THE ORIGIN, HISTORY AND DEVELOPMENT OF THE ARBORETUM TROMPENBURG, ROTTERDAM, HOLLAND

BY J.R.P. van HOEY SMITH

The history of the arboretum started in 1820 when a small country seat was built in the village of Kralingen, now part of Rotterdam, 4 km from the center of the city. The owners had their permanent house and work in Rotterdam, but the weekends were spent at Kralingen. The house was not built on poles, as is the custom now, but on casks with long willow branches in them. These were put vertically on the earth and loaded, whereby the willow twigs bend outwards and so give a considerable carrying capacity. This old-fashioned way of making foundations is a consequence of the weak structure of the underlying soil.

Forty percent of Holland, also Rotterdam, lies under sea level, our arboretum by four meters! During the floods of 1953, the dykes were half eaten away by the water before the tide turned and saved us. Originally, the Rhine Maas Delta consisted of peat swamps and in the Middle Ages, and also later, these were used commercially and the peat was removed for burning. Of 20 to 30 meters of soft peat, 4 meters were removed and the rest flooded again at each tide. So, a small layer of heavy river clay covers the thick peat layer and mud was deposited on top. The peat still contains many stems of oaks, birches, and alders. When digging our swimming pool, the stem of a heavy oak had to be removed. The wood was still in perfect condition and used for repairing a Viking ship, uncovered by the reclaiming Zuiderzee. Furthermore, a reclaimed area with dykes around is called a "polder" and when the water was pumped out of the polder Kralingen, long straight ditches were dug, each about 45 meters apart. "Trompenburg" consisted of three plots, 45 meters wide but 350 meters long. In 1820 when the house was built, only the middle plot was laid out as a garden and the other plots remained meadows.

Our soil consists of a layer of good disintegrated mud of about 50 cm and on a layer of heavy impenetrable clay of about 30 cm. All this clay on the 20 m of loose light peat. The clay must be kept carefully, because when this is removed, the oxygen enters the peat, which disintegrates and the soil collapses. This circumstance means that only a small but very fertile layer of garden soil is available and in dry periods we have to water often, as nothing comes up from below and roots cannot penetrate the clay. And this in a country of plenty of water, where the water is controlled so carefully. We know this from experience as a former head gardener once thought it would be a very good thing to remove the clay from an area of 10 x 10 meters. Still now, 40 years later, we have to bring in, each year, new soil, the old having sunk away.

The Romans built through the swamps cordouroy roads, which were discovered in Holland in several places. These were built from wooden sticks 2 m long and with a diameter of 10 cm, connected to each other and in this way formed a reliable road. We brought sand on to our roads and when the road sagged, new sand was put on top. The more sand, the quicker sagging went on. Now the modern method of building roads in Holland is by one of two systems: removing all the sand and replacing that by bales of peat moss, then covering by asphalt, or, the second method, digging by huge dredgers a canal, removing all the peat down to the original sand 20 meters below and after that, filling the canal with and again. Both methods are very expensive and one may be astonished that we nevertheless have good roads.

Quercus robur 'Heterophylla'
Photograph by M. Nigel Wright

Trompenburg was bought by James Smith, a Rotterdam shipowner and agent in 1850. His grandfather had come from England more than a century earlier and he still had both the English and Dutch nationalities. He immediately extended the house and in 1870 ordered the well-known Dutch garden architect, Zocher, to lay out the western part. His son, William, planted a long alley on the edge of the eastern part in 1900. James van Hoey Smith got the opportunity to lay the basis of the present arboretum and his son now completes his work. William added the name "van Hoey" for his son in order to prevent confusion in the shipping business to England, where the name James and Smith being too common.

The opportunity arose from a circumstance at the time considered a disaster, namely, the Dutch Elm disease. Looking back, we may now consider this to be a blessing to the arboretum, although elsewhere it remains a disaster, as there has not yet been found an equivalent substitute for planting roads and dykes. Imagine, that if the 400 large elms were still growing then only a forester could enjoy the long straight stems under which not even grass would grow.

James van Hoey Smith managed the garden from his father's death in 1919 until 1950 when he retired to his country seat. His son took over, extended the oak collection, already started by him, changed more meadows into gardens and started several new collections, such as the rhododendron collection, which contains now 800 species

and hybrids. Also the succulent collection, started by James van Hoey Smith just after World War I, as a result of a visit to the Canary islands, is continued and extended by the writer. Every spring the big specimens are removed from the greenhouse into the open and so contribute to the general interest and attraction of the Aboretum. As specialization we grow 350 taxa of succulent *Euphorbia*.

The yearly rainfall is 760 mm. The climate is more continental than in England and we have 10°F more frost. The 10° just prevents us from growing the beautiful rhododendrons of hardiness 3 and even some of hardiness 4 in the R.H.S. Rhododendrons Handbook are doubtful. From 1963 on, many big-leaved rhododendron have been tried, but that year was the last with a severe winter. *Rhododendron fictolacteum* flowered last year for the first time. The soil is very fertile, pH about 4.5, ideal for rhododendrons. *Araucaria araucana*, although growing in several places in Holland, always froze at Trompenburg. Now a specimen has been planted on top of a hole filled with old bricks and roofing tiles in a small quantity of soil. This specimen has grown slowly, this way. *Quercus cocciferra*, definitely not hardy in the normal way, was planted on top of a low brickwall and also in this way grows slowly but will be hardier. Instead of improving the soil, which most gardeners do, we have to reduce fertility sometimes.

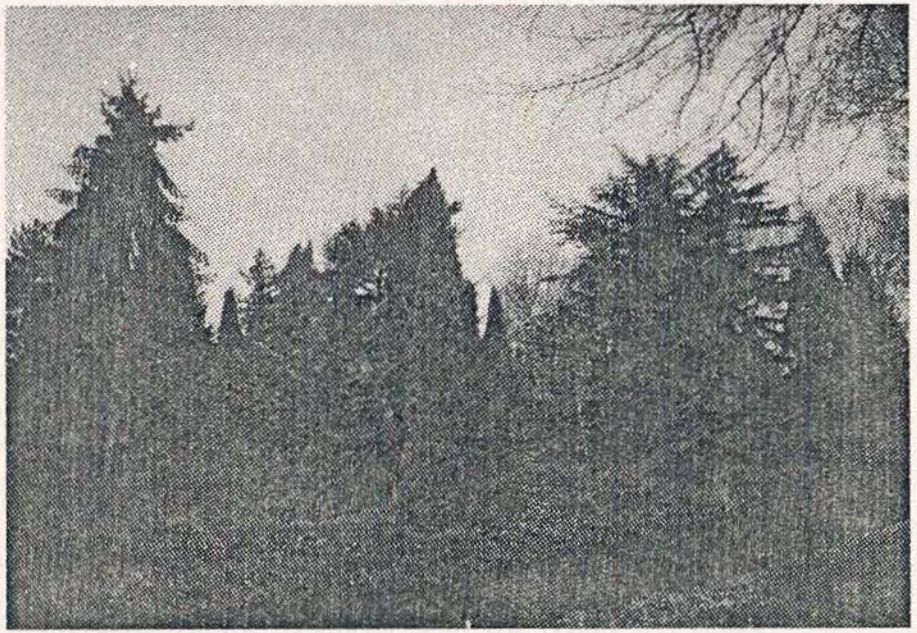
The first plantings of dendrological interest were made about 1870. Before that date from the original plantings of 1820, only some oaks remain. From the 1900 plantings, we still have a *Gymnocladus dioicus* and a *Fraxinus xanthoxyloides* var. *dumosa*. The latter had to be moved 80 meters, which was done with complete success with a frozen ball of 4 meters in diameter. During three years everything was prepared for removal and photographs of the event appeared in the Rotterdam newspapers.

James van Hoey Smith was the first to plant interesting trees on a larger scale with the positive intention of starting an arboretum. As stated before, only after all elms had been removed, could he carry out these plans. From 1928 onwards every year he ordered plants from Hesse, Germany and Vilmorin, France, apart from local nurseries. Every Sunday, together with his sons, he visited some nurseries and ordered plants. His son, the writer of this article, went on ordering, but now also from Messrs. Hillier, England. Moreover, he himself is collecting, ordering seeds and scions and getting plant material from all over the world.

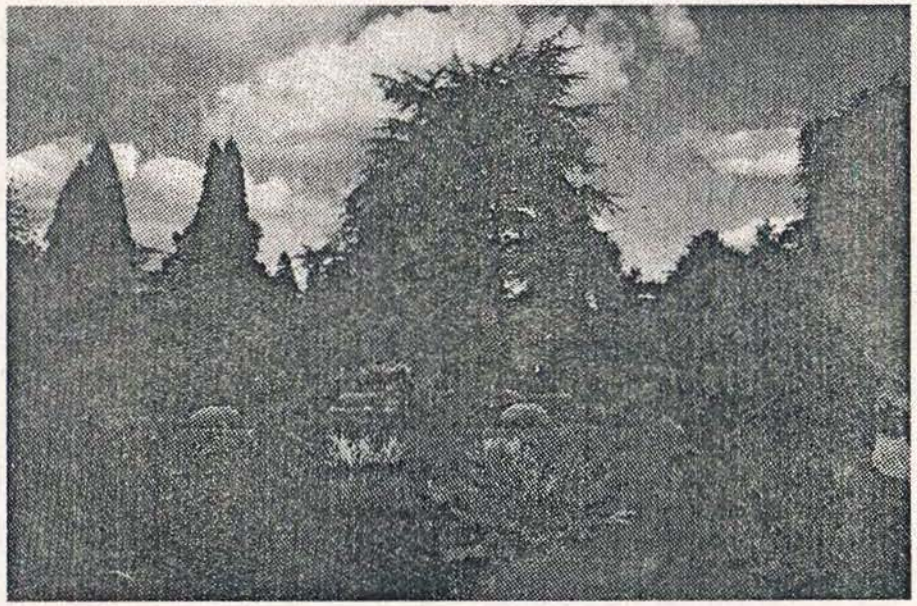
The Arboretum consists of five parts, laid out at different times. Originally, there were only three plots. The fourth and fifth plots were added in 1965:

I. In 1820 the center of the three original parts was laid out as a garden in English landscape style. We find here a couple of common oaks left from the plantings of 1820; the elms having been cut down. The orchards, vanished by their original shape, have been maintained. Now it is transformed into a beautiful group of Blue Atlas cedars, another part was replanted with different rhododendrons.

II The western part of the original plots was laid out, also in English landscape style, in 1870 by Zocher, who also laid out the Rotterdam municipal park and many other famous gardens. Apart from a *Thuja plicata* and a Taxodium distichum, only some ashes, old taxus, a Gingko and a 100 year old group of orange-red azalea, *R. japonicum* remain of the 1870 plantings. A meadow with sheep attracts visitors. In 1928 part of the



Conifer Garden from South



Goldfish Pond

Photographs by J.R.P. van Hoey Smith

meadow was made into a pinetum.

III. The eastern part of the original plots was edged in 1900 by an avenue mainly of elms with some interesting trees in between. After the First World War, a herbaceous border, rose garden, goldfish pond, heather garden and succulent house were laid out on this plot and the original vegetable garden was made a nursery for woody plants only.

IV. "Perenhof," situated east of Plot III, was transferred to the management of the arboretum in 1965 in order to synchronize its maintenance with that of the arboretum. It was also laid out around 1820 in English landscape style but had been terribly neglected. It has been reorganized completely, maintaining the English style.

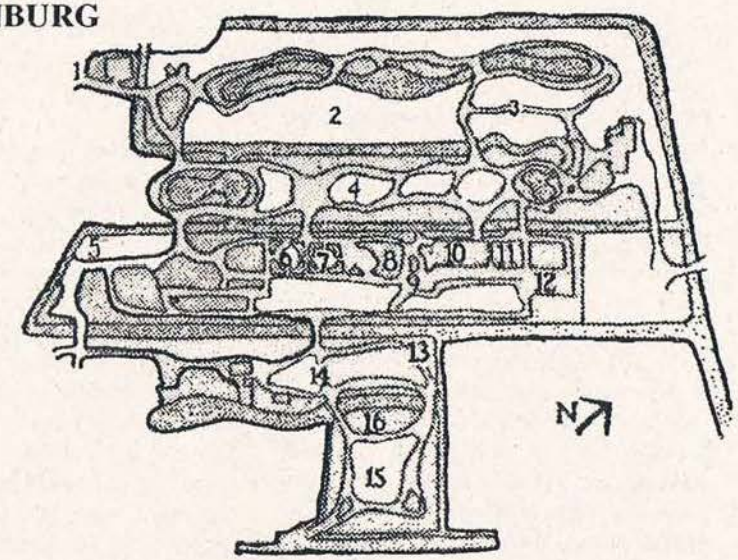
V. "Woudesteyn," situated east of Plot IV, was leased also some years ago from the municipality of Rotterdam in order to extend the Arboretum. During wartime it was allotment gardens, but these were given up after nothing had been done and the clearing was tremendous work. At the present time it has shrub borders also the dahlia collection is planted there.

Of special interest to visitors are:

1. Collection of oaks, 94 species and 100 culitvars; of these 20 are evergreen.
2. Collection of beeches, 50 taxa.
3. Collection of rhododendrons, 325 species and 475 hybrids.
4. *Gingko biloba* with 13 cultivars.
5. *Liriodendron* in 2 species, 8 cultivars.
6. *Cedrus*, 4 species and 24 cultivars
7. *Chamecyparis*, 7 species, 135 cultivars
8. *Pinus*, 40 species and 145 cultivars.

The above is only a small part of the total collection of over 3,000 woody plants among which outstanding items are:

MAP OF THE ARBORETUM TROMPENBURG



Fraxinus xanthoxyloides var. dumosa, 90 years old, most 20 years ago.
Picea omorika 'Expansa' found by the writer 50 years ago.
Pinus pumila, 'Dwarf Blue' the plant from which Mr. den Outden described this form.
Quercus pontica, 50 years old.
Quercus dentata, 50 yeara old.
Quercus pontica x *dentata*, 35 years old, (*Q. 'Pondaim'*).
Quercus macranthera x *frainetto*, 35 years old, (*Q. 'Macon'*).
Fagus sylvatica 'Aureopendula', 40 years old.
Quercus robur 'Pendula', 40 years old.
Liriodendron tulipifera 'Fastigiatum', 50 years old.
Liriodendron tulipifera 'Mediopictum', 40 years old.
Liriodendron tulipifera 'Crispum', 40 years old.
Liriodendron tulipifera 'Integrifolium', 40 years old.

Many visitors ask how we have succeeded in collecting such an assortment. Indeed, a great deal we have received in an unusual way. A witch's broom that we found in a *Picea sitchensis*, gave a new dwarf-sitka spruce *Picea sitchensis 'Strypemonde'*. When driving from the airport to the city of Hamburg, I saw a nice umbrella-shaped shrub. It proved to be a weeping oak, a much better form than the existing one. This shrub is the mother of our *Quercus robur 'Pendula'* over the pergola.

From *Fagus sylvatica 'Zlatia'*, the golden beech, I got several plants with leaves ranging from yellow to green, deep purple to yellow-brown. From *Fagus sylvatica 'Rohanii'* I got many incised forms in colors also between green, purple-green and yellow (*F. sylvatica 'Rohan Gold'*). *Fagus sylvatica 'Dawyck'*, thought to be sterile, fruited and 40 percent were fastigiate. These 40 percent consist of mainly the original green form, but also some in dark-purple and yellow. Now, 20 years later, these seedlings are 10 m high and are a welcome extension to the nursery assortment, as they keep their dense fastigiate habit very well. They are now available under the names of *F. sylvatica 'Dawyck Purple,' 'Dawyck Gold,'* and *Red Obelisk'*.

Our Arboretum of only 5 hectares (13 acres) has limited possibilties. Therefore, we have to make use of every inch. Specializing is essential under such circumstances, not only in species, but also from a selected species only the interesting and nice trees are kept. Moreover, our principle is that the trees must grow in aesthetically justified circumstances. This means that we cannot plant too close, that we do not plant similar trees next to each other. Asked for by visitors what is our system of management, I always answer, "My system is having no system." But I have four guidelines:
1. I mix as much as possible, evergreens and deciduous, so that in winter the garden is also beautiful.
2. I give much attention to colors, not planting next to each other two different pinks.

3. I keep the vistas open.
4. The axe (now chainsaw) is my paintbrush.

Also visitors many times ask why they see and how we manage to produce only beautiful specimens in nice surroundings. The answer is very simple: we cut vigorously every plant that is growing badly. This especially refers to some conifers, which grow well when young. As soon as they are around 30 years old, they get thin and leggy. We cut them and replace them by young ones. *Abies* and *Picea* in our climate and in our Arboretum have to be replaced generally after such a term and specialists declared that the reason is that our climate does not give them enough rest in winter. They need lower temperatures then and in summer, in dry periods, our air lacks the moisture they always have in the mountains. *Pinus* and *Juniperus*, however, do not suffer at all.

Moreover, just after the elm disease, many large specimens of common trees were plante d in order to give shelter. Now these have done their duty and can be removed. We do this very slowly, in order not to disturb the public, who also, in Holland, protest against every tree cut down. Sometimes, we have to make a choice between two trees when they touch each other. Doing nothing is also a decision, which often results in two ugly trees instead of one nice one.

In 1956 a foundation was formed with the purpose of securing the Arboretum for future generations. The foundation, partly financed by the van Hoey Smith family and partly by the Foundation Volkskracht, in 1970, also got support from the Rotterdam Municipality and so its importance was officially confirmed. This was important as our Arboretum is visited not only by botanists and dendrologists, but also by many Rotterdam citizens, who look for a nice, quiet place to relax from the turmoil of the Rotterdam city, with its harbors, industry, oil refineries, etc. They all enjoy the blessing of this oasis of green.

In 1991 we had 45,000 visitors and for 1992 four gardening groups from the USA already booked for a guided tour.

QUERCUS GENUS IN ARBORETUM TROMPENBURG

In the Arboretum Trompenburg we grow in the park and in the nursery 93 species and 84 cultivars and have more or less a reference collection. We also grow oaks of minor interest. However, having at our disposal only 5 hectares, we are obliged to specialize. We do not grow the many local forms of *Q. robur* and *Q. patraea.* I simply have to select (by lack of space) in a very personal way and with a personal taste, which is of course very unscientific. However, all differences are easily visible and in that way I can show everybody the specific features of the oaks we grow.

The full list of 177 oaks is available to anyone asking for it. Below you find in alphabetical sequence only those which grow well and have proved to be of interest for parks and gardens:

Quercus acuta from Japan, an evergreen species with big leathery leaves, needs protection when young. Now we can only cover the lower parts of the trunk and the 25 year old 6 m tall bush fruits yearly.

Quercus acutissima from Japan, Korea and China is of medium size, deciduous and the serrate leaf resembles that of *Castanea*, but is narrow and -- contrary to *Quercus variabilis* -- is bright green underneath.

Quercus alba, the common American White Oak, growing from Eastern Canada to Florida. The name alba refers to the white bark. In Europe they do not grow to the size they reach in America, where 50 m tall is not unusual. In autumn the deeply lobed leaves color from red to purple-red. Acorns imported from America are often infested with worms and all acorns with round holes should be destroyed immediately. No doubt that some selection done with seed from the wild or with seed from one of the few European trees will result in a well growing clone. The wood is of the same good quality as our common oak.

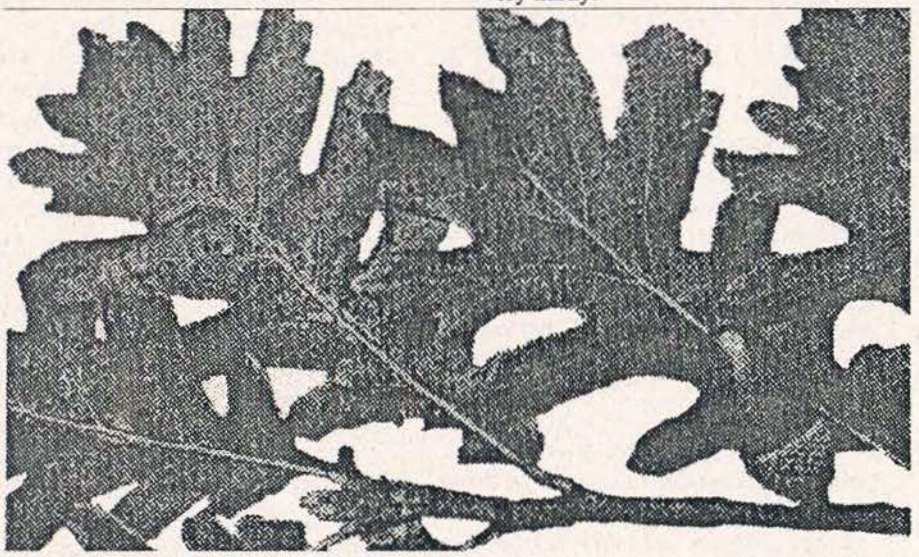
Quercus aliena var. *acuteserrata* from China, Korea and Japan has toothed leaves of 15-20 cm. It is a deciduous but smaller tree.

Quercus bicolor from eastern North America. It is a large tree with leaves grey beneath and can be easily recognized by the many dead young shoots in the crown and a bark peeling off like a birch.

Quercus castaneifolia from Caucasus, Persia has cerris-like buds with long narrow scales. The leaves are larger than *Q. cerris* with sharp pointed teeth. Like cerris it grows very well in chalky soil. It is difficult to buy a true specimen!

Quercus cerris from Southern Europe and Turkey is a large tree and grows fast in all soils. It is very wind-resistant. The leaves are very variable. The large acorns have cups with long scales. The reason why this tree is never used in forestry is that the trunk easily splits in winter, which makes it of no value. Its cv *'Variegata'* is a small tree with creamy-white margined leaves.

Quercus coccifera from the Mediterranean is a slow growing, dense, evergreen shrub. The small leaves are very prickly and in Turkey and Morocco they are the main food for goats. In those countries whole areas are covered by this oak and after having been eaten down every year, they show a great variety of topiary shapes. Plants grown from seed collected in cool areas are very hardy.



Photograph by J.R.P van Hoey Smith

Quercus x Macon

Quercus dentata from Japan, Korea and China makes a smaller tree with remarkable large leaves, sometimes 30 cm long and 18 cm wide. They often remain on the tree until next spring. It has, however, very small round acorns of 1 cm diameter and fruits abundantly in Trompenburg. The young shoots are yellow-brown and downy. It is one of my favorites. From America came a cultivar with deeply cut leaves. They arrived grafted on *Q. macrocarpa* stock. In the next year, the stock threw off the scion. Two other importations did exactly the same. Then we imported scions and grafted them on *Q. robur*. No success. The following year on *Q. dentata* own seedlings. No success. The next year on *Q. pontica* own seedlings. No success. We nearly did not dare to ask our American friends for more scions. However, then the grafts on own seedling *Q. macranthera* and *Q. Macon* F.2. were successful and we now await to see which will prove to be the best stock. After 8 years experimenting, we now have three year old specimens.

Quercus falcata. From seeds received from Eastern U.S.A. in 1959, we selected a specimen with the typical leaf with two long pointed lobes. It moreover has a good conical habit. It has not the red autumn color like many other red oaks. It is astonishing that in their native habitat red oaks seldom hybridize, although they grow together in the wild. Occasionally, however, they do and in the Monographie des Chenes of the French Professor Camuz one finds many. We have *Quercus* x *ludoviciana* (*Q. phellos* x *facata*) but why is the hardiness insufficient?

Quercus frainetto. In the wild the leaves are very variable from petraea-shape to our *frainetto* from the nurseries. One should realise that our usual *frainetto* is a beautiful double-lobed selected clone, which should have a cultivar name and is always propagated vegetatively. Some years they produce acorns abundantly and one can make selections with still deeper cut double-lobed leaves. However the clone we usually grow is so nice and makes such a good tree, that further selections are a waste of energy.

Quercus garryana from western North America, especially Oregon. This oak is of medium size with a short stout trunk and a wide-spreading crown. The leaves are shiny dark green above and deeply cut into oblong lobes. This beautiful oak, one of the few in America, which with *Q. alba* belongs to the White Oaks, should be planted much more frequently and grown from seed. Will nurserymen please see to it that it becomes readily available?

Quercus glandulifera from Japan, Korea and China is one of the oaks from which in 1951 acorns were collected in Kew and one grew at Trompenburg into a beautiful large tree. The leaves are small with gland-tipped teeth.

Quercus ilex from the Mediterranean grows in England into a large tree. In Central Europe it is generally only a large shrub. This evergreen tree with leaves like Ilex is not hardy here when grown from acorns collected in a London park, those will be hardy. Either those trees, already introduced in the 16th Century, are from a selected hardier clone, or they have adaped themselves to colder weather. In England--called Holm Oak--it is found in every park and larger garden and it should be planted widely both on theEuropean Continent and in America.

Quercus ilicifolia from eastern U.S.A. is a spreading shrub. In the Arboretum Tervueren near Brussels, it lines groups of large trees. The leaves of the Red oak--although, not colouring in autumn--are white felted beneath, persist in the winter, and many leaves then turn and show their white side against the dark brown of other leaves. The acorns are black with yellow stripes.

Quercus imbricaria, also from eastern U.S.A. is another favourite of mine. I planted a specimen when I was 17 in 1939 and now it is already a large tree of 18 m tall and the trunk has a diameter of 60 cm at 1.70 m. The leaves are entire, narrow, oval and dark green. Although Hillier says that is has rich autumn colours, this has not been our experience. It produces many good acorns, which come fully true. I can recommend this tree for every purpose.

Quercus libani. In its native habitat, Syria and Turkey, it is a medium size tree, with us only a large shrub. Its small, serrate, narrow leaves are as conspicuous as the large acorns. At Trompenburg it hybridized with *Q. cerris* and all those hybrids are named *Q.* x *libanerris*. One of them I am discussing in the hybrid-section of this article.

Quercus macranthera from the Caucasus and North Persia is a fast growing medium to large tree. It can be easily recognized by its stout one year shoots clothed with a yellow-brown velvety tomentum. The young bark can be grey with long wide plates and only a few furrows. This robust looking tree has an interesting dense compact appearance.

Quercus marilandica from eastern United States is a small slow growing tree of spreading habit. The dark green glossy leaves are triangular and tawny yellow beneath. The clone from nurseries is a selection with really magnificent leaves, which justify its planting in the garden.

Quercus mongolica var. *grosseserrata* from Japan, together with *Q. aliena* var. *acuteserrata* suffers with us from die-back of young branches, as do several other East Asiatic species. Both are very similar and have large and wide serrate leaves. Although both are said to be medium size trees, at Trompenburg it looks as if at maturity they will reach a considerable size.

Quercus myrsinifolia from China and Japan is a beautiful small densely branched, evergreen, compact tree. The shining leaves are lanceolate, green above and grey beneath. Although said to be tender, it has survived the last three severe winters undamaged.

Quercus palustris from eastern North America is said to grow in wet conditions. My experience is that it grows best in dry places and even in a street it is a success. The deep cut, pointed leaves are very similar to those of *Q. coccinea* but they are smaller and sometimes the autumn colour is as good. Unlike *Q. rubra* and *Q. coccinea* the tree does not make the large size branches, but grows into a column. Also the many dead small branches in the crown, which are very persistent, are a help to its recognition.

Quercus petraea has its habitat in all Europe and Turkey. It grows more columnar than *Q. robur* and the bark is less furrowed. Unlike *Q. robur* the leaves have a 1cm petiole, the vein is yellow, the fruits are sessile and the buds are pointed. Owing to the taller trunk, the timber is more valuable than that of *Q. robur* and is often used for plywood. In forestry, especially in Germany, *Q. petraea* is mostly growing in mountain areas and the famous Spessard-Oaks are all *petraea*. Even standing alone it never has the wide-spreading habit of *Q. robur*. *Q. robur* is robust, *Q. petraea* is elegant.

Several cultivars are available: *Quercus petraea 'Columna'* is fastigiate with leaves like *Q.p. 'Mespilifolia'*. *Quercus petraea 'Mespilifolia'* can reach a large size and has a narrow 15-20 cm, most entire dark, glossy green leaves. It is a solitary beauty in a park. *Quercus petraea 'Lacinieata Crispa'* is most interesting. The leaves of the first shoot are long and very narrow, like threads. The second, St. John's shoot, has more or less normal leaves. Consequently it then makes a very untidy tree and is more peculiar than beautiful.

Quercus phellos, the Willow Oak, from eastern United States is a large tree with small entire willow-like leaves. It is a striking tree with a good shape.

Quercus phillyreoides is the eastern Asiatic form of *Q. ilex* and is hardier. It grows to a large shrub. The leaves of this evergreen are oval, leathery bronze-green with minute teeth. It should always be planted in a groups, to get acorns, cross-pollination is required. This oak is ideal when an evergreen shrub is required.

Quercus pontica from Armenia, Caucasus and North East Turkey, generally grows as a large shrub and can in 20 years reach 6 m tall and 6 m wide. The large leaves are very similar to those of Castanea sativa, but wider. The large sessile acorns fall early in September and the shrubs start fruiting when 1 m tall. This tree by itself in a lawn as in Trompenburg is quite a sight. Grafting is difficult and from seed it grows very slowly. It is one of my most beloved treasures.

Quercus pyrenaica grows wild in S.W. Europe and Italy to a medium to large sized tree. The deeply cut, lobed leaves are pubescent on both sides. In nurseries generally the *cv. 'Pendula'* is sold and the normal growing species is very rare. I like it so much because of the leaves.

Quercus robur is too common to give much attention. However, it has many cultivars, of which I would recommend the following: *Quercus robur 'Atropurpurea'* is a very slow growing purple-leaved oak, mostly not larger than a shrub, suitable for a small garden. *Quercus robur 'Concordia'* generally also remains a yellow-shrub, but I have seen larger fruiting specimens in eastern Europe. From seed of one of these the Arboretum Trompenburg has a promising normal-growing specimen. *Quercus robur 'Cristata'* has deeply lobed, folded and curled leaves. Our specimens are from 1951 Kew acorns and also our present crop comes true from seed for 50 percent. *Quercus robur 'Fastigata'* is well-known, although not always grafted from a good specimen. Therefore, more selection work is needed, so that only first class material becomes available. *Quercus robur 'Pecinata'* only reaches large shrub size. The leaves are very deeply cut and only long, narrow, pointed lobes are all that are left. We tried one thousand acorns and not one came true. *Quercus robur 'Pendula'* has drooping branches, but grows to a large size. It is very suitable to train over a pergola. *Quercus robur 'Salicifolia'* is a very interesting oak. Hillier puts it in the petraea-group, because of the petioles of the leaves. The very small acorns, however, have very long petioles. The leaves on a young tree still have some lobes, but mature trees have only entire leaves. From seed it comes true for 100 percent. Its origin I do not know. It was known in Germany in 1873 and I doubt whether it grows anywhere else in the wild. I would not object when it attains species-rank.

Quercus rubra is too common for comment, but has one outstanding cultivar, *Q. rubra 'Aurea'*. It was found in 1878 in Holland between seedlings and comes true from seed for a good percentage. Planted against a dark background of large conifers, it can make a marvelous sight.

Quercus sadleriana from Oregon and California is sometimes creeping, but can in the wild reach a height of 2 m. It has small pontica-like leaves on stout branches. It is fully hardy and one of the smallest oaks.

Quercus trojana--old name *Q. macedonica*--is very similar to *Q. libani*. It grows in the Balkans and in Turkey. The small leaves, however, are glossy dark green and they remain in brown colour on the tree all winter. That accounts for its very compact impression.

Quercus variabilis from China, Korea, Formosa and Japan has serrate leaves similar to *Q. acutissima*, but they are white beneath. The bark is corky and is very beautiful when mature, as seen at Kew. The hardiness is a problem and consequently the origin of the seed is very important. Acorns from Eastwood Hill in New Zealand produced seedlings, which freeze down to the ground every year. A plant from acorns collected at high altitude in Mount Omei, China, however, is doing very well.

Quercus warburgii is of uncertain origin. The only original tree is growing in the Botanical Garden at Cambridge, England, and I doubt very much whether it is a species or a cultivar. Seedlings could solve that problem, but at Cambridge the acorns are always collected by birds and squirrels before ripening. However, my young graft had some good acorns two years ago, but the seedlings of one year old look very uniform and very similar to *Q. robur*. They will have to be examined for several more years, before any conclusion can be drawn.

It is a semi-evergreen tree and when just out, the leaves are a beautiful pink and have a petiole like *Q. petraea*.

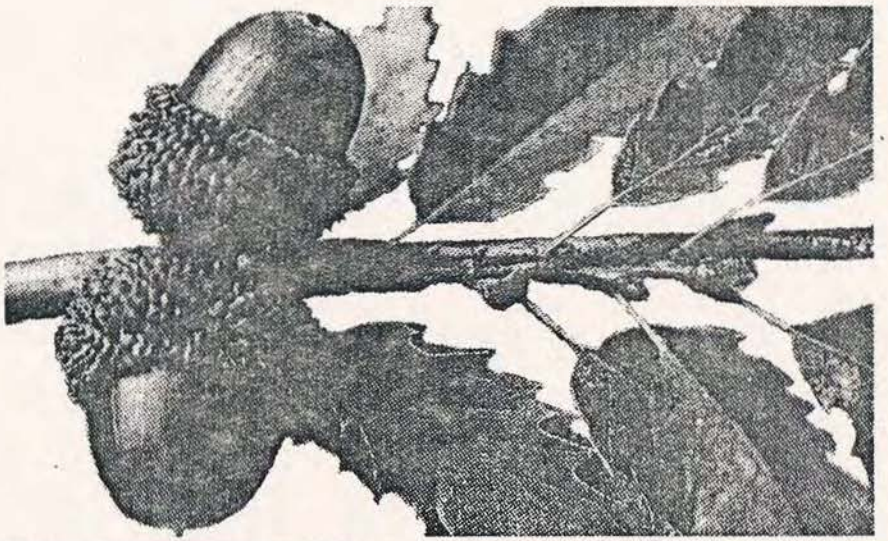
This article would not be complete without mentioning some of the hybrids as well and I restrict myself to only those, which are interesting to grow. In the Monographie des Chenes of Camus many hundreds of hybrids are described, but these are mostly of no interest and not available anywhere.

HYBRIDS

Quercus x *hispanica* is a group of seedling-hybrids of *Q. cerris* and *Q. suber*. These species hybridize very easily and the seedlings are very variable. The leaves vary from both parents to every thinkable intermediary form and the bark does the same. The second generation seedling (F.2.) are even more variable. Out of this enormous quantity of hybrids, some have been given cultivar names and these should be propagated vegetatively. From *Q. suber* all inherited the evergreen leaves and sometimes the corky bark. From *Q. cerris* originates the large size. Best known, already in 1763, is *Q.* x *hispanica 'Lucombeana'*, a full size tree. *'Diversifolia'*, has very peculiar leaves and *'Ambrozyana'* originates from Mlyany, the estate of Count Ambrozy in Czechoslovakia.

Quercus x *leana* is *Q. imbricaria* x *Q. velutina*. The leaves are long and lanceloate like *imbricaria*, however, with a few, sharp pointed lobes. They are leathery like velutina. The latter property distinguishes it from *Q.* x *heterophylla (imbricaria x rubra)*, which has the same, but thin leaves.

Quercus x *libanerris (libani x cerris)* originates from the Arboretum Trompenburg. The leaves are intermediate



Photograph by J.R.P. van Hoey Smith

Quercus x libanerris

between the parents, but it has the growth and will grow the size of *cerris*. The first seedling was named *Q.* x *libanerris 'Trompenburg'*. Later a seedling appeared with the same good growth, but serrate leaves, exactly the size of *libani* and acorns even larger than those of *libani*. This outstanding cultivar I named *Q.* x *libanerris 'Rotterdam'* and the vigorous narrow habit makes it very suitable for street-planting.

Quercus 'Macon' (macranthera x *frainetto)* also originates from Trompenburg. The leaves are frainetto-like, but the indumentum of the young shoots and the buds are pure *macranthera*. However, the acorns are 3-4 cm long and only 0.5-0.8 cm wide. It makes a beautiful tree.

Quercus petraea 'Columna' is the hybrid of *Q. petraea 'Muscaviensis'* and *Q. robur 'Fastigiata'*. When young, the habit is good, but it starts broadening after 15 years. At Trompenburg it fruited already abundantly and then it mendels back to the parents, but between them we found two with a better compact fastigiate shape. *Q. petraea 'Westcolumn'* has *'Columna'* leaves, is 8 m tall and 60 cm wide. *Q. petraea 'Eastcolumna'* is the same size, but only one leader on top, much smaller leaves, consequently the first impression is better.

Quercus 'Pondaim' (pontica x dentata), at Trompenburg the parents grow near each other and between pontica seedlings this oak appeared, which is intermediary between the parents. The leaves are very large, but serrate like pontica and the growth and size are that of dentata. It keeps the leaves in winter. A very remarkable tree indeed.

Quercus x turneri (ilex x robur), in Dutch nurseries this was the only available evergreen oak, at the time under the name *Q. austriaca sempervirens* and *Q.* x *turneri* var. *pseudoturneri*. It can grow to a medium size, but is very wide. The green leaves fall down in spring when the buds open. It was raised in the nursery of Mr. Turner of Essex, England, in the late 18th Century. It is the hardiest of all evergreen oaks, even when in a severe winter it drops its leaves at very low temperatures. Δ

THE GENUS QUERCUS IN ROMANIA

BY DR. STELIAN RADU

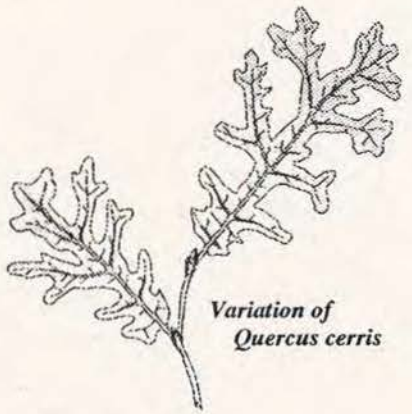
Seven species of oaks, belonging to the family group *Cerris* (Spach. & Oaerst) and *Lepidobalanus* (Endl. & Oesrt) subgenus, are spontaneously growing in Romania. All together, they roughly cover 2,970 acres, which represents about 19 percent of forested land. Another 20 exotic oaks were introduced and cultivated in forests and parks.

Due to their silvicultural importance, the Romanian native oaks were thoroughly studied during the past 50 years from different points of view: botanical, ecological, genetic, typological, edaphic, mensurational, diseases and pests control, including the wood properties and uses. Abundant Romanian literature is available on these topics.

For a short and general note, addressed to the International Oak Society members, we have tried to compile some basic data. The nomenclature, occurence, soil requirements and uses of Romanian oaks are listed in the following table.

The great diversity of sites and compositions of stands, formed by these species, is well reflected in existing classifications. Therefore, oak forests were studied and described: 141 forest types (Purcelean, Pascovschi, 1968), 104 site types (Chirita, Stanescu, 1990).

Producing high quality wood, the oak forests exert multiple productive (climatic, hydrological, and erosion control) functions. But during the centuries, the natural oak forests endured a strong antropic pressure. The deforestations, application of coppice systems, abusive forest pasture, prolonged and frequent droughts, strong defoliations and finally, air pollution and acid rains - produced an appreciable weakness of some oak ecosystems.



Variation of Quercus cerris

The so-called 'dieback' ('deperissement') of oaks, frequently recorded in Europe during the last decades, is noted also in Romania, particularly in European and sessile oaks, and sometimes on other species. The oak forests are subjected to sophisticated sylvicultural systems, relying on natural regeneration. But seed crops are, unfortunately, rare, particularly in last decades.

In the frame of scientific cooperation and exchanges of biological materials, our research station is able to locate seed crops for these species and to organize the collection and dispatching through the post (with necessary documents of provenance and phytosanitary certificates) of some small quantities of acorns, in exchange of North American or Asiatic forest and amenity tree seeds. Special requests must be directed in advance to: Forest Research Station & Arboretum, str. Biscaria, 1 Jud. Hunedoara, R-2625, Simeria, Romania. A catalog of seeds and plants for exchange is published annually by our research station. Δ