

THE PALM HOUSE. A PROJECT OF DOMESTICATION

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THE PALM HOUSE

AN ARCHITECTURAL CLUE

A greenhouse evokes the terrarium in a literal way, as it is almost an architectural representation of it. A greenhouse is usually designed as a place to collect, grow and exhibit plants; however, in contrast to the terrarium, it is fixed in place. The Palm House at the Royal Botanic Gardens in Kew, in addition to being a literal interpretation of the terrarium, is also a piece of architecture which provides clues for studying certain design themes, such as the interplay between the interior and the exterior, as well as certain environmental themes. It emphasises the critical relationship between architecture and nature by nurturing plants that are almost extinct in the wild. It embodies various geo-political themes in regard to the relationship between Empire and the colonies. It is also an example of a cultural direction which evokes an anthropocentric way of thinking. When it was built in the mid-nineteenth century, the aim of the Palm House was to display the unusual species which came from the colonies and from other far-flung countries, as beautiful ornaments and also as the subject of scientific study; today, it houses plants which are at risk of extinction. The Royal Botanic Gardens at Kew have evolved over time. The existing collections, such as that of the Palm House, have been expanded and new gardens and research departments to enable scientific projects have been created. Indeed, the Palm House, evolved from being an expression of the culture of the British Empire into becoming an international research laboratory to study endangered species. In 2003 Kew Gardens became a UNESCO World Heritage site and was listed as a place to protect nature, in particular certain plants and fungi, which are necessary for life on Earth.✽

This paper explores the architecture of the Palm House, as a tool for speculating on the relationship between content and container and on the evolution of its meaning throughout history, by comparing it with other projects at Kew. The Palm House becomes a starting point to reflect on universal issues, from a certain cultural perspective.

A DISTINCTIVE DESIGN

The incredible lightness of its structure and the purity of its shape make the Palm House at the Royal Botanic Gardens in Kew one of the most iconic buildings in London. The character of its architecture is deeply dependent on its content: majestic, exotic palms which come from all over the world.

Indeed, this building appears to be made up of tropical forest and, once we are inside it, the glass and iron of the envelope somehow disappear, or, better still, seem to emphasise how

Palm House at Kew Gardens - cross section.
Drawing by AHMM, 2022. Credits: @AHMM



unique this space, which recreates the conditions of an exterior space inside an artificial space, is.

Kew was created as a private garden in the sixteenth century, but the various collections of plants, including the exotics, were started in 1759 by Augusta of Saxe-Gotha, Princess of Wales. The plant collections were expanded by her son George William Frederick, King of Great Britain and Ireland from 1760 to 1820, with the aid of British naturalist Sir Joseph Banks. Finally, in 1844 when the Royal Botanic Gardens at Kew became a national institution, the director, Sir William Hooker, commissioned the Palm House. Sir William wanted to create a laboratory for scientific research but also “a permanent exhibition of landscape aesthetic” (Matveleff 1989). As pointed out by Catherine Matveleff in her thesis about Kew Gardens, the Palm House differed from other buildings designed in the nineteenth century because, in contrast to nineteenth-century architecture, its design did not take inspiration from the universal codes and aesthetic values of the past (Matveleff 1989, Vidler 2008). On the contrary, the style of the Palm House was based on techniques drawn from the development of engineering in Great Britain. Its spacious and minimal design was ideal for displaying the living treasures which were brought from the colonies. Indeed, this piece of architecture appears to be the result of a particularly English desire to collect exotic plants (Horwood 2007), combined with a desire to demonstrate techniques in advanced technology, which were partially borrowed from shipbuilding techniques. Crystal Palace, which was designed by Joseph Paxton for the Universal Exposition in 1851 and which became one of the symbols of modern architecture (Heynen 1999, pp. 95-117), evokes the structure of the Palm House, on a larger scale. The design is the result of a collaboration between the Irish engineer Richard Turner (1798–1881), who had considerable experience in iron structures and curvilinear glass, and the architect and member of the Royal Botanic Society, Decimus Burton (1800-1881), who had previously designed the conservatory at Chatsworth House and the winter garden glasshouse at the Royal Botanic Society in Regent’s Park. The conversion from a royal garden to a public garden is also key to understanding the role and the special design of the Palm House. The glazed surfaces and the function of the greenhouse partly invoke the gentle architecture of orangeries of previous centuries, which are symbolic of the old aristocracy and their private property.⁸ The dimensions and the function of the Palm House, however, are not that of a private orangery but rather that of a national institution. A variety of different elements led to the realisation of this greenhouse.

During that period, indeed, the interest in botanical and natural sciences was increasing. The study of the new plants which were found during geographical exploration, underlined the failure of the previous Linnaean system and showed that it required updating. In *nature Displaced, Nature Displayed: Order and Beauty in Botanical Gardens* Botany, Nuala C. Johnson suggests a link between the development of botany and taxonomy, and aesthetic staging, in architecture, as taxonomy reinforced a visual order that influenced different spheres, including garden design and architecture (Johnson 2011). Furthermore, a growing section of the population had access to leisure activities, such as visiting museums and parks, which were being expanded in that period. When it was built between 1844 and 1848, the Palm House was remarkable because of its large dimensions: 110 metres in lengths with a central section measuring 42 metres long, 30.5 metres wide and 21 metres high. Its size, however, was soon surpassed at Kew Gardens by the Temperate House (1860-1898), which was twice the size of the Palm House. What made this project distinctive was its innovative style, which was different from preceding greenhouses. In contrast to the other cast iron buildings, the Palm House did not have much decoration. It was very modern. Its allure, indeed, was dependent on the lightness of its structure, which allowed as much sunlight as possible to enter. To erect this bold and courageous structure, a specific technique which came from the shipbuilding industry was used: the more usual cast-iron ribs were replaced by wrought-iron ribs, which were narrower but had greater tensile strength. To build the vaulted roof, Turner used a very original type of purlin, which worked as a prestressed structure. The whole project was made possible because of the technological advances of the time. The heating system, for example, benefitted from the recent introduction of steam technology, while the quality of the glass was achieved due to improvements in national manufacturing. These improvements came about because of the necessity of competing with foreign imports after the tax on glass was abrogated in 1845. The abolition of this tax, furthermore, made the cost of the raw material much cheaper.

THE CONTAINER

The transparency, or more precisely translucency, of the glass allows the rays of the sun to pass through the walls, providing light and heat for the plants. At the same time, it allows us to see the plants from outside. This creates intriguing effects, as container and content overlap, somehow adding complexity to the pure lines of the building and revealing the function of the

The Palm House at Kew Gardens - longitudinal section.

Allford Hall Monaghan Morris is assisting Kew Gardens with the restoration of the Palm House and other structures. The project will include the replacement of the building services systems with a net zero carbon ready solution for heating, cooling, ventilation, and all services.

Drawing by AHMM, 2022. Credits: @AHMM



The Palm House at Kew Gardens.

Palm trees are visible through the glass.

Photo by Charlie Porter, 2023. Credits: @Charlie Porter



building.

The Palm House clearly has a 'literal transparency', which means that it is possible to see through the building.↓ This kind of transparency is the same which characterised the period of architectural modernism and in some places, such as France, it also had political connotations, linking the idea of transparency with the idea of accessibility (Forty 2000, p 286). One could also find in the Palm House a 'transparency of meaning' (Forty 2000), as the signifier and the signified coincide.↗ During the sixties, Susan Sontag wrote about the 'transparency of meaning'.

Transparence is the highest, most liberating value in art – and in criticism – today. Transparence means experiencing the luminousness of the things in itself, of things being what they are.

(Sontag 1964, p. 9)

In architecture, 'transparency of meaning' occurs when there is no distinction between form and function, or content. This kind of transparency constitutes the essence of modernist aesthetics in architecture, as well as in art. Walter Benjamin interpreted modern architecture by focusing on the use of glass, which is usually associated with 'literal transparency'. Benjamin saw in the glass architecture of the arcades in Paris, as well as in the glass architecture of the great exhibitions, 'the glorification of the phantasmagoria of the commodity', considering it an essential element of that period, as it expressed the 'poverty' which characterised that type of society (Heynen 1999, p. 112), moving towards issues of meaning.

However, it was only during the twentieth century that the use of glass in architecture included a new notion of dwelling, which had to do with transparency and also with lightness, brightness, airiness, and fluidity. Indeed, another interesting aspect of the Palm House is that it is a hybrid space, being a greenhouse, a museum and a space for leisure. It was designed to have different functions: horticultural - to grow tropical plants, didactic - to display plants, and aesthetic - to surprise its viewers. Even though, today, the technological aspect of this glazed structure is no longer notable, the pleasure of venturing into this tropical forest under the protection of an elegant glass structure, is still a feeling which is appreciated by the visitors. Of course, a slice of nature, which is enclosed in an artificial space with the goal of preserving plants which are becoming extinct, can be controversial and give rise to mixed feelings. It appears that human intervention is necessary in order to maintain an ecosystem, such as the rainforest, today. This implies that the Anthropocene wilderness no longer coincides with the untouched and the virginal, but rather with the artificial (Burckhardt 2019).

Or, more precisely, that there has been a shift in the environmental paradigm, from aiming to preserve nature in its prehuman state, towards a hybrid of pristine nature and human management (Marris 2011).

THE EXOTICS

The website of Kew Gardens presents the Palm House as an extraordinary indoor rainforest where one can observe tropical plants from some of the most endangered environments in the world. However, there is no reference to its architecture, except for a brief description in a short video by Sir David Attenborough. The website firstly provides some data about the collection of exotic plants, asserting that the vegetation of the rainforest includes 50% of the species which are vital to sustain life on earth, only 2% of which survive on Earth today. For this reason, the Palm House is still very important for scientists, as some of the species in the collection no longer exist in the rainforest. In addition to endangered and extinct species, the Palm House also includes exotic plants which are a precious commodity in tropical countries around the world, such as the rubber tree (*Hevea brasiliensis*), African oil palm (*Elaeis guineensis*), and cocoa tree (*Theobroma cacao*). On entering the Palm House, the vegetation is lush and the air is heavy and dense. This greenhouse reproduces a British version of the Tropics, which only includes plants. In the nineteenth and twentieth centuries, plants were essential elements in representations of tropical architecture. ¹

God of our fathers, known of old,
Lord of our far-flung battle-line,
Beneath whose awful Hand we hold
Dominion over palm and pine—
Lord God of Hosts, be with us yet,
Lest we forget—lest we forget!
Kipling *Recessional* 1897

In *Recessional*, the poem composed by Rudyard Kipling for Queen Victoria's Diamond Jubilee in 1897, palm trees are a synecdoche for the colonies, highlighting the connection between colonial architecture in tropical countries and plants. Exotic plants, indeed, were brought to Europe during this period of geographical exploration, they were domesticated ² inside greenhouses, and then reinterpreted and used as decoration in tropical interiors, evoking a Western idea of the exotic but also a sense of comfort. Houseplants, indeed, are usually comforting elements in an interior, as they are a symbol of care and domesticity. If we think about the history of houseplants and consider the reasons why they have become so popular, one can see

Dense Air Inside the Palm House.

Photo by Cendrine Robert, 2022. Credits: @Cendrine Robert



that they may symbolise different things, for instance wealth, power, or love for the environment.*

Tropical houseplants, indeed, contributed to the definition of the European idea of wilderness,[¶] evoking the idea of pristine nature in a portable version. The English, indeed, were particularly interested in wild nature for various reasons. In *L'invenzione della natura selvaggia* (2013), Franco Brevini focuses on the story of the English explorers in his search for the origins of the European fascination for wilderness. Brevini argues that among the reasons for English primacy in exploration is their sensitivity to nature, which has very ancient roots. This sensitivity is visible in the English taste for country houses, parks and gardens, in their love for animals such as horses and dogs, and in their practice of birdwatching and hunting. In addition to their sensitivity to nature, however, the English have a tradition of discovery and conquest, which was consolidated in the Victorian Age. The third and most fundamental reason to explain why the English were so interested in nature and particularly in wilderness, is the industrial revolution, which took place in Great Britain before it took place in any other country. At the end of the eighteenth century in Great Britain, "l'impoetica skyline degli opifici" (Brevini 2013, p. 111), the factories, the mines, the coal waste and the smoke, were irreversibly spoiling the gentle landscapes, which had been depicted by painters such as Thomas Gainsborough (1727-1788).

CONCLUSION

The aim of the Palm House was to impress the visitor with its grandeur, its size, the quality of its structure, and its talent for displaying the achievements of the Colonial Empire. Today, it still has a fascinating effect on visitors: the beauty of lush vegetation inside and the contrast between the enormity of the interior space and the slimness of the structure, between the height of its surfaces and the absence of thick structural elements, between the pure and rigorous image of the greenhouse outside and the hypernatural[^] and complex perspectives inside. The importance of the cutting-edge technology used in the glass architecture has, however, been eclipsed by the importance of the botanical collection in this greenhouse.*[¶]

At the Royal Botanical Gardens at Kew one can see how the interest in plants has evolved. In 1982, a grass garden was established to exhibit thousands of species of herbaceous plants, catering to the new interest in herbaceous perennials in garden design.*[¶]As tropical plants during the nineteenth century represented wild nature by evoking the dense and untouched

jungle, so herbaceous perennials today represent wild nature by evoking the spontaneous and biodiverse meadow.

Despite all our wonderful plantings and spectacular exotics, there is still a deep-seated and perhaps increasing affection for wild flowers as they look in nature. This gives us an opportunity to get across the message that conservation begins at home and to connect our UK audience with concerns about biodiversity in the UK. (Crane 2002, p. 7)

Herbaceous perennials, indeed, appear to be completely different from tropical plants, as they are usually part of the local vegetation. They are not evergreen species with lush flowers, but rather they change throughout the seasons and become particularly interesting in autumn and winter, when the flowering season is over. Furthermore, they don't need much care or much water, tolerate a wide range of temperatures and many of them are particularly loved by pollinators. Looking at plants from the lens of design, we can observe how the introduction of ecology into landscape design influenced the discipline, with sustainable projects becoming important because of environmental issues (Whiston Spirn 1997). This also resulted in a heightened interest in plants, as argued by Marc Treib in *The Aesthetics of Contemporary Planting Design* (2021). The artificiality of the Palm House is far removed from the image of nature described by contemporary post-anthropocentric and post-Eurocentric theories; however, it can be seen as the starting point for questioning the approach taken by architecture to environmental issues.



✂ “The Royal Botanic Gardens, Kew’s mission is to be the global resource for plant and fungal knowledge, building an understanding of the world’s plants and fungi upon which all our lives depend” https://www.kew.org/sites/default/files/202105/Kew%20World%20Heritage%20Site%20Management%20Plan%202019-2025_1.pdf

✂ The first greenhouses were created as simple shelters for citrus in Northern Italy during the Renaissance and then evolved into charming spaces, halfway between a living room and a garden, during the seventeenth century, when their function expanded, and they became spaces dedicated to leisure. The luxurious orangery at Versailles created during the reign of Louis XIV is an example.

⇓ About the ‘literal transparency’ see Rowe C., Slutzky R., *Transparency* (1963), Birkhauser Verlag, Basel 1997. About the ‘transparency of meaning’ see Forty A., *Transparency*, in Idem (ed.) *Words and Buildings. A Vocabulary of Modern Architecture*, Thames and Hudson, London 2000, pp. 286-288.

⌒ The signifier is ‘the architectural form’, the signified is ‘the architectural function’. About this definition see Jencks C., Baird G. (eds.), *Meaning in Architecture*, Barrie & Rockliff the Cresset Press, London 1969.

└ To cite one example, the Pegu Club, which was founded in Yangon, Myanmar in 1871, was a Victorian-style Gentlemen’s club that was represented on postcards as surrounded by exotic potted plants.

└ By ‘domesticated’ I mean that that these plants were taken from the rainforest, which was perceived as wild, exhibited in the greenhouses, and then transformed into decorations for interior spaces, such as houses, hotels and restaurants.

* Plants have always been part of the human existence, as medicines, as spices for cooking or just as beautiful things to collect. During the Tudor period in Britain, when different events transformed the interiors layout and several aspects of domestic life, the new lightness and the development in building techniques allowed to grow plants inside the house. And the renewed taste for decoration gave to indoor plants a particular added value: plants became desirable objects to show.

|| Franco Brevini points out that the European concept of wilderness developed, particularly in the eighteenth century, through the idealisation of two places: the Alps and the New World, in Brevini F., *L’invenzione della natura selvaggia. Storia di un’idea dal XVIII secolo a oggi*, Bollati Boringhieri, Torino 2013, p. 96.

⌒ ‘Hypernature’ is as an exaggerated version of nature, which is designed to recreate the perception of wilderness within a small urban space. See Amidon J., *Hypernature*, in Michael Van Valkenburgh Associates, *Allegheny Riverfront Park*, Princeton Architectural Press, New York 2005, pp. 57-72.

✂ The term *protected* is put between inverted commas, because one could argue that the reasons why many plants are endangered are due to a wrong use of natural resources, which started with the colonies’ exploitation.

✂ A number of garden designers started to experiment with herbaceous perennials during the 1980s, starting a particular tendency in garden design. This tendency became known under different names, from *Naturalistic Planting Design*, to *Dutch Wave*, to *New Wave*, to *Perennial movement*, etc. to indicate a design direction in which garden designers look at wild nature as a source of inspiration for their planting schemes.