LANDSCAPE ARCHIVE COLLECTIONS. DESIGN THE CONTEMPORARY TERRARIUM

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Building an archive on the contemporary landscape, or a Terrarium as this volume invites us to do, implies a reflection on the meaning of the term archive[1] applied to the project and, even more restrictively, to the landscape. In fact, it is no longer just a matter of cataloguing and organising documents or records, as one would do in a traditional archive, but rather of describing and selecting projects that use the archive as an operational tool. The idea of the Terrarium proposes to reflect on the relationship between ecology, architecture and landscape, with respect to contemporary design, and to understand the relationships between land, nature and space which has long been the subject of reflection in the disciplines of architecture and landscape (Bonneuil, Fressoz 2016; Braidotti 2013; Morton 2016). Therefore, one possible interpretation of the contemporary Terrarium is to imagine a natural, living archive that grows and changes over time and in space.

This paper compares three possible design options with respect to the construction of a Terrarium: on the one hand, the research carried out by Cesare Leonardi and Franca Stagi through an almost obsessive cataloguing of the species identified by the two architects during numerous field trips and which has as its premise the need to construct a scientific tool useful in the design of green spaces. On the other hand, the projects as part of Junya Ishigami's Art Biotop Water Garden and the park, designed by Catherine Mosbach, surrounding the Louvre Lens by SANAA, use the species in the archive – the arboreal species – as a preparatory tool for the project and test its real potential. The paper emphasises the need to cultivate continuous and productive links between landscape and architecture. Mosbach does this by merging the landscape of the Louvre Lens with the buildings of SANAA; Ishigami uses architecture to design his artificial garden, the individual tree crowns and the relationships between water and vegetation; while for Leonardi it is the form of the tree itself that becomes architecture.

THE ARCHITECTURE OF TREES: A SCIENTIFIC AND OPERATIONAL ARCHIVE

Cesare Leonardi's work began in 1982 and, through a more than 20-year-long survey carried out together with his wife Franca Stagi, has made it possible to build an immense arboreal heritage published in the volume *L'architettura degli alberi*, which contains the systematic description of 211 arboreal species. The book is the product of an exhibition of the same name held the year before, in 1981, in Reggio Emilia and then in Modena, which told of the journey of discovery of trees undertaken by the two architects.

Cesare Leonardi's passion for the description and study of tree species developed during his university years; his fascination for the vegetation in the Florentine hills led him to choose to develop, as the topic for his thesis, the design and plan for a new urban park in Modena♌. The forms of vegetation, and of trees, represent a wonderful world that attracts Leonardi more than the forms of architecture and drives him on a real journey in search of the main species to document, draw and describe. The construction of this scientific Terrarium, through the field study of tree species, began in Florence, then in Modena and on the Modena Apennines, then continued, together with Franca Stagi, for about twenty years and was an epic journey, where photography and design allowed the species being chosen by Leonardi to be captured.

From Cesare Leonardi's archives we learn how the journey, which first began in Italy, led him to visit the Botanical Garden of Palermo, the Reggia di Caserta and Villa Taranto on Lake Maggiore, to then move around Europe, to the lakes in Switzerland, to France, and to finally document the beauty and magnificence of London's parks.

Franca Stagi argued that

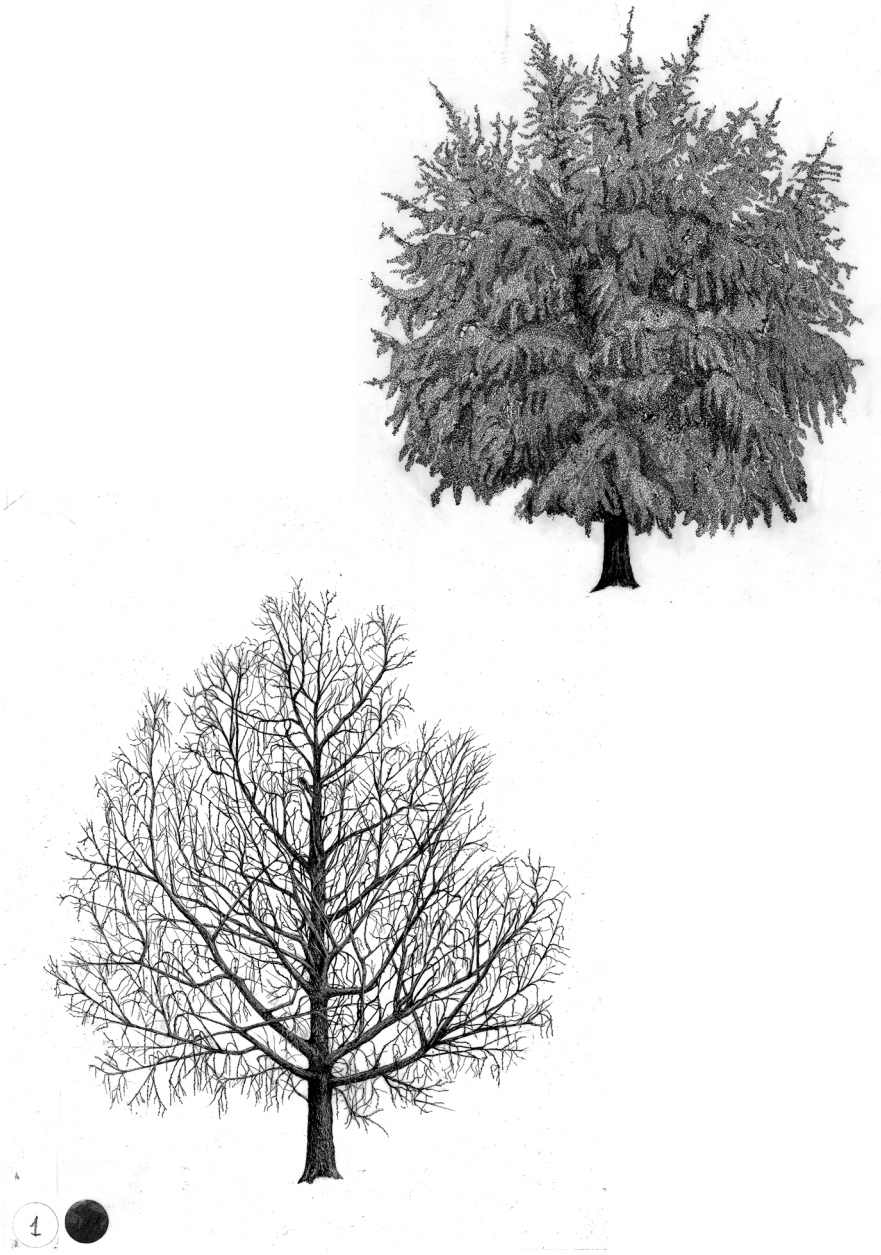
> we must understand trees in order to design parks; to know them one by one, and also to understand that the design of a park is the design of a 'becoming,' the proposal of a mechanism of transformation, growth, life and death (Leonardi, Stagi 1982).

It was precisely the need to understand trees in depth, in order to be able to use them in design, that drove Leonardi to gather information almost obsessively and to produce a manual that, to this day, is a valuable archive for those involved in green design. As with every archive, it is notable to highlight the criteria used by Leonardi to select and represent the tree species; each tree, considered of interest, is photographed in the field and its measurements are noted. Afterwards, Leonardi proceeded to the punctual redrawing of each tree, using photography as the basis of his work, and choosing to represent each species on a scale of 1:100.

L'architettura degli Alberi builds a relevant but abstract selection of trees and puts them all in a designed archive, representing a scientific terrarium. Indeed, 211 species are described through 374 drawings, to which detail drawings are added, where Leonardi depicts the leaves and fruits of each tree, as well as datasheets that describe each individual species and report their territories of origin, adaptation to the urban environment and different climatic conditions. Leonardi chose drawing as

Cesare Leonardi, Franca Stagi, *L'Architettura degli Alberi.*
Poster of the exhibition held in Reggio Emilia and Modena in 1982.
Courtesy Fondazione Archivio Leonardi, Modena.

Cesare Leonardi, Franca Stagi, Ginkgo biloba.
Ink on transparent film. Original drawings are in scale 1:100.
Courtesy Fondazione Archivio Leonardi, Modena, 1982.



the fundamental tool to compile this archive; the meticulous representations drawn by Leonardi are images of rare beauty that fascinate for the diversity and variations that each species presents (Cavani, Orsini 2017). At the same time, the drawing allows both the distinctive features of the tree to be captured and isolates the tree from the surrounding landscape. The archive designed by Leonardi has abstraction as its main feature; each tree is a miniature, finely represented, where every detail is reproduced with extreme precision and care.

Structure⇓ is at the center of Leonardi's work, in the study of trees and their growth habit, as seen in his drawings as well as, at the same time, in the photographic compositions, which are defined by the juxtaposition of a series of images in sequence and by the green structures, as Leonardi calls the parks he designed between the 1960s and 1980s.

Leonardi's work, which is still too little known, is a significant example of the inseparable relationship between research and design; the study and cataloguing of arboreal species gave Leonardi an in-depth insight into the elements of his future projects.
The design of each park thus becomes a time for verification, for choosing precise species and creating an original tree structure non repeatable elsewhere and designed for that specific context. But it is also the manifesto of a magnificent obsession, as Joseph Grima recalled in the curatorial statement at the opening of the exhibition at the Villa Croce Museum in Genoa in 2017.

> *L'Architettura degli Alberi* by Cesare Leonardi is a poetic ode to the magnificence of trees, the life's work of an architect who was obsessed by their effortless beauty and offended by the callousness with which most architects treated their presence (Grima 2017).

BETWEEN REALITY AND ABSTRACTION: JUNYA ISHIGAMI'S DESIGN ARCHIVE

More real is the Terrarium interpretation made by Junya Ishigami in his project *Art Biotop Water Garden* developed in 2018, in Tochigi (Japan), which relocates an existing forest to an adjacent site; originally, the area was a densely wooded *satoyama*⇑, which was to be transformed into a luxury villa complex.
Ishigami draws specific shapes of trees and ponds for this uncanny garden, where trees are moved and rearranged into a new composition. Bright spaces appear between the 318 unique tree shapes and 160 thoughtfully designed ponds between each tree. Ishigami creates a mysterious landscape where the selected species – beech, oak, canine cherry – coexist with the water thanks to an artificial system of pond waterproofing.

The Art Biotop Water Garden demonstrates its charm precisely in the ambiguity that separates and unites the natural and the artificial: a thin line that Ishigami delicately crosses in the conception and construction of this garden. The natural organic harmony of tree foliage and overlapping silhouettes contrasts with the artificial arrangement of plants that follow a precise pattern, designed by Ishigami, and intertwine with the pond system, representing a completely artificial landscape. The garden builds a delicate and fascinating relationship between the sinuous geometries of the water islands and the main verticality of the trees planted on them (Yoneda 2021).

Moving the existing tree species was a delicate and very complex operation, carried out with the help of special machinery – only two of which can be found in Japan – that can move four trees per day. The artifice constructed by Ishigami is extremely interesting because it builds a living archive – a garden – made up of species placed to construct a faux-natural landscape. Indeed, as mentioned earlier, the species transported in the garden (beech, oak, canine cherry) could not coexist with water in a natural environment, which is why Ishigami uses a pond sealing system that allows this coexistence and enables a new relationship between nature and water that has never existed before.

Ishigami's project raises profound questions related to the transformation of nature by humans; it is evident that, thanks to modern technology and experiments conducted in various fields, it is possible to intervene in the natural environment, creating increasingly artificial and controlled landscapes (Ishigami & Associates 2019). Art Biotop Water Garden shows how detailed and conscious landscape design can help intertwine and merge the natural and human environments in increasingly interesting ways. Ishigami constructs a series of precious drawings to describe the choice and arrangement of species for the Water Garden. As in Leonardi's work, drawing is a tool for constructing a precise archive to describe the delicate forms of the garden and the intersections between water and nature. The refined designs produced by Ishigami, in particular the different layouts of the garden and its elements, describe the balance that is recreated between vegetation and water. Alongside the plans showing the artificial design of the ponds and the location of the trees, Ishigami builds a list of the drawings of all 318 trees that have been moved and reintegrated into the new water garden. This catalogue of tree drawings has an illustrative and pseudo-scientific character (Yoneda 2021) because what is really of interest is the root configuration of each species and the conditions that each tree needs to survive.

Ishigami's concise planimetric representation reduces the trees to abstract points, circles immersed in a series of organic forms – the ponds –, while the anatomical thorough examination of the species is depicted very clearly in section, where both the size and shape of the roots and the shape of the different treetops and crowns are illustrated. The construction of the Art Biotop Water Garden demonstrates how the close collaboration between architects, landscape architects, gardeners and arborists is necessary to build the right balance between plant geometry and botanical and hydrological knowledge, which is essential for species' survival.

Compared to traditional Japanese gardens that change with the passing of time and seasons, time is suspended in the Water Biotop Garden. The trees' foliage cannot grow too much, or in an uncontrolled way, to avoid unbalancing the free space left between the trees, and precisely drawn by Ishigami, or so the view of the landscape is not obstructed. The garden results from rigorous maintenance work by skilled gardeners caring for the plants and their geometric form.

TIME AND LANDSCAPE: THE CHANGING LANDSCAPE OF THE LOUVRE LENS GARDENS

Time is the element that unites – in different ways – the three projects that are the subject of this paper and the different forms of archive that have been imagined, planned and designed.
Creating a landscape that crosses time is the objective of the garden for the Louvre Lens Museum, designed by Catherine Mosbach, in 2014; the architecture-landscape built for the SANAA project stands on the remains of a previous railway track. Here, the abandoned rails were the niches of a new decolonization, based on vegetation, resulting in a pioneer forest to the west and native plant corridors along the rider seams.

The new museum built in Lens by Kazuyo Sejima and Ruye Nishizawa constructs the landscape (Rocca 2013) and merges with it, thanks to the reflecting façades of the buildings that draw ethereal, light and almost evanescent spaces in total contrast to the monumental symmetry of the museum's main building in the Palace du Louvre, Paris (Jacob 2013). The new museum is located on a coal mine site, decommissioned in the 1980s, and respects its layout through establishing five volumes arranged as a cluster, a cluster of separate buildings that are linked to one another in topological ways (Rocca 2013). The volumes are adapted to the site's gentle, wave-like slopes and the museum is broken up into long, winding volumes that slightly bend and follow the traces of the existing railway track (Sejima, Nishizawa 2015).

Louvre Lens, garden landscape, aerial view.
Credits: ©Philippe Frutier ©adagp, 2014.

Louvre Lens, Garden.
Photos by Iwan Baan, 2012.

It is, however, the creation of the garden that surrounds themuseum that provides a balance to the system of transparent and plastic volumes designed by SANAA. The garden, designed by Catherine Mosbach, welcomes and preserves the spontaneous vegetation on the site, which has grown over the many years of abandonment, proposing a regenerative scenario where the choice of different species determines a changing and refined landscape. In the landscapes designed by Mosbach, different conditions coexist, such as clearings, wooded meadows, soil perforations, and draining stones that reduce environmental dust, where visitors are intrigued and urged to explore (Mosbach 2019).
The aerial view of the Louvre Lens site shows how the coal industry has shaped and designed the areas, in particular it is responsible for the differentiation of areas for the production and transport of materials, as well as the clustering of living spaces. It is clear that the mining economy has indelibly left a mark on these places and, for this reason, Mosbach's project appears very valuable because it recognises the memory of the past – and of the abandonment – that has defined the character of these environments. The park thus represents a system that accommodates within it the site's different souls and, at the same time, serves as a backdrop for the exhibition volumes that are developed on different formations and that overlap in small places, which determine the transitions between one space and another (Mosbach 2019). The garden's design is established by different landscapes that alternate and follow one another throughout the development of the park and allow the visitor to take a highly variable, articulated and unpredictable journey throughout time. Three main points open up at the north and south ends, allowing the park to be crossed quickly from east to west along its entire length; these points follow the old railway. Other minor routes, paths and short crossings, on the other hand, invite you to linger longer in the different areas, forests, flower meadows, esplanades and bodies of water (AA.VV. 2017).

The soil's surface is perforated with draining stones, which become mineral deposits and are the preferred substrate for the growth of mosses that trap heavy metals in the soil and reduce dust in the environment. The perforations in the mineral surface of the garden ensure a gradual transition from the flowery glades to the mineral surfaces, which are densely packed around the museum and allow visitors to enjoy the spaces.
The mining past and the sandstone deposits that are already present have, over the years, become a preferred haven for the growth of a diverse flora.

The construction of the museum had a limited impact on the species that had colonised the area, thus preserving the biodiversity that had developed over time. This has made it possible to preserve valuable plant species, particularly rare in northern France, that had grown on railway tracks, such as astragalus glycyphyllos and mullein [7].

The structured vegetation added by Catherine Mosbach alternates between grasslands and gardens of memory that recall the carbon cycle, fields of tall bundles of grass arranged along to the plot's long side and that cross, instead, paths of mown grass; while at the edges of the site we find the densest part of forest. To call Mosbach's garden for the Louvre Lens a terrarium may seem risky, but hers is an experiment that harmoniously accommodates, and in a single design, very different species and helps preserve species that are increasingly rare. Mosbach's landscape reminds us of the passing of time, the fusion of past and present and the need to preserve the biodiversity of places. The idea of narrating these different passages of time is, in itself, the construction of an archive. As, in part, does Ishigami who, instead, places the – often invisible – boundary between the artificial and the natural at the centre of his design in the construction of the landscape, constantly moving between abstraction and reality. Finally, Cesare Leonardi's fascinating work is perhaps the most literal interpretation of Terrarium, a reasoned and designed collection of species, which is, however, subject to the passionate choices of the architect who freely chooses how to compose their archive, with which species and how to represent them. Leonardi and Stagi's manual is an extremely rich piece of work not only because it reminds us that design cannot ignore its elements but because it still represents a valuable legacy for the future of landscape.

Time, abstraction, and drawing are the hallmarks of the interpretations of Terrarium chosen for this paper. Although designed and drawn at very different times, each tells of the need to know, intertwine and merge landscape and architecture through continuous references and suggestions.

[1] The Treccani dictionary defines an archive as: a collection of private or public documents relating to a person, a family, a municipality or a state. Reference is made to: https://www.treccani.it/vocabolario/archivio/ [accessed 25 August 2023].

[2] The thesis, written under the supervision of professor Leonardo Savioli at the University of Florence, focused on the area that will later become the Parco della Resistenza, and designed its green landscape.

[3] The exhibition *"Cesare Leonardi - Strutture"*, curated by Joseph Grima and Andrea Bagnato and held at Villa Croce, Genoa, from 18 February to 9 April 2017, explored the relationship between structure, architecture and landscape design in Leonardi's work.

[4] The term *Satoyama* literally means "village and mountain", but the word indicates a particular type of landscape and place that indicates the border zone between forests and agricultural fields.

[7] Reference is made to the description of the Louvre Lens project and Catherine Mosbach's garden on the museum's website: https://www.louvrelens.fr/le-louvre-lens/architecture-et-parc/ [accessed 25 August 2023].