this, my eighth day in Mexico, we leave Monterrey going south-east on MEX85 towards Allende. It is very muggy in Monterrey and about 90° F. There has

been more rain here in four days than what usually falls in 6 months time. We are going to Vitro Parque El Manzano and then on to La Ciénaga (Nuevo León). It is raining and at 1550 m visibility is not more than 20 m.

At about this altitude there is *Q. sartorii* Liebm., *Q. rysophylla* and *Q. polymorpha*, with the first two being dominant. Also we find *Cornus florida* L., *Taxus globosa* Schtdl. and *Arbutus xalapensis*.

At 1554 m we encounter our first group of *Q. coccolobifolia*. These are large trees of over 15 m tall but with no acorns. The leaves are often grouped at the tips of the branches, forming shiny green bouquets in the middle of which the acorns appear to be nesting. Of all of the large-leafed Mexican oaks this species was the easiest to identify, with surprisingly little leaf variation – except on one tree we were to find near Basaseachi in Chihuahua, with very pointed leaves and a dense white tomentum. Hybrid? There were no acorns.

There is fallen rock everywhere along here and in many places the road is in great disrepair. This damage is not due to the heavy rainfall provoked by the recent hurricane Karl (although this cannot have helped) but to hurricane Alex that swept through the north of Mexico in July 2010, devastating many areas in Coahuila, Nuevo León and Tamaulipas.

We find lodgings for the night in a very nice and comfortable log cabin in La Ciénaga after visiting with a family whom Rubén had met many years ago while working in this area. Just behind their house we see a magnificent *Q. coccolobifolia* as well as an equally pretty *Q. rysophylla*.

"Ciénaga" in Spanish means a place filled with mud – not a very poetic name to describe a place filled with small rivers, lakes and water falls (although the connection is obvious). And so it was that to reach the *Q. coccolobifolia*/*Q. rysophylla* forest at about 1550 m we had a steep climb zig-zagging our way up through a small water fall. Two successive fires (one in 1990 and one in 2002, both purportedly due to human activity) have left this place with blackened stumps, toppled trees and for the oaks, vigorous shoots that seem to sprout from everywhere. It is a sad and eerie place. There is also *Pinus pseudostrobus* and *P. montezumae* Lamb. "El Ocote" is the common name for this pine and is also the name given to the hardened resin that is found inside a living tree. Villagers here and elsewhere cut this out of the tree to light fires with.

Here also was my first encounter with "el gusano del risofila" (the rysophylla-eating caterpillar). A very beautiful creature about 9 cm long, black with yellow/orange markings and long bristly hairs – but beware! Even just slightly brushing against it is a very painful experience. I still have three little blue marks on the inside of my left arm to remind me.

***Quercus cupreata* Trelease & C. H. Muller 1936**

On the road again going still further south, we are headed for the mythical Cañon de Iturbide and El Bosque Escuela.

Entering Santiago we buy ½ kilo of "chile piquín del monte" (wild *Capsicum annuum* L.) from a street vendor off the side of the road. These are delicious and very strong tiny little chile peppers about the size of a red currant. We have lunch in an off-the-road, make-shift eatery. On the menu, dozens of different, very

authentic, Mexican taco fillings which you order at the counter standing in front of the cooks telling them what you want. Together with the chiles we had bought, this was one of the best meals I had in Mexico.

Leaving Santiago again going south on MEX85 towards Galeana, we are immediately surrounded by magnificent *Q. vaseyana* Buckl. The other oaks we encounter on the road to Iturbide are *Q. polymorpha*, *Q. fusiformis* Small and *Q. canbyi*.

As we reach 1200 m, El Bosque Escuela is on our left (to the east) and we continue onward to the town of Santa Rosa to the official entry to this "School in the Forest." El Bosque Escuela belongs to the Universidad Autonoma de Nuevo León and serves as open class room for the students of the Forestry Sciences Faculty. The road leading to Santa Rosa is devastated, with large portions to be found in the canyon below and in many places this already dangerously winding road is reduced to only one lane. We visit the nursery and then go off on foot down the road that will lead us through El Bosque Escuela and which is no longer practicable – indeed no longer exists in many places – for motorised vehicles.

Growing here are *Cupressus arizonica* Greene, *Pinus pseudostrobus*, *Juniperus flaccida* Schltldl., *Cercis canadensis*, *Arbutus xalapensis*, *Carya*, *Ungnadia speciosa* Endl., *Fraxinus* and *Sophora*. There are also a lot of oaks: *Q. tuberculata* Liebm., *Q. laceyi*, *Q. edwardsiae*, *Q. laeta*, *Q. canbyi* and *Q. cupreata*.



Quercus flocculenta

photo©Béatrice Chassé

We leave to spend the night in Galeana, and along the road that takes us there we find *Q. canbyi*, *Q. pringlei* and *Pinus arizonica* Engelm. Both of the locations we have for *Q. flocculenta* C. H. Muller are at Cerro El Potosí, which is where we are headed tomorrow. It is the highest point of the Sierra Madre Oriental, culminating at 3713 m.

***Quercus flocculenta* C.
H. Muller 1936**

We are off to an early start because we intend to go all the way to the top first to find *Pinus culminicola* Andresen & Beamon and driving is very slow on the unpaved road, built for the

microwave relay station that was installed at the summit in the 1960s. I wonder, was there another road in the 1930s when C. H. Muller discovered and described this species ?

It is indeed a breathtaking view the one that looks out over these vast populations of *P. culminicola*. Not quite at the top, but not any less spectacular, the spectral white masses of burnt *P. culminicola* interspersed with patches of green *Abies vejarii*, *Pinus hartwegii* Lindl., and *Pseudotsuga menziesii*. The cloudy sky with intermittent sun bursts light the scene.

There are many, many oaks here. The first *Q. saltillensis* we see is at 2100 m and between there and 2900 m we find populations of varying size of *Q. cordifolia*, *Q. striatula*, *Q. hintoniorum*, *Q. greggii*, and *Q. hypoxantha*. And, at 2771 m, *Q. flocculenta* – what we have come for! It is good that I am writing this now because Thierry Lamant has told me since that *Q. flocculenta* may very well be a synonym of *Q. saltillensis*. To be continued...

A most extraordinary *Agave gentryi*, with a flower stalk nearly 4 m tall, bids us farewell as we leave this place and head back to Galeana for a good night's rest. Tomorrow we are headed for the city of Durango – a 700 km drive across the "altiplanicie mexicana" – obligatory passage in northern Mexico between the Sierra Madre Oriental and the Sierra Madre Occidental.

***Quercus resinosa* Liebmann 1854**

The "altiplanicie mexicana" that we drove through yesterday is, although fairly uneventful for an oak enthusiast, the most significant physiogeographic region in Mexico, constituting as it does ¼ of the country. There are many rare plants to be discovered here. Among the genera that are only found here (and in some places in the southwest of the United States) are *Ariocarpus*, *Grusonia*, *Lophophora* and *Sartwellia*. About 90 km from Durango the countryside is dominated by *Acacia* species with here and there



Quercus resinosa

photo©Béatrice Chassé

some cultivated fields (corn, beans).

After a very comfortable night and good meal in Durango, we head off northwest on MEX23 from the city of Durango in the direction of a place called El Mezquital looking for *Q. depressipes* Trel. and *Q. resinosa*. It is raining with a very overcast sky, but quickly after leaving Durango the sun is shining. A very impressive military check-point has to be crossed to leave the city, and we will fall upon this more and more frequently as we go further west and north in Mexico. A portion of this road is planted with *Q. fusiformis* and the "coco plumosa" (*Syagrus romanzoffiana* (Cham.) Glassman). Very odd.

Here we are in the Sierra Madre Occidental, and at 2200 m the first oaks that we see, growing in sparse clumps in a vast grassland, were later to be identified by Thierry Lamant (with help from Richard Spellenberg and Jeffrey Bacon) as a southern form of *Q. laeta* (that used to be called *Q. transmontana* Trel., considered today only by Govaerta & Froden as a distinct species).

9 km from El Mezquital there are *Q. resinosa* on both sides of the road. It is a very beautiful tree, with massive leaves lit up by a yellow/white tomentum on the underside of the leaf. The very characteristic scaly bark adds to the charm of this tree that outclasses many. The acorns had apparently fallen several months before because the ground was covered with only rotten acorns and dozens of seedlings. Growing here as well is, perhaps, *Q. conzatti* Trel. and several species of pine.

As we head back to Durango to spend a second night, we find the city literally submerged in water, due to all the rain that we happily did not see one drop of. Huge amounts of rain continue to fall during the evening and throughout the night.



Quercus durifolia

photo©Béatrice Chassé

Quercus durifolia Seemen ex Loes 1900

Under a grey sky, light rain and dense fog we leave the city on MEX40 to the southwest towards El Salto and Mazatlan. Along this road we are accompanied by *Pinus engelmannii* Carr, *P. durangensis* Mart., *P. strobiformis*, *P. teocote*, *Arbutus glandulosa*, *Juniperus deppiana*, *Arc-tostaphylos*, *Cupressus arizonica*, *Styrax*... and spectacular views of the

scenery and general ambiance of the Sierra Madre Occidental, esthetically more grandiose than the Sierra Madre Oriental. We spend the day between 2100 and 2800 m.

The oaks are magnificent and numerous: *Q. durifolia*, *Q. cordifolia*, *Q. coccolobifolia*, *Q. sideroxyla*, *Q. resinosa*, *Q. rugosa* Née and *Q. scytophylla* Liebm. *Q. durifolia* is one of those Mexican oaks of the section *Lobatae* whose elegance equals that of the oaks of the subgenus *Cyclobalanopsis*. Of most of these species we find both very tall trees as well as bushy forms in some places because of great disturbance to the ecosystem from one human activity or another (especially for *Q. coccolobifolia* and *Q. resinosa*). We find *Q. sideroxyla* as 15m tall trees in one place and elsewhere as spindly little trees growing under different pines. *Q. scytophylla*, another extremely elegant tree, has quite variable leaves, from entire to slightly lobed, but is always easily identifiable with its characteristic thick white pubescence on the underside.

Easy identification was, however, not to be the case for numerous oaks of section *Quercus* found here and even more so in Chihuahua in the days to follow. A cloud of frustrating confusion looking somewhat – but never quite enough – like *Q. arizonica*, *Q. grisea*, *Q. laeta*, *Q. deserticola* Trel., *Q. chihuahuensis* Trel... ? I owe many thanks to Francisco Garin, Jean-Louis Hélardot, Thierry Lamant (and through Thierry, to Richard Spellenberg and Jeffrey Bacon in Mexico) for looking at photographs of these curious creatures to try to produce names or ideas. The moral of the story: much field work is needed in these parts of Mexico!

We arrive back in El Salto fairly late in the evening and decide to spend the night there. It is raining so hard we need to shout to be heard! The next morning we are headed back north with the intention of driving to Delicias (Chihuahua) where we will be looking for *Q. deliquescens* C. H. Muller. Arriving in the city of Durango we decide that we need a break : we have travelled thus far 3627 km in 14 days and still have a long way to go. We spend the day in Durango, happy to not be in our Toyota Land Cruiser, catching up on e-mails, sorting notes and samples and mostly... sleeping!

***Quercus deliquescens* C. H. Muller 1979**

Day 15 is spent driving the 650 km between Durango and Delicias, on MEX45. Along this road the hillsides are covered with *Q. emoryi* Torr. Before turning on CHIH22, we find a Chinese restaurant, owned by a man whose mother was Chinese and whose father was Mexican. Aside from the roasted, whole Jalapeno peppers on the menu, everything else is Chinese cuisine (as that is found in America) except that we don't get chopsticks. Much as was the case earlier on in the United States, at the end of the 19th century the Mexican government actively encouraged Chinese immigrants to come because cheap labour was needed to build railroads and such.

"Recent heavy concentration of collecting efforts in the Chihuahuan Desert region of Mexico... have yielded much new information on the flora and its distribution. Among the novelties is a striking species of *Quercus* here described as new." Here was the bait that lured us to Delicias. Writing in *Phytologia*, Vol. 42 (1979), pp 289-291, C. H. Muller goes on to give a very precise description of where



Quercus deliquescens

photo©Béatrice Chassé

to find this new species, *Q. deliquescens*. "Chihuahua: south slope and top of Sierra del Roque, approached from Minas Las Playas via Rancho El Saucito." Leaving the paved road that leads out of the town of Julimes, there are 40 kms of very difficult terrain that take us nearly two hours to do: the Chihuahuan desert with here and there tiny abandoned villages of broken adobe-type structures and very old and weathered sign posts indicating various "ranchos." If Clint Eastwood had appeared on the horizon it wouldn't have surprised me...

We finally stop along one of these abandoned villages, at the foot of a canyon. My GPS tells us that we are but a few hundred metres from the coordinates I had programmed (C. H. Muller : 28°.39'-28° 40' N ; 105° 18'-105° 19') and have to climb up the canyon. It is extremely hot and we are drenched in dust and sweat, with only the occasional *Ungnadia speciosa* to offer a bit of shade. Luckily we do not have far to go before falling almost exactly on these coordinates and finding our first clump (there are no other oak species here). There are only a few dried acorns and the trees are covered with a very slender kind of wasp - but further up there is a larger group with a few healthy acorns. Although we are in the precise location indicated by Mr. Muller, this resembles *Q. pungens*. There are no other oaks around.

Back across the desert to Julimes we drove, and then from there to the city of Chihuahua where we will spend the night on our way further southwest towards Tomochi and, finally, Yecora in Sonora. We have had nothing to eat all day long for some reason and so it was quite funny that upon leaving the desert the first place to eat we see is called El Milagro.

***Q. macvaughii* R. Spellenberg 1992**

MEX16 takes us to Cuauhtémoc and through our most worrying incident with the police. After stopping us, and saying something about our car being involved in some matter, they tell us to follow them and stop where they stop. 15



Quercus macvaughii

photo©Béatrice Chassé

or 20 minutes later down the road, Rubén sees them in the center of the highway and manoeuvres to stop where they are and they ... simply wave us on with a nod of the head.

Cuahtémoc is a city where one out of every 4 or 5 vehicles - including very large trucks - does not have a license plate. As we go further west, this was to remain true. The general ambiance in these parts of Mexico is one of unease and suspicion and one has to be careful with camera and notebook. Mexico is the country with the highest assassination rate for journalists.

Travelling towards Tomochi, we encounter the first in a series of the different oaks here that are very difficult for us to identify - many of which will have to await my return to France to receive a name, or even a clue. We just called them *Quercus* sp? or, more fondly, by a collective nickname of Rubén's: "los odios" (the hated ones!). The populations we find here have been tentatively identified as hybrids of *Q. arizonica* and *Q. grisea*. I'm not convinced though



Quercus chihuahuensis x *grisea*

photo©Béatrice Chassé

that they have nothing to do with *Q. chihuahuensis*. A little bit further down the road we find equally problematic populations that will later be identified as a hybrid between *Q. chihuahuensis* and *Q. grisea*. Along this way we find our first *Q. macvaughii* (2177 m). It is hard to believe that this spectacular species was only discovered in 1989 and described in 1992. There are only a few acorns on the ground and they obviously have fallen some time ago. *Q. macvaughii* is very common in these parts, unlike a similar species, *Q. fulva* Liebm., which is also on our Chihuahuan list but that we will fail to find.

We arrive in Tomochi – an unpleasant town where it is not recommended to go out after dark. Fortunately, Rubén, who had a project near here the year before, knows a simple but very comfortable little hotel run by a very kind elderly lady who had the weathered face of someone who has seen a lot and the bright eyes to show that she had made some sense of at least some of it.

The following morning after a night of torrential rain we leave Tomochi in the direction of Yakuirachi slightly to the northwest, passing through the Ejido Tatuaca and the hamlet of Valacillo. There are many oaks here: *Q. durifolia*, *Q. sideroxyla*, *Q. macvaughii*, *Q. rugosa*, several of "los odios" – but no *Q. fulva*.

Quercus perpallida Trel. 1924

We have spent the night in Basaseachi right near one of the two entrances to El Parque Natural Cascada de Basaseachi, from where we leave this morning to see what oaks we can find here and further down the road on the way to Yecora (Sonora). We leave on the road that goes to San Juanito and very quickly (2000 m), are amongst *Q. coccolobifolia*, *Q. sideroxyla*, *Q. macvaughii*, several of these bothersome little white oaks and, luckily for us, *Q. perpallida*. The only other location we have for this oak is in La Sierra el Encinal, to the north and west of Yecora, and for safety reasons we had previously decided not to go there.



Quercus perpallida

photo©Béatrice Chassé

Spectacular scenery abounds in the Natural Park, where we find our "pointy-leaved *coccolobifolia* (?) hybrid" plus a pretty little *Quercus* sp? which still remains a mystery. It looks to me to be a variation of *Q.*

depressipes. We also find what, according to Thierry, is a kind of *Q. aff toumeyi*, but it will have to wait for a final verdict because apparently this taxon is being revised to be split into two. This is a beautiful place with extraordinary sculptured cliffs and gorges covered in oak and pine – as is this whole area that we have driven through since a bit before Tomochi, two days ago.

Back on MEX16 going towards Yecora, *Q. glaucoides* Mart. & Gal. is very dominant and gives a blueish hue to the countryside. Here also, magnificent *Q. durifolia*, *Q. scytophylla*, *Q. coccolobifolia* and our first *Q. viminea* Trel. We also find quite a lot of another strange little oak which looks like *Q. deserticola* (not known in Chihuahua) or an introgressed or local form of *Q. laeta* (also not reported in this state) or *Q. arizonica*.

Just past the border into the state of Sonora we see another large-leafed oak: is it *Q. tarahumara* Spellenberg or is it *Q. conzattii*? The bases of the leaves suggest the latter, but the size of them, the former.

***Quercus albocincta*
Trelease 1924**

After a night in Yecora – another fairly uneasy place to be – we head back east to cover the same area as



Quercus sideroxyla

photo©Béatrice Chassé



Quercus aff toumeyi

photo©Béatrice Chassé



Quercus albocincta photo©Béatrice Chassé



Quercus coffeicolor photo©Béatrice Chassé

yesterday afternoon which we had gone through fairly quickly in order to arrive in Yecora before dark. Breathtakingly beautiful countryside with the only gloomy note being that the oaks in Sonora are not being very acorn-cooperative this year.

We find large populations of magnificent *Q. albocincta* and also *Q. glaucooides*, *Q. viminea*, *Q. sideroxyla* and *Q. macvaughii*. There are of course many pines and other genera here, but after nearly 3 weeks and 5341 km, it seems I only have eyes for *Quercus*!

Back in Basaseachi we spend another night before heading southeast towards Creel (Chihuahua) and the Sierra Tarahumara. We have been lucky with the rain in that, except for one day early on (in Diamante), it always falls at night.

***Quercus coffeicolor* Trelease1924**

The road to Creel is in the process of being cut out of the mountain in some places, and with all of the rain that has fallen recently driving is difficult but well worth the trouble. *Pinus durangensis*, *P. engelmannii*, *P. teocote*, *P. arizonica*, *P. ayacahuite*, *P. leiophylla* var. *chihuahuana* and *Picea chihuahuana* Martinez line the way. We visit the Vivero Forestal Bosque Modelo Chihuahua (in Bocoimba), where the Director, Saul Silva, is an acquaintance of Rubén's. They

specialise in growing pines but also some oaks – mostly *Q. emoryi* Torr. because the acorns are a food source here and are sold at local markets.

After a quick lunch in Creel we head off to El Parque Natural Baranca del Cobre. Spectacular scenery lines the way, and not infrequently, a thin line of bright colour weaves up the surrounding mountains. These are the Tarahumara indian women with their brightly coloured skirts and tops, going home somewhere hidden in the Sierra. We note along the way most of the conifers we saw this morning and *Q. rugosa*, *Q. conzattii* (?), *Q. sideroxyla*, and *Q. durifolia* plus a new mystery oak that has since been tentatively identified as being one of the geographic forms of *Q. laeta* that used to have species status (*Q. obscura* Trel.).

We spend a very comfortable night in Creel and start off in the morning in the direction of the town of Guachochi (CHIH25), although we will turn around before arriving there to come back to Creel and spend another night before heading north to the city of Chihuahua.

This was one of the last of such beautiful Mexican roads that I was to drive, and so it seems fitting that it delivered up a wonder-

Quercus viminea



Quercus tarahumara photo©Béatrice Chassé





Quercus conzattii

photo©Béatrice Chassé

ful surprise: *Q. coffeicolor*, although we were not sure. Positive identification had to wait for Francisco Garin. Many species of pine, *Q. macvaughii*, *Q. viminea*, *Q. durifolia*, *Q. coccolobifolia*, *Q. scytophylla* and assorted section *Quercus* headaches are part of what surrounds us. We

turn around at a place called Tatatuichi, heading back to Creel to spend the night.

***Quercus depressipes* Trelease 1924**

Most of yesterday was spent driving back north to the city of Chihuahua where we spend the night. In the morning we are headed to El Parque Nacional Cumbres de Majalca where we hope to find *Q. subspathulata* Trel. and *Q. depressipes*. A very pretty drive takes us through large clumps of *Q. emoryi* (we are at 1575 m). At around 2000 m, the first *Q. rugosa* appear, and a bit further, pretty little *Q. depressipes*. We drive far up the canyon with huge *Q. emoryi* looming over us and end up in a very dense *Q. grisea* woodland. There is a lot of *Q. rugosa* here but we do not find any *Q. subspathulata*.



Quercus depressipes

photo©Béatrice Chassé

The end of the road

After another night in Chihuahua we set off to do at least a part of the 818 km between here and Monterrey. We stop in Torreón – a city that smells of gasoline everywhere and all the time – for

the night and are in Monterrey the next day, late afternoon. Zilmar had informed us that he has found *Q. intricata* and had samples for us and so we decide to meet back in Saltillo the following day. After a bit of sight-seeing and finally returning the Land Cruiser, I say good-bye to Rubén and the north of Mexico as I board what will turn out to be a very comfortable bus to sleep in whilst being driven to Puebla to visit with Allen and Maricela Coombes. It was a pleasant farewell from Mexico – good food, excellent company – during which time I will have the opportunity to see *Q. trinitatis* Trel. and *Q. frutex* Trel. with Allen.



Quercus trinitatis photo©Béatrice Chassé

I would like to thank for their help in preparing for this trip: Rubén Maroquín for his contacts in Nuevo León, Coahuila and Chihuahua; Francisco Garin for invaluable location details, especially in the state of Chihuahua; and Thierry Lamant for his contacts in different places. Special thanks of course to C. H. Muller who left such detailed and precise location descriptions!

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Quercus frutex photo©Béatrice Chassé

Oak Open Days – Portugal/Spain

27-30 October 2010

Jean-Louis Hélardot
Brive-la-Gaillarde
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Wednesday 27

The participants met in the lobby of the Holiday Inn in Lisbon at 20h00. By 21h30 everyone had arrived and we were carried off to dinner at the exhibition center that was host to the Exposition Universelle in 1998. Afterwards we visited the grounds where oaks had been planted to landscape the area in 1998: *Q. mas* Thore (or, more precisely, *Q. petraea* (Matt) Liebl. subsp. *huguetiana* Franco and Lopez-Gonzalez) as well as numerous other more common taxa such as *Q. cerris* L., *Q. xturneri* Willd., and *Q. frainetto* Ten.. We had a rather surrealistic nocturnal botanizing experience in this ultra-modern site with the contrast of powerful urban lighting and the sombre ground on which to look for acorns!



Strolling the Dehasa, Portugal

photo©Jean-Louis Hélardot

Thursday 28

We were off to an early start, as was to be the case every day hereafter. We headed for Montemor, southeast of Lisbon, to discover *Q. alentejana*, a new species (in publication) typical and endemic to the Alentejo region of Portugal, as well as its weeping form (from which Dirk Benoit collected scions). Our guide during this visit is Pr. Carlos Pinto.

Our next stop was at Vendas Novas to observe pure populations of *Q. lusitanica* Lam. as well as hybrid populations of this species with *Q. suber* L. and *Q. faginea* Lam. subsp. *broteroi* (Cout.) A. Camus. Carlos Pinto explained how to distinguish pure *Q. lusitanica* : the leaf margin should be entire, without teeth or lobes at the base, and the acorns should be short and large. When there is hybridization with *Q. suber*, for example, the base of the leaf margin will have teeth and the acorn will be much longer.

We crossed the border into Spain and Carlos took us to lunch at a local inn to eat bifanas, a delicious speciality of Extremadura that we all enjoyed heartily.

On the road again for a two-hour ride, our next destination was Guadajira (Spain) and the Arboretum de la Orden, center for biodiversity studies and Francisco Vasquez' fief. Here we admired a collection of local *Quercus*, and in particular *Q. canariensis* Willd, *Q. faginea* and its subspecies *broteroi*, and *Q. alpestris* Boiss. We visited the ultra-modern propagation greenhouses and had our first presentation. The presentations were very interesting but the language barriers were difficult for everyone – except for Dirk Benoit! Finally, we returned to the bus again for our final destination of the day, Badajoz (Spain) for dinner and the Hotel Rio.



Learning about the trees of Lisbon's Ajuda Botanic Garden, the first botanic garden established in Portugal (1768), from its director, Dalila Spirito Santos

photo@Timacheff

Friday 29

We left for Almendral (Spain) to be transported in 4-wheel drive vehicles to an enormous *Q. rotundifolia* Lam. with a circumference of 4.5 m and 500 years of age: El Romo, or Monumental Holm Oak, in a typical dehesa (see International Oaks, Issue N° 13, 2002, page 5). After, we entered the Valle de Santa Ana and found more *Q. alentejana* as well as two rather small specimens of *Q. robur* L. subsp. *extremadurensis* O. Schwarz and the hybrids of these two taxa.

Back in our bus, we headed for Fregenal de la Sierra to admire a very large and old *Taxodium distichum* and to have a wonderful lunch provided by the parents of one of Francisco's students, Maria. Expecting a picnic, everyone was surprised to be served a pantagruelien lunch composed of Extremaduran specialties that we all enjoyed immensely. The rain that commenced during our lunch was to stay with us for the remainder of the trip but this did not stop us from exploring the most southern location of a pure *Q. pyrenaica* Willd. forest – with an enormous acorn production!

Back in the bus we went, and on to Monesterio for a second conference hosted by the local city Council. We ended the day in a restaurant where we enjoyed a marvelous dinner of both cooked and raw wild mushrooms (amongst others, Amanites des Césars, Bolets, Russules)

Saturday 30

We left at 8h00, in the rain, for a 2-hour bus ride and arrive in a mixed dehesa of *Q. suber* and *Q. rotundifolia* in a prehistoric site called Les Almendres where there is a cromlech (prehistoric monument of megaliths), astonishing both in its



The group admires Encine el Romo, one of the largest and oldest *Quercus rotundifolia* trees in Extremadura, Spain
photo©Timacheff

dimensions and age (7000 years). As we leave, our bus breaks down and we have to wait for a new one to arrive. Following this we leave for Evora to explore a forest of *Q. coccifera* subsp. *rivas-martinezii* J.H. Copelo et J.C. Costa. We collected acorns in torrential rain, lunched on bifanas in the bus, and returned to Lisbon with a stop on the way near Setubal to visit a site with *Q. faginea* subsp. *broteroi*.

Once in Lisbon we went directly to the Jardin Botanique de Ajuda which we visit accompanied by light rain. Doctora Dalila Spiritos Santos, director of the garden and a very pleasant person, explained with much humour the history of this garden in which there are a large number of essentially exotic plants. We exchanged acorns in an ancient green house with an all-marble interior.

Our last dinner together was as lively and gay as the entire trip, thanks to Francisco's team composed of young men and women from amongst whom it would be hard to decide who was the nicest. They all largely contributed to the success of these Oak Open Days.

Many thanks to Béatrice Chassé for translation.

Oak Open Day in Belgium

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The fog had invaded the valley of the Ourthe that morning of the 4th of September. Béatrice Chassé, our Franco-American president, had driven up from the Dordogne to spend the night here before our planned visit to Daniel Dumont's oak collection. I did not know Daniel Dumont until my return from the IOS conference in Dallas in 2006, although early members of the IOS had known him for some time. He had heard that I had come back from the conference and a pre-tour organized by Guy Sternberg with quite a few acorns. And it is with great pleasure that I gave him acorns from the lots he was interested in. In the summer 2007, I finally visited Daniel's "Belgian" collections (see below) and I was happily surprised by the number of trees it included and that it was relatively unknown in local dendrological circles. Moreover, it was less than an hour away from the Arboretum Robert Lenoir, an arboretum I myself am taking care of in my free time.

As we left the valley to drive to Daniel and Arlette Dumont's place, we also left the fog behind us. Up on the plateau the skies were blue and the sun was shining. This would prove to be the finest week-end of the latter part of the summer.

Soon after we arrived, we were joined by about 15 other people, mostly from Belgium (many of these were members of the Belgian Dendrology Society) and from the Netherlands.



Daniel Dumont welcomes the group at the gate in the deer fence at Arboretum Willerzie. Photo©Charles Snyers

Introduction

Before starting the visit, Daniel gives us a brief overview of the history of his collections and the reader will quickly realize that Daniel clearly suffers from a severe case of tree compulsion!

It was in the early sixties that Daniel planted his first trees in the small garden of his grandmother in Ciney, a city in the French-speaking part of Belgium. A few good trees are still to be found in this garden today, for example, *Taxodium distichum* L., *Sassafras albidum* (Nutt.) Nees, and *Cedrela sinensis* A. Juss. Soon, in 1963 and then again in 1965, Daniel acquired two small plots in Chapois (near Ciney), of 0.27 and 0.51 hectare respectively (Haute Famenne, altitude 290 m and 310 m). The soils on these sites are acidic.

In 1976, after a very hot and dry summer in Europe, Daniel acquired yet another 3 hectare piece of woodland, farther south, near the French border, in the massif of La Croix Scaille, near Gedinne; the soil is again acidic and boggy in part, at an altitude of 360 meters.

In 1981 he invaded the garden of his in-laws in Moustier sur Sambre in the Valley of the Sambre and acquired another hectare of land nearby, in Lesve, where he can spend time when his wife visits her parents. This land is partly ferruginous, partly calcareous (cave of Lesve and dolines) and partly acidic (Haute Marlagne). We will be visiting Lesve in the afternoon. The garden in Moustier had a good specimen of *Quercus tomentella* Engelm. which I saw and photographed two years ago. Unfortunately, two consecutive severe winters (2009 and 2010) killed all aerial parts of the tree; it is now slowly re-growing from basal sprouts. Three magnificent specimens of *Sorbus domestica* L. are also growing there.

In 1986, the Dumont family moved to a new house in Scoville (Hamois en Condroz) in the Valley of the Bocq, just about 10 km away from Ciney, from which we set out this morning. The house is surrounded by a garden of 2 hectares where we are standing as we listen to Daniel. The soil here, he says, is limestone, with a high pH. The altitude is 300 meters.

Daniel further expanded his collections into France in 1999. He wanted a warmer climate in order to be able to plant tender plants. After having considered the south of France, he concluded that what was really important were the minimum temperatures, and that he might as well buy land much farther north, in Brittany, where minimum temperatures are about the same as in the area of Nice, on the French Riviera, even if maximum temperatures are far from being as high as on the Riviera in Summertime¹.

Daniel tells us that both of the arboreta that we will visit today (here in Scoville in the morning, Lesve in the afternoon) have endured two severe winters, with temperatures as low as -25° Celsius (-10F). Furthermore, a disease probably caused by two very wet years in 1999 and 2000 has decimated his collection of pines. Daniel also admits that the double hedge of spruces that he has planted all around his garden might also be detrimental to his pines. He has started to plant pines in Brittany also, where there is more wind along the coast, to duplicate his initial collection in Belgium.

¹ I thank Daniel for having sent me a summary of what he told us in the introduction.

Daniel ended his introduction by describing the storm of July 14th, 2010. On that day southern Belgium was hit by a major storm, especially harsh in the region of Ciney and the garden suffered some losses (The church in Ciney lost its bell tower). I would notice later in the garden that Daniel had done a lot of work in preparation for our visit, removing fallen trees since my pre-visit at the end of July. And although the gales were probably a disaster for the trees that were felled, they may have done a favor for the remaining trees: the latter will now have more room, which is a scarce commodity in this garden.

The Garden in Scoville

After his introduction, Daniel invited us to walk down to his garden. The visit started out as a field trip of the Conifer Society, with assembly around an *Abies squamata* Mast., a Chinese fir with remarkable bark. The group then moved on to *Abies vejari* Martinez, a Mexican fir that does very well in collections in Europe and North America. There is indeed an excellent specimen at Thenford House, the garden of IOS member Michael Heseltine in England. (This tree grew initially in the garden of Keith Rushforth.) Next we saw *Abies pindrow* (Royle ex. D. Don) Royle, *Athrotaxis laxifolia* Hook., and many juniper species and cultivars.

But come on! This is the Oak Society! So the group eventually began to focus on oaks. The first one is a specimen of *Quercus graciliformis* C.H.Mull., an oak native to the Chisos Mountains in Texas, growing here in an area comparable to USDA zone 6. Daniel Dumont belonged to the network of people around Steven Roesch who eventually brought about the creation of the International Oak



Daniel Dumont with IOS President Béatrice Chassé at Arboretum Scoville, located at Daniel's home
Photo©Charles Snyers



Tour participants examining *Quercus canariensis*

Photo©Charles Snyers

Society, and he grew this oak from seed received through that network, as is the case with many of his oaks. This *Q. graciliformis* was sown in 1994.

Next we moved on to a *Q. robur* L. 'Fastigiata'. Daniel believes that this tree belongs to a species distinct from *Q. robur* proper because it comes true from seed. He collected the seed from which he grew this plant on a tree at the Castle of Dave, in Belgium, which was a property of the Spanish Duke F. Lunez. Daniel said that he saw a whole stand of the very same oak in Ustarritz, in the French Basque country, all fastigate like this one. The stand in Ustarritz has since disappeared. Daniel believes that the mother plant of his tree might have come from that area close to Spain (Note: Some of us thought that the tree was a fastigate form of *Q. petraea* (Matt.) Liebl.)

Next we came to a specimen of *Q. kelloggii* Newb., grown from seed which Daniel received from Steven Roesch. This oak from the Pacific Coast of North America is not doing well in Belgium. As far as I know, all other specimens of this species in Belgium are younger than Daniel's tree and none are really happy in the Belgian climate.

Farther down in the garden we came upon three good plants of *Q. trojana* Webb (grown from acorns bought from Schumacher in the USA) and a specimen of *Q. acerifolia* (E. J. Palmer) Stoyhoff & W. J. Hess. This plant came from seed originally gathered from a well-known specimen growing at the Morton Arboretum in the United States. This handsome oak is not often seen in Europe. We then saw *Q. dentata* Thunb. and nearby a vigorous *Q.* 'Vilmoriniana', which is a hybrid between *Q. dentata* Thunb. and *Q. petraea* (Matt.) Liebl. This came from what was a chance seedling noticed by Maurice de Vilmorin at the Arboretum des Barres at the end of the 19th century.

Daniel has planted a double line of Norway spruce, *Picea abies* (L.) H. Karst., all around his garden. These were planted as a windbreak. Over the years they have grown to be tall trees and they take a lot of light from the trees they are supposed to protect. At one point during the visit I walked through the hedge to examine a lacinate form of *Quercus cerris* L. growing beyond the windbreak. Here I caught a bit of sun at last, and I noticed how beautiful the countryside is. None of that can be seen from the other side. The Turkish oak is doing very well even though it is outside the enclosed area. I wonder if Daniel could be persuaded to thin this double hedge a bit, maybe first right here at the *Q. cerris*?

We finished the visit to the garden in Scoville with a *Picea chihuahuana* Martinez, a recent introduction with needles as sharp as thorns. We then headed back to the house, where we had lunch on the terrace in the sun. This was also an ideal time to thank Daniel and Arlette for their hospitality and to present them with some gifts: oak seedlings mostly, but also Mexican pines, brought by Béatrice for the occasion.

The Arboretum in Lesve

After lunch, we drove to Lesve, which is about 40 km away from Daniel's house and a 45 minute drive over various back roads of Wallonia (French Belgium). We crossed the valley of the Meuse in Burnot before driving up to Profondeville and Lesve. Daniel's field there is about half the size of the garden in Scoville. It is also fenced by a double hedge of *Picea abies* and because its area is even smaller than at Scoville, one feels oppressed by the darkness of the place. The sun is shining, but the trees do not get much of it.



Quercus aliena within the spruce windbreak (left) at Arboretum Lesve

Photo©Charles Snyers



Measuring *Quercus xruncinata* at Arboretum Lesve

Photo©Charles Snyers

Darkness notwithstanding, Daniel has some interesting trees here. Some of the people in attendance, also members of the Belgian Dendrology Society, started measuring some of the trees for the national tree inventory (BELTREES), which was established and is maintained by the Society (Circumference is measured at 1.5 meter high).

The first tree of note, right at the entrance, is a spectacular *Corylus columna* L. (138 cm in girth and about 15 meters high). A few meters away, are an *Acer triflorum* Kom. (58 cm) and a small birch, labeled *Betula davurica* Pall. It was quickly decided that the label is incorrect, and some of the participants got very excited trying to identify it (Actually the birch is not yet identified. Since it came from a nursery, it may be a hybrid.)

Nearby is a good specimen of *Quercus xruncinata* (A. DC.) Engelm. (137 cm in circumference and 17 meters high), seemingly quite happy here. The next oak is *Quercus xcalvescens* Vukot., a naturally occurring hybrid between *Q. petraea* (Matt.) Liebl. and *Q. pubescens* Willd. Daniel collected this one in a natural stand in Ave et Auffe, not far from Lesve. The collection also contains *Q. pubescens*, collected by Daniel Dumont in the Gard region in France. *Q. pubescens* occurs here and there in southern Belgium always with populations of hybrids, *Q. xcalvescens* already mentioned and *Q. xkernerii* Simonk. (*Q. pubescens* x *Q. robur*). The latter is much rarer, but found a bit farther north in the Province of Brabant but in the absence of *Q. pubescens*. Other oaks recorded are *Q. aliena* Blume (74 cm), *Q. cerris* L. (143 cm) and *Q. macranthera* Fisch. & C. A. Mey. ex Hohen. (65 cm).

For the record, in addition to those already mentioned, other trees which were measured in Lesve (thanks Marc Struelens for the list) are *Abies concolor* (Gordon & Glend.) Lindl. ex Hildebr. 'Candicans' (83 cm), *Betula costata* Trautv. (81 cm), *Betula szechuanica* (C. K. Schneid.) C.-A. Jansson (45 cm), *Calocedrus decurrens* (Torr.) Florin (127 cm), *Castanea sativa* Mill. 'Argenteo-marginata' (170 cm in girth and 15 m high), *Cupressus arizonica* Greene (80 cm), *Fraxinus excelsior* L. 'Jaspidea' (80 cm), *Fraxinus latifolia* Benth. (80 cm), *Juniperus squamata* Buch.-Ham. ex D. Don 'Meyeri' (38 cm), *Pinus lambertiana* Douglas (138 cm and 17 m), *Pinus taeda* L. (51 cm and 12 m), *Pinus virginiana* Miller (76 cm and 10 m), *Robinia pseudoacacia* L. 'Unifolia' (97 cm), *Salix candida* Flügge ex Willdenow (164 cm. Note: this one needs to be checked as *S. candida* is a North-American shrub), *Salix pentandra* L. (98 cm and 15 m, collected in Switzerland), and *Tilia americana* L. (113 cm).

Uncle Oak: the Giant of Palomar Mountain

Joseph Wasyl,
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It felt great to be back on Palomar Mountain. As I went about the business of unloading the bed of the truck and setting up camp, I could not help but marvel at the primordial beauty of the mountain and the relative solitude of the oak-studded forest. Thanksgiving Friday wound up being a perfect early winter afternoon, azure blue skies with a midday temperature approaching 18 C. (65 F.), warm for late November at an elevation of over 1500 m, even here in San Diego County.

Palomar Mountain itself began with a tectonic upheaval from the surrounding planes five million years ago as a single, 420 km² block of igneous rock. The high point of this fractured granite block now stands roughly 1900 m above sea level, near the site of the observatory which houses the 200-inch (508 cm) Hale telescope, at one time the largest, most powerful telescope on Earth.

My friend, Timothy Wolfe, and I had once again arranged to escape from the city for our annual Thanksgiving weekend adventure to eat leftover turkey, tell tall tales around the campfire, and visit our old friend, the ancient Palomar Mountain Canyon Live Oak (*Quercus chrysolepis* Liebm.) that we took the liberty of naming “Uncle Oak.” This campout had certainly evolved over the years, from a raucous party in the mid 1970s, with a dozen or so high-spirited friends (Dan Nutt, Mark Benner, Cousin Craig, Jenda, Debbie Lander, Debbie Miller, The Frenchman, et. al.) complete with guitars, dancing, card-playing, pilgrim hats, etc,



The author at upper left with John LeBoeuf and Guy Sternberg under Uncle Oak, 2005
photo©Guy Sternberg

to a multi-family get-together with spouses and small children. A torrential rain event on Thanksgiving night, 1990 ended the family phase of this adventure. That night the force of the raindrops pounding against the roof of our tent created a continuous cold wet mist, and Debbie and I spent the entire night using our bodies as human shields for Jason and Joey, our 2 young boys, then age 11 months & 2 years 6 months. Now our Thanksgiving expedition has evolved into just a couple of old friends communing with nature.

I was first introduced to Uncle Oak in 1976. Tim and I had come to Palomar to do some trout fishing in Doane Pond. I don't recall the actual circumstances surrounding our decision to go for a hike in the forest, but regardless, we picked up a trail guide and ultimately found ourselves on French Valley Trail on our way to explore the old weir, constructed in the late 1800s. After hiking about a mile from the campground, we came around a corner and there it was! Standing majestically on its fractured granite promontory, this oak was indeed a monumental tree. Uncle Oak had managed to take root on top of the outcrop centuries earlier, sending its roots along a torturous journey through cracks in the rock and securing its foothold in the forest. It had long ago engulfed the 1.5 meter diameter, 1 meter high chunk of granite at its base. When I first saw the oak in 1976, it was also cradling a semi-toppled mature Ponderosa Pine in its massive branches, as if to offer the pine the opportunity to send its cones out into the forest for another year or two.

The oak tree was magnificent. I remember stopping to rest on the cool granite rocks around its base in the perfect shade of its canopy, above a forest floor carpeted with nothing but its oak leaves and acorns. Magical! I recall surveying all the possibilities for climbing this giant, but after several failed attempts came to conclusion that it was virtually un-climbable by mortal man without special



Guy Sternberg, John LeBeouf, and the author with Uncle Oak, 2005, as seen from the trail
photo©Guy Sternberg

climbing gear. Somehow, during that first encounter, the tree itself had become the destination from that time on.

Another memorable visit to the oak occurred the day of the Palomar Mountain monsoon. Tim, Joey and I were on the trail to visit Uncle Oak when a large fog bank, or at that elevation probably a cloud, rolled in. We each could barely see the person walking in front of us, but we wanted little Joey to find Uncle Oak so badly that we pressed on through the forest, at times with 2-year-old Joey riding on our shoulders. Then, at the very moment we came upon the tree, the clouds temporarily lifted revealing Uncle Oak standing majestically above us. After a proper visit, we hurriedly felt our way back along the misty trail only to be abused by the rain and cold as the full force of the Pacific storm rolled in that night.

Years later, Joey and Jason both spent sixth grade camp at the Palomar Outdoor School located in Doane Valley, only a ten-minute hike from the campground. Before they left San Diego, I gave them each detailed instructions on how to find Uncle Oak. I was very pleased to learn that each of them wound up leading an expedition of their sixth grade schoolmates to see the tree. The tree was becoming part of our lives.

In December of 2005, another pilgrimage to see Uncle Oak was responsible for re-uniting three old friends: Guy Sternberg, John LeBoeuf, and me. The three of us had headed west for the first time in 1972, and over the summers of 1972 and 1973 wound up traveling a total of 24,000 kilometers in Guy's 1971 Dodge Charger SE, visiting every national park west of the Mississippi River collecting and photographing tree specimens and amassing memories. Anyway, in 2005 Guy flew in from Illinois, John drove down from Fresno, and we all met up again for the first time in over 30 years. Besides the camping vacation, we spent one entire day hiking up French Valley and sizing up Uncle Oak. Good times, baby!

Back to the present. Tim and I spent Friday night on the mountain around a blazing campfire with music, copious amounts of food and drink, sharing stories of last year's encounter with a sasquatch (or someone dressed in a sasquatch costume?!?). Our friend Bobby McNeal saw it too! (Bobby didn't make this year's adventure...I wonder why?)

We also talked about the Poomacha Fire that in October of 2007 burned over 200 km² of the mountain, including over 400 hectares (1000 acres) in Palomar Mountain State Park. Some signs of that fire are still visible today, even around the campground itself. During our annual trip 2 years ago, in November 2008, we had hiked up French Valley trail as usual to visit the tree, but had grave concerns about Uncle Oak when we saw that the fire had burned right up French Valley. I had been so relieved when we came upon Uncle Oak standing tall and strong despite the previous year's inferno.

I awoke Thanksgiving Saturday morning to another glorious day on the mountain, and quickly made preparations for the hike to visit Uncle Oak. As I started out along the trail I noticed that whenever I came to an area burned out by the fire I found a meadow sprinkled with new knee-high seedling trees and shrubs. The young cedars, pines, and oaks had already begun spacing themselves out to anchor a new generation of forest.

Then I came around the final turn in the path, and to my horror, there was

Uncle Oak totally uprooted! Its fallen trunk created a massive ceiling-high oak arch over the trail. During its fall the oak had sheared the rock outcrop that had served as its foundation for all of these centuries. It was still holding the lion's share of that exposed granite in its craw. Virtually the entire root system of the tree was exposed and now totally compromised. I am still shocked and amazed by how such a tiny root system could support a tree of this stature.

Sadly, this tree ultimately was another victim of the wildfire that roared though the park in 2007. The entire twisted surface of the root system that had been in contact with the granite outcrop had been charred, and apparently damaged to the point where it could not resist the powerful winter storms of 2009.

What a magnificent specimen, and what a magnificent life it must have led. Even in death it commands the highest respect. I am quite certain that its massive body will continue to form a spectacular wooden arch over the French Valley Trail for the rest of my lifetime, and (barring another major fire) perhaps long after my passing.

Farewell old friend.

Editor's note: Joe Wasyl is an old friend and a new Oak Society member who has served since 1980 as a development engineer at the Center for Coastal Studies, and more recently, at the Marine Physical Laboratory at Scripps Institution of Oceanography, University of California San Diego. I was privileged to see Uncle Oak with Joe and another old friend, John LeBoeuf, in all its glory in 2005. I think all three of us presumed it had been there forever, and would still be there forever.



The fallen Uncle Oak arching over the trail, 2010

photo©Joe Wasyl

A Gallery of Oaks

Historic Drawings

Guy Sternberg ⁽¹⁾ and Eike Jablonski ⁽²⁾

¹ Starhill Forest Arboretum of Illinois College, Petersburg, Illinois USA

² LTAE, Dept. Horticole., B.P. 76, L-9001 Ettelbruck, Luxembourg

This year's Gallery of Oaks features historic drawings from several centuries of talented, oak-loving artists. They were selected and reproduced from the libraries of Guy Sternberg at Starhill Forest Arboretum in Illinois and Professor Eike Jablonski in Ettelbruck, Luxembourg.

Sources from Starhill Forest include *Dodona's Grove* (1640) by James Howell; *Rei Agrariae* (1674), by Wilhelm Goes; John Evelyn's *Silva* (1775), with artwork by William Burgh; *A Treatise on Forest Trees* (1775), by William Boutcher; *Descriptions and Sketches of some Remarkable Oaks ...* (1790), by Hayman Rooke; *Robin Hood* (1795) by Joseph Ritson, with artwork by Thomas Bewick; *Sylva Britannica* (1830), by Jacob George Strutt; the *North American Sylva* (1857) by François André Michaux, with illustrations by Pancrace Bessa, Pierre-Joseph Redouté, and Henry Joseph Redouté; *English Trees and Tree Planting* by William Ablett, 1880; *Der Wunderbaum von Harreshausen* (2005) by Georg Wittenberger, featuring reprints of historic views of *Die Shoene Eiche*; and several unsourced prints.

Sources from Prof. Jablonski include *Codex Manesse* (ca. 1320), Heidelberger Liederhandschrift; *New Kreütterbuch* (1543) by L. Fuchs; H. Bock's *Kreuterbuch* (1546); *Harbkesche Wilde Baumzucht* (1792) by J. P. DuRoi; *Geschichte der Amerikanischen Eichen* (André Michaux's precursor to North American Sylva - 1802); William Forsyth's *A Treatise on the Culture and Management of Fruit Trees* (1803); *Flora Universalis* (1828) by D. Dietrich; *Arboretum et Fruticetum Britannicum* by John Loudon (1844); Theodor Kotschy's *Die Eichen Europas und des Orients* (1862); *Köhler's Medizinal-Pflanzen Atlas* (1887) edited by G. Pabst; and Hempel and Wilhelm's *Die Bäume und Sträucher des Waldes* (1898).

Our generation has not been the first to be inspired and awed by *Quercus*. There are many more illustrations which could have been included if we had more space – oaks are a popular theme for artists, both now and in the past. We hope you will take some time to appreciate the richness of some of these early drawings, and the feelings their artists had for oaks. A few of the ancient trees depicted in some of these drawings may still be seen growing today.

Guy and Eike

14th Century



Quercus robur, from *Codex Manesse*, ca. 1320, Heidelberger Liederhandschrift

16th Century

Unterscheid/namen vnd würckung. 177 Eichbaum.

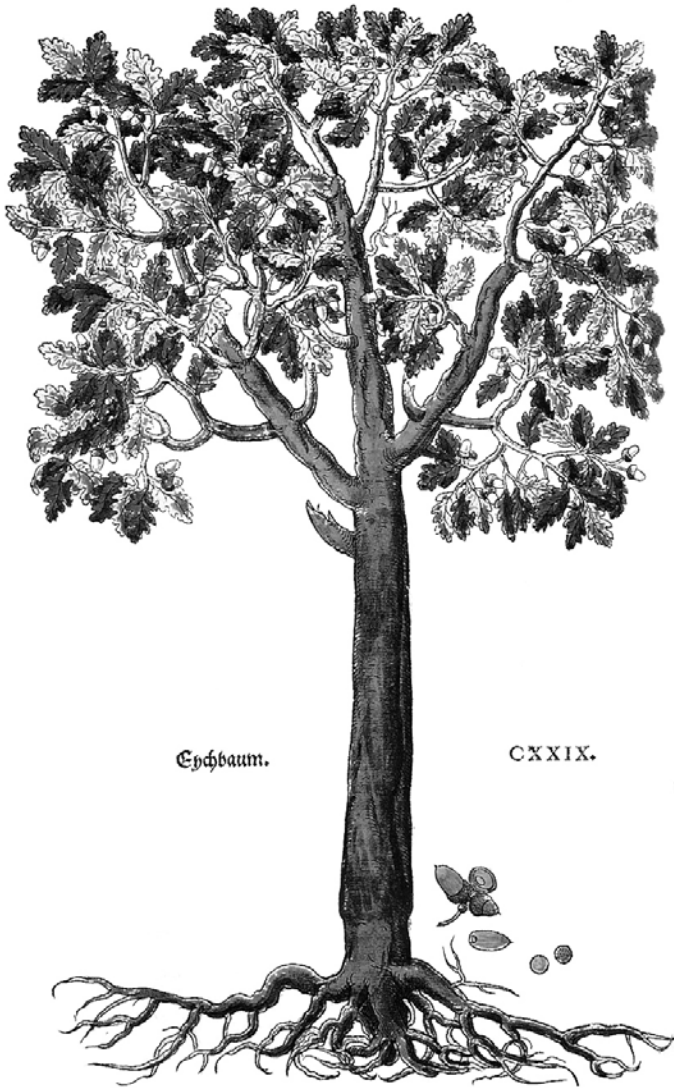


Das bleich geel färbig laub / wirt je lenger je grüner vnd harter / wie wol etliches laub an Eichbaum erstmals auch bräunrot wirt / sonderlich an den jungen ständen. Nach dem getreid kommen als bald die aller kleinste rote blümlin auff stenglin / dar aus werden Eichel / erwan drei oder vier auff einem dünne faden stengel. Ob aber die Eichel beständig feiert nimbt man war vmb S. Jacobs tag / als dan siehet man die gedrungene Eichel aus ihren schüssel schließen / Ein jede Eichel hat nach dem schüsselin zwo heute / die eüßerst ist die zehe harte scheel / die ander das braunfarbig bitter heülein vmb den herben bitteren kern gewachsen.

Eliche Eichbaum gewinnen im Lenz runde lücke öpffelin / als schwarz / inwendig voller herber feuchtigkeit / darin wachsen maden / vnd werden zu leest schändlein daraus.

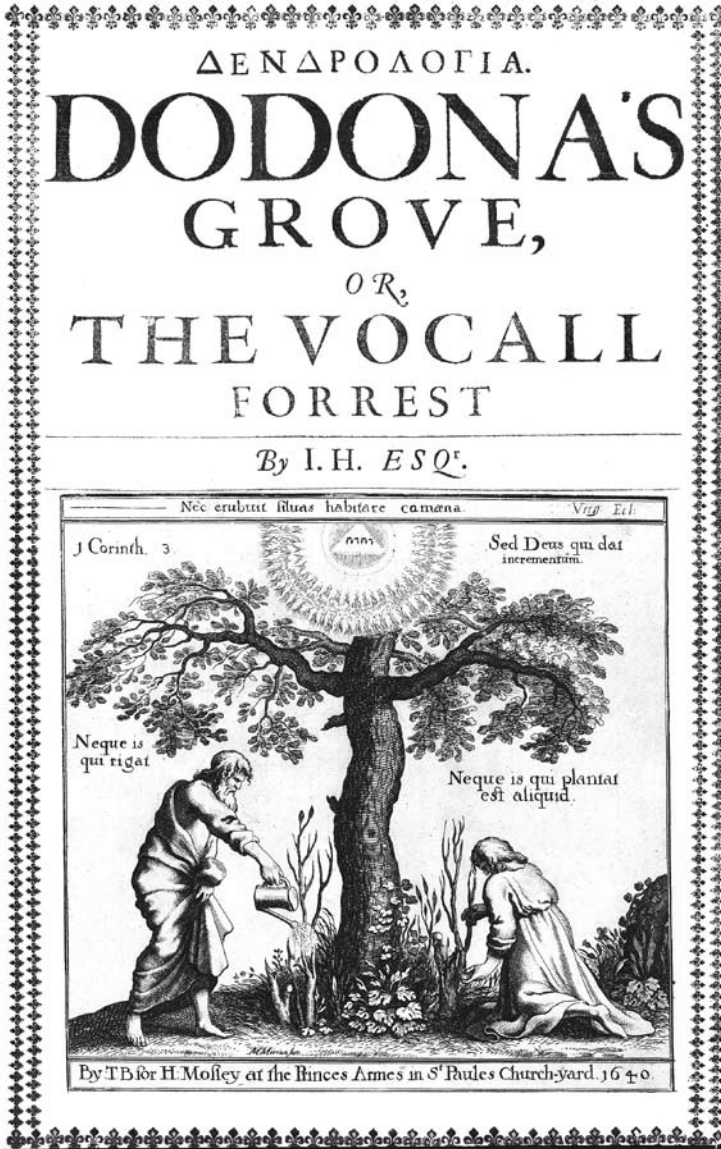
Gegen dem Herbst bringt das Eliche laub erwan runde lücke öpffelin / auff der seiten gegen der erden / erwan vj oder x öpffelin an einem blat / das erin wachsen auch maden / die werden mit der zeit / so der Herbst warm ist / zu stiegen vnd schnocken / vnd das sind aber nit die rechten Gall öpffel darmit man ferbt / Von den selben her nach.

Quercus robur from *Kreüterbuch*, by Hieronymus Bock, 1546



New Kreütterbuch, Quercus robur, by L. Fuchs, 1543

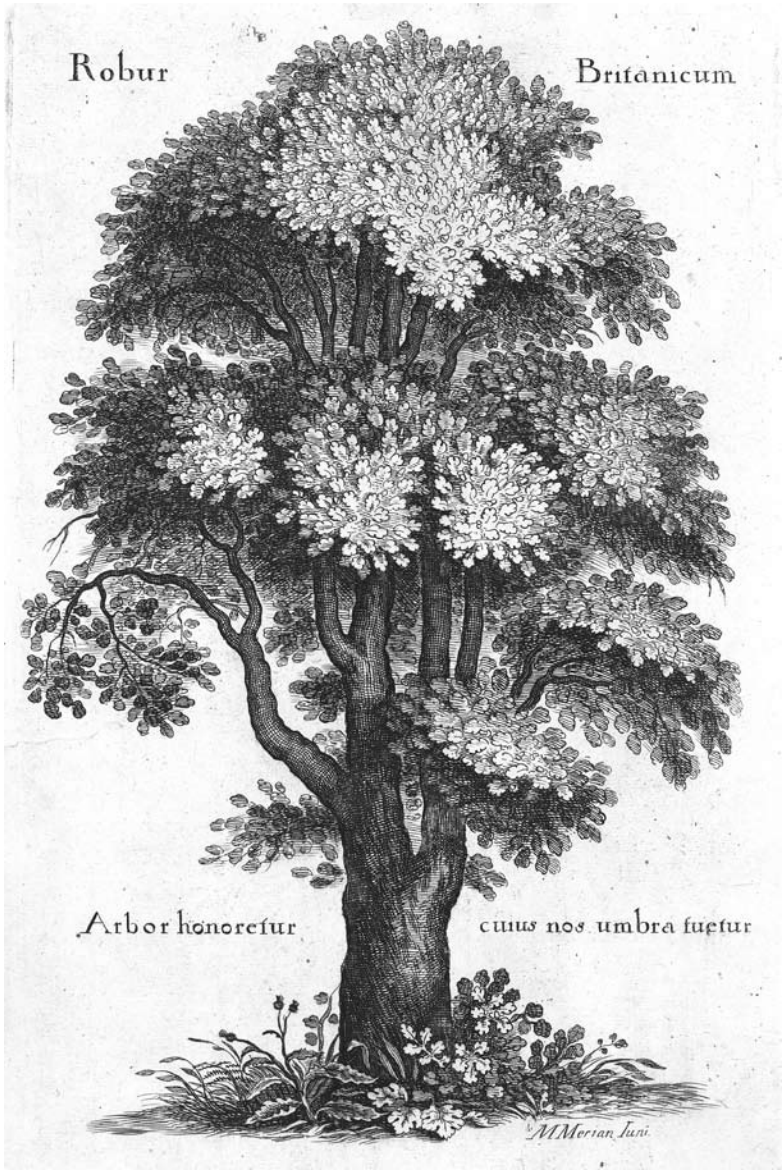
17th Century



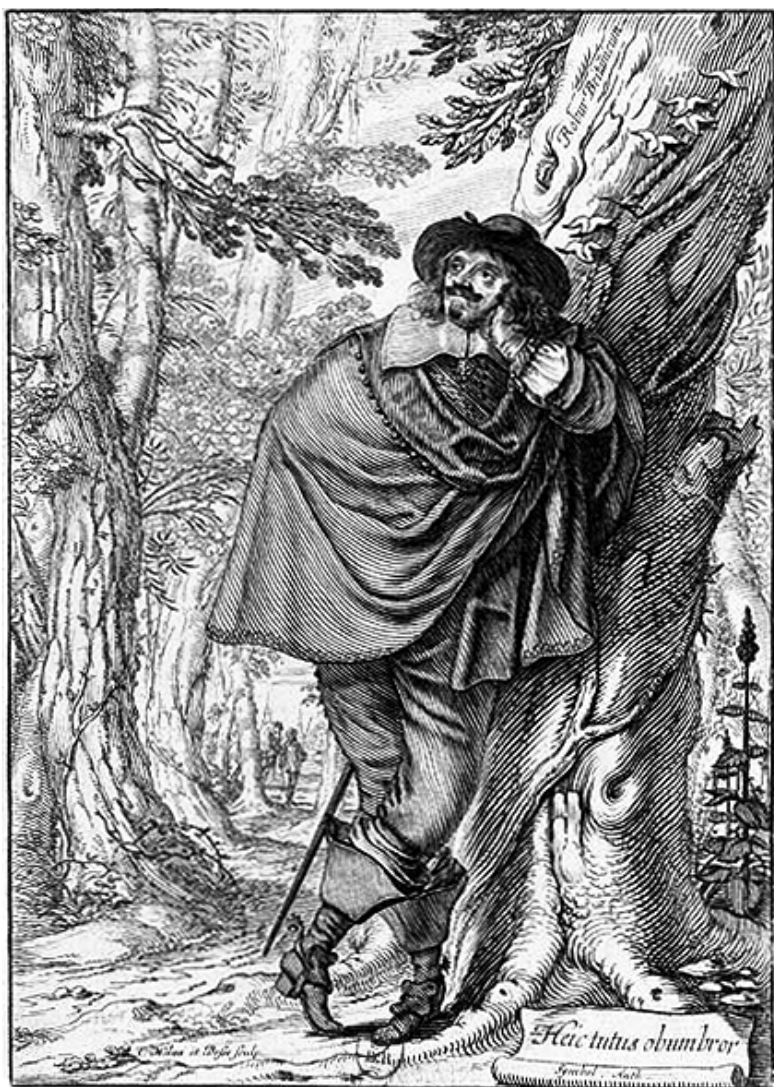


DODONÂS GROVE

Oak with acorns, from *Dodona's Grove*, 1640



Quercus Robur, from *Dodona's Grove*, 1640



Dodona's Grove author James Howell portrayed leaning against *Robur Britannicum* (English Oak), 1641 Edition.

R E I
A G R A R I Æ

Auctores legesque variæ.

Quædam nunc primum, cætera emenda-
tiora prodeunt curâ

W I L E L M I G O E S I I,

Cujus accedunt

Indices, Antiquitates agrariæ & Notæ:

Una cum

N I C O L A I R I G A L T I I

Notis & Observationibus, nec non
Glossario ejusdem.

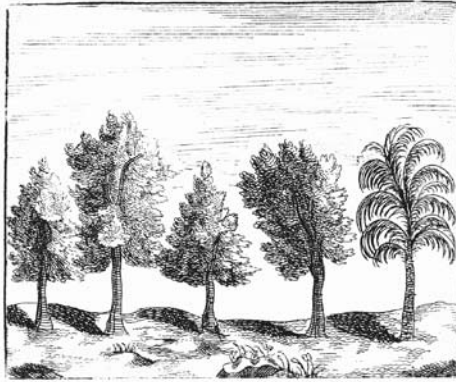


AMSTELREDAMI,

Apud JOANNEM JANSSONIUM
WAESBERGE, 1674.

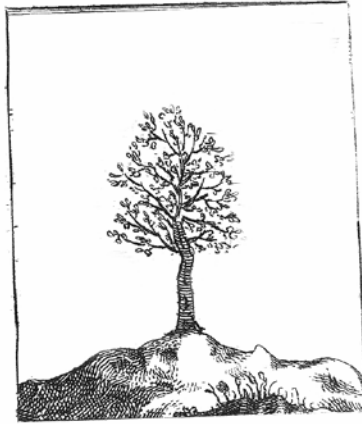
Title page from *Rei Agrariæ*, by Wilelmi Goesii, 1674

VAR. AUCTOR.



ITEM VITALIS AUCTOR.

Oak and other trees, from *Rei Agrariae*,
by Wilelmi Goesii, 1674



VITALIS ET ARCADIUS
AUCTORES.

Oak on a hill, from *Rei Agrariae*, by Wilelmi Goesii, 1674

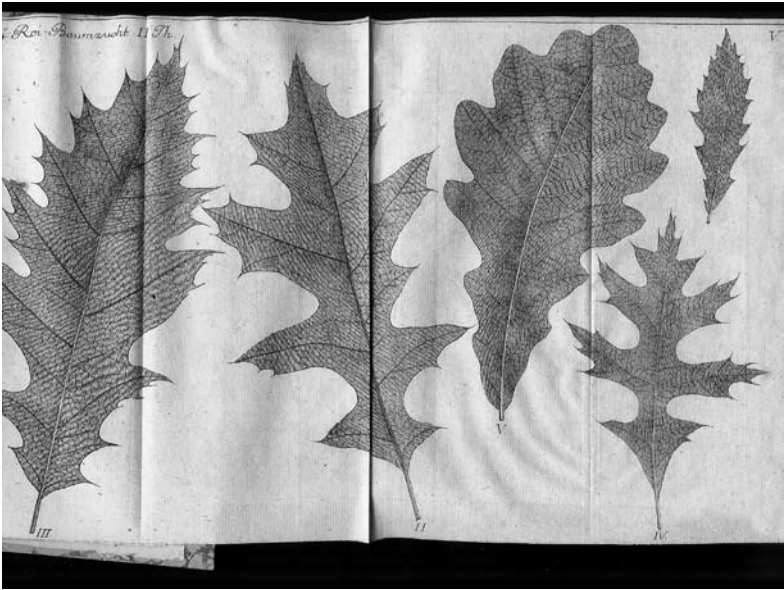
18th Century



Thomas Bewick, 1795 woodcut illustration to Joseph Ritson's *Robin Hood: A Collection of All the Ancient Poems, Songs and Ballads*



William Burgh, from Evelyn's *Silva*, 1775, A Winter View of the Cowthorpe Oak



Quercus leaves from *Harbkesche Wilde Baumzucht* by Johann Philipp Du Roi

White Watson's

DESCRIPTIONS AND SKETCHES
OF SOME
REMARKABLE OAKS,
IN THE PARK AT WELBECK,
IN THE COUNTY OF NOTTINGHAM,
A SEAT OF
HIS GRACE THE DUKE OF PORTLAND.
TO WHICH ARE ADDED,
OBSERVATIONS ON THE AGE AND DURABILITY OF THAT TREE.
WITH
REMARKS ON THE ANNUAL GROWTH OF THE ACORN.
By HAYMAN ROOKE, Esq. F. S. A.

L O N D O N,
PRINTED BY J. NICHOLS, FOR THE AUTHOR:
AND SOLD BY B. WHITE AND SON, FLEET STREET;
AND J. ROBSON, NEW BOND STREET.
M, DCC, XC.

Title page from *Descriptions and Sketches of Some Remarkable Oaks*



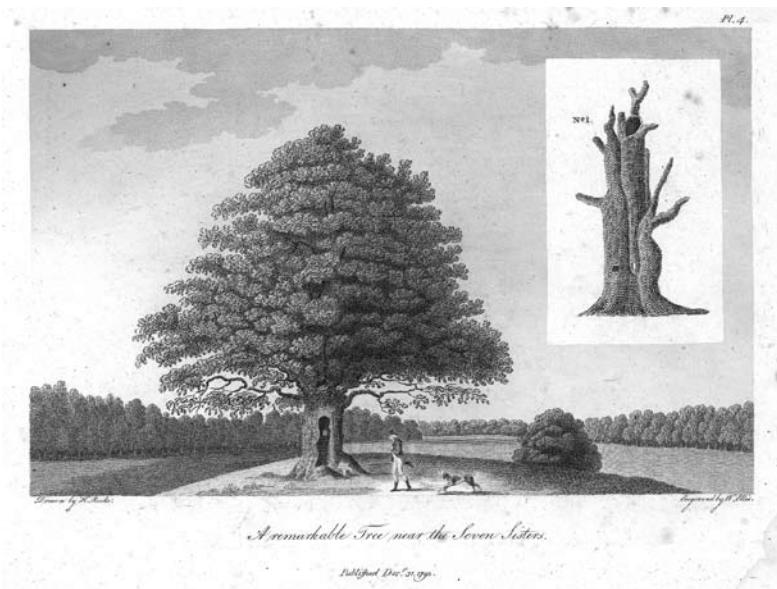
From *Descriptions and Sketches of Some Remarkable Oaks*, by Hayman Rooke



Two large trees in Welbeck Park called the Porters, by H. Rooke, pub. 1790.



The Seven Sisters, by H. Rooke



A Remarkable Tree near the Seven Sisters, by H. Rooke



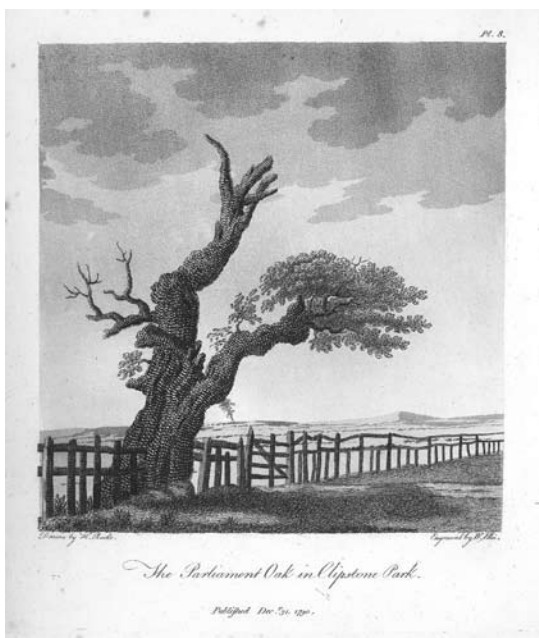
The Green Dale Oak, by H. Rooke



The Oak of Ashe, by H. Rooke



A View of Welbeck with part of the Lake, by H. Rooke



The Parliament Oak in Clipstone Park, by H. Rooke



An Ancient Oak in Birchland Wood, by H. Rooke

Forst = Archiv

zur Erweiterung der
Forst = und Jagd = Wissenschaft
und der
Forst = und Jagd = Literatur

herausgegeben
von
Wilhelm Gottfried von Moser

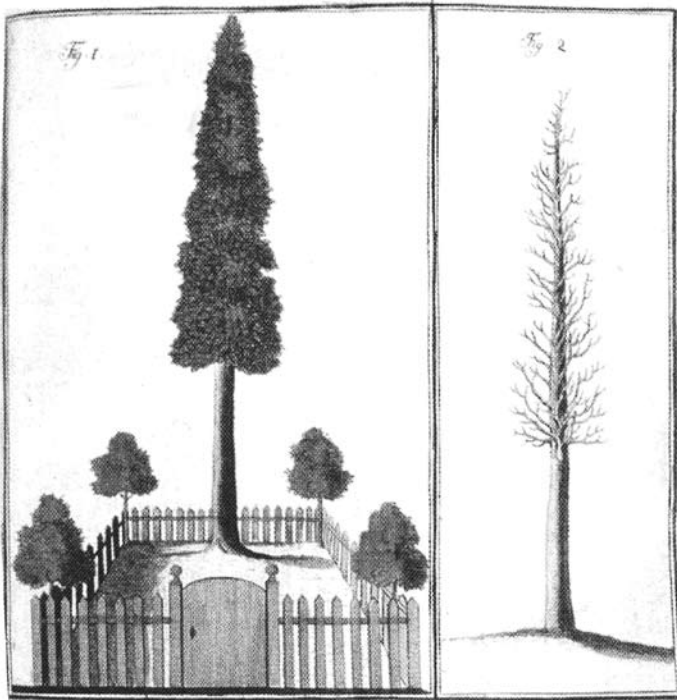
Sechster Band.



Ulm 1790.
Im Verlag der Stettinischen Buchhandlung.

Die erste Abbildung der „Schönen Eiche“, gezeichnet im Jahre 1766, jedoch erst 1790 als Titelkupfer im „Forst-Archiv“ gedruckt.

The Beauty Oak of Harreshausen, Germany as drawn in 1766



In belaubtem und unbelaubtem Zustand wird die „Schöne Eiche“ als farbiges Kupfer im „Hanauischen Magazin“ 1781 abgebildet. Diese Arbeit von „S“ ist die erste bekannte Beschreibung der Pyramideneiche von Harreshausen.

The Beauty Oak of Harreshausen, Germany as drawn in 1781

A
Treatise
on
FOREST-TREES



by
William Boucher,
NURSERY-MAN, at *Comely-Garden, EDINBURGH.*

Pruning or pollarding an oak in Edinburgh, William Boucher, 1775

19th Century



Oak of Rest (Balut es-Sebat), also known as Abraham's Oak - Artist unknown. This ancient *Quercus ilex* tree, which reportedly marked the burial place of Abraham's wife Sarah near Hebron, survived until 1996.



The King Oak, in Torrington Forest

The King Oak from *English Trees and Tree-Planting* by William Ablett, 1880



P.J. Redouté

Post Oak.
Quercus obtusiloba.

Benard & C.

Post Oak, *Quercus stellata* from *The North American Sylva*
by F. André Michaux, illustration by Pierre-Joseph Redouté



Yellow Oak.
Quercus P^{na} acuminata.

Yellow Oak or Chinkapin Oak, *Quercus muehlenbergii*, from *The North American Sylva* by F. André Michaux, with illustration by Pierre-Joseph Redouté



Dwarf Chestnut Oak, *Quercus prinoides* from *The North American Sylva* by Francois Andre Michaux, with illustration by Panrace Bessa



Laurel Oak.
Quercus imbricaria.

Laurel Oak or Shingle Oak, *Quercus imbricaria* from *The North American Sylva* by F. André Michaux, with illustration by Henry Joseph Redouté



Black Jack Oak
Quercus ferruginea

Black Jack Oak, *Quercus marilandica* from *The North American Sylva* by
F. André Michaux, with illustration by Pierre-Joseph Redouté



Bear's Oak
Quercus bunsterti

Bear Oak, *Quercus ilicifolia* from *The North American Sylva* by
F. André Michaux, with illustration by Henry Joseph Redouté



Chêne quercitron.
Quercus tinctoria

Chêne quercitron or Black Oak, *Quercus velutina* from *The North American Sylva* by F. André Michaux, with illustration by Pancrace Bessa

Ivenacker Eichen



Deutschlands merkwürdige Bäume: Die Eichen zu Ivenack.

Ernst Keil's Nachfolger

Leipzig - publication 1895

Source scan eines Sammelbandes aus eigenem Besitz

N^o 4.

Michaux's Eichen 2^{de} H.



Quercus Phellos. 1. *maritima.*
2, 3. *pumila.*

Quercus phellos, from *Geschichte der Amerikanischen Eichen*,
by Andre Michaux, 1802

N^o 12.

Michaux Eichen 2^{te} H.

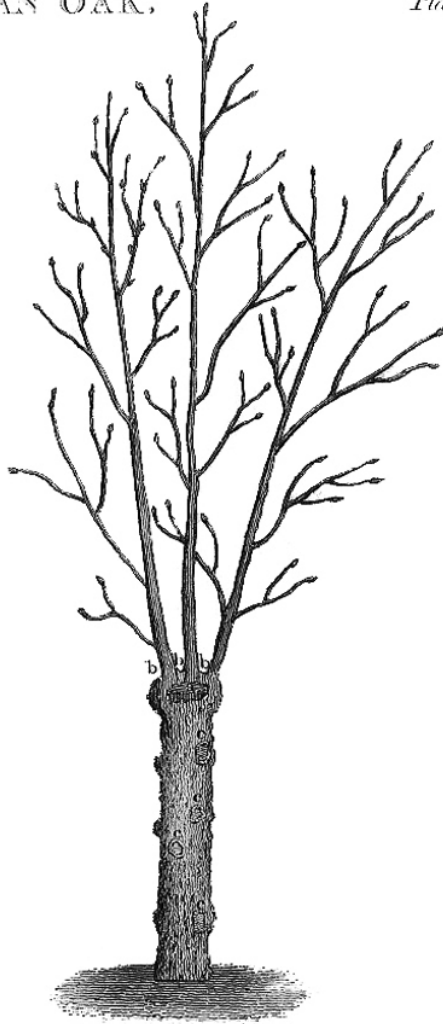


Quercus Virens.

Quercus virginiana, from *Geschichte der Amerikanischen Eichen*,
by Andre Michaux, 1802

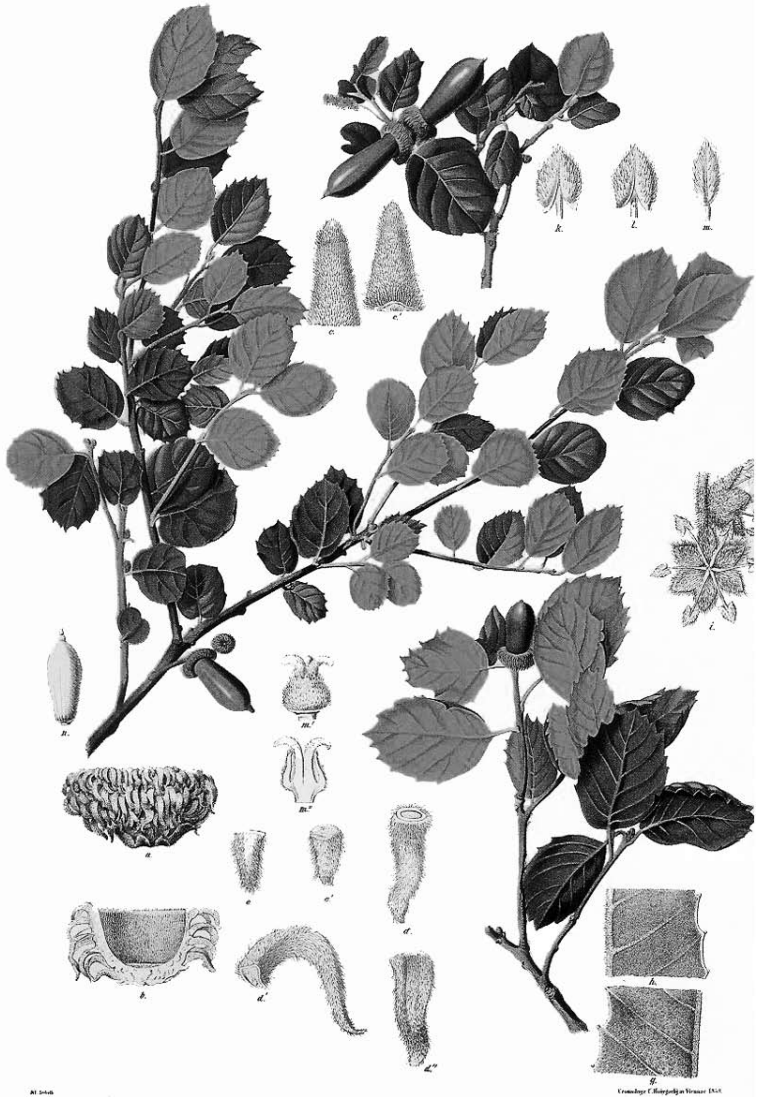
AN OAK,

Plate XII.



Published Feb^r 1st 1803, for Hill's Forsyth, Kensington.

Quercus oak treatment or oak pollarding from William Forsyth's
A Treatise on the Culture and Management of Fruit Trees, 1803



Quercus alnifolia from *Kie Eichen Europas und des Orients*, T. Kotschy, 1862



Quercus americana or American oaks from *Flora Universalis* by D. Dietrich, 1828



Stein und Varig von K. Meissl in Wien

Oben von W. Langsdorff, unten von A. Lipsch.

Zerreiche, *Quercus Cerris* L.

1. Zweig mit jungen Trieben, männlichen Blütenkätzchen (bei a-c), weiblichen Blütenstände (bei d) und jungem (einjährigem) Fruchtstande (bei e). — 2. Zweig mit entwickelten Trieben und halbreifen (zweijährigem) Fruchtstände. — 3. Rote Eichel. — 4. Leerer Becher. — 5. Zweig im Winterzustand; bei a künftiger Fruchtstand.

Quercus cerris from *Die Bäume und Sträucher des Waldes*,
by Hempel and Wilhelm, 1898



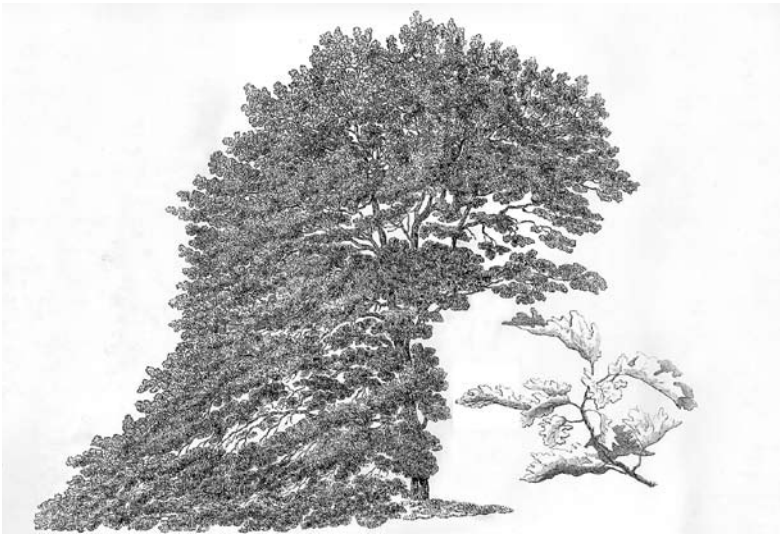
Druck und Verlag von K.B. Hirtel in Wien.

Hort. bot. W. Engelb. 1878. tav. A. 2408.

Ungarische Eiche, *Quercus hungarica* Hubeny.

1. Zweig mit jungen Trieben, an diesen männliche Blüthenkätzchen (bei a-d) und weibliche Blüthenstände (bei c). — 2. Entwickelter Zweig mit reifen Fruchtständen. — 3. Reife Eichel. — 4. Leerer Becher. — 5. Zweig im Winterzustande.

Quercus frainetto from *Die Bäume and Sträucher des Waldes*,
by Hempel and Wilhelm, 1898

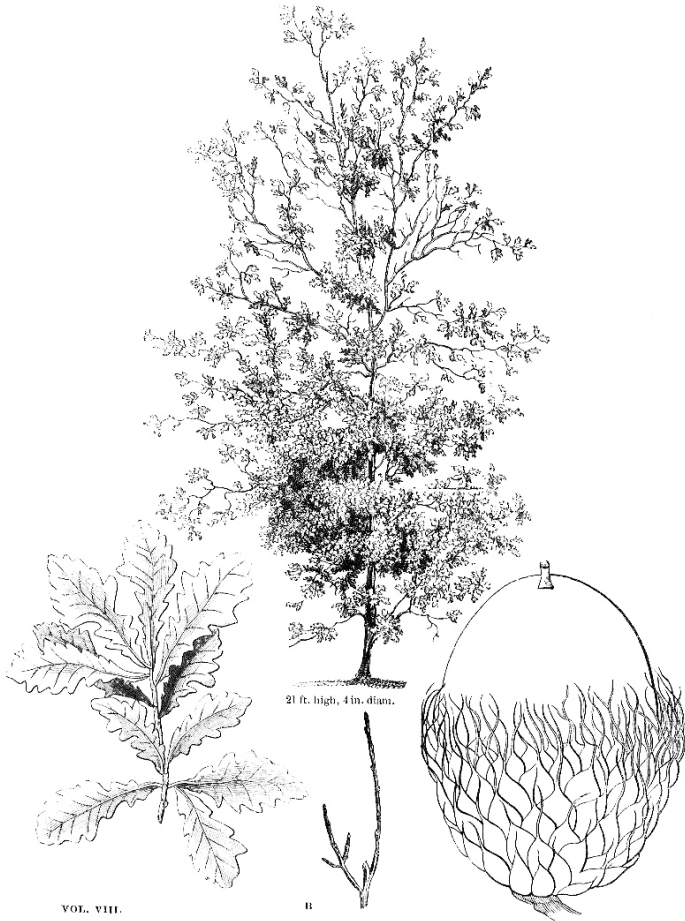


Quercus cerris from *Arboretum et Fruticetum Britannicum*,
by John Loudon, 1844

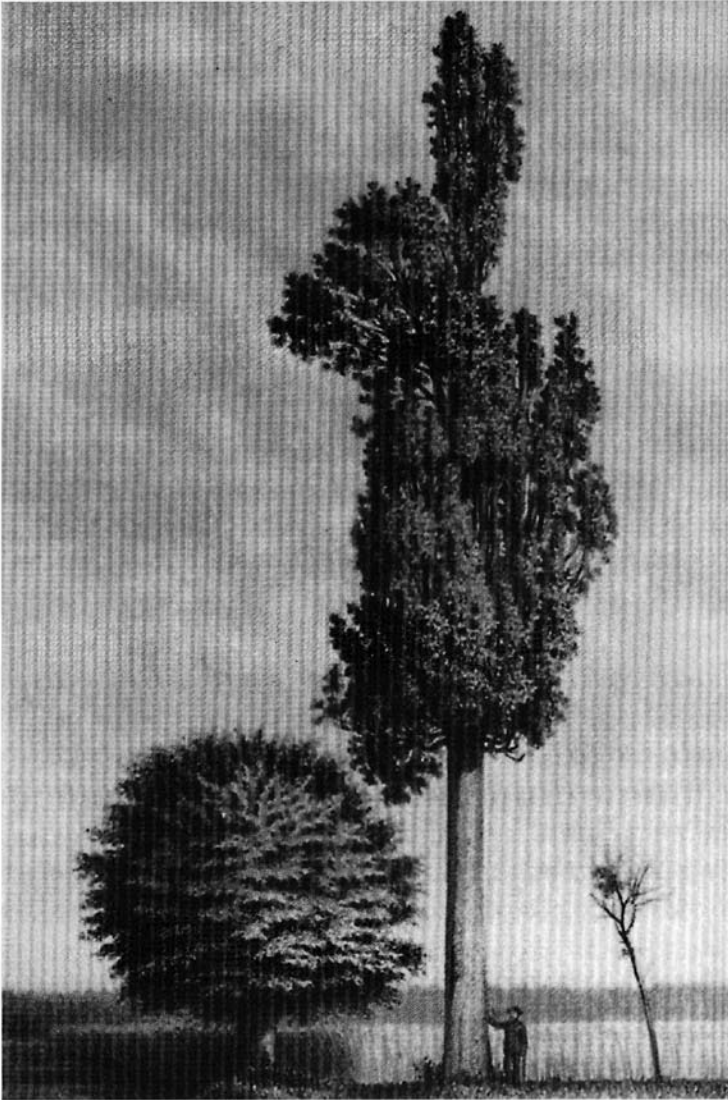


Winfarthing Oak from *Arboretum et Fruticetum Britannicum*,
by John Loudon, 1844

Quercus macrocarpa. The large-fruited Oak.



Quercus macrocarpa from *Arboretum et Fruticetum Britannicum*,
by John Loudon, 1844



Majestätisch erscheint die „Schöne Eiche“ in der Arbeit von BLUM (1895).

The Beauty Oak of Harreshausen, Germany as drawn in 1895.

Sylva Britannica;
OR
PORTRAITS OF FOREST TREES



New Forest. Vide page

The New Forest, Great Britain, shown on the frontspiece of *Sylva Britannica*,
by Jacob George Strutt, the Octavo Edition, May 1830

Sylva Britannica ;
OR,
PORTRAITS OF FOREST TREES,
DISTINGUISHED FOR THEIR
ANTIQUITY, MAGNITUDE, OR BEAUTY.

DRAWN FROM NATURE
BY
JACOB GEORGE STRUTT,

AUTHOR OF "DELICIE SYLVARUM," &c.

Hail, old patrician trees!

COWLEY.

————— arched walks of twilight groves
And shadows brown, that Sylvan loves,
Of pine, or monumental oak.

MILTON.

LONDON :

PUBLISHED FOR THE AUTHOR,
8, DUKE STREET, ST. JAMES'S,
BY LONGMAN, REES, ORME, BROWN, AND GREEN.

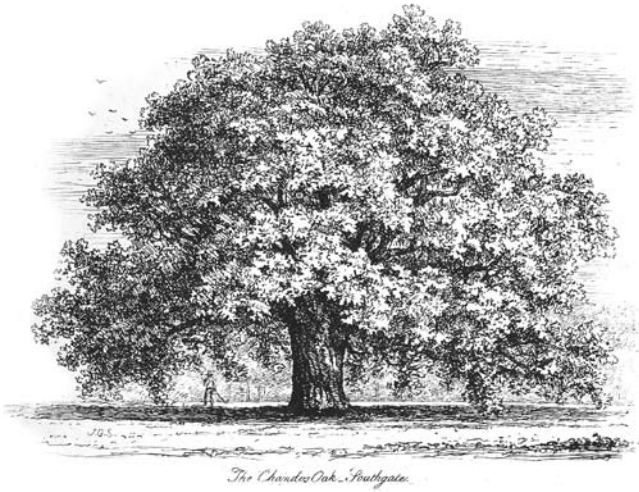
(Octavo Edition, May 1830)



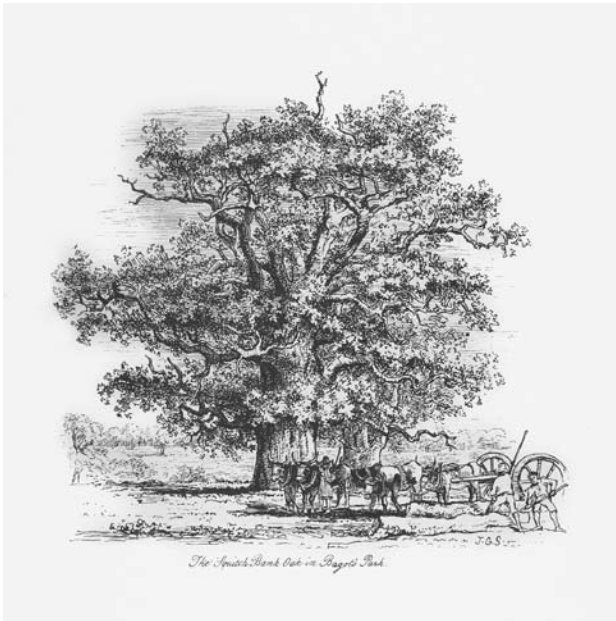
The Great Oak at Pansanger, by J. G. Strutt, 1830



The Wotton Oak, by J. G. Strutt, 1830



The Chandos Oak at Southgate, by J. G. Strutt



The Squitch Banks Oak in Bagot's Park, by J. G. Strutt



The Beggar's Oak at Bagot's Park, by J. G. Strutt



The Salcey-Forest Oak, by J. G. Strutt



The Bull Oak, Wedgwood Park, Warwickshire, J. G. Strutt



The Swilcarl Lawn Oak, by J. G. Strutt



The Moccas Park, by J. G. Strutt



The King Oak of Savernake Forest, by J. G. Strutt



The Creeping Oak of Savernake Forest, by J. G. Strutt



The Gospel Oak near Stoneleigh, Warwickshire by J.G. Strutt



The Cowthorpe Oak, by J. G. Strutt



The Greendale Oak, by J. G. Strutt



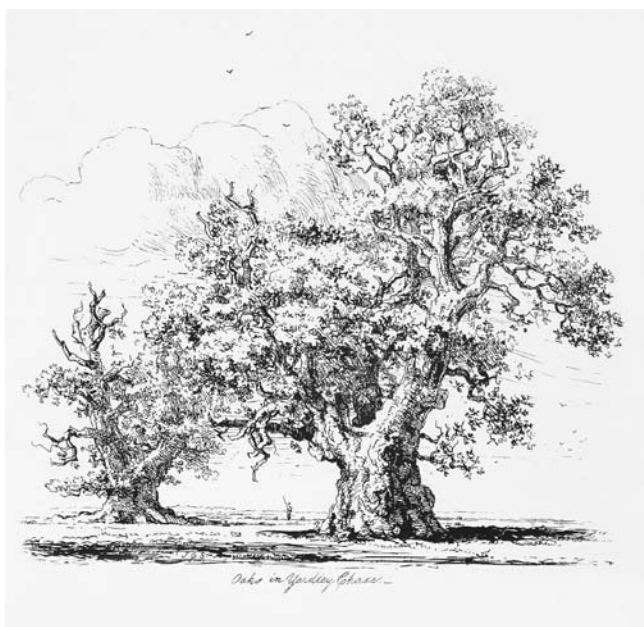
The Shelton Oak, by J. G. Strutt



Queen Elizabeth's Oak, by J.G. Strutt



Sir Philip Sydney's Oak at Penhurst, by J. G. Strutt



Oaks in Yardley Chase named Gog and Magog, by J. G. Strutt



Oaks at Fredville named Stately, Majesty and Beauty, by Strutt



Pascha Weitsch: Oak Forest near Querum with Self-Portrait, 1800

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Material may be previously published or unpublished. The author's name, title, postal address, telephone and/or fax number, and e-mail (if available) should be provided and should include all information as intended for publication. Any contributions longer than 7500 words must be approved in advance by the editors.

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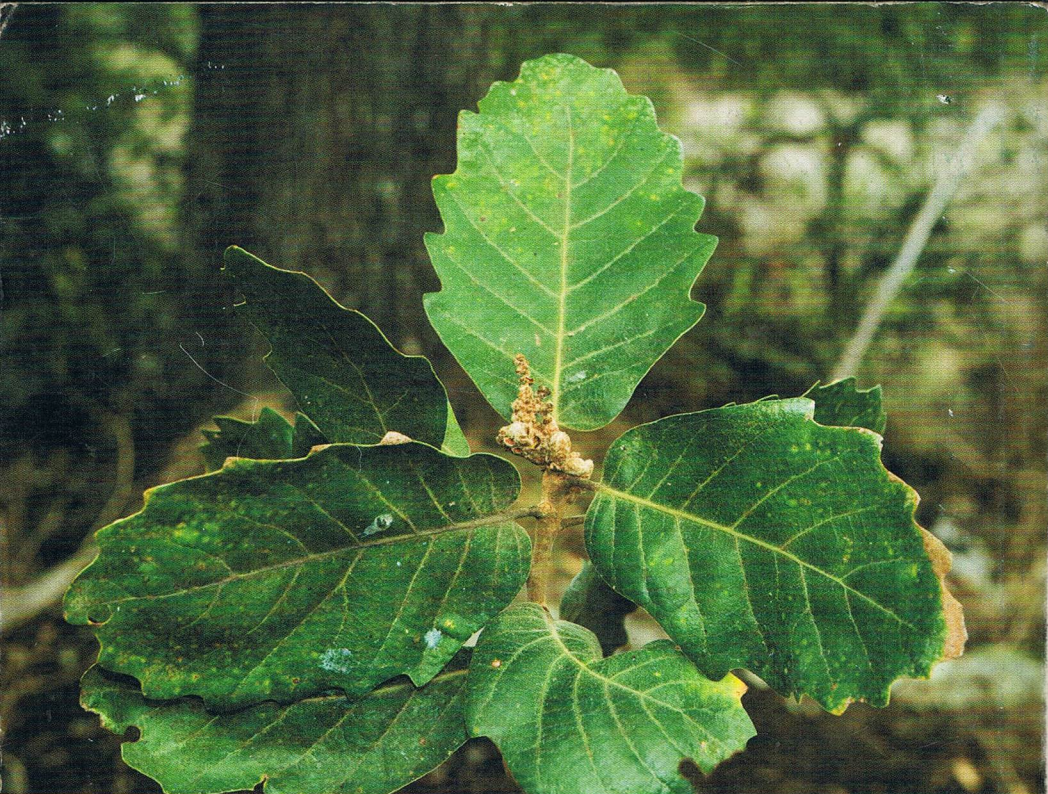
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*Riet and Dick van Hoey Smith
Trompenburg, 19 September 2010*





Quercus alentejana (a new species), foliage and fruits
Photos by Michel Timacheff

