

PALM-HOUSE

BRITTANY UTTING

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The Botanic Gardens of Padua, Italy (Orto Botanico di Padova) were founded by the University of Padua in 1545 for medicinal plant research. Located south of the Basilica of Sant'Antonio, the herbarium takes the form of a circle divided into four quadrants each containing a carefully curated arrangement of specimens. The herbs and plants in the garden, imported from all over the world, were used to train medical students to identify specific species for medical and therapeutic remedies.¹ Because of the rarity of the specimens housed inside, the Orto Botanico was fortified against theft with a circular stone wall, revealing how valuable both the botanical specimens and associated medical knowledge was at the time. Such ideal Renaissance botanical gardens performed two functions: rationalizing the natural world into an organized and carefully sorted collection, while also producing an exclusive space for biomedical knowledge production. The organization of the plant species within the walled space reflects the development of pharmaceutical technology in the 16th century, performatively embodying the knowledge structures of botanical medicine to function as a pharmaceutical laboratory.²

In the northeast quadrant of the Orto Botanico, along the garden wall, survives the oldest of the garden's specimens, a 450 year old Mediterranean Palm, or *Chamaerops humilis*, a species indigenous to southern Europe. This particular specimen became famously known as Goethe's Palm, serving as a primary inspiration and subject for Johann Wolfgang von Goethe's theory on botanical morphology, enumerated in his essay *The Metamorphosis of Plants* from 1790. To protect this scientifically and culturally valuable specimen over the centuries, university gardeners constructed a series of temporary and permanent palm houses to both shelter and display the palm. Early etchings reveal elaborate structures that were built around the palm each winter, and then removed in late spring. The earliest photographic evidence of a palm house structure is an ornate wood and glass shelter designed and built in the 1870s, which was later replaced by an operable concrete, steel, and glass greenhouse structure in the 1930s after a cold wave of 1929 almost killed the palm. The current structure was a renovation in the early 2000s that transformed the palm house into an operable enclosure featuring radiant heating as well as large panes of plate glass that open

and close depending on temperature. This evolution from a mostly open-air structure to an environmentally contingent enclosure can serve as an architectural index of the tightening strictures of environmental control and display. Examining the material-historical lineages of this palm house, how can architecture complicate the traditional role of nature as an object of consumption and contemplation?

While early greenhouses were often temporary structures built to protect non-native species vulnerable to extremes in temperature and weather, industrial forms of horticultural production radically transformed greenhouse architecture and its technologies. The transformation of these seasonal shelters into large-scale infrastructures emerged from the reciprocal development of building technologies such as iron and glass, mobilized by an emerging network of colonial extraction and emerging markets. From empire to industrial-scale cultivation, current generations of greenhouse landscapes have taken the form of immense distribution centers for living material, eerie ecosystems in hectares of artificially illuminated and autonomously monitored specimens. The incorporation of data and surveillance technologies provide these logistical enclaves with full biological, climatic, and digital control, analyzing growth patterns and precisely calibrating lighting, temperature, and humidity. Paying attention to the material and political histories of these palm house structures and greenhouse enclosures, how can architecture begin to decolonize these landscapes of extraction, making visible the precise territorial and environmental arrangements of an ecology?

PALM-HOUSE is a project that examines the relationship between a plant, the people who care for it, and the architecture that houses it. From extraction to cultivation to protection, PALM-HOUSE examines architecture's often fraught relationship with the landscapes it organizes and mediates. Continuing the four centuries of cultivation that began in 1585 with the planting of Goethe's Palm, PALM-HOUSE proposes three possible prototypes to house this specimen, expanding the political postures and creaturely alliances of the caretaker, viewer, and palm. While greenhouse architectures often represent a problematic conflation of colonial extraction and ecological optimization, can an alternative deployment of



Figure 1. *PALM-HOUSE* Forest View. HOME-OFFICE, 2020.

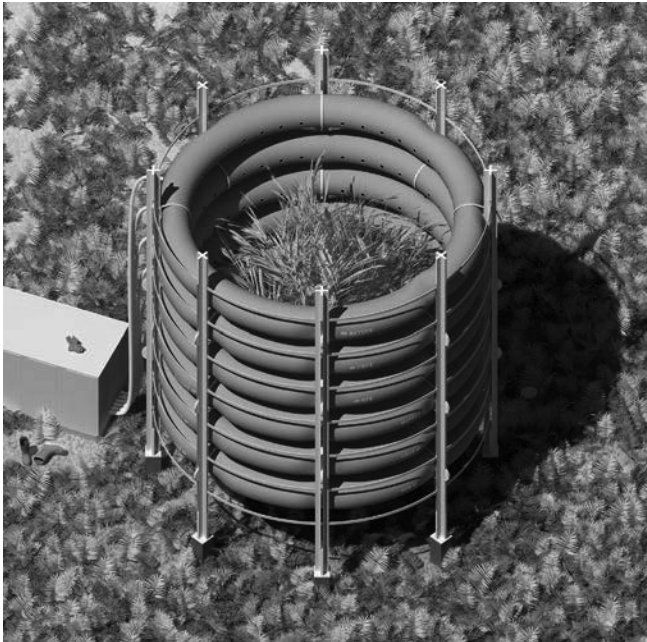


Figure 2. PALM-HOUSE 01 Image. HOME-OFFICE, 2020.

the tectonic and climatic systems used for horticultural care instead be used to promote a renewed awareness of planetary ecology? Operating as a proxy for new modes of mediation between architecture and its environments, these three PALM-HOUSES propose a new ecosystem of care and curation, implicating the viewer, the specimen, and the maintenance worker in the daily life of the palm.

PALM-HOUSE 01 is a circular structure that suspends a series of fabric air ducts around the palm, surrounding it completely. Each duct is connected by hose to an air and vapor compressor that is controlled by an air schedule. By adjusting this air schedule, botanical technicians are able to create new atmospheric compositions, expelling clouds of gas and vapor to envelope the palm when external conditions are far from ideal. Calibrating the palm's immediate atmosphere to counter dangerous particulate clouds, molecular swarms, and synthetic ozones, care workers can curate a more chemically-compatible environment for the palm. The architecture allows the palm to retreat from the touristic gaze, visible only when the ducts are deflated and the atmosphere is safe.

PALM-HOUSE 02 similarly responds to the increasing concentration of environmental pollutants that threaten to overwhelm the palm's osmotic defense systems. Composed of an infrastructure of filtration panels, the wall assemblies can open and close with a motorized gear system, limiting the infiltration or increasing the ventilation of airborne particulates. The shingled and breathable envelope is maintained by workers who carefully monitor current atmospheric systems, replacing spent filter units in the structure or operating the



Figure 3. PALM-HOUSE 01 Detail Image. HOME-OFFICE, 2020.

facade to open and close in order to influence pollination protocols and particulate counts. When fully open, the palm is clearly visible, and when closed it is abstracted through the mesh filters, once again deferring the possibility of unmediated contemplation during moments of ecological precarity.

PALM-HOUSE 03 allows botanical technicians to calibrate the palm's balance of heat and light, protecting it from extreme temperatures and lighting conditions as the climate radically shifts. The structure is designed as an open armature that uses solar greenhouse curtains to regulate the palm's exposure to light while also providing a thermal barrier. A secondary structure of moveable wall modules installed with panels of grow lights and heat lamps can be repositioned to provide the palm with extra heat and light as needed. By calibrating heat gain and solar exposure as the climate radically shifts, care workers can adjust and design the spectral output for the palm, protecting the plant from extreme temperature fluctuations while also preventing the harmful absorption of excess solar radiation. The eerie glow of the lights, the shimmering veil of the solar blanket, and the caution stickers that line the public ladder create a new visual lens through which to behold the palm, performing an aesthetic of ecological crisis and the specimens' increasing need for mediation and protection.

By adjusting these assemblages, botanical technicians continuously calibrate the enclosures to mitigate the deteriorating environmental conditions of this indigenous species: curating atmospheric compositions, filtering dangerous pollutants, and shielding the palm from extreme temperature fluctuations. Performing as *socio-ecological* and *socio-technical* objects the

PROJECT

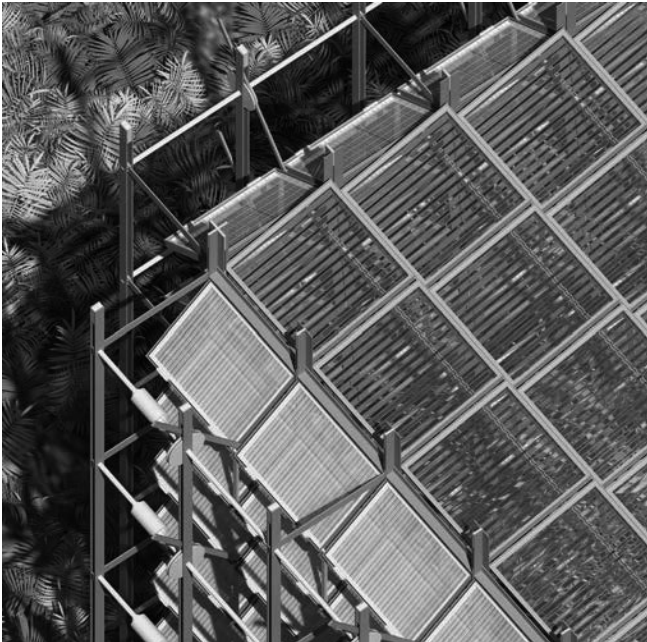


Figure 4. PALM-HOUSE 02 Detail Image. HOME-OFFICE, 2020.



Figure 5. PALM-HOUSE 03 Detail Image. HOME-OFFICE, 2020.



Figure 6. PALM-HOUSE Gallery View. HOME-OFFICE, 2020.

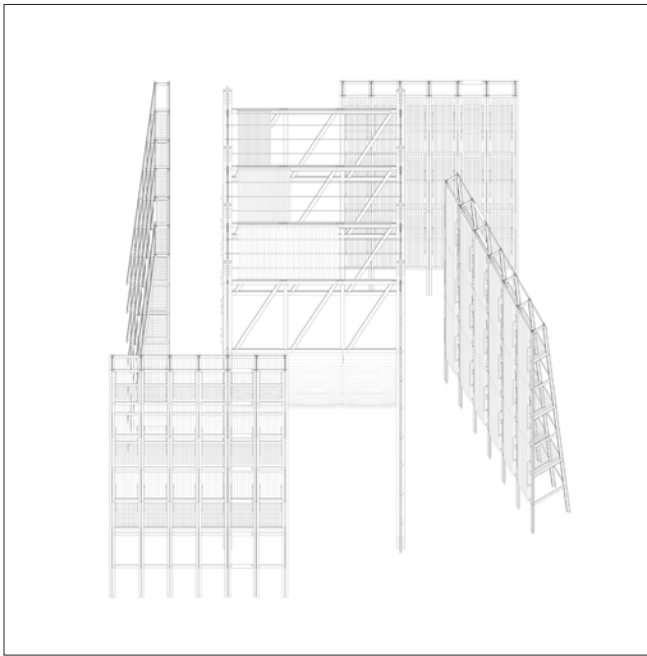


Figure 7. PALM-HOUSE 03 Assembly. HOME-OFFICE, 2020.

three palm houses seek to recenter the palm in an infrastructure of care, reimagining the architectures of climatic control in order to produce new ecological alliances.³ While the elaborate assemblies of the PALM-HOUSES reveal the degree to which we have profoundly altered planetary ecology, they also express the reciprocal labor, maintenance, and care work required for a species' survival.

Exhibited in the Citygroup Gallery in New York City from November 2020 to March 2021, the project installation was designed to make visible a deeper scope of the material politics, and possible material ethics embedded in the production of this architecture. For instance, critical to this research is the representation of the maintenance and care required of the palm as well as the architecture. Discussing the histories of the palm houses and the maintenance protocols of the palms with the head librarians, curators, and gardeners of the Orto Botanico, the project also reflects the role of the palm's caretakers, including how often workers clean and prune the leaves, their watering schedules, and when to add nutrients and chemicals to the soil. The origins of the materials were also included in the research material of the exhibition. Examining the supply chains of materials typically used in greenhouses, like glass or Acrylic panels and aluminum extrusions, the project followed their trail from extraction to production to distribution, understanding the geopolitical and environmental conditions surrounding their movement.

In addition to the drawings and text that described these material histories, the project deployed a tectonic system that could visualize a supply chain, showing the complex entanglement of resources, labor, and capital. Continuing this supply chain

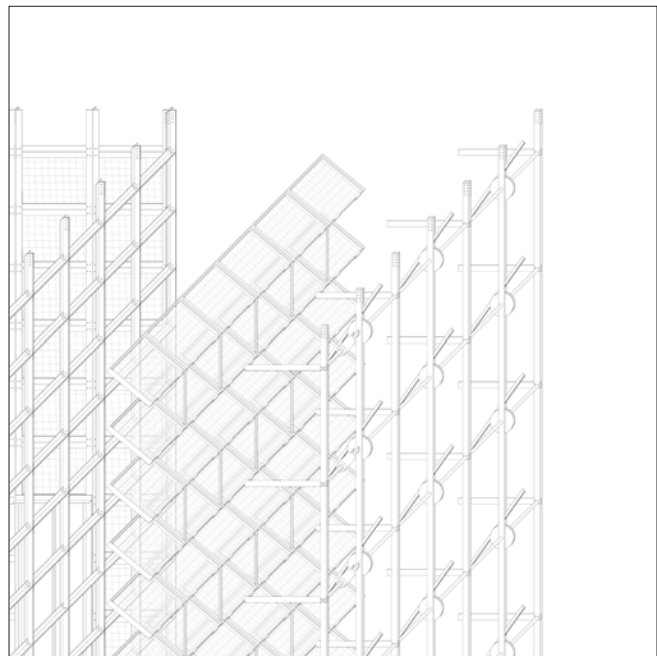


Figure 8. PALM-HOUSE 02 Detail. HOME-OFFICE, 2020.

analysis, the exhibition included a material acknowledgement of the materials used to construct the project, describing their origins, mining and refining locations, legislation that influenced their trade, and their regional environmental impact. Replicating and condensing the details of the palm houses into the aluminum frames, the lightboxes function as a series of hyperreal artifacts, reproducing the material assemblies and tectonic details of the palm-houses within the space of the gallery.

Calling attention to its own technical, environmental, and notational systems, architecture can produce a difficult view: a view obscured by the material, environmental, and political conditions of both the beholder and the object of their gaze. Jane Hutton writes in her recent book *Reciprocal Landscapes*: "The textures, smells, structures of particular materials give people tactile and intimate contact with fragments of distant landscapes and their myriad social and ecological relationships" [4]. Positioned at the hinge point between awareness and agency, these PALM-HOUSE prototypes seek to entangle the beholder into a more textured relationship between architecture and ecosystem.

ENDNOTES

1. Vittorio Dal Piaz and Maurizio Ripa Bonati, "The Design and Form of the Padua Horto Medicinale," *The Botanical Garden of Padua 1545-1995* (Venice: Marsilio Editori, 1995) 44.
2. *Ibid.*, 54.
3. For more information on the theorization of the socio-technical and socio-ecological, see Damian F. White, Alan P. Rudy, and Brian J. Gareau. *Environments, Natures, and Social Theory* (New York: Palgrave Macmillan, 2016) 2.
4. Jane Hutton. *Reciprocal Landscapes: Stories of Material Movements* (New York: Routledge, 2020) 221.

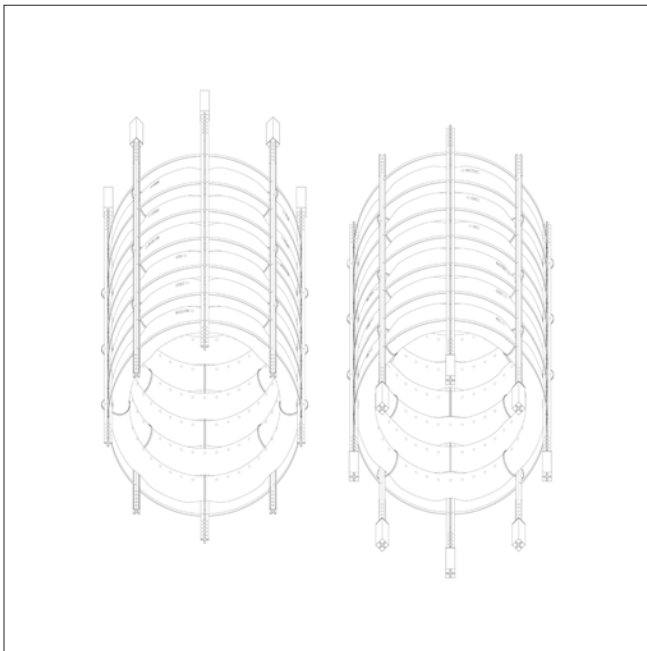


Figure 9. PALM-HOUSE 01 Axonometric. HOME-OFFICE, 2020.

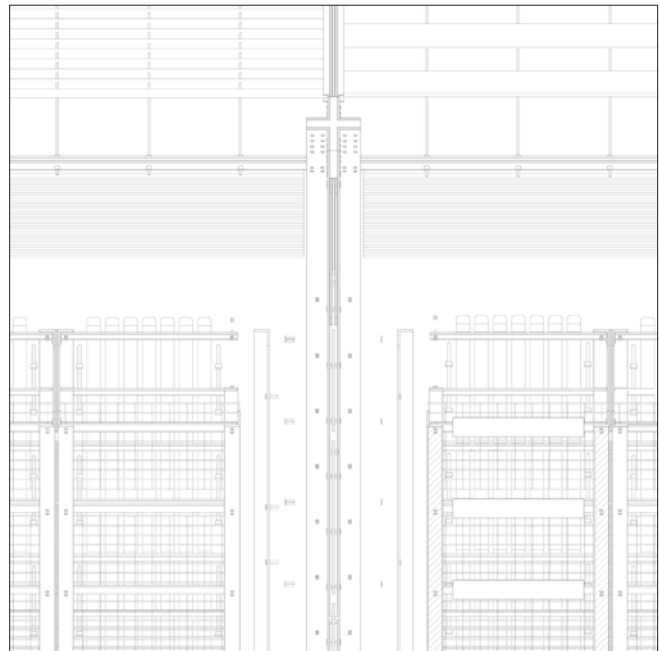


Figure 10. PALM-HOUSE 03 Detail. HOME-OFFICE, 2020.



Figure 11. PALM-HOUSE Gallery Detail. HOME-OFFICE, 2020.