THE OLDEST ORANGE TREES IN CASE OF EUROPE

Axel Bonaert, Ph.D. (E.E.), M.B.A.,
Castle and Gardens of Freÿr on the Meuse ASBL
www.freyr.be

Louis Schockert , Arch.,
Schockert Architect Bureau

PRESENTED at the

ICOMOS TAGUNG "ORANGERIEN in EUROPA"

Bamberg, 29 Sep - 01 Oct 2005

THE ORIGIN OF ORANGE TREES at FREYR

The oldest orange trees at Freÿr are coming from Lunéville, the Versailles of the Duke of Lorraine.
It has been said that they were bought from Stanislas Leszczynski.
It seems more accurate that they were bought from Francis III, the last Duke of the Vaudémont branch.

Indeed, the oldest engraving representing the gardens at Freÿr by Remacle Le Loup and dating from 1740, depicts a four closed wings Renaissance castle, surrounded along the Meuse by two gardens of the same style, both consisting of a cross with four beds and a fountain in the centre.

One discovers further on this engraving that the end of the Northern garden has been enlarged with two winter houses, each one preceded by three rows of four trees. These 24 trees appear to be fully-grown up.

Since Stanislas arrived in Lorraine not before 1737, and since Francis III sold whatever was saleable in Lunéville upon leaving Lorraine to marry Maria-Theresa, …

The gardens at Lunéville were laid in the early 18th century (1711-1718), but on the engraving of Le Loup , the trees appear to be older than 30 years. Hence, the oldest trees in Freÿr have between 300 and 350 years.

Around 1760-65, the Renaissance garden was transformed in classical style. A pound was added before each winter house and the trees were laid around both pounds. More trees were added at that time.
Even younger trees came in the 19th and 20th century, including lemon trees and laurels.

TYPOLOGY of THE ORIGINAL TREES

Currently, the oldest trees show an unexpected variety and can be categorised as so:

	Meuse-side	Hill-side
Not Grafted		
Squat	8	3
Balanced	3 + 1 (*)	3
Tall Trunk	0	1 + 1 (§)
Grafted		
At the root	1	1
Middle of the trunk	0	1 + 1 (?)
Total	13	11

At least one tree died during the invasion in 1940, since no one was there to take care of them.

Another one (*) recovered, but has grown from the surface while the central part of the trunk became progressively empty, and is till well alive

Tree (§) has recently lost progressively the bark and the branches on one side of the trunk, the other side remaining healthy up to this spring when 2/3 of the remaining branches died . I wondered if it was not the result from a careless spraying of weed-killer. Anyway, since then, I spray weed killer personally. The head gardener of the Arboretum of Meise believes rather that the tree decays progressively of old age.

Tree (?) has a thinner trunk and is most likely younger. Hence, we remain with 23 trees out of the 24 original

THE TREES AS SAVIOUR OF FREYR

In 1794, the French armies invaded the Low Countries and imported the Regime of the Terror.
The mayor of the neighbouring French City of Givet (17 km) came to loot and burn castles and monasteries.
So were damaged the monasteries of Waulsort (4km) and Hastière (7km) as well as the winter residence of the Duke of Beaufort-Spontin at Beauraing. His summer residence at Freyr escaped narrowly the same fate.

Indeed, upon arriving in July 1794 in Freÿr, the mayor felt in love with the blossoming trees and their perfume. He wanted to seize upon them to carry them back to Givet on barges. They were none at hand. While they were fetched, the mayor did not burn the buildings.

In the mean time, Robespierre lost power in Paris. The population of Givet took arms and came to Freÿr to arrest its "former" mayor. The trees had saved the place.

HEATING OF THE TREES

Up to the presence of our last gardener (1975), each winter house was warmed by a coke oven, although on the design of Le Loup, no chimney is visible on the winter houses. A fact corroborated by the examination of the bricks of the chimneys indicating that they were added later, likely in the 19th century.
The temperature was kept around 7 ° C in winter.

After the departure of the last gardener, the coke ovens were replaced by an automated heating system fed by a gas tank. The following oil shock and the skyrocketing cost of gas rendered that solution too costly.

After consultation with the head gardener at Versailles, where no heating is used in the winter house,
it was decided to put two electrical radiators per winter house and to close the shutters by heavy cold.

The first winter thereafter, we got –20 ° C, and the temperature felt to 1 ° C.
Later, replacing windows and doors (located only on the Southern façade, the other facades being blind) by new hermetic ones to eliminate cold drafts, allowed the use of radiators only when freezing outside.

WATERING OF THE TREES

In a diary on how to maintain the trees, my great grandmother prescribes:
one bucket per tree and month in winter,
one to two (if fairly warm) buckets per tree and day in summer and sprinkling the leaves every day upon torrid heat.

After the departure of our last gardener, my mother took over this task, and followed the advice of her grandmother, but used a pipe feeding slowly water instead of buckets. It was less tiring. The leaves of the trees turned progressively yellow and later felt down. We lost one middle-age tree in the third winter after the take-over.

We consulted the head gardener at Versailles. He was surprised since there, watering takes place every week in summer and the climate is warmer and dryer than in Belgium! He asked that the lateral boards of the cases be removed for some time so that the earth, which had become like wet concrete, could dry up.

Upon thinking, we first guessed that my great grand-mother, knowing the nonchalance of her gardeners, had prescribe an overdose, but that did not fit with her temper for precise control of everything.

Here is a first explanation. Water thrown in one shot from a bucket with shower effect is much better than the same amount of water sprayed slowly via a pipe and choking the earth. A second explanation is given later under the Pruning paragraph.

Anyway, we learned the lesson and turned watering in as much as the water would penetrate fast into the earth, adjusting the dose to each tree. We preferred to underwater, which was easily detected when the leaves started shrinking, and then react, rather than to overwater and discover much later the yellowing of the leaves.

FRUITS

We had plenty of blossoms, up to 300 per tree, which had to be removed manually one by one to avoid wounding the tree, in order that the tree did not become exhausted by having to feed the blossoms growing into fruits.

My great grandmother, who kept pruning the blossoms in the summer up into her nineties, used them to make orange teas, marmalades and sweets. Having less time, we pruned in September at the same time both the leaves and the blossoms having become buds in the meantime.

Thinks were to change after two consecutive winters with flooding of the winter houses by the Meuse, in December 2003 (1meter) and early 2005 (1.8 meter). In the following years, the blossoms retracted drastically in numbers and were limited to the internal part of the trees. Furthermore, in the outer parts of the trees, thorns started appearing.

The Agricultural School of Gembloux explained this phenomenon. The cases had bathed within the water of the Meuse loaded with fertilisers washed by the heavy rains. It resulted in a growing of the leaves to a size much bigger than before at the expenses of a drastic reduction of the number of blossoms.

A phenomenon unknown during the previous heavy flooding in 1925 (2 meter) when fertilisers were not yet used.

Gembloux proposed to add chemicals to neutralise the phosphates, else that phenomenon would take up to 50 years (up to the next flooding) to disappear. We did not act, but noticed that upon potting a tree with new earth, the phenomenon was regressing.

PRUNING and FUNGICIDE

Our last gardener, a worker without gardening experience, was pruning the hedges almost up to the trunks and was applying the same method to the orange trees in September, all the more that at the end of the summer, the leaves were loaded with dark and sticky matter caused by greenfly .
The trees were wintering with all the leaves grown during the summer having been removed and plenty of not scarred cuts.

After his retirement, my father first and I later followed the same procedure. In the early nineties, we noticed that upper branches were decaying at the end of the winter and that the trees had difficulties to revitalise.

An assistant from the Agricultural School of Gembloux diagnosed fungus introducing itself via the not scarred cuts and blocking the sap. The remedy was to apply three times (October, January and April) anti fungicides:
on the roots, a mixture of water, Topsin M and Proplant,
and on the trunks and the leaves, a mixture of water, Topsin M and Mirage 45 E.

It helped some how as did the treatment of the largest cuts via vegetal oil and the spraying of Confidor 200 SL against greenfly.

But an effective and simple remedy was to be given by the Head Gardener from the National Arboretum at Meise: In September, prune only the most overshooting new branches so that the tree does not start wintering after a surgical operation, and in May, when the sap comes back, prune what is necessary but no more.

To avoid being tempted to prune leaves blackened by greenfly,the Head Gardener prescribed to spray water mixed with Summer Oil on the leaves to grease them so that greenfly could not fix itself on the leaves, as a more natural way than a chemical repel like Confidor.

The results were outstanding. The trees have much more leaves and have regained their bowler hat shape. Further with more leaves, they need more water, precisely the amount indicated by my great grandmother!

FEATURES of FREYR CASES

The cases at Freÿr are still essentially made of wood and hence contrasted to the 19th century variety to be seen in many classical gardens, where the structure is in cast iron and the sphere culminating each jamb has been oval shaped.

The sizes of the cases have been normalised to a cubic meter by my father, Architect F Bonaert. Before, some cases were slightly bigger or slightly smaller.

Each one meter high jamb (with a section of 11cm on 11 cm) is connected to each of its two neighbours via two planks 78 cm in length.
The lower plank, 15 cm above the ground, has a section of vertically 18 cm on horizontally 5 cm.
The higher plank, 85 cm above the ground, has a section of vertically 12 cm on horizontally 4 cm.

Between these two planks, stands a movable board applied against the earth and maintained by one bar, one end of which is fixed on one jamb, the other end falling into a hook fixed on the neighbouring jamb.

A board is pierced with two horizontal rods, one at 1/3 of height, the other at 2/3 to reinforce the board and avoids its warping due the humidity gradient between the inner face standing against wet earth and the outer face dried up by air.

One iron shaped L is fixed on the bottom of each jamb (23 cm above the ground) and onto its two lower planks, while the foot of each jamb is encircled with an iron square.

Along two opposite lower planks, an iron shaped L is fixed on each plank. These two L's support horizontal planks constituting the bottom of the case.

On the other two opposite lower planks, two iron shaped T's are going from one plank to the other. Each T is attached on the middle of the plank at 1/3 of the length. They help bearing the bottom of the case.

Oak was used up to 1975, later substituted by teak as being less expensive and supposedly more resistive. More recently, as the prize of imported tropical wood increased, we switched back to oak.

The difference between oak and teak does not lie so much in the wood than in its quality.
With poor oak, a caste breaks down within 15 years. With poor teak, it is the same, except that teak does not break down but carbonises and looses all strength.

With good wood, a case lasts around 25 years and over 30 with extremely good wood.

The inner sides of the cases were painted with lead-iron minium. As this product became prohibited, we moved to the less effective linseed oil.

Usually, the breaking of a case comes first from the boards, next from the lower planks and its L shaped reinforcements, and finally from the jambs and their feet.

A deficient board is nowadays replaced with maritime plywood.

IMPROVEMENT of the CASES (L. Schockert)

The problem of lengthening the life expectancy of a case, was studied by Christine Herman, Arch., Head of the Heritage Maintenance Department (Walloon Region), Louis Schokert, Arch. (Schockert Architect Bureau) and Nathalie de Harlez, B.A. The cost of study was fully supported by the Walloon Region and the realisation of five cases subsidised to a level of 60%.

The new cases have kept the so typical external look and structure while being slightly enlarged (105 cm instead of 100 cm) to allow for a better protection of the internal wooden parts and hence to longer its life expectancy. Also, the know how transmitted by the family has been recorded by Heritage Maintenance Department in various drawings.

The project started by a study of the existing cases and the currently weak spots.
Oak has been retained, but of first quality instead of lower industrial quality previously used.
The external fittings will be in wrought iron instead of the current rolled iron.
Only, the internal parts will be made from rolled iron.
Currently, wooden and iron parts will remain painted in white (although iron parts should be painted in black).

Improvements to the structure have been applied by metal reinforcements inside the case and by substituting the wooden floor by an iron grid.
The water along the lateral boards, planks and jambs has been better drained so that the wooden parts do not remain humid and instead become ventilated. This has been performed via internal filtering and draining cover, which should enhance the life expectancy of those weak spots.

The new case model is being patented.

MOVING OF THE TREES

Moving the trees back and forth between the winter houses and the garden has also evolved through time.

Before the Second World War, a heavy wooden car was used. The car came along the tree, which was then tilted up on two feet. Next, some wooden rods were laid from the ground under the case and up to the car. Finally, some wooden rods were laid transversally on that inclined plane under the case, on which the case was then rolled up to the car as the Egyptians were rolling up heavy stones.

After the war, a new lighter steel car was designed so that one was able to turn it around under the tilted case, which was then lowered down on the car.
The car was narrow enough so that the middle part of the case could rest on it, high enough so that the feet of the case were hanging outside the car in the vacuum without touching the ground (which would have hinder the moving of the case). The height of the car was nevertheless not too high which would have prevented its turning under the tilted up case.
The tilting operation was weakening the case and reducing its life expectancy by 1/4 compared to its current value, but the avoidance of the rolling up of the case had increased its life expectancy by 1/4 with respect to the previous "Egyptian" method.

Then came different variety of tractor or Schaeffer using a fork passing under the cast and elevating it through two opposite lower planks resting on the fork.

The wooden car was pulled by horses, the steel one by a tractor.

Warmer climate has resulted in that the trees are put in the garden on the 1 May (15 days earlier than before) and similarly the trees are moved to the winter houses around mid October (15 days later than before).

CHANGING CASE and FERTILIZERS

One of the winter house has in its attic a drum on which a rope wraps up. That rope can be lowered down and attached to the trunk of a tree to lift it up while changing its case.

Before that, the four boards are removed and a layer of 10 cm earth is taken away from the lateral sides, roots included.

Then, one verifies that holes have been foreseen in the bottom of the new case so as to ease the flow of water, which is further drained by laying pieces of bricks on the bottom of the case. Then, sulphur is spread on the lateral faces of the earth to protect the roots from vermin. The tree is lowered in the new case, which is filled on its four sides with a mixture of arable earth, heather earth, and compost, all of which is tamped.

The Arboretum of Meise has suggested that we use simply compost for rhododendrons.

Earlier, sheep dropping mixed with water was used as fertiliser between the changing of the lateral earth, which occurred upon potting (at that time, roughly every 15 years).
During the reign of the last gardener, fertilisers were not used anymore, although the period between potting had increased due to the improved moving method.

So it was not surprising that the Arboretum of Meise first advice was on fertiliser: cow manure and mineral salts (ASEF). This diet has been applied since two years and has proved to be outstanding. The trees are lusher than ever before.

Up to now, the density of the root network did not become too dense between potting. However, that may change with the new cases and a longer life expectancy. It may require an intermediary earth refreshing.

CONCLUSION

It is said that orange trees are delicate.
Looking to what they have gone trough at Freÿr, you start doubting about such statement.
Hopefully, the trees will still live for a while, although as the are nearing their 4th century of existence, no one can forecast their future.