



Rebuilding The Glass Palace

by Troy Lair

Built as part of the original Garfield Park Conservatory in 1907, the Palm House was designed by Jens Jensen to represent a giant haystack glistening in the farm field. Jensen was a leader in the 'prairie' style and featured many idealized elements of the rustic Midwest, its farms and people that so influenced his work. His only major public architectural effort, the Garfield Park Conservatory was hailed as a 'Glass Palace' to rival the great conservatories of the world.

After decade of great popularity and huge crowds of visitors, the original steel and wood structure began to deteriorate severely. In 1957 it was replaced entirely with a new steel I-beam structure and covered in the now infamous fiberglass sheeting. Originally hailed as the material of the future, semi-transparent, durable and inexpensive, the fiberglass yellowed with age and soon deprived the palm collection of life-giving light.

Now, 46 years later, we finally had the opportunity to remedy some of the aesthetic mistakes made in 1957, rebuild the Palm House roof to match the rest of this historic 'glass palace,' and dramatically improve the growing conditions required by tropical plants.

Rough Brothers, Inc., a specialist in restoring historic conservatories, was brought in to carry out this complex project. Rough Brothers had recently completed the restoration of the U.S. Botanic Garden (the largest greenhouse construction effort anywhere in the United States in the last 50 years) in December 2001 to much media attention and acclaim. "This level of expertise was vital for the renovation of such an important and prominent feature of Garfield," said Michael Fus, Project Manager for the Chicago Park District. In fact, Rough Brothers had acquired in 1988 all of the drawings,

records and equipment of Lord & Burnham, which had built more than 90 percent of the public conservatories in the United States, including Garfield Park Conservatory. "This gave Rough [Brothers] ready access to information that was critical to a more accurate reproduction of Jensen's original design for the Palm House," added Fus.

Creating an aesthetic that was more in keeping with the original Jensen design was underscored, in part, because so much was lost in the 1957 rebuilding of the Palm House, including the original Jensen design and construction drawings. The drawings in Rough Brothers' possession took on special importance and allowed designers to reconstruct the aesthetic of Jensen's original work.

At its simplest, the project entailed replacing the old fiberglass panels with glass. The implementation of this mandate, though, was anything but simple. Two overriding considerations complicated the entire process and drove many of the construction decisions.

First, the Conservatory planned to keep many of the most interesting and rarest palms from the old palm collection. However, many of these were simply too large to move, some towering 40 feet overhead. Rough Brothers had to design a special scaffolding structure around these large palms that would both guarantee the plants' safety and allow them to reach every point on the roof as it curved from ground level to the peak 60 feet above. The result was a web of scaffold and platforms that arched over the Palm House's central beds and large palms, a beautiful feat of engineering in itself.

Second, the short growing season in Chicago severely limited the time that the Palm House could be exposed to outside air. In other

words, the first piece of old fiberglass could not be removed sooner than May 15 (the last possible frost date for Chicago) and the last piece of new glass had to be installed by October 1 (the first possible frost date for Chicago) — a mere 138 days to complete the majority of this ambitious renovation.

The project was further complicated by the safety requirements for the new glass roof. In place of the simple single-pane glass found in the older section of the Conservatory, Rough Brothers would install double-pane safety glass. "Each piece of [double-paned] glass had to be cut once on each side in precisely the same place, then heated to bend the clear laminated plastic in the center, which was then cut itself," explained Fus. "If the cuts aren't precise, the two sides of a pane will expand and contract differently with temperature fluctuations, putting the entire assembly under stresses that will lead to cracks, broken seals and leaks."

The last pane of glass was installed on October 15, right on schedule and well ahead of the temperature drop to 26° and frost warnings on November 9. The next month would be a mad dash to complete the interior work, install circulation fans and vent mechanics, as well as a computer-controlled shading and misting system. All of these new environmental controls are designed to address a number of deficiencies in the Palm House's growing environment, in addition to replacing the roof to let in more light.

Circulation had always been a problem in the Palm House; previously, the side and top vents created a passive circulation system through convection, hot air rising out the top vents with cooler ground-level air entering through the side vents. The enormous volume of air in the Palm House limited the effectiveness of



this method, leaving lots of hot and cool spots throughout the greenhouse. Designed using computer simulation, the new system employs four ceiling-mounted paddle-fans and 18 wall-mounted horizontal fans to create a rotating air-circulation to expel hot air, as well as mix the interior air more effectively.

High humidity is vital for the health of tropical plants. The large volume of air in the Palm House and cold, dry Chicago winters combined to create difficult growing conditions for palms. As reported in the Spring 2002 issue of *Greenscapes*, horticulture staff had to wet down walkways, walls and topsoil repeatedly to help generate needed humidity through evaporation. Done daily, this took hours of staff time from other plant care chores. The new misting system checks relative humidity automatically and adds moisture to the air as needed. Moreover, the humidity is added at leaf level, higher up in the canopy like in a natural rainforest, where it does more good for the plants.

Finally, the enormous scaffold had to be disassembled and removed in preparation for soil amendment, replanting, and the installation of the *GIANTS* exhibit. Rough Brothers

completed work on November 15 and the horticulturists moved in.

First, all the soil was amended with palm mix, bark, sand and peat. Next came the tremendous feat of moving the Conservatory's priceless Double Coconut Palm. Planted in the corner of the Palm House since 1960, it had grown as tall as the roof would allow at that point (20 ft.), still a mere fraction of a Double Coconut's mature 80 ft. height. The root ball was excavated one section at a time over the past nine months. Now completely severed from the surrounding soil, a complicated crane and lift system cradled the giant root ball in preparation for its 100 foot move to the center of the Palm House. It took more than 20 staff six hours to move the rare palm inch by inch to its new home. If it survives the move and thrives in its new location, we can look forward to many more decades of enjoying this endangered palm as it extends its leaves toward the new roof now 35 feet away.

Twenty-five staff worked 7 days a week from December 1 to December 15, assisted by at least another 30 volunteers, to replant 50 palm trees from the previous collection and plant 250 new palm trees, canopy trees, understory palms, and count-

less companion plants, which are found at the different levels of a tropical rainforest. This was a gargantuan effort, unprecedented at Garfield since its construction in 1907. The results will speak for themselves.

As you walk up to the entrance now, you will see a transformed Conservatory. Instead of a dull, yellowed, hulking Palm House, you will encounter a completely transparent Palm House that soars up behind the entry pavilion, seemingly without weight. Instead of mere shadows of plants cast upon the old fiberglass, you will be able to see and identify the green, luscious palms from the outside. From the inside, you will be able to see through the Palm House ceiling into other greenhouses, giving you a better sense of the scale and grandeur of the entire Conservatory.

The new Palm House will immerse you in a more realistic tropical environment: a warm mist will circulate through the plants and trees; dappled sunlight will play across the floor; and rainforest plants and canopy trees, as well as a more diverse palm collection will represent the different layers of a rainforest.

New interpretive signage will soon be installed that will provide more information than just plant name and origin. In addition to plant tags, a series of signs



photo by Troy Lair

will emphasize what is different and interesting about particular plants, the role plants play in supporting life, and culturally significant uses of these plants. Another series will be wall-mounted bas-reliefs depicting several of the major plant families: palms, ferns, aroids, and succulents. The first of these will be in the Palm House and show the morphology of a palm — what makes a plant a palm. Another interpretive element will be

a life-size model of a Double Coconut seed (the largest in nature) next to the relocated Double Coconut plant.

This new emphasis on interpreting the collection for visitors will drive many changes throughout the Conservatory in coming years. Lisa Roberts, Director of Conservatories for the Chicago Park District, explains, “The way visitors experience our plants is an essential aspect of our

interpretation. We know that our visitors have different knowledge levels, learning styles, interests, backgrounds and reasons for coming. It is this mix of experience and memory and emotion that gives meaning to people’s lives and that gives people a way to connect with plants.

“So, the first step is to create a personal connection with visitors, then direct that personal connection to a deeper level of involvement and

understanding of our overall message that ‘all life depends on plants.’” The new Palm House is part of this effort and its messages will focus on the role of plant diversity in a healthy ecosystem.

So as you stroll through the new Palm House, take a moment to breathe in some live-giving oxygen and reconnect with the plants. And, if you look a little harder, perhaps you’ll notice the beautiful glass and all the new environmental features that will be so important to a thriving palm collection for decades to come.

Previous page: the west side of the new Palm House roof, taken from the top of the Fern Room; **top:** panorama of the interior scaffolding allowing workers to reach every point in the Palm House; **right:** Michael Fus breaks a piece of safety glass to demonstrate how the plastic laminate holds the glass together.

