Traducciones / Translations

Foreword

With the launch of this new issue, *RA Revista de Arquitectura* turns twenty. There are many reasons for considering this a big success, being its published materiality the most obvious. Anyone familiarized with the procedures and circumstances in which academic magazines are immersed will join us in our delight. For these twenty years, its contents, ambition and scope, have been evolving and adapting at the slow pace inertia of academia. And so has changed the panorama of research within the context of Schools of Architecture.

The original goals of *RA*, though, still remain intact. Beyond normalizing criteria and usually unpredictable evaluation processes, *RA* was originally conceived to contribute to the academic discussion with a rigorous and critical point of view, excelling the practical, to sustain a progress of knowledge by recognizing the transcendental cultural dimension of Architecture. And this meant to be done within the frame of the University: with generosity above any yield, and idealistic, far from any utilitarian benefit, so dangerously spread even in the academia. Making ours the lucid Nuccio Ordine's essay, we would like to think that we have been somehow contributing to defend 'the usefulness of the useless'. And also considering that university is precisely the suitable place where this battle against immediate benefit must be fought. It may be there where we should nurture knowledge, criticism and thought, and develop a stronger passion for knowledge.

In short, this is another sustained step which we trust to keep placing the magazine in its prominent situation among the ever-growing list of academic journals in our field. From this point on, the main topic and scope for every monographic issue are defined with the collaboration of an external guest editor. Therefore, essays will not elude the recent or upcoming debate, nor will they forget the lessons from the past. In addition to the open nature of the magazine, several contributions by invited authors will set some of the extents of the conversation.

Finally, essays are now published complete, both in Spanish and English, and the layout follow a full redesign, making the reading of the magazine a more pleasant experience, trying to avoid the arid nature unfairly but commonly associated to academic journals.

The Editorial team

Editorial

Nature as Construction Material

Jesús Vassallo

It is by no means an exaggeration to say that the current man-made environmental crisis is a historic event of a magnitude such that calls for a comprehensive and deep reexamination of all human activity on the planet. In that regard, and for architects, it is a development comparable to the invention of agriculture or the industrial revolution, to the extent that it will radically transform the ways in which we build.

On the other hand, the problems and challenges that we face today are not completely new. In fact, each environmental crisis has been historically followed by an increase in both awareness and specialized knowledge. Such generation of knowledge has been indeed intense in the last decades within the environmental sciences and humanities, a body of work in which architects have only tangentially or sporadically participated.

The marginal position of architecture in these discussions is surprising, not only because of the responsibility implied in the percentage of emissions and energy consumption embodied in the built environment, but most of all because architecture, having traditionally defined itself as the opposite of nature, has amassed a rich and deep body of knowledge about the latter. While much contemporary environmental literature discards the ideas of nature generated within architecture history and theory as romantic or obsolete, I believe, as editor of this issue, that this is a perfect time to take stock of such tradition and evaluate its possible contributions to our current change of paradigm. At the end of the day, the challenge that we face today is the necessary dissolution of the dichotomy between the concepts of culture and nature. In that context, architecture, which has traditionally imagined itself as crystallized culture, has both a privileged standpoint and a great responsibility.

It all boils down to a simple yet radical idea: we need to reconsider human activity in general -economy is the best example-, and its products in particular -the built environment- as internal rather than external to nature. While this may seem counterintuitive, there are however plenty of precedents which we can leverage if we are to reconstruct our definitions of both nature and architecture and produce a new paradigm that can carry us forward through the next century.

Ever since the power of industrialization first revealed itself, there have been periodic bursts or attempts to rethink the relationship of the discipline of architecture to nature. This was the main drive of the Arts and Crafts movement, and its search for the new forms of architecture within nature, or even more literally in the City Garden movement, which reconceptualized nature as the primary city-building material. Also within the modern movement, once the first fevers of progress started to wear out, instances of this trend emerged, with Frank Lloyd Wright's Broadacre City as perhaps the most salient example at the scale of urbanism. Nordic architects of the second generation of modernism also incorporated nature deep at the core of their approach for architecture, as is evident in the experiments that Alvar Aalto or Arne Jacobsen carried out in their own homes and with their own hands. Closer to our day, the attempts of Herzog & de Meuron to literally build with algae or moss complicate distinctions between nature and artifice and prefigure our contemporary interest in natural construction materials. As mass timber construction quickly gravitates towards the mainstream of the construction industry, and experiments with rammed earth, unfired clay, or bamboo become more common, it seems clear that a path emerges in which architecture may one day, at least conceptually, grow out of the soil instead of being imposed on it. This promise also poses the potential to reconsider the divide with which we think about and design rural and urban areas, even the possibility to rethink our cycles of production and consumption as part of a larger gradient of agricultural and natural cycles. With that end in mind, this issue collects a series of essays and case studies, both historic and contemporary and within a wide range of scales, which may contribute to reconceptualize nature as a construction material, or alternatively, architecture as a vehicle for nature. The time may have come to let the forest back into our cities.

Image: Panoramic view in the longleaf yellow pine timber possessions of the Thompson & Tucker Lumber Company as seen from the Eastern portion of the George Smith Survey, fourteen miles south of Willard, Texas, 1908.

01

Arquitectura y natura

Irénée Scalbert

La arquitectura está necesitada de una teoría global. Una teoría capaz de explicarla en el contexto de toda la tierra. En el trasfondo de la crisis ecológica que se avecina y que obliga a los arquitectos a reconsiderar otra vez la relación entre naturaleza y cultura, Scalbert explora una amplia colección de referencias que van desde la historia de la arquitectura, a la literatura, la ciencia, la geografía o los estudios vernáculos, en un esfuerzo por fijar los parámetros para un diálogo contemporáneo que debe reforzar otra vez el modo en el que los arquitectos toman la naturaleza como un parte intrínseca y necesaria de su trabajo.

¿Qué podemos decir hoy en día de la naturaleza? **(fig. 01)** El concepto es tan amplio y su historia tan antigua que solo pronunciar esa palabra causa cierto reparo. La naturaleza es el reino de las cosas que no cambian, o de las cosas que cambian al ritmo imperceptible de la evolución, o de las cosas que se repiten sin apenas variación según las estaciones. Cuando hablamos de la naturaleza de las cosas nos referimos a una realidad fundamental e inmutable. La naturaleza es lo opuesto a la moda.

Resulta fácil comprender por qué en una época como la actual, donde parece que no hay nada más importante que las alteraciones imprevisibles de los mercados, donde se prefieren los cambios de cualquier tipo a la permanencia y donde se ha reinstaurado la moda como una fuerza legítima, la idea de naturaleza pueda parecer anticuada y casi mística. La naturaleza es un fastidio. Pero conforme crece el número de humanos y más graves son las consecuencias de sus actos sobre el entorno, mayor es la insistencia con que la naturaleza reivindica sus derechos. No hay más que pensar en la correlación entre las emisiones de dióxido de carbono y las tormentas tropicales. La naturaleza es el reflejo de nuestra conciencia, y cada vez más, de nuestra mala conciencia. Actuamos, construimos y la naturaleza nos juzga.

Llegados a este punto, ¿cómo podríamos recrearnos con la idea de la naturaleza sin caer en la complacencia? ¿Cómo podría la arquitectura evitar la tentación de escabullirse de esta incómoda testigo? Porque lo cierto es que en los últimos veinte años ni la arquitectura ni las ciudades han ocupado los titulares de los periódicos; la naturaleza sí. Especialmente, claro está, debido al cambio climático. Pero existen contaminaciones de todas clases; de hecho, el conocido *espacio basura* propuesto por Rem Koolhaas representa en el contexto de la arquitectura el equivalente estético de esa misma contaminación.

Koolhaas afirma que, si bien el espacio basura nos parece una aberración, es precisamente lo que caracteriza las urbanizaciones comerciales. Y no fue el primero en advertir esto; ya en 1883, William Morris sostuvo en una conferencia que "la verdadera esencia del comercio competitivo es el despilfarro"[1]. Para Koolhaas, incluso el paisaje se encuentra ahogado en un planteamiento comercial, donde un campo de golf, por poner un ejemplo, es únicamente una imagen especular del espacio basura, un lugar del que se ha retirado la basura comercial.

En lo que la sociología conoce como *sociedad del riesgo*, la naturaleza es objeto de la máxima preocupación. Basta con recordar Chernóbil o Fukushima. Lo que está en juego es la perennidad de la naturaleza, su capacidad de permanencia y, por lo tanto, la nuestra. El dato es conocido, pero merece repetirse: los edificios son los causantes de la mitad de las emisiones de dióxido de carbono. Es cierto que no todos los edificios han sido diseñados por arquitectos; se estima que estos son responsables únicamente del 1 % de los inmuebles de todo el mundo.

Los arquitectos, por su educación y por la profesión que han escogido, se encuentran una posición privilegiada para influir en el transcurso de los acontecimientos. Tienen conocimientos tanto del medioambiente como de la tecnología; piensan simultáneamente en un detalle constructivo y en cómo afectará al lugar. Sin embargo, podemos observar que los arquitectos están muy lejos de comprender la inmensa ventaja que les confiere su situación. Y lo que es peor, hasta ahora se han mostrado indiferentes a cuestiones que les tocan muy de cerca, por no decir que son el núcleo de su vocación. La naturaleza sigue siendo para ellos un territorio inexplorado.

No deberíamos sorprendernos. Durante cuarenta años, el contexto teórico de la arquitectura ha sido la ciudad, y especialmente lo que se conoce con más o menos acierto como la *ciudad europea*. Si observamos las imágenes de los libros de Aldo Rossi, como *La arquitectura de la ciudad* o *Autobiografía científica,* apenas se ven árboles. Ya sea Milán, Luca, Roma, París o Berlín, la ciudad es para Rossi casi exclusivamente mineral. Es algo artificial, una creación de la mente en la que no hay lugar para la naturaleza. Ni siquiera se aprecian espacios residuales donde las plantas puedan crecer escondidas de los humanos.

La situación no cambia mucho en *Ciudad collage*, de Colin Rowe, donde la ciudad elegida no es simplemente Roma, sino la Roma imperial. La enorme maqueta del Museo de la Civilización Romana de la EUR muestra una inmensa acumulación de objetos y entre ellos, de vez en cuando, crecen algunos cipreses. Hacia el final de *Ciudad collage*, Rowe incluye una serie de imágenes en las que pueden verse jardines, pero no debemos equivocarnos: para Rowe el jardín es solo un indicador de la categoría de la ciudad y apenas tiene valor en sí mismo. Tanto Rowe como Camillo Sitte antes que él pensaban que el objetivo principal consistía en que el espacio urbano mostrara una forma artística. El patio de la Galería de los Ufizzi era el contrapunto perfecto al ilimitado espacio verde del movimiento moderno. Quince años después apenas ha cambiado el consenso sobre la naturaleza. En palabras de Koolhaas, la *ciudad genérica* no es más que una versión degradada de la *ciudad collage* donde el centro comercial sustituye al foro romano[2].

Las ciudades, ya se trate de Roma, París o Atlanta, son puro artificio. Su identidad reside únicamente en la cultura. Como prueba no hay más que pensar en el centro Pompidou, un extraordinario símbolo del poder regenerador que se atribuye a la cultura: al igual que en todas las grandes ciudades del planeta, aquí solo hay espacio para lo humano. En nuestra concepción de las ciudades no hay plantas, ni cielo, ni clima. Curiosamente, la única excepción es Venecia, una ciudad europea caracterizada por un tropismo atípico donde todo lo humano -arte, palacios, *campos*...- se vincula íntimamente con el agua, el cielo y el clima **(fig. 02)**. ¿En qué otro lugar nos conmovería tanto ver unas plantas?

Llegados a este punto, ¿cómo podríamos enfocar las preguntas que tienen que ver con la relación entre la naturaleza y la cultura? Por ejemplo, todas las relativas al cambio climático, que siguen sin respuesta. Desde luego, podemos encontrar excepciones, como Paolo Portoghesi, el arquitecto posmoderno responsable de la Strada Novissima de la Bienal de Venecia, que propuso algunas soluciones. En su libro *Nature and Architecture* busca arquetipos que, mediante símbolos, reproduzcan en la naturaleza el origen de las formas arquitectónicas. Según esta idea, las calles tendrían su origen en los cañones esculpidos por los ríos. «El origen de la casa -escribe- se encuentra en el árbol, en la gruta y en el nido de las aves, pero también guarda relación con el arquetipo de la vida prenatal en el útero"[3]. ¿Es necesario continuar?

Los modernos fueron mucho más allá **(fig. 03)**. Los habían acusado de dividir la ciudad de una forma simplista y arbitraria. Sin embargo, la naturaleza acaparó todas sus atenciones. En la Carta de Atenas, Le Corbusier le dedicó una de las cuatro funciones principales atribuidas al urbanismo: el ocio. Para conseguirlo, era necesario preservar espacios abiertos en las ciudades (parques principescos, jardines burgueses, paseos militares...) y hacerlos accesibles al público. En palabras de Le Corbusier, «La protección o creación de espacios verdes [...] constituye para la especie [humana] un asunto de salvación colectiva».

Como consecuencia, la textura de los asentamientos urbanos se verá modificada para convertirse en «ciudades verdes». Los edificios dotacionales se situarán próximos a las viviendas en superficies ajardinadas con árboles. En el perímetro de las ciudades se protegerán las praderas, los bosques y las playas para albergar el ocio de fin de semana **(fig. 04)**. Un poco más lejos, también se cuidarán los paisajes naturales: los ríos, las montañas, los lagos, el mar... La gran ambición de los CIAM era implantar lo que Le Corbusier denominaba «biología del mundo». Se ha criticado mucho al urbanismo del movimiento moderno por adoptar una concepción esquemática de la naturaleza y por no prestar atención a sus particularidades geográficas e históricas, pero nadie puede reprocharle que se olvidara de la naturaleza y de su trascendental vinculación con los seres humanos.

Apenas queda nada de aquella visión. El conocimiento actual de los arquitectos acerca de la naturaleza proviene de los estudios de Ernst Haeckel y D'Arcy Thompson sobre la génesis de las formas naturales. Se basa en la idea de que la forma de todos los organismos se origina de acuerdo con las leyes de la física y la geometría. Forma parte de una tradición que únicamente se preocupa por el mundo de las formas y donde la voluntad humana no tiene cabida. El ejemplo más asombroso de este materialismo acérrimo es Frei Otto. Es evidente que las formas y las técnicas ideadas por Otto son extraordinarias y casi siempre muy hermosas, pero no resulta fácil descubrir qué pueden aportar los humanos al cuasicientífico proceso del *Gestaltwerdung* o 'configuración de la forma'.

Como prueba, basta con echar un vistazo a las viviendas «ecológicas» diseñadas por Otto para Berlín **(fig. 05)**. En ellas, el proceso de configuración de la forma apenas sobrevive en el gran árbol central que preside simbólicamente el proyecto, a no ser que consideremos que la propia sociedad está determinada por sus propiedades físicas. De hecho, eso es lo que Otto parece afirmar en su original ensayo sobre urbanismo *Occupying and Connecting*, una aseveración a la que, a mi juicio, debemos resistirnos. Hasta que no alcancemos un conocimiento más profundo sobre este tema, las personas y las sociedades humanas no pueden reducirse a leyes físicas.

Sin embargo, esta es la tendencia predominante en la arquitectura sostenible. Las cuestiones sobre nuestra relación con la naturaleza se formulan como teoremas aislados que solo la ciencia puede resolver; así, todos los problemas derivados del cambio climático se solucionarían garantizando una correcta integración del ciclo de carbono en la biosfera. Del mismo modo, la arquitectura sostenible busca integrar el uso residencial en el ciclo de carbono. Se ha reducido a un problema de química, como demuestra el gran éxito del libro *De la cuna a la cuna*, escrito conjuntamente por un químico y un arquitecto. Todo se resume, en cuanto a la organización, en gestionar fluidos y temperaturas; y en cuanto al diseño, en adecuar la química de los materiales a la psicología humana.

Esto es lo que Philippe Rahm y Jean-Gilles Décosterd expresaron de una forma tan poética en el pabellón suizo de la Bienal de Venecia de 2002. En su Hormonorium se simulaba el efecto de la elevada altitud mediante una luz muy intensa y la reducción del nivel de oxígeno, lo que causaba en el cuerpo humano una reducción de la fatiga y, aparentemente, un incremento del deseo sexual. Pero ¿en verdad podemos asimilar la arquitectura a la química del cuerpo humano? Las últimas instalaciones de Philippe Rahm y los diseños de William McDonough (el arquitecto coautor de *De la cuna a la cuna*) nos dan motivos para dudar. En muy poco tiempo hemos alcanzado un punto donde el análisis científico abandona toda sensibilidad y en que los métodos necesariamente sintéticos del proyecto arquitectónico no dan más de sí.

Esta limitación de la arquitectura sostenible también afecta a la ecología. Tanto una como la otra están atrapadas en un círculo virtuoso. El objetivo de la arquitectura sostenible es reciclar el aire y el agua para reducir, o incluso eliminar, cualquier consumo externo, como si los intercambios pudieran producirse de forma aislada. Para la ecología, el reciclaje no es simplemente un objetivo que deba alcanzarse; es la misma definición de un ecosistema. Si los ecosistemas pudieran funcionar como una máquina bien integrada, la estabilidad de la naturaleza quedaría fuera de toda duda. Pero las dificultades son abrumadoras. Los diagramas que representan los ecosistemas suelen ser tan complejos que recuerdan, como la arquitectura sostenible, a las cómicas invenciones de Heath Robinson.

Tanto los ecosistemas como la arquitectura sostenible están regulados por un principio común: la conservación de la energía. La arquitectura sostenible comprende un conjunto de artilugios diseñados para reducir el consumo energético. Cuando asumimos esto, la misma concepción de la naturaleza se convierte en un rehén del cientificismo ecológico y sus conspiraciones energéticas. Los ecologistas demuestran la adecuación de este principio común mediante el microcosmos que constituye una laguna, donde se aprecian claramente los vínculos entre los organismos vivos y el entorno abiótico; entre el consumo, la producción y la descomposición. Pero la laguna escrita por los ecologistas y la laguna descrita, por ejemplo, por Henri David Thoreau no tienen nada en común **(fig. 06)**.

El escritor y pionero del movimiento medioambiental Thoreau construyó una cabaña al borde de la laguna Walden, donde vivió durante un tiempo. Al contemplarla, decía de ella que era el rasgo más hermoso y expresivo del paisaje: «Es el ojo de la tierra; al mirar en su interior, el observador mide la profundidad de su propia naturaleza»[4]. Entre la idea de ecosistema y la de naturaleza vivida, entre la laguna de los ecologistas y la laguna de Thoreau, entre una fábrica de energía y un espejo filosofal, existe un abismo similar al que se encuentra entre la arquitectura sostenible y la arquitectura sin más. Así que para ser creativo, la relación entre la arquitectura y la naturaleza requiere un acercamiento que no sea ni estrictamente materialista, como en la biofísica, ni estrictamente sistémico, como en la ecología. La arquitectura hunde su raíz en la vida diaria y en la concreción. Y por ahí debemos empezar.

Existe una disciplina, la geografía, que estudia la naturaleza desde su globalidad hasta el más mínimo detalle. Paul Vidal de la Blache ha contribuido más que muchos académicos al conocimiento de la tierra y de sus paisajes en relación con las sociedades humanas. Aunque hoy en día los arquitectos apenas lo mencionan, fue precisamente Vidal de la Blache el precursor de las obras de J. B. Jackson, quien quizá sea el autor más reconocido en la actualidad cuando hablamos sobre estudios del paisaje. Jackson sentó las bases de los primeros estudios académicos sobre arquitectura ver-

nácula y fue quien inspiró el concepto de *vida material* acuñado por Fernand Braudel. Hoy en día parece ser el precursor necesario de la oposición naturaleza-cultura propuesta por Bruno Latour.

Vidal guía al lector por lo que denominó *el laberinto de las formas sobre la superficie de la tierra*. Describe con todo detalle las fuerzas físicas que esculpen el paisaje: el agua, el viento, las plantas, los animales... Estas fuerzas se van alternando para ayudar a los humanos a concretar sus invenciones y dirigir sus esfuerzos: una montaña protege un pueblo, un río se utiliza como medio de transporte, una isla sirve de refugio. Los humanos escogen lo que les resulta útil. Mediante una acción continuada sobre la naturaleza, desarrollan modos de vida concretos y, amparados por las plantas, los animales y las máquinas, redirigen hacia sus propios fines las posibilidades que brinda la naturaleza para así influir en la geografía.

Al mismo tiempo, Vidal era consciente de que el espacio estaba cobrando mucha importancia en la vida humana. Durante largo tiempo había sido un obstáculo que mantenía distanciados a los pueblos, pero el control del espacio se fue convirtiendo en un objetivo en sí mismo, impulsado por el comercio y la creciente movilidad de personas y mercancías. Los inconvenientes eran una mayor emancipación del entorno local y la expansión de las ciudades. En este contexto, Vidal hablaba de «los impulsos de la vida general» que trascienden el modo de vida local ligado a un lugar concreto. Este concepto de la vida general auguraba, por una parte, el capitalismo a larga distancia cuya descripción corrigió Braudel en *Civilization and Capitalism* y, por otra, la reciente ciudad genérica sobre la que reflexiona Rem Koolhaas.

Este concepto de Vidal se ha vuelto tan omnipresente que los geógrafos casi han abandonado los estudios regionales. Durante los últimos cincuenta años, se han interesado especialmente por los números, el espacio y las ciudades a expensas de la forma física del paisaje. ¿Qué importancia podían tener los campesinos y su modo de vida ancestral para los pasajeros de una diligencia que circulaba por la carretera? ¿Quién se acuerda de los pocos indios paiute que aún existen mientras apuesta en un casino de Las Vegas? Como decía Koolhaas: «¡Jodido contexto!».

Sin embargo, excepto cuando volamos o navegamos, siempre estamos en algún lugar, en un sitio concreto. El geógrafo Robert Capot-Rey, en un trabajo que hubiera merecido mayor reconocimiento, muestra cómo ciertas leyes regulan el trazado de las carreteras en un entorno físico. Y explica cómo a su vez el trazado de las carreteras determina la ubicación de las viviendas y la forma de las ciudades. Los *no lugares* de los que tanto se habla son un constructo del hombre que viaja en diligencia. Los no lugares no existen. La expresión es un eufemismo, una hoja de parra que esconde el desinterés, la indiferencia y el despilfarro.

A día de hoy no disponemos de una teoría global de la arquitectura, una teoría que pueda explicar la arquitectura en el contexto planetario. Un discípulo de Vidal de la Blache, Albert Demangeon, lo intentó por primera vez en 1937 con la publicación de *Les Maisons des hommes.* Más tarde, en 1972, un seguidor de Vidal llamado Pierre Deffontaines escribió *L'Homme et sa maison*. Más recientemente, Paul Oliver editó un *Atlas of Vernacular Architecture of the World*, que pretendía relacionar la arquitectura con los recursos naturales. Cuando se trata de vincular la arquitectura con la naturaleza, la arquitectura vernácula se convierte en una referencia obligada.

Pero el modelo vernáculo tiene sus limitaciones. En primer lugar, casi siempre ignora la movilidad de personas y mercancías. Según Paul Oliver, la arquitectura vernácula es una arquitectura «del pueblo y hecha por el pueblo, pero no para el pueblo»; pertenece a una sociedad concreta, y nadie más puede hacerla en su nombre[5]. Esta definición excluye claramente la participación de arquitectos y empresas profesionales. Por otra parte, la arquitectura vernácula se arraiga en una cultura y una tradición locales. Evoluciona con lentitud en largos períodos de tiempo y se muestra recelosa por naturaleza ante las iniciativas particulares que puedan apartarla de esa tradición.

En su origen, la idea de la arquitectura vernácula no incidía en la tradición, sino que era una llamada a la apertura. Oliver menciona el «revolucionario» trabajo de Sibyl Moholy-Nagy de 1957, *Native Genius in Anonymous Architecture in North America*. La autora no tenía interés en exaltar las culturas locales; su punto de partida era exactamente el opuesto. Tras analizar casi exclusivamente ejemplos estadounidenses, observó que, salvo en las ciudades, los inmigrantes que habían abandonado Europa rumbo al nuevo mundo no mostraban ninguna nostalgia por las tradiciones que habían dejado en sus lugares de origen **(fig. 07)**.

En realidad, ¿por qué iban a querer los inmigrantes preservar unas tradiciones que, en muchos casos, les habían impulsado a emigrar? ¿Qué necesidad tenían de replicar los modos de vida que en cierto sentido les habían traicionado? En su lugar adaptaron a su nuevo entorno antiguas costumbres (la autora se refiere a ellas no muy acertadamente con el término alemán *Brauch*). Moholy-Nagy afirma que supieron aprovechar unos recursos que les eran desconocidos con el cuidado y el ingenio propios del hombre neolítico, y califica esa arquitectura de «nativa» en el sentido de que era innata, natural.

Moholy-Nagy comienza su libro elogiando la figura de Frank Lloyd Wright, de quien incluye una cita en la que alaba la arquitectura popular, cuyos edificios -dice- son a la arquitectura lo que las canciones *folk* son a la literatura y a la música. El propio Wright emplea la expresión *arquitectura nativa*, y puede decirse que nadie mejor que él supo construir este tipo de arquitectura, enraizada en la geografía y, al mismo tiempo, desprovista de sentimentalismos.

Algunos arquitectos del siglo diecinueve disfrutaron de un éxito similar, como Karl Friedrich Schinkel en Potsdam o los arquitectos del movimiento *arts and crafts* en el Reino Unido. Todos ellos contaban con un mentor que hablaba en nombre de la naturaleza: Schinkel tenía a Goethe, el *arts and crafts* tenía a Ruskin, y el propio Wright tenía a Ralph Emerson. El problema de nuestra época es que no existe tal profeta. Podemos invitar a la naturaleza a que ocupe asiento en lo que Latour denominaba *el Parlamento de las Cosas*; pero sin una representación adecuada, la naturaleza no puede hablarnos[6].

Quizá el proyecto que mejor represente esta arquitectura «natural» sea Taliesin Este. Me refiero en concreto al proyecto de 1911, antes de las reconstrucciones de 1914 y 1925 **(fig. 08)**. Neil Levine cuenta en un exhaustivo estudio sobre Taliesin cómo para su arquitecto este proyecto supuso una reinvención personal tras el exilio de Chicago y una renovación de su arquitectura[7]. La relación entre la arquitectura y la naturaleza ya no se basaba en la analogía, sino que era substancial. No hay nada en su planta que haga pensar en un orden abstracto o formal; las estancias se abrazan unas a otras sin acatar reglas establecidas, sin mantener proporciones, sin seguir más alineaciones que las sugeridas por el propio paisaje.

Wright decía de la residencia de Taliesin que era «casera». Todo lo había ideado él: la cimentación, el jardín, el huerto, incluso el terreno para pasto y el estanque. Taliesin constituía una unidad residencial completa que contaba con una vivienda, un taller, un jardín y una granja; lo abarcaba todo, «desde el cerdo hasta el propietario». La propia arquitectura parecía algo accesorio, un mero accidente de la naturaleza.

Afirmar que la arquitectura de Wright es orgánica no le hace justicia. La arquitectura orgánica sigue buscando la analogía. Describe una forma de composición y crecimiento cuyo modelo ideal es el árbol. Al igual que la arquitectura sostenible, procura mimetizarse con la naturaleza para pasar desapercibida. Pero la arquitectura de Taliesin no intenta ser natural. No tiene consciencia de sí misma ni de estar siendo juzgada por la naturaleza. Al contrario; reclama sus derechos y participa activamente en el debate del Parlamento de las Cosas.

En la actualidad, ningún arquitecto incorpora la naturaleza en sus trabajos con la integridad y la convicción de Wright. Ni siquiera los urbanistas, que se ocupan no solo de la ciudad, sino del territorio que le da sustento, hablan con la amplitud de miras de Patrick Geddes o la autoridad de Ebenezer Howard. En general, la naturaleza se ha vuelto un sinónimo de *lugares verdes*, en oposición a los *lugares grises*, pero esta forma de verlo no dice gran cosa de la naturaleza y se limita a designar la prohibición de urbanizar. En la mentalidad contemporánea no hemos dado con una expresión lo bastante concreta y enriquecedora como para sustentar la visión y los proyectos de los arquitectos.

A comienzos del siglo pasado, el geógrafo ruso Alexander Woeikof observó algo que puede servirnos de conclusión[8]. Woeikof (uno de los primeros académicos en estudiar el impacto de los humanos en el clima) se dio cuenta de que los humanos apenas lograban influir en su entorno cuando se oponían directamente a las fuerzas de la naturaleza, pero su influencia era considerable cuando actuaban sobre lo que él llamaba *«corps meubles»* o 'cuerpos muebles': material suelto que se había desprendido de la corteza terrestre por la acción del viento o el agua. Entre esos materiales se encuentra el suelo y el subsuelo, las arenas, las gravas, la cal o la nieve. Los humanos se asientan espontáneamente donde hay abundancia de estos cuerpos y pueden obtenerlos con facilidad para construir. Desde la perspectiva de la geografía, la cuestión fundamental de la arquitectura es cómo determinar la relación entre esos materiales inestables que padecen una erosión continua y unas construcciones estables que deben soportar la ingenuidad de sus arquitectos.

Irénée Scalbert
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01. Irénée Scalbert en un bosque de Güeldres, en Holanda.

02. *Campo*, Venecia.

03. Parque Kepa Potocka y bloques residenciales, Varsovia.

04. Edificación residencial en Rusanivs'ka Naberezhna, Kiev, años setenta.

05. Frei Otto, viviendas ecológicas, IBA, Berlín.

06. Laguna Walden en Concord, Massachusetts.

07. Dos graneros de la reserva de Fort Klamath, en Oregón.

08. Frank Lloyd Wright, Taliesin East, Wisconsin, segunda década del s. XX.

02

Sobre la mímesis moderna de la naturaleza. Redes, herramientas y planteamientos ecológicos

Albert Pope

La fértil relación de la arquitectura con la naturaleza se ha empobrecido gradualmente y reducido a un único modo de acción según la cual la primera imita las formas de la segunda. Este uso de la naturaleza como un repositorio de formas de las que apropiarse corresponde, uno a uno, con la lógica de extracción de recursos que se encuentra en la raíz de la crisis ecológica actual. En este ensayo, Pope rastrea varias respuestas arquitectónicas y urbanas a esta crisis, proponiendo una definición específica de la idea de organicismo como un modelo de intervención en el mundo natural que se basa en procesos de integración funcional

INTRODUCCIÓN: LA IMITACIÓN TRANSFORMADA

La arraigada tradición mimética de la arquitectura y el urbanismo sugiere que la naturaleza es el marco de referencia definitivo del entorno construido. Desde la columna corintia a la Casa de la Cascada de Frank Lloyd Wright, pasando por el hombre de Vitruvio, la cabaña primitiva de Marc-Antoine Laugier o la Casa de los Vigilantes del Río de Claude Nicolas Ledoux, la imitación de los fenómenos naturales siempre ha legitimado las por otra parte arbitrarias formas surgidas de nuestra propia imaginación. Mientras que la relación entre la arquitectura, el urbanismo y la naturaleza ha sufrido un profundo cambio a lo largo de la historia, la necesidad de formas naturales de referencia en los entornos en que construimos ha permanecido inquebrantable. Sin embargo, hoy en día esa relación ha entrado en una nueva fase sin precedentes, simbolizada por la declaración de una nueva era geológica, el Antropoceno, que reconoce la actividad humana como fuerza dominante en la continua transformación del planeta y sugiere que, sea cual fuere en el pasado nuestra relación con el entorno natural, en la actualidad se ha convertido en algo muy diferente. La creciente consciencia del impacto ruinoso que provocamos en la tierra plantea la duda de si nos es posible continuar con la tradición mimética de la arquitectura y el urbanismo y, de ser así, de cómo deben transformarse a la luz de la crisis actual.

En este artículo se procura dar respuesta a esta cuestión recorriendo los diferentes intentos de arquitectos y urbanistas para tomar como referencia el mundo natural mediante un *proceso de imitación funcional* conocido con el nombre de *organicismo*. Como puede verse, la respuesta arquitectónica y urbana a la crisis climática, al igual que la propia crisis climática, venía gestándose desde hacía mucho tiempo.

La respuesta no necesita ser muy extensa. La imitación funcional de la naturaleza requiere un cambio del centro de atención que pase del propio objeto a las relaciones entre objetos. Durante décadas, tanto los teóricos medioambientales como los urbanistas nos han advertido una y otra vez de que el estudio de las relaciones es crucial. Aunque podemos admirar la belleza de un árbol centenario o de un antiguo monumento religioso, cuando extirpamos un objeto, ya sea natural o artificial, de su contexto natural o urbano perdemos su principal atractivo: el papel que juega en un conjunto de agentes y objetos interconectados. En otra palabras: si extraemos las características de un ecosistema o de una ciudad de los entornos en los que han surgido, no podemos percibir su función última. Mientras que estos razonamientos han sido aceptados con bastante éxito en los círculos medioambientales (prácticamente todo el mundo comprende la idea de ecosistema), su incidencia en el discurso arquitectónico y urbanístico ha sido muy limitada. Seguimos prefiriendo -cuando no adorando- el objeto arquitectónico aislado en todo su esplendoroso aislamiento.

Para ser exactos, mantener el centro de atención en los objetos arquitectónicos en lugar de en las relaciones entre objetos arquitectónicos ha tenido un efecto positivo en la disciplina, especialmente en cuanto a la representación de instituciones culturales. No obstante, ha dificultado construir una idea urbana convincente y ha hecho casi imposible dialogar con mundo natural. El cambio de punto de vista es importante para comprender los entornos naturales y construidos, pero es indispensable si el objetivo es correlacionarlos.

Quizá esta evolución resulte obvia: diseñar un estadio que parece una semilla o un puente que se asemeja al ala de un insecto no deja en buen lugar a la imitación. Las traducciones literales (semilla por estadio o insecto por puente) provocan comentarios ingeniosos sobre los edificios que terminan por que todo el mundo les asigne sobrenombres más o menos cariñosos que nunca escapan a cierto menosprecio. Está claro que en la actualidad necesitamos hacer frente a una perspectiva radicalmente nueva sobre el entorno natural y construido que exige un acercamiento a la imitación más sofisticado. Las limitaciones de las semillas y los insectos son precisamente las limitaciones derivadas de extirparlos de sus contextos originales. Hoy, la imitación necesita que avancemos desde el diseño de objetos independientes al diseño de interconexiones entre objetos dependientes. Si reconocemos, como ya ha hecho el resto del mundo, que el objeto independiente no existe, podremos sacar partido a esas interconexiones mediante una imitación «funcional» de la naturaleza.

LA EXTRACCIÓN

No es casualidad que nuestra manera habitual de pensar refleje las prioridades de una economía extractiva. Reflexionar sobre un objeto de la naturaleza, como un árbol o un pez, ya conlleva un proceso mental de extracción. Pensar en la naturaleza como en un objeto enmarca su significado, pues le elimina cualquier referencia a un contexto ambiental más amplio. Al igual que cuando intentamos comprender la función de un martillo en un mundo sin madera, clavos ni carpinteros, un objeto extraído carece de un contexto que pueda explicar los términos de su existencia. En este sentido, la simple extracción transforma completamente los objetos urbanos y medioambientales y los aproxima a entidades o mercancías discretas.

Aunque extraer un objeto de su contexto provoca un distanciamiento entre ese objeto y el mundo del que proviene, también hace más sencillo comprender ese mundo y hacer referencia a él. La imitación tradicional se caracteriza por el empleo de la sinécdoque (una figura retórica donde la parte representa al todo). La reducción de las fuerzas naturales a un conjunto de objetos discretos o signos capaces de representar al total de la naturaleza es un aspecto básico de la comunicación que se remonta al más primitivo de los lenguajes. En un extremo se encuentran los llamados *signos arbitrarios*. Un cuerpo, una isla o un árbol son ejemplos de objetos representativos o partes de objetos que pueden evocar variadas asociaciones, como la hoja de arce que representa Canadá o la gran manzana con la que se ha venido identificando Nueva York durante más de un siglo.

Estos signos arbitrarios se oponen a los que los lingüistas llaman *signos motivados*, que se caracterizan por mantener una relación funcional entre el significante y el significado. Esto quiere decir que la estructura y la organización del signo son similares a los del objeto significado. Por ejemplo, el Centro Nacional de Convenciones de Catar, creado por Arata Isozaki en 2011, relaciona con cierta ironía su estructura triangulada con un árbol de espina santa o *Paliurus spina-christi*, que a su vez representa el legado cultural del Estado de Catar. Existe una correlación entre su función (la estabilidad de la estructura) y su significado. Un signo arbitrario reproduce el aspecto exterior del significante mientras que un signo motivado reproduce su funcionamiento .

Ambos proyectos emplean objetos naturales aislados de sus contextos para producir sendos iconos urbanos para Manhattan y Catar. Quizá el aspecto más importante de estas cosificaciones es que traducen la naturaleza en elementos que pueden compararse directamente con nuestra propia producción. De hecho, el largo historial de asociaciones análogas entre los objetos de la naturaleza y los fabricados por el hombre resulta muy ilustrativo. En muchos aspectos, la historia de las asociaciones por analogía, de objeto a objeto, es la historia de la elaboración mimética de formas. Así, el orden corintio presenta una analogía con la hoja de acanto; la planta de cruz latina, con el cuerpo humano; los sillares escalonados del basamento clásico con la sedimentación geológica; las salas hipóstilas, con un bosque; y los estanques y jardines son análogos a los paisajes naturales. A lo largo de la historia, la lista de objetos formalizados mediante mímesis es inagotable.

Estos procedimientos de mímesis encontraron su lugar en el movimiento moderno. Frank Lloyd Wright asociaba directamente el núcleo de un edificio en altura moderno con el tronco y las ramas de un árbol, y diseñó un museo con forma de caracol. Louis Kahn imaginaba que las autopistas de Filadelfia eran análogas a los ríos, arroyos y afluentes. El posmodernismo nos trajo los dos signos urbanos ya mencionados con todo su simbolismo. En la actualidad, estamos rodeados de asociaciones de objeto a objeto con el mundo natural en las que apenas reparamos. El expresionismo, que hasta hace unos años apenas contaba con defensores por considerarse una rama menor del movimiento moderno, vuelve a estar en primera línea y ha recuperado las estrategias tradicionales de mímesis. Hoy, todo tipo de instituciones adoptan rutinariamente la imagen de raíces, conchas o alas de insectos con la que intentan embellecer arquitectónicamente los vastos paisajes urbanos. Y esos paisajes se rigen igualmente por la asociación de objetos.

El Team X asociaba los planeamientos urbanísticos en doble peine con las hojas y los árboles, mientras que algunas agrupaciones de condominios cerrados se asemejan hoy a archipiélagos. La imitación sigue su curso, pero tanto las asociaciones anteriores como las contemporáneas se apoyan en extracciones conceptuales que resultan ser mucho menos inocentes de lo que parecen a primera vista.

LA POLARIZACIÓN

Las analogías de objeto a objeto (estadio-semilla, planta en cruz latina-cuerpo humano, edificio en altura-árbol, campus-isla) son muy productivas y, con el tiempo, han generado un cierto grado de asociación efectiva entre el mundo natural y el artificial. Desde este punto de vista, la naturaleza sigue ostentando una poderosa autoridad; una autoridad que vincula la inocente manzana de Times Square con la necesidad de las compañías petroleras de proyectar una imagen de compromiso medioambiental. Entre los ejemplos más evidentes se encuentra British Petroleum, que tiene un bonito logo de un sol verde sobrevolando las operaciones de limpieza del golfo de México; o Shell, cuya imagen corporativa de una concha roja y amarilla preside las plataformas de perforación de un polo norte en proceso de descongelación. La potencia económica y política de estas asociaciones se basa en la sinécdoque. Pero en la misma medida en que estos iconos son atractivos, son también reduccionistas. La extracción de la naturaleza provoca un distanciamiento entre el objeto extraído y el resto de la naturaleza, incluyendo nosotros mismos.

Tal distanciamiento suele atribuirse a la denostada división cartesiana entre cuerpo y mente, el yo y el mundo, y la naturaleza y cultura que muchos ecologistas actuales identifican como el origen de nuestra profunda alienación del mundo no humano. Entre las múltiples disociaciones que conforman nuestra perspectiva irremediablemente dualista, pocas han sido tan perniciosas como el antagonismo entre naturaleza y cultura. Aunque el dualismo no es intrínsecamente negativo, con demasiada frecuencia se desvirtúa hasta generar dos polos opuestos que eliminan cualquier matiz que pudiera tener cabida entre ellos. En otras palabras, el problema no es el dualismo, sino la polarización reduccionista que anula todo potencial de interrelación que pueda ocupar una zona intermedia aniquilada. Aún a riesgo de simplificar en exceso, los objetos habitan en los extremos y las relaciones entre los objetos habitan el espacio intermedio. La incapacidad de discernir estas relaciones dificulta notablemente el diseño, ya que es en esta zona intermedia entre el reino de la naturaleza y el de la cultura donde tienen lugar la mayor parte de los retos de diseño y donde pueden encontrarse sus posibles interrelaciones con el entorno.

La polarización entre naturaleza y cultura también nos proporciona el espacio cultural desde el que contemplamos la naturaleza como un ideal externo a nuestra existencia rutinaria y artificial. La cosificación de la naturaleza nos lleva a enclaustrarla en vitrinas herméticas, en museos de historia natural y parques y reservas naturales, de manera que la naturaleza ya no es el lugar en el que vivimos, o algo de lo que formamos parte, sino algo que aislamos y cuyo estado ideal es objeto de devoción. En todos estos ejemplos, la extracción de la naturaleza es más material que semántica, pero en ambos casos entra en juego la polarización. Mediante un procedimiento de extracción medioambiental purificamos la naturaleza, la despojamos de toda adulteración y la convertimos en algo remoto, refinado y precioso. Pero esta reclusión de lo natural dentro de un terrario o un atrio o un parque nos da vía libre para minusvalorar cualquier forma de naturaleza situada fuera de esos límites. En otras palabras, los elementos de la zona intermedia, que combinan lo natural y lo cultural, no se corresponden con la naturaleza ideal que nos gusta reverenciar. Todo aquello que no está aislado (más del 85 % de la superficie terrestre y el 99 % del mar, incluyendo el golfo de México) pasa a considerarse un recurso explotable que la humanidad puede saquear impunemente. La cosificación de la naturaleza nos posibilita llevar a cabo este expolio.

Desde el logo de Shell hasta el parque nacional de Yellowstone, la extracción de objetos naturales de sus interrelaciones funcionales ha promovido un conocimiento de la naturaleza que es al mismo tiempo útil y alienado. A corto plazo, este distanciamiento ha sido muy práctico para la humanidad, pues nos ha proporcionado

unos recursos aparentemente ilimitados que hemos podido explotar gracias a una conveniente coartada cultural. Es precisamente este distanciamiento lo que nos ha permitido erigir un orden mundial antropocéntrico que ha puesto en jaque gran parte de los sistemas naturales del planeta. Con apenas setenta años de existencia, el Antropoceno simplemente ha confirmado lo que ya sabíamos: que los humanos hemos alcanzado un nivel de conocimiento técnico capaz de destruir las propias condiciones de las que dependen nuestra prosperidad y supervivencia.

Llegados a este punto, ¿continúa siendo posible subvertir la polarización de naturaleza y cultura? ¿Podría fomentarse esta subversión mediante un ejercicio de la arquitectura y el urbanismo basado en la mímesis? ¿Puede el mundo construido imitar el mundo natural sin caer en el nocivo proceso de la extracción? No puede decirse que estas preguntas sean nada nuevo, pero ahora nos urge responderlas.

SOBRE REDES Y HERRAMIENTAS

> «El martillo, las tenazas, la aguja, "se refieren en sí mismos a", "son de" acero, hierro, bronce, piedra, madera. En el útil usado es codescubierta por medio del uso la "naturaleza"».
>
> Martin Heidegger, «El ser de los entes que hacen frente en el mundo circundante»[1].

Los peligros de la extracción y la polarización no son nada nuevo, y desde muchas disciplinas se ha advertido la necesidad de cambiar el foco de atención de los objetos en sí mismos a las relaciones entre ellos. Continuando con el ejemplo de los ecosistemas como redes naturales o internet como red artificial, las teorías de red se han centrado en las interrelaciones entre objetos de todo tipo. En los años ochenta, la teoría del actor-red (o ANT, por sus siglas en inglés), elaboró una crítica de los objetos desde la perspectiva más amplia de las ciencias sociales y naturales. Desarrollada por Michel Callon y Bruno Latour, académicos del campo de la ciencia y la tecnología, junto con el sociólogo John Law, la ANT es más un método de análisis que una teoría fundamentada. Se propone describir los mundos social y natural como un conjunto de relaciones interconectadas con dos propiedades características: la primera es que las redes contemporáneas son exhaustivas, no puede existir un objeto natural ni artificial fuera de ellas; la segunda es que todos los elementos de la red se sitúan al mismo nivel, constituyendo lo que desde entonces se denomina *ontología plana*. En una ontología plana, todos los elementos constitutivos de la red tienen la misma importancia (ya sean animados e inanimados, humanos o no), una cualidad que da origen a redes heterogéneas inéditas que, sin embargo, se asemejan a las redes de las que formamos parte. Existen redes de todo tipo: de normas, residuos, clima, bolsitas de té, tecnología digital, desde lo más serio a lo más prosaico, por no hablar de la interminable lista de ideas obsoletas que cuentan con total libertad de interacción, dado que la red es plana.

Quizá para la figuración del enfoque relacional en el campo de la arquitectura y el urbanismo lo más importante sea haber definido la ANT como un método *semiótico-material*, lo que significa que la teoría del actor-red procura explicar unas relaciones que son al mismo tiempo materiales (relaciones entre objetos) y semióticas (relaciones entre conceptos). En pocas palabras, la ANT afirma que las relaciones sociales significativas son, inevitablemente, tanto materiales como semióticas. Desde hace tiempo, los antropólogos han denominado a este tipo de red *cultura material*. Y sin embargo, la ANT difiere de la mayoría de las ciencias sociales en que su enfoque rechaza extracciones esencialistas de objetos, ideas o acontecimientos.

Aunque incluye actantes que pueden ser tanto semióticos como materiales, la típica red de la ANT parece más inclinada a la materialidad. Esto es algo crucial para los diseñadores del entorno construido, ya que sublima el objeto según la función que debe desempeñar en el reino de las cosas, pero sublima esta humilde función del objeto como parte de una red y no aisladamente como un icono. Latour afirma que, desde el punto de vista político, «cada objeto reúne a su alrededor su propio conjunto de idearios con algo que decir. Cada objeto desencadena nuevas oportunidades para diferir y discutir acaloradamente. Cada objeto también puede proporcionar nuevas maneras de poner fin a la discusión sin tener por qué compartir los puntos de vista sobre muchos aspectos. Es decir: los objetos -considerados individualmente como puntos de discrepancia- nos hacen llegar a consensos que dibujan un espacio público»[2].

Considerar que los objetos arquitectónicos pueden ser un objeto de reflexión política resulta esperanzador a pesar de que, mediante el diseño, los objetos se extraen de su red y se veneran individualmente hasta el punto que se vuelven incapaces de «reunir» nada a su alrededor, y mucho menos espacio público. Si intentáramos comprender la función de un martillo en un mundo sin madera, clavos ni carpinteros, nos resultaría evidente que todo objeto precisa de un contexto que pueda revelarnos los términos de su existencia.

SILENCIAR EL OBJETO

Durante los años noventa, esta revaluación de las formas materiales en cuanto componentes clave de una red de actantes sirvió como telón de fondo -aunque de escasa repercusión- para un creciente interés en las redes por parte del discurso arquitectónico y urbanístico. En varias ocasiones se ha intentado reconducir el énfasis desde el objeto hacia la red de relaciones que existe entre los objetos humanos y los no humanos. Los intentos más recientes de elaborar un esquema estructurado de relaciones se han vinculado a lo que *a posteriori* ha resultado ser un entusiasmo un tanto ingenuo por la emergente cultura digital. En estos casos, la teoría de redes sirvió como portada del renacimiento de un formalismo biomorfo digital que continuó la costumbre de la imitación literal de semillas, conchas o protozoos que constituyen el «parametricismo» actual. Otros, sin embargo, se aproximaron a las redes con un sentido más abstracto y literal. En su prolífico ensayo de 1997 «From Object to Field», Stan Allen encontró en las tipologías cuasiurbanas de la mezquita de Córdoba, así como en la lógica estructurante del arte minimalista, algunos valiosos precedentes de cómo el objetivo principal del diseño se había reconducido desde el objeto al campo. Los términos de esta reconducción no pudieron ser más explícitos: «La producción minimalista de los años sesenta y setenta buscaba eliminar de la obra de arte su carácter figurativo o decorativo con el fin de poner en primer plano su condición arquitectónica. La construcción del significado se reconducía desde el propio objeto hacia el campo espacial entre el observador y el objeto: una zona fluida de interferencia sensorial habitada por cuerpos en movimiento»[3].

Aunque muchos arquitectos actuales proyectan con un «estilo» minimalista, por lo general se emplea como apoyo a la obsesión por los objetos más que como apoyo de las relaciones entre objetos. En el mejor de los casos, el minimalismo moderno trata de eliminar del objeto su carácter figurativo y decorativo precisamente para traer al primer plano la relación entre objetos. Mies creó edificios minimalistas para enfatizar la relación entre objetos, como demuestran sus múltiples proyectos de conjuntos edificatorios. John Pawson, por ejemplo, utiliza el minimalismo estrictamente para venerar un fetiche, tal como suele hacer Calvin Kline, su cliente habitual. Que ya no podamos apreciar la diferencia entre el minimalismo de Mies y el de Pawson es un indicio de lo lejos que estamos de reconducir el énfasis desde los objetos a las relaciones entre ellos. Más tarde volveré a tratar este aspecto de la obra de Mies.

La incapacidad de la arquitectura de ir más allá del fetiche a pesar de la claridad de sus intenciones es consecuencia de dos problemas relacionados. El primero es la ausencia de un proyecto urbano contemporáneo coherente. Desde el fracaso del urbanismo moderno en los años setenta, no han aparecido ideas a

escala urbana que hayan ocupado su lugar. Lo mejor que podemos ofrecer son megamanzanas que intentan imitar el urbanismo desfasado de calles y edificios con una escala antropomorfa. Esto resulta desconcertante, dado que el estudio de las relaciones entre objetos es, primera y principalmente, un estudio de la forma urbana. Al fin y al cabo, en las ciudades, incluso más que en los ecosistemas o las redes digitales, de lo que se ha tratado siempre es de relacionar los edificios, más que de los edificios en sí mismos. Es a partir de las relaciones entre edificios donde surgen los espacios públicos, por poner un ejemplo. Sin la implantación de un modelo urbano activo, se considera que la ciudad es aquello que ya existe, y el quehacer arquitectónico se limita a producir contrapuntos monumentales en el seno de unas preexistencias. Esto nos lleva al segundo problema relativo a nuestra capacidad para reconducir las relaciones: la absoluta identificación de la arquitectura con la producción de formas espectaculares. A pesar de la urgente necesidad de redirigir la arquitectura hacia el campo del diseño urbano, seguimos empeñados en reproducir el «efecto Bilbao». Y mientras que este efecto no muestra ningún síntoma de debilitamiento, el lujo de limitar el diseño arquitectónico a la producción de formas espectaculares nos alcanza por la retaguardia. El hecho de que muchos de los problemas de diseño más acuciantes de hoy no puedan resolverse mediante la creación de una forma aislada y espectacular conlleva irremediablemente que nadie se apiade de aquellos que siguen obstinados en producirlas.

EL ORGANICISMO

> «Pondremos en claro el principio orgánico del orden como una determinación del sentido y la proporción de las partes y su relación con el todo. Y por esto nos decidimos. La larga trayectoria del material hasta la configuración, a través de los fines, solo tiene un único objetivo: crear orden en la desesperante confusión de nuestros días. Pero queremos un orden que otorgue a cada objeto su sitio. Y queremos dar a cada objeto aquello que le corresponde por su esencia. Queremos hacer todo esto de una manera tan perfecta que el mundo de nuestras creaciones empiece a florecer desde su interior»[4].
>
> Mies van der Rohe, «Discurso de ingreso como director del Departamento de Arquitectura del Illinois Institute of Technology», 1938

No es casualidad que nuestra manera habitual de pensar refleje las prioridades de una economía extractiva. De una forma muy sencilla, Jason Moore afirma que «el capitalismo es un modo de organizar la naturaleza»[5]. Esta organización se basa en un proceso de mercantilización que extrae las materias primas de las redes de que forman parte y las transforma en objetos discretos de consumo. La necesidad de comprender material y conceptualmente las redes a las que pertenecen los objetos es una muestra de la importancia de imponer límites a la producción capitalista. También es una llamada a revaluar la creación de formas espectaculares. Superar la economía extractiva exige una evolución cultural que rompa con la burda cosificación de la naturaleza y de la cultura que las define como polos de un problema binario. Desde el prisma del ecosistema integrado, el diseño no debe imitar los objetos de la naturaleza, sino las intrincadas relaciones funcionales que se dan entre ellos.

El término *organicismo* se acuñó en Alemania en el siglo XIX para describir las relaciones funcionales de la naturaleza y fue adoptado por el movimiento moderno durante sus primeros años. En aquel contexto, se entendía por organicismo *una estrategia de mímesis que no utilizaba la extracción y la cosificación para reproducir el aspecto exterior de la naturaleza; se interpretaba más bien como un proceso que imitaba el funcionamiento de la naturaleza dentro de una red relacional compleja e integrada.* Tras superar los mecanismos de mímesis tradicional que habían caracterizado la arquitectura y el urbanismo, el movimiento moderno empleó el término *organismo como metáfora de amplio espectro de una lógica organizativa que integraba un conjunto complejo de partes en un todo*. El modelo definitivo de esta red de relaciones se remonta a la concepción de la ecología, que desde entonces se considera origen de todas las redes interconectadas. La idea contemporánea de red no proviene de las tecnologías de la comunicación o del transporte; ni siquiera de la relación entre edificios mediante infraestructuras urbanas. Todas ellas imitan a redes operativas descubiertas en la naturaleza. Y fue la ecología quien descubrió y describió por primera vez estas redes en el siglo XIX. Para cuando llegó el cambio de siglo, estas ideas habían madurado hasta el punto de ser ampliamente comprendidas y aceptadas, por lo que comenzaron a influir notablemente en los discursos culturales, incluido el discurso sobre arquitectura y urbanismo modernos.

SOBRE LA INTEGRACIÓN HOLÍSTICA

A la luz de las nuevas teorías que reflexionaban sobre las redes interconectadas naturales, la arquitectura y el urbanismo moderno dieron un giro para aceptar estrategias que permitían imitar no solo los objetos naturales aislados, sino también su lógica organizativa. La ciencia del siglo XIX enseñó a la primera generación del movimiento moderno que la lógica funcional de la naturaleza no podía deducirse a partir de objetos fuera de contexto por la sencilla razón de que ya se sabía que la naturaleza no funcionaba así. Una vez que las biotas y los ecosistemas formaron parte del conocimiento general, la representación idealizada de la naturaleza se reveló anticuada, ineficaz e incompatible con la visión moderna del universo. Esto despertó en el movimiento moderno la necesidad de actualizar las estrategias arquitectónicas de mímesis. Con esta nueva premisa, la sinécdoque (la identificación de la parte con el todo) ya no era efectiva. Los objetos naturales ya no eran representativos del conjunto, sino que debían reproducirse con total precisión como lo que realmente eran: elementos en un conjunto mayor de relaciones entre las partes y de las partes con el todo.

Para dar respuesta al nuevo tipo de imitación, se definió la concepción contemporánea de *organicismo*, tanto en las ciencias como en las artes, como una actualización del término influenciada por una filosofía (por otra parte, bastante antigua) conocida como *holismo*. Habitualmente descrita por el manido eslogan de «el todo es más que la suma de sus partes», la perspectiva holística permitió estructurar los problemas de las partes con el conjunto que los ecosistemas complejos comenzaban a postular en cuanto modelo de organización natural. Enseguida, esta problemática relación entre las partes y de las partes con el todo se convirtió en el eje vertebrador de la estrategia de imitación moderna.

La definición más sencilla de *organicismo* dice de él que es el empleo de sistemas naturales y, más específicamente, de organismos biológicos como modelo definitivo para la formalización urbana y arquitectónica. Creo que el primero en establecer esta correlación fue Detlef Mertins en su fructífero artículo de 2001 «Living in a Jungle: Mies, Organic Architecture, and the Art of City Building», en el que describe el impacto de los procesos orgánicos en Mies van der Rohe (podía parecer que él era el menos indicado del movimiento moderno para protagonizar una formalización orgánica). El hecho de que Mies sea el menos «orgánico» de los padres del movimiento moderno es lo más interesante: en un intento por evolucionar desde la imitación de cómo se muestra la naturaleza a cómo funciona, las construcciones miesianas de acero y vidrio -objetos de los que se ha eliminado su «carácter figurativo y decorativo»- rompen con la imitación tradicional y sin embargo muestran cómo las antiguas estrategias de mímesis pueden renovarse y ampliarse. Así, sus diseños se convirtieron en modelos paradigmáticos en los que aislar y definir una imitación moderna de las funciones naturales. Mertins escribe[6]:

> «Mies aseguraba que las formas de las ciudades son la expresión del modo de vida de sus habitantes. Y continuaba diciendo que "ambos están inextricablemente vinculados, y los modos de vida, junto con las formas de las ciudades, están sujetos al cambio". Describía la función del planeamiento urbano moderno y cómo debía servir para que "la nueva organización de

la vida moderna encuentre una expresión propia" por medio de la "formalización orgánica de las ciudades". Mies consideraba que la ciudad era el entorno (*Umwelt*) al que estaba ligada la arquitectura y, al mismo tiempo, su objetivo final. Era un ejemplo de totalidad e integración, un símbolo de estructura intangible pero omnipresente, la unidad de las relaciones y las interdependencias entre las cosas que procuraba expresar en la materialidad de las formas para que el observador pudiera percibirlas. Como otros muchos de su generación, Mies se valía del recurso del organismo para invocar precisamente esa estructura relacional holística y unificada. Basado en el principio orgánico de la libre relación entre partes autodeterminadas, el modelo orgánico podía aplicarse igualmente a las máquinas, a las ciudades concebidas como máquinas o a las plantas".

Mediante la referencia al organismo biológico y su «principio de libre relación entre partes autodeterminadas», Mies y su brazo derecho en materia de urbanismo, Ludwig Hilberseimer, se sirvieron de lo orgánico para llegar a una idea casi espiritual y generalizada de la función natural. Mucho tiempo después, Mertins reflexiona sobre el importante papel que representó la función biológica en la génesis de la arquitectura moderna y cómo el organicismo permitió resolver la aparente oposición entre las formas naturales y la abstracción moderna. El funcionalismo orgánico sostenía que la arquitectura no debía imitar la forma exterior de la naturaleza sino la organización fundamental (la relación entre las partes) omnipresente en el mundo natural. Desde esta perspectiva, las partes debían disponerse de manera que generaran nuevos elementos fruto de las «interdependencias» entre las partes y de estas con el entorno en el que se situaban. Una vez que se asumió esta definición más profunda de *función*, pudo reproducirse su lógica interna en una red más extensa de partes interrelacionadas.

Utilizando una referencia natural para describir la idea de la integración holística, Mies puso como ejemplo una falange o sección del dedo (puedes convertir una mano completa en un icono, pero no puedes hacer lo mismo con una sección aislada de un dedo). Mies tenía claro que la relación entre cada falange de un dedo con el dedo completo era una relación funcional. La forma en que el dedo se relaciona con los otros dedos y con la palma de la mano, la muñeca, el antebrazo y el resto del brazo creaba lo que Mertins ha denominado antes una «estructura relacional holística y unificada». La proporción entre las partes y de las partes con el todo evocan un funcionalismo imitativo que puede apreciarse en el trabajo de Hilberseimer y también en el proyecto moderno en general. Gracias a esta correlación substancial entre la forma de diseñar y la indiscutible autoridad de la que goza el mundo natural, el organicismo se convirtió en una metáfora de algo que es simultáneamente relacional y autónomo.

Al abrazar el organicismo, la arquitectura moderna no solo abrazó una imagen del mundo más avanzada y proveniente de la biología, sino también una nueva estrategia que evolucionó a partir de la arraigada costumbre de imitar lo natural. Aunque es algo de lo que nos hemos olvidado por completo, el movimiento moderno, y en especial el urbanismo moderno, se empleó a fondo en una revaluación integral de la forma para redirigir la atención desde el objeto hacia la interacción entre objetos. Como ya he mencionado, el objeto ambiental moderno se vació de contenido para enfatizar la relación entre objetos (una red cuyos nodos eran casi invisibles). El exquisito equilibrio de las relaciones entre las partes y el todo de los grandes conjuntos edificatorios de Mies -el campus del IIT (1939-1958), Lakeshore Drive 860-880 (1949-1951), Lafayette Park (1956-1964) o el Toronto-Dominion Centre (1964-1969), entre los más conocidos- sencillamente no pueden entenderse sin este premeditado cambio de dirección. Muchos otros modernos reproducen lo que debe denominarse un «estilo» minimalista, pero la eliminación de ese sentido figurativo casi siempre se utiliza para ensalzar el objeto aislado, más que para poner de manifiesto las relaciones entre objetos. Incluso en la obra de Mies, los objetos aislados, como el edificio Seagrams, adquieren un carácter reductivo (es decir, fetichista) dentro de su legado que ha llevado a malinterpretar sus objetivos últimos. En el mejor de los casos, la a veces bella y a veces terrible vacuidad de la forma minimalista es algo más que una elección estilística. Al permitir que la relación entre objetos sea la protagonista, Mies y Hilberseimer estaban adaptando la antiquísima costumbre mimética a un contexto cultural y científico radicalmente transformado.

Acabar con los procedimientos de mímesis tradicionales -incluyendo el simbolismo expresionista e icónico predominante en las manzanas, insectos y semillas actuales- permitió a los funcionalistas orgánicos concebir la arquitectura y el urbanismo como una red integrada análoga a un organismo vivo. En la medida en que cada organismo posee su propia lógica interna, sus partes también pueden ser autónomas o autodeterminadas. Sin embargo, estas partes relativamente autónomas también se relacionan entre ellas para formar conjuntos integrados. En ningún lugar este delicado equilibrio de la relación entre las partes y el conjunto es tan evidente como en las propuestas urbanísticas a gran escala.

UN ORGANISMO INTERCONECTADO: NEW ROCKFORD

«La teoría de la arquitectura en cuanto arte de construir (*Baukunst*), que Mies presenta aquí, se fundamentaba en los principios del planeamiento orgánico de las ciudades. Como muchos otros de su generación, Mies consideraba que las ciudades debían ser formas culturales sintéticas que mudaran a lo largo del tiempo mediante la interacción de fuerzas específicas invariables a lo largo de la historia. Las ciudades eran la máxima expresión de la una sociedad en continua evolución, el producto de una influencia recíproca y dinámica de los condicionantes económicos, políticos, sociales y espirituales. Mies aseguraba que "las formas de las ciudades son la expresión del modo de vida de sus habitantes". Y continuaba diciendo que "ambos están inextricablemente vinculados, y los modos de vida, junto con las formas de las ciudades, están sujetos al cambio". Describía la función del planeamiento urbano moderno y cómo debía servir para que "la nueva organización de la vida moderna encuentre una expresión propia" por medio de la "formalización orgánica de las ciudades"[7]. Mertins, "Living in a Jungle: Mies, Organic Architecture, and the Art of City Building"

El organicismo subrayaba la relación flexible entre el organismo y el contexto ecológico del que dependía su supervivencia (la supervivencia es la «función» primaria de todo organismo que ha logrado adaptarse a un entorno concreto). En esta relación es clave la escala del entorno. Mientras que *un* entorno puede tener varias escalas, y cada una puede hacer referencia a una escala mayor, *el* entorno es único. Por este motivo entre otros, Mies y Hilberseimer buscaban una integración de la arquitectura y el urbanismo y los consideraban simplemente dos escalas de una única red actante. Como un organismo que no distingue los límites entre él mismo y su contexto, la estancia en un edificio, el edificio en la ciudad y la ciudad en el territorio podrían considerarse una «estructura relacional holística y unificada».

Aunque está presente en todos los aspectos del trabajo de Mies y Hilberseimer, es importante vincular explícitamente su aplicación del organicismo a una imitación específica de la «función» orgánica. Teniendo en cuenta que la imitación no diferencia entre la escala arquitectónica y la urbana, me gustaría mostrar el tratamiento de un campo interconectado de partes autodeterminadas en un conjunto de escala relativamente grande.

A comienzos de los años cincuenta, Hilberseimer redactó un proyecto de reforma integral por fases para Rockford, en Illinois. Rockford era, y sigue siendo, una ciudad de tamaño medio fundada en la ribera y el vado (*ford*, en inglés) del río Rock. Seguramente Hilberseimer se sintió atraído por trabajar con un asentamiento urbano cuyo nombre reflejaba oportunamente la confluencia del mundo natural y la transformación ejecutada por el hombre. De hecho, esta conexión funcional entre los sistemas urbano y natural está muy presente en gran parte de su obra y sobre todo en el planeamiento para Rockford, un hecho que lo aleja del funcionalismo reduccionista con el que se lo ha asociado habitualmente.

A lo largo de sus carreras, tanto Hilberseimer como Mies fueron conscientes de que lo que hoy recibe el nombre de

ecología era considerado un problema cultural más que técnico. Desde la Casa de la Cascada a Lafayette Park, la sensibilidad por la cultura llevó al movimiento moderno a integrar en su ideario la función mimética de la arquitectura. Es importante reconocer que una interpretación en clave cultural de nuestros problemas ecológicos está en desacuerdo con la hegemonía técnica que monopoliza actualmente el discurso medioambiental.

La hegemonía técnica nace de la polarización de lo cultural frente a lo técnico.

Como ocurre con la oposición entre naturaleza y cultura, esta dualidad también se ha visto polarizada en dos posiciones excluyentes que no dejan espacio entre ellas. La imitación de la naturaleza es irrelevante desde una perspectiva estrictamente técnica, no porque sea cultural, sino porque plantea una interrelación compleja entre lo cultural y lo técnico, en vez de ocupar un polo definido. En otras palabras, la imitación no es técnica ni cultural, sino que se ubica en esa zona intermedia que no tiene cabida con una perspectiva polarizada que limita nuestra capacidad para resolver los problemas más acuciantes. Cuando un problema es técnico, se plantea en el campo de la ingeniería. Si el problema es cultural, pertenece al campo del artista. Durante mucho tiempo, el problema de la ciudad ha estado restringido al factor ingenieril de la ecuación, y solo se han concedido al mundo de la cultura algunas migajas ocasionales en forma de monumento.

Donde más intensamente se ha percibido la ausencia de ese espacio intermedio entre lo técnico y lo cultural ha sido en la descripción de la ciudad «ecológica». El proyecto urbano de Ludwig Hilberseimer procura abrir brecha en esta tierra de nadie considerando que en la ciudad es tan importante el aspecto cultural como el técnico. Mediante una estrategia de implantación progresiva, el proyecto de Hilberseimer para la reforma interior de Rockford nos muestra las posibilidades que pueden explorarse en este olvidado terreno intermedio.

Al analizar la documentación del proyecto, lo primero que llama la atención es que no está regido por un plan director, sino que se describe mediante una serie de fases, y cada una de ellas tiene su interés. En lugar de proporcionar una formalización única y final, el planeamiento para Rockford, al igual que todos los últimos trabajos de Hilberseimer, utiliza el tiempo como herramienta de diseño. En Rockford, la secuencia temporal se muestra en cuatro paneles. La reforma interior de la ciudad no postulaba una *tabula rasa*, sino que se propusieron una serie de fases bien definidas de demolición y construcción, en las que cada fase daba como resultado un asentamiento diferenciado con distintos grados de continuidad, de unidad y fragmentación, y de permeabilidad y compacidad. New Rockford emergería del tejido existente de manzanas y calles originando conjuntos de unidades menores con calles sin salida que en fases posteriores llegaría a parecerse en muchos aspectos a la megalópolis contemporánea. Volveré a incidir en este aspecto en la conclusión.

Además de la dimensión temporal, otra característica fundamental de este proyecto es la transformación de una estructura urbana centralizada y monocéntrica en una conurbación policéntrica que consta de treinta y nueve núcleos discontinuos, cada uno de ellos vertebrado por un eje central formando una estructura en doble peine. Aunque la transformación de Hilberseimer en una ciudad lineal ilustra bien el paradigma moderno (una estructura lineal sin principio ni fin), el proyecto no se limita a seguir ciegamente este paradigma, sino que proporciona una respuesta integrada con el entrono fluvial en el que se encuentra. Es decir, la causa del esquema lineal de Rockford no fue una simple afiliación a la ciudad lineal *per se*, sino la voluntad de crear una relación recíproca entre la forma natural y la urbana. Esta reciprocidad entre un urbanismo lineal y un valle lineal respondía a cómo el autor percibía un desequilibrio entre un urbanismo que se extiende arbitrariamente a partir de un único núcleo y el contexto natural en el que se extiende. No se trata de un contexto abstracto, sino que está bien definido por la cuenca del río Rock, formada por una topografía muy heterogénea que incluye el propio río, sus afluentes y algunos humedales contiguos, los bosques y la fauna que habita en ellos. El proyecto de Hilberseimer deja claro que este paisaje es una red biológico-geológica de un superorganismo que todo asentamiento urbano debe integrar mediante un proceso de imitación funcional. Si consideramos que la ciudad es parte de esta red biológico-geológica, la reforma interna de la ciudad debería imitar la adaptación funcional de un organismo a su ecosistema. Mediante esta imitación, Hilberseimer secuenció una transformación de Rockford de una cuadrícula reproducida mecánicamente en una especie integrada de organismo urbano adaptada a su emplazamiento natural.

Los pormenores del proyecto explican detalladamente las estrategias de mímesis de Hilberseimer. El primer panel muestra la situación preexistente de Rockford; se trataba de un infraestructura en cuadrícula que se había ido desarrollando alrededor del vado original del río. Mediante dos fases intermedias, la ciudad se va transformando calle a calle, y pasa de ser un tejido centralizado de manzanas y calles continuas a convertirse en una agregación lineal de fragmentos discontinuos alrededor de ejes secundarios. En la primera etapa de transición se aísla lo que será la arteria principal de tráfico norte-sur, que comienza a diferenciarse de las calles contiguas. Esta vía discurrirá junto al río, cruzándolo una y otra vez, como si se tratara de una interpretación artificial del curso del agua y los sedimentos. En la segunda etapa se continúa con la demolición de la cuadrícula y se inicia la construcción de nuevas calles. Además, se proyecta una vía principal este-oeste por la zona sur que despeja el centro de la ciudad en las inmediaciones del río. Se restaura el vado original y se liberan las márgenes del río, lo que da vía libre a la fuerza salvaje de la naturaleza para repoblarlas.

En la tercera etapa de la propuesta, el curvilíneo esquema inicial se conecta por el sur y se eliminan los cuatro ejes principales que comunicaban la ciudad con el campo. Conforme va desapareciendo la retícula, se recuperan completamente las orillas del río y se retiran todas las infraestructuras urbanas de las zonas inundables, excepto el puente sobre el vado original de la ciudad. Durante este proceso se establece un segundo eje norte-sur para vertebrar las infraestructuras que se mantienen al este del río. En esta fase ya se han iniciado los treinta y nueve núcleos en doble peine, entre los que se encuentra la construcción de tres nuevos nodos para industrias pesadas, estratégicamente situadas según los vientos dominantes. En la etapa «final», se eliminan las manzanas y calles continuas de la cuadrícula y se establece un nuevo patrón de agregación lineal e ilimitada. De manera análoga a los procesos de transformación urbana que evolucionan durante extensos (y variables) períodos de tiempo, Hilberseimer escalona una poética reconciliación entre la ciudad industrial y el entorno natural en que se asienta. Se han implantado esquemas lineales de estructura urbana para que puedan crecer en equilibrio con las fuerzas de la naturaleza que habita en el valle del río Rockford.

Al contemplar la fase «final» de la propuesta de Rockford, sorprende todo lo que puede conseguir un urbanismo polinuclear discontinuo que queda fuera del alcance de un tejido en forma de retícula continua. Una de sus mayores cualidades es la de integrarse en el contexto ecológico. A diferencia de la malla continua, la agregación linear de Hilberseimer es capaz de responder a los condicionantes existentes, pues la discontinuidad inherente a sus subnúcleos podía cambiar de dirección con facilidad para acomodarse a la compleja topografía y adaptarse a la escala geológica de la cuenca. Además, su intrínseca discontinuidad hacía posible llevar esta adecuación a todos los niveles. Como un peine abierto a las excepcionales brisas y temperaturas del ecosistema fluvial, cada nueva calle residencial finalizaba ahora en la ribera del río.

Hilberseimer buscaba una integración entre un urbanismo formado por distintas partes adaptadas a las complejas redes

ecológicas que conformaban este emplazamiento fluvial. Igual que un organismo, podría adaptarse a lo largo del tiempo a un entorno concreto mediante un procedimiento de diseño muy similar a los procesos evolutivos que originaron este lugar. Al fin y al cabo, la estancia en un edificio, el edificio en la ciudad y la ciudad en el territorio podrían considerarse una «estructura relacional holística y unificada» perfectamente adaptada a un medioambiente más amplio. Si la más elemental definición de *ecología* es 'la relación entre organismos y entre organismos con su contexto natural', podemos apreciar con claridad la estructura relacional que representa cada falange de un dedo a escala regional.

CONCLUSIÓN: UN ANTICIPO DE LA ERA SUBURBANA

La relación del planeamiento de Rockford con su entorno natural es «funcional» del mismo modo que un organismo natural complejo. Se trata de un ejemplo de planeamiento ecológico planteado en clave cultural, más que técnica; muy diferente a los modelos de planeamiento «verde» que en ningún caso logran trascender sus prioridades tecnocráticas. Dicho de otro modo; fracasan en su intento de poner en duda el tan arraigado prejuicio antropocéntrico inherente al enfoque estrictamente técnico. En su conocida colección de ensayos titulada *Down the River*, el ecopoeta Edward Abbey despotricaba contra estos prejuicios y los asociaba explícitamente con el proceso de extracción de recursos: «Detesto la palabra *recurso*. ¿Cómo podría un río, que forma parte del torrente sanguíneo de la naturaleza, llegar a ser considerado un simple recurso, como si no fuera más que una veta de carbón, un campo de coles o un camión de estiércol?»[8]. Está claro que los recursos son extracciones de un conjunto más amplio de relaciones, de los que el carbón, las coles o el abono no son más que una parte. New Rockford tiene tanto de proyecto de rehabilitación como de ejercicio de urbanismo moderno. Retirarse de la zona inundable del río y dejar espacio para que lo pueda recuperar su compleja biota subacuática no es solo un símbolo del nuevo modelo de ocupación humana del paisaje, sino también una liberación del río de un yugo que lo limitaba a ser un recurso.

No es casual que las últimas fases del proyecto de Hilberseimer para Rockford reproduzcan el patrón en doble peine tan habitual de los desarrollos suburbanos contemporáneos. El esquema en fondos de saco que puede verse en las interminables áreas residenciales de los Estados Unidos y en los planeamientos lecorbusianos de Asia y Europa no es sino un monocultivo programático estructurado por los núcleos discontinuos en doble peine que había «inventado» Hilberseimer. Al igual que un «campo de coles», las parcelas para unifamiliares, parques empresariales, centros comerciales, megaiglesias, aeropuertos y residencias colectivas, carecen del lirismo coreográfico de Rockford, pero su sustrato mantiene intacta la capacidad de imitación funcional que Hilberseimer imprimió a toda su obra.

Tras investigar el doble peine desde los últimos años veinte, Hilberseimer lo definió como el único sustrato organizador del urbanismo moderno. En proyectos como el de New Rockford o Lafayette Park, Hilberseimer llegó a pensar que este esquema llegaría a sustituir las grandes retículas de manzanas y calles que habían caracterizado el urbanismo durante siglos. Desde el momento de su aparición se confirmó que las especulaciones de Hilberseimer eran ciertas. Conforme nos adentramos en el siglo XXI, el porcentaje de urbanismo estructurado mediante el doble peine ha ido en aumento: tras más de setenta años en los que no se ha reproducido el esquema reticular de calles y manzanas, el urbanismo basado en el doble peine supone casi el 75 % del suelo construido.

La estructura de doble peine compartida entre New Rockford y los triviales monocultivos del siglo pasado acarrean importantes consecuencias para la reforma urbana. Por primera vez, la imitación funcional nos permite superar la escenografía de una naturaleza bucólica e idílica. Las calles curvas y los parques frondosos conforman el aspecto exterior de los sistemas naturales mientras ignoran su lógica interna. El proyecto de Hilberseimer sugiere que en el diseño urbano es posible una imitación más sofisticada y no escenográfica basada en una red interactiva de fuerzas naturales y urbanas, más que en el exuberante aspecto exterior. No obstante, dada la tensa relación entre el diseño de Rockford y los desarrollos suburbanos contemporáneos, es muy discutible que las aspiraciones medioambientales de Hilberseimer continúen latentes en el omnipresente esquema de doble peine. En otras palabras, las áreas suburbanas necesitan desesperadamente una revisión conceptual.

No es casualidad que nuestra manera habitual de pensar refleje las prioridades de una economía extractiva: «el capitalismo es un modo de organizar la naturaleza». Esta organización se basa en un proceso de mercantilización que extrae las materias primas de las redes de que forman parte y las transforma en objetos discretos de consumo. La necesidad de comprender material y conceptualmente las redes a las que pertenecen los objetos es una muestra de la importancia de imponer límites a la producción material. También es una llamada a revaluar la creación de formas espectaculares. Superar la economía extractiva exige una evolución cultural que rompa con la burda cosificación de la naturaleza y de la cultura que las define como polos de un problema binario. Desde el prisma del ecosistema integrado, el diseño no debe imitar los objetos de la naturaleza, sino las intrincadas relaciones funcionales que se dan entre ellos.

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03

Más allá de lo crudo y lo cocido

Scott Colman
Lars Lerup

La vieja dicotomía entre lo natural y lo artificial encuentra su expresión más grave en la rutina y viejas formas con las que conceptualizamos e intervenimos en el suelo. En este ensayo, Colman y Lerup proponen juntos desestabilizar y redefinir nuestra relación con la naturaleza a través del suelo, aplicando el prisma del Post-estructuralismo a las ideas y categorías expuestas por Claude Lévi-Strauss en Lo crudo y lo cocido. La obra del arquitecto belga Xaveer de Geyter, y sus intervenciones no convencionales en el saturado suelo de su contexto flamenco, sirven como demostración de las muchas maneras en las que arquitectura y naturaleza pueden y deben intercambiar posiciones de acuerdo a esta nueva lógica.

El concepto de «lo crudo y lo cocido» resulta muy útil para reflexionar sobre la «naturaleza como material de construcción», tal como se plantea en este número de *Ra, Revista de Arquitectura*. La expresión reproduce el título de la obra de Claude Lévi-Strauss *Le Cru et le Cuit*, escrita en 1964. Al asumir las relaciones entre opuestos que plantea este autor («lo fresco y lo podrido, lo mojado y lo quemado...»), nos encaminamos, igual que el propio Lévi-Strauss, por una senda que enmaraña la función organizativa y clasificatoria del pensamiento que, según él, podían tener las abstracciones empíricas de este tipo[1].

Es conocido cómo dos años más tarde, en su conferencia en honor de Lévi-Strauss, Jacques Derrida anunció una ruptura en los trascendentales «orígenes» del pensamiento oposicional, mientras explicaba, vapuleaba, socavaba y ponía del revés el proyecto estructuralista[2]. Como apunta la obra de Derrida, mientras no cocemos las cosas no somos conscientes de que están crudas.

Si consideramos el estructuralismo como nuevo material de estudio, observamos que, sorprendentemente, Derrida provoca una transubstanciación de lo cocido en crudo[3]. A medida que sentimos cómo se intensifica la temperatura del planeta, sus componentes sufren una creciente transmutación. Esta alteración ha llegado a ser paradigmática: nuestro ineluctable punto de partida no es la naturaleza, sino el artificio.

Se ha considerado el estructuralismo como la espacialización de las relaciones: mediante una metáfora que ha resultado muy atractiva para los arquitectos, la cota cero de un proyecto o una maestra en un muro representa la estructura organizativa de una

idea en un momento concreto. Cuando se enfrenta a un problema, el estructuralismo confía en elementos que coloca en lugares precisos[4]. Roland Barthes comparaba este enfoque con la vista sincrónica de París que proporciona la torre Eiffel[5]: nuestra visión y desvinculación de la tierra son simultáneas.

Para los arquitectos, la vista de pájaro es tan problemática como seductora. Conforme el suelo caótico que dejamos atrás se ha ido convirtiendo en un cimiento cada vez más fluido y difícil de aprehender, hemos alimentado un deseo galáctico; fantaseamos con otros mundos para intentar eludir nuestras limitaciones materiales mediante la concepción de un planeta propio completamente nuevo.

Pero hay todavía otra «línea de fuga» que propone una nueva concepción de nuestra esfera cada vez más recalentada, fermentada y podrida[6] y que, mediante el descenso a la sustancia de las cosas, socava la abstracción de términos antagónicos (lo crudo y lo cocido, lo natural y lo fabricado, lo construido y lo no construido).

Al arrebatarnos el suelo bajo los pies, el posestructuralismo podría habernos provocado una sensación de naufragio. Pero ha resultado ser extraordinariamente liberador una vez que hemos aprendido a flotar. El suelo, el aire, el espacio... no son más que líquidos que fluyen, descienden, se elevan y reaccionan. Cuando somos conscientes de que, aunque no podamos percibirlo, todo se mueve, el tiempo se vuelve primordial.

Durante mucho tiempo hemos pensado que la tierra gira alrededor de nosotros. La idea de un cambio climático inducido por el hombre reafirma este antropocentrismo. Por supuesto, no ponemos en duda que somos los principales responsables de la complicada situación actual, pero es crucial que distingamos entre la capacidad de actuar, que resulta evidente por todas partes, y el control, que no se aprecia en ningún sitio. En el momento en que nos damos cuenta de esto, nuestras nobles ambiciones vuelven a tierra.

Para capturar esta sensibilidad más modesta, reproducimos un poema de William Wordsworth. En su personaje Lucy (1798), que es a la vez temporal y eterna, podemos apreciar un destello de nosotros mismos:

> El sopor dominaba mi espíritu;
> no tenía temores humanos.
> Ella parecía una cosa incapaz de sentir
> el tacto de los años terrenales.
>
> Ya no se mueve, no tiene fuerza,
> tampoco oye ni puede ver;
> acompaña el transcurso diario de la tierra
> junto a las rocas, y las piedras y los árboles.

Lo antagónico (la vida y la muerte, el día y la noche, lo animado y lo inanimado, lo aéreo y lo subterráneo, lo autóctono y lo trasplantado, el movimiento y la estasis y, por supuesto, la naturaleza y el artificio) forma, de hecho, un caos. A partir de esta maraña, la ciencia saca a al luz la historia y estudia sus mecanismos, elementos que las artes y el diseño tratan de motivar, organizar e, incluso, acelerar.

Ya que realmente nunca hemos logrado alcanzar las formas celestiales que tenía en mente el demiurgo artesano de Platón, los arquitectos podríamos reconocer, y tal vez acoger con los brazos abiertos, la mortalidad sublunar de las cosas. El hecho de identificar a Lucy en nosotros mismos (atrapada entre el futuro y el pasado, el ser y el devenir), tiene mucho que ver con esto. En el abrasador mundo en el que nos encontramos se produce una interminable transformación substancial: inhalamos las moléculas que un día respiró Wordsworth. Todas nuestras *particularidades* no son más que simples *partículas* arrastradas por el viento -y que pronto volverá a arrastrar-, un viento cada vez más sometido a nuestros propios delirios de grandeza.

Lucy es recurrente en la obra de Wordsworth. También se revela como uno de los descubrimientos más importantes de la paleontología: un esqueleto cuya anatomía es sorprendentemente similar a la nuestra. Y aparece «in the sky with diamonds» en un mundo de *flores de celofán, mandarinos y cielos de mermelada*[7]. Suspendida entre el conocimiento y la imaginación, el pasado y el futuro, la naturaleza y el arte, Lucy es parte de todo, pero no (o no solamente) con el sentido poético que hemos llegado a concederle: dada la dimensión material de nuestra naturaleza humana, nos convertimos en árboles que se convierten en edificios que se convierten en compost[8]. Todo es producto de una constante reutilización[9].

¿Y cómo navegar entre la espesa niebla?

El terreno en cuanto emplazamiento liminar de la representación material, esa superficie mística de escritura entre el cielo y la tierra, ha recibido durante mucho tiempo una especial atención por parte de la teoría de la arquitectura[10], por no hablar de cómo dejar el estructuralismo a la deriva se convirtió en una estrategia de la producción arquitectónica contemporánea[11].

En lo más íntimo de estas disquisiciones, que desde antiguo han formado parte de las metáforas arquitectónicas de la filosofía occidental, se encuentra un punto débil en los fundamentos y la metafísica sobre los que descansa la tierra -nuestro monumento y lápida sepulcral- y que constituye el elemento crítico ineluctable[12].

Pero, al saltar por los aires los fundamentos establecidos, lo que en el pasado se encontraba suspendido en la intemporalidad y anclado en estratos geológicos se ha liberado y combinado para originar una nueva atmósfera cultural. La gasificación y la licuación definen nuestra era, y conforme la tierra se evapora y derrite, sus contornos se disipan. La naturaleza y el artificio, lo construido y lo no construido se han desplomado en el vacío. La disensión categórica entre lo crudo y lo cocido nos ha dejado sin tierra bajo los pies y con la visión borrosa. Ahora debemos aprender a orientarnos bajo la luz homogénea de un entorno omnidireccional[13].

Para profundizar en las cuestiones arquitectónicas afectadas en este contexto de licuación física e intelectual, resulta muy esclarecedor el trabajo del arquitecto belga Xaveer de Geyter, tanto en sus obras junto a la Office for Metropolitan Architecture (OMA) como en Xaveer de Geyter Architects (XDGA). El procedimiento diagramático adquiere una particular relevancia en nuestras reflexiones, ya que deambula por los límites del razonamiento anclado en el terreno.

En el libro *After-Sprawl* (2002), XDGA y Lieven de Boeck comienzan con la observación de que el *sprawl* o dispersión urbana (la desmaterialización de un umbral nítido entre el campo y la ciudad) es un concepto global que desdeña toda variación en los patrones de asentamiento y las condiciones locales particulares. Sugieren que tal dispersión es un concepto propio de Norteamérica y que las categorías enfrentadas de lo construido y lo no construido carecen de todo sentido en el contexto europeo, caracterizado por la multiplicidad de capas de historia, sedimentadas, erosionadas, coaccionadas y transformadas, y cuyos paisajes han sido desnaturalizados una y otra vez[14].

Para evaluar las consecuencias de esta apreciación, es útil llamar la atención sobre una de las últimas conferencias de De Geyter (Rice University, 31 de enero de 2018) o, en concreto, sobre su inteligente estructura discursiva. Se trata de una ponencia elegantemente concebida y dictada con habilidad, que abarca desde la escala de la ciudad a la del detalle constructivo. Pero lo más importante es cómo varían sus criterios conceptuales desde un riguroso esquema urbano hacia el reino más sutil del material, como si un negativo fotográfico sobreexpuesto se transmutara ante nuestros propios ojos en un paisaje de elementos pixelados.

Aunque la conferencia incluyó muchos otros proyectos, mencionamos a continuación los más representativos:

1. La prioridad de lo construido y lo no construido se revierte: En el proyecto de OMA para el planeamiento de Melun-Sénart, una nueva ciudad en los «verdes» campos al sureste de París, la «estrategia del vacío» invierte la focalización arquitectónica ortodoxa sobre lo construido y en su lugar se centra en la forma de lo

no construido para preservar el espacio abierto independientemente del desarrollo urbano futuro de esta área **(fig. 02)**[15].

2. Se erosiona la relación entre lo construido y lo no construido: El proyecto para la Oude Dokken School (Gante, 2015) introduce el paisaje en una «mitad» del edificio **(fig. 03)**. El proyecto para la sede central del Comité Olímpico Internacional (Lausana, 2014) subsume conceptualmente una zona de parque y un edificio histórico bajo una única cubierta. Mientras que estos dos proyectos incorporan lo no construido a lo construido, un tercer proyecto, la ampliación del Museo de Bellas Artes de Tournai (2015), diseñado originalmente por Victor Horta (1907-1928) agrega lo construido a lo no construido rellenando el vacío urbano existente que rodeaba el edificio original **(fig. 04)**.

3. El terreno como punto de referencia de lo construido y lo no construido se socava y subvierte: En la propuesta conjunta de OMA, XDGA y One Architecture para Les Halles (París, 2003-2004), se desestabiliza por completo la oposición entre lo crudo y lo cocido, lo natural y lo fabricado **(fig. 05)**. Para descubrir los estratos latentes, inertes y marchitos bajo el centro de París desde la caricatura de reforma de los años sesenta, los arquitectos provocan una disrupción volcánica: los niveles de infraestructuras salen a la luz, se excavan grutas comerciales en los diferentes estratos, las vías de metro erupcionan y se solidifican en conexiones monolíticas mientras que el programa y la vegetación, de diversas formas y matices cromáticos, dispuestos ordenadamente o al azar, se acomodan en grietas y recovecos, fecundos desfiladeros, en pavimentos deformados o en círculos que reproducen a escala doméstica los dibujos de los cultivos.

4. Lo natural y lo procesado se sintetizan: En los pliegues rizoides de Les Halles se elige la historia de la ciudad como materia prima del futuro. A una escala muy diferente, en las aperturas inferiores de la Escuela de Arquitectura y Arte de Sint-Lucas (Gante, 2002-2013) -modelada a partir de ejemplares líticos naturales, resinas traslúcidas y semitransparentes y conglomerantes cementosos opacos para erosionar cualquier distinción formal entre lo orgánico y lo inorgánico- **(fig. 06)**, la imbricación de lo construido y lo no construido, de lo geológico y lo tectónico se evidencia por la detallada materialidad de una íntima experiencia sensorial.

La conferencia sigue un desarrollo más escalar y conceptual que cronológico. Pero el aparente cambio de rumbo desde la delimitación hacia la complicación de lo crudo y lo cocido, de lo construido y lo no construido, no debería entenderse como constitutivo de un progreso temporal. La negativa de De Geyter a reconocer tal desarrollo traiciona su aseveración acerca de que nuestra batalla con la condición material ya no puede enseñarse en términos lineales, como una naturaleza inexplorada o abandonada al destino manifiesto de un horizonte artificial. Ahora podemos acceder a este repertorio de posicionamientos híbridos y sintéticos gracias al campo vectorial establecido por dos polos: la naturaleza y el artificio.

La obra de De Geyter, más que deambular entre términos antagónicos, nos lleva al momento de su sublimación. Como podía apreciarse en Melun-Sénart, y aún con más claridad en *After-Sprawl*, el vacío se materializa, más que por oposición o como una singularidad, como una multiplicidad de capas y fragmentos ecológicos entremezclados e interpenetrados (agricultura, bosque, ocio, ganadería...). Especialmente en Bélgica, país en el que trabaja XDGA, la distinción entre el fondo y la forma se ha disgregado en un lienzo infinito de retales (in)congruentes e indistintos, en un paisaje pospuntillista de innumerables matices y formas que entremezclan los verdes, grises, marrones, azules... Los categóricos tonos de la naturaleza y el artificio han perdido todo valor discernible. En su lugar ha surgido una constelación de elementos y accidentes geográficos transitorios: ríos, terraplenes, cauces, plantas, riberas, zonas verdes, criaturas, máquinas...

El carácter temporal del *after* de *after-sprawl* expresa un descubrimiento más que una proyección, pero en cualquier caso es un gran paso adelante en la medida en que perfora y desintegra el plano del suelo en cuanto tímpano de nuestro pensamiento. En ese momento nos damos cuenta de que, al igual que los insectos acuáticos, hemos estado durante mucho tiempo inmóviles en una tensión superficial paralizante. Es obvio que entre Melun-Sénart y Les Halles, el terreno como punto de referencia, en una continua rumiadura conceptual, ha sido tan mascado que desprende un ambiente de sustancias volátiles. Lo que resulta menos obvio es que con ellas aparecen algunos mecanismos de suspensión.

Normalmente se asocia la composición arquitectónica con la disposición metódica y tangible de elementos en un lugar mediante diferentes constructos organizativos. Sin embargo, las obras de XDGA tienen a discurrir por otros derroteros. Más que disponer, el proyecto del COI absorbe algunos aspectos irreductibles del contexto y de los requisitos del programa de necesidades mediante un único *escaneo* del emplazamiento **(fig. 07)**. Enfrentado al dilema de ampliar una institución privada a expensas de un parque público, XDGA resuelve el oxímoron extendiendo uno en el interior del otro: una porción del parque y el edificio histórico, con todas sus peculiaridades y posibilidades, quedan así atrapados bajo una cubierta que los expone en una vitrina transparente de iluminación uniforme. De Geyter insiste en que «lo que caracteriza el diseño [del proyecto del COI] es la utilización de elementos y edificios existentes como piezas de una nueva composición». Como ocurre con el «descubrimiento» de un *«sprawl»* europeo ecológicamente diverso, los componentes del proyecto no son objetos procesados, sino restos encontrados; se engulle lo cocido como si estuviera crudo. Al comparar esta propuesta con el diseño del New Port House de Amberes (2008), que XDGA describe como «perdido» en el solar, De Geyter añade: «Lo que a algunos podría parecer conflictivo es para nosotros una oportunidad de crear una situación nueva a partir de lo preexistente»[16]. En la cuestión de lo crudo y lo cocido, que ya nada tiene que ver con lo construido y lo no construido, empieza a pesar menos la delineación precisa del emplazamiento que la recomposición con unos ingredientes materiales específicos.

La táctica de escanear el terreno, en lugar de generar contornos precisos sobre una cota cero predefinida, da forma a relaciones internas. Aglutina todas las relaciones (entre humanos, entre humanos y cosas, cosas y cosas...) en una multiplicidad de interrelaciones. Abandona la idea de diseño que oscila entre lo abstracto, la formulación universal de un objeto autónomo y su materialización en un lugar. El proyectista olvida su actitud demiúrgica y se convierte en un sujeto inmanente al objeto, que observa y promueve la redisposición y la transmutación de los condicionantes preexistentes. De esta manera, el arquitecto, concebido como un sujeto que escanea continuamente, ya no se evade en un ideal, sino que consume y respira los constituyentes y la atmósfera terrenales; queda sepultado junto lo que hasta entonces era «lo otro», un extenso panteón que incorpora todo lo creado.

No pretendemos que XDGA se abandone por completo a las consecuencias materiales de su propio punto de partida. Ya hay otros estudios, por lo general más jóvenes, dispuestos a encontrar la redención en el potencial ecológico, sensorial y afectivo de la materia[17]. Además, las nuevas generaciones son más propensas a implantarse prótesis espectrales, como dispositivos lídar o la fabricación, impresión y fotografía digitales, que atrapan al diseñador contemporáneo en nubes virtuales que se convierten en terreno fértil para la imaginación. Sin embargo, pensamos que la obra de XDGA debe llegar hasta el mismo umbral (las aperturas mencionadas antes de los talleres de Sint-Lucas son, quizá, las que más se aproximan). Y, precisamente por estar en la cúspide de una naturaleza evanescente y por haberse liberado de un terreno figurativo, algunas transformaciones potenciales y latentes son, al menos para nosotros, todavía más evocadoras.

Emplazada junto al canal, la Oude Dokken School (escuela de los antiguos muelles) consigue dragar el fondo marino para

sacar a la superficie los métodos de educación primaria contemporáneos: flotadores, botes salvavidas y alimento, pero también descubrimientos nunca antes revelados de un programa que es al mismo tiempo centro educativo, guardería y patio de juegos. En un arrecife de visiones lúdicas, XDGA imagina una escuela de niños efervescentes. Los estanques, las fuentes, los toboganes, los areneros, las rampas, los juncos y las bolas de colores se distribuyen por un acuario abierto, un verdadero microcosmos escolar. El proyecto deja claras sus intenciones de desvincularse de los centros educativos tradicionales semejantes a un terrario extirpado al subsuelo. Algunos de sus elementos más teatrales se acompañan de parterres de colorida vegetación. El «espacio abierto» es por fin espacial, liberado del abstracto movimiento moderno de un lienzo terrestre. En la versátil red de la escuela, todo parece olvidado en la naturaleza, como una vasija antigua.

En este gran contenedor podemos distinguir el destello arquitectónico de un universo futuro. Suponemos que esos niños no conocerán los discursos tradicionales del orden y la certeza. La próxima generación bien podría colarse tras el viejo telón y correr libre, más allá de la casa, por todo nuestro museo terrestre para encontrar especímenes inéditos con los que desarrollar un currículum poshumanista y elaborar desde cero una nueva historia natural.

Pero, incluso si ponemos en duda nuestras etiquetas o las eliminamos de los archivadores de las bibliotecas, el contorno de la cuadrícula todavía sigue ahí, y quizá lo tangamos grabado en la retina para siempre. Puede que hayamos logrado levar el ancla en los antiguos muelles, pero no salimos del puerto. Ese andamiaje figurativo y estructurador constituye un umbral entre el edificio y el mundo; una andamiaje que quizá nunca lleguemos a franquear, por mucho que el cambio posibilitado por esta red suponga el advenimiento de una nueva igualdad no solo entre alumnos y profesores, sino también entre sujetos y cosas. A punto de percibir el mundo en todas sus dimensiones, incluso la noción filosófica de la *ontología plana* parece excesivamente reduccionista. En el horizonte de un futuro poshumanista nos encontramos un pasado antropocéntrico.

Esta confluencia resulta evidente en la ampliación del museo de Tournai, donde XDGA amarra la tortuga de Horta como queriendo martirizar al hombre vitruviano en una memorable intervención que nos permite ser testigos de la absoluta disolución de las categorías. Parodiando el estudio anatómico de Da Vinci, Horta había trastocado extraordinariamente el corpus antropomórfico de la arquitectura, no al estilo del *contrapposto* de Miguel Ángel, sino mediante el teriomorfismo mitológico. Aunque el antiguo museo no sea el ejemplo más atractivo de la fusión de Horta entre «hombre» y naturaleza, XDGA reinterpreta con brillantez este tema recurrente de la obra de Horta. Como ocurre en la casa Tassel, al entrar al museo de Tournai desde el interior de la metrópolis, los muros del edificio se disuelven iluminados por grandes lucernarios y el peatón se descubre a sí mismo en medio de la naturaleza. XDGA rellena el vacío entre el museo y la ciudad y despeja los restos del naufragio acumulados en el edificio primitivo para sintetizar con singular potencia el concepto original de Horta: «*Horta in urbs* y *urbs in horto*».

Y sin embargo, al configurar la ampliación como una retícula de espacios, y al escalarla y alinearla para establecer una relación con las protuberancias y proporciones del caparazón del museo preexistente, XDGA provoca una radical transubstanciación de la planta de Horta. Atrapada en la red de XDGA, la vivificación arquitectónica propuesta por Horta queda revertida bajo la perversidad de un taxidermista habilidoso y sádico. Conforme se desvía la atención del contorno exterior, el cuerpo animado de Horta comienza a descomponerse y se separan una a una las extremidades desde sus puntos de articulación. Esta inquietante degradación de un cuerpo transformado en animal y fragmentado en órganos permite a XDGA mostrarnos una arquitectura desfasada y yacente, casi petrificada, el velatorio de un fabuloso cadáver geometrizado. En el grado cero de la red, la planta de XDGA tensiona el plano del suelo provocando en la entrada una convulsión de vacío y precepto que embalsama el cuerpo arquitectónico y precipita su descomposición abandonado en el territorio salvaje de la ciudad. De este modo, el proyecto recupera el listado de propuestas especulativas con las que finaliza *After-Sprawl*, donde XDGA simultáneamente licúa y preserva la relación entre fondo y forma urbanos descomponiendo su complejidad en una serie de píxeles de una imagen continua[18].

En Torunai, el objeto se momifica víctima de una crisis perpetua, una metonimia que vincula la ciudad con el proyecto de XDGA, que, a su vez, escanea una imagen congelada de la necrosada fermentación del paisaje belga y pone de manifiesto su extraordinaria variedad de circunstancias[19]. En el esquema voxelizado del museo de Tournai, XDGA dibuja por toda la planta una línea sinuosa desde la entrada hasta la salida que representa el recorrido aleatorio del visitante. Aunque esta línea no muestra ninguna variación conforme va pasando de las zonas nuevas a las antiguas, la forma del antiguo museo y la del terreno recién ocupado, a pesar de su predestinada contigüidad, mantienen decididamente su propia lógica interna. En esta relación entre espacios aislados y abiertos (la forma y su descomposición), dos mundos radicalmente opuestos aparecen interconectados: uno abierto, flexible e indeterminado; el otro es una serie de celdas provisorias. En el espacio abierto, cada pixel se relaciona con todos los circundantes. En la planta zoomórfica, los huecos bien definidos controlan la circulación. La estricta disciplina de este segundo discurso, tan íntimamente vinculado con el antropocentrismo, se licúa en el territorio poshumanista mientras el conjunto histórico es perforado por los gusanos.

Como Gulliver, nos descubrimos clavados al suelo, como rodeados por un contorno de tiza. Pero estamos equipados con medio siglo de «teoría» que nos permite discernir el menor rastro de antropocentrismo y somos conscientes de que el caprichoso paso del tiempo echará por tierra cualquier intento de regulación. Algunos suponen que no deberíamos darnos tanta importancia. Otros todavía añoran el horizontal paisaje circadiano al que cantaba Jacques Brel en *Le Plat Pays*. Pero, si somos conscientes de que estamos cayendo por un precipicio de piedras y robots, quizá podamos llegar a comprender que las cuadrículas, redes y estructuras reticulares cada vez más finas con las que aplanamos, pixelamos y voxelizamos nuestra irreductible materialidad no son solo una manera de clasificar y estructurar lo que nos rodea, sino el modo como buscamos y nos enfrentamos al progresivamente complejo transcurso de nuestro devenir terrenal. Para profundizar sobre este incipiente potencial, lo mejor que podemos hacer es reproducir palabra por palabra un texto de Mario Carpo[20]:

> "En teoría, y cada vez más en la práctica, las herramientas de diseño y fabricación digital están eliminando gran parte de las limitaciones que supuso el auge de los estándares industriales. Por ejemplo, la ingeniería forestal ya está utilizando sistemas de cubicación de árboles mediante rayos X: se escanean los árboles antes de talarlos y se adapta el corte de los tablones de cada tronco para minimizar los residuos. En el aserradero no guardan los escaneos después de vender las piezas, pero no hay motivo para no diseñar un flujo de trabajo integral desde el diseño hasta la entrega, que en este caso se podría ampliar para incluir la producción natural de la materia prima: una producción *desde el bosque hasta la entrega*, que incluso podría iniciarse el día en que se planta el árbol (y que, curiosamente, podría emular de nuevo las prácticas ancestrales de nuestro pasado preindustrial). De este modo, podría talarse cada árbol de acuerdo con un fin específico: una perfecta combinación biunívoca entre la oferta y la demanda que permitiría un ahorro considerable sin necesitad de producir a gran escala, que es precisamente lo que hacen las nuevas tecnologías cuando se aplican correctamente. De igual modo, ahora podemos diseñar y fabricar materiales de propiedades variables con un nivel de resolución inimaginable anteriormente, incluido el hormigón, que puede extruirse mediante troqueles manejados por brazos robóticos, por lo que cada pieza de material puede ser diferente a todas las demás. Esta siempre fue la gran ventaja del hormigón artesanal, ese que aterrorizaba a los ingenieros, pues no podían diseñarlo y calcularlo".

Continuamente escaneada, nuestra realidad material está por fin a nuestra disposición, aunque no de la manera que, como recoge la idea de la «existencia» de Martin Heidegger, permite determinarla y estabilizarla[21]. Ahora podemos proceder al diseño, pero en vez de utilizar rudimentarias abstracciones, podemos trabajar de una manera más intimista, con las aspiraciones peculiares y específicas de los materiales que componen el emplazamiento, el programa y el cuerpo. Más que abandonar nuestra ineluctable ansia tecnológica en una desubicada nostalgia por lo crudo, recién cocido, mezclado, fermentado y nuevamente descompuesto, las «existencias» -ese irreductible vacío instrumental entre nuestras figuraciones sobre el mundo y la realidad de la tierra- podrían sencillamente «desvanecerse en el aire»[22]. La química es inmisericorde. Pero debemos consustanciarnos con esa turbulenta granulación pegajosa que satura nuestros cielos de mermelada. Como todo buen cocinero sabe, el aspecto más acuciante de la materialidad de lo crudo y lo cocinado es la irreversibilidad del tiempo.

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Notas

01. LÉVI-STRAUSS, Claude, *Le Cru et le Cuit*, 1964. Traducido al español por Juan Almela como *Mitológicas. 1, Lo crudo y lo cocido*. México D. F., Fondo de Cultura Económica, 1968.

02. Véase DERRIDA, Jacques, "Structure, Sign, and Play in the Discourse of the Human Sciences" en *Difference and Repetition*, Londres, Routledge, 1978, pp. 278-294. Traducido al español por Patricio Peñalver como "La estructura, el signo y el juego en el discurso de las ciencias sociales" en *La escritura y la diferencia*, Barcelona, Anthropos, 1989, pp. 383-401.

03. Véase DERRIDA, Jacques, *Of Grammatology*, Baltimore y Londres, The John Hopkins University Press, 1976 (1998). Traducido al español por Óscar del Barco y Conrado Ceretti como *De la gramatología*, México D. F., Siglo Veintiuno, 2003.

04. Sobre esta metáfora en Barthes, véase el décimo capítulo de FRY, Paul, *Theory of Literature*, New Haven, Yale University Press, 2012.

05. Para Barthes, la torre Eiffel está "decidida a persistir, como una roca o un río". Véase BARTHES, Roland, "The Eiffel Tower", traducido al inglés por Julie Rose, en *AA Files*, 2012, 64, pp. 124-132.

06. Aquí utilizamos una elaboración de las categorías de Lévi-Strauss desarrollada por K. Michael Hays para su conferencia junto a Andrew Holder en la Harvard Graduate School of Design, "Inscriptions, Architecture Before Speech", 23 de junio de 2018. La expresión "línea de fuga" pertenece a Gilles Deleuze.

07. Según Wikipedia, el australopiteco descubierto en 1974 recibió el nombre de Lucy por la canción de los Beatles del mismo nombre que sonaba a todo volumen una y otra vez en el radiocasete del campo de excavación.

08. Nuestra utilización del poema de Wordsworth como epitafio está influida por los dos últimos capítulos de FRY, *Theory of Literature*, op. cit.

09. Véase SERRES, Michel, *Rome: The First Book of Foundations*, Londres, Bloomsbury, 1983 (2015).

10. Sobre la pizarra mágica o "block maravilloso", véase FREUD, Sigmund, "A Note Upon "The Mystic Writing Pad"", 1925, y DERRIDA, Jacques, "Freud and the Scene of Writing" en *Writing and Difference*, Londres, Routledge, 1978, pp. 196-231. Traducido al español por Patricio Peñalver como "Freud y la escena de la escritura" en *La escritura y la diferencia*, Barcelona, Anthropos, 1989, pp. 271-317. Véase también EISENMAN, Peter, "Diagram: An Original Scene of Writing" en EISENMAN, Peter, *Diagram Diaries,* Nueva York, Universe, 1999, pp. 26-35.

11. La obra de Peter Eisenman es el ejemplo más inteligente de esto.

12. Véase WIGLEY, Mark, *The Architecture of Deconstruction: Derrida's Haunt*, Cambridge (Massachusetts) y Londres, The MIT Press, 1993.

13. Si carecemos por completo de terreno, ya sea natural o artificial, podríamos encontrarnos en una situación de carencia de "inscripción", de cualidad figurativa tras el dibujo. Compárese KNAPP, Steven, y MICHAELS, Walter Benn, "Against Theory", en *Critical Inquiry* 8, vol. 4 (verano 1982), pp. 723-742, que comienza con la inscripción en la playa (un terreno inestable) y HAYS, K. Michael, en la conferencia citada anteriormente, quien, continuando con la introducción de *Essay on Epitaphs,* de Wordsworth, elige el terreno artificial de la arquitectura como lugar para la inscripción.

14. DE BOECK, Lieven, y XAVEER DE GEYTER ARCHITECTS, "After-Sprawl", en XAVEER DE GEYTER ARCHITECTS, *After-Sprawl: Research for the Contemporary City*. Rotterdam, NAi Publishers, 2002, pp. 19-32.

15. Véase "Surrender" en SIEGLER, Jennifer (ed.), *S, M, L, XL*. Rotterdam, 010 Publishers, 1995, pp. 972-989.

16. DE GEYTER, Xaveer, "A Conversation with Xaveer de Geyter, XDGA, at Casa dell'Architettura in Rome", 26 de febrero de 2015, http://www.bmiaa.com/xdga-casa-dellarchitettura/

17. La muestra más representativa de estos estudios podría ser la recopilada por K. Michael Hays y Andrew Holder para la exposición "Inscriptions: Architecture Before Speech", del 22 de enero al 11 de marzo de 2018, Harvard Graduate School of Design.

18. Xaveer de Geyter Architects, *After-Sprawl*, op. cit., pp. 173-251.

19. Sobre la "crisis del objeto", véase TAFURI, Manfredo, *Theories and History of Architecture,* Nueva York, Harper and Rowe, 1976. Traducido al español por Martí Capdevila como *Teorías e historia de la arquitectura: (hacia una nueva concepción del espacio arquitectónico)*, Madrid, Celeste, 1997.

20. CARPO, Mario, *The Second Digital Turn: Design Beyond Intelligence.* Cambridge (Massachusetts) y Londres, The MIT Press, 2017, pp. 52-53. Carpo se refiere a la búsqueda, más que a la clasificación, como base de lo que denomina "el segundo giro digital". Esta distinción se mantiene a lo largo de todo el texto.

21. Véase HEIDEGGER, Martin, *The Question Concerning Technology and Other Essays,* Nueva York, Harper, 1977, p. 20. Traducido al español por Eustaquio Barjau como *La pregunta por la técnica*, Barcelona, Serbal, 1994, pp. 9-37.

22. Para la diferenciación de Heidegger entre *tierra* y *mundo*, véase "On the Origin of the Work of Art" en *Basic Writtings,* Nueva York, Harper Collins, 2008, pp. 143-212. Traducido al español por Helena Cortés y Arturo Leyte como "El origen de la obra de arte" en *Caminos del bosque,* Madrid, Alianza, 1996. La expresión "se desvanece en el aire" es de BERMANN Marshal, *All That is Solid Melts into Air: The Experience of Modernity,* Nueva York, Penguin Books, 1988. Traducido al español por Andrea Morales como *Todo lo sólido se desvanece en el aire. La experiencia de la modernidad,* México D. F., Siglo Veintiuno, 1988.

Imágenes
01. y 02. Ville Nouvelle Melun-Sénart, Melun, OMA, 1987.

03. Oude Dokken School, Gante, XDGA, 2015.

04. Museo de Bellas Artes, Tournai, XDGA, 2015.

05. Les Halles, París, OMA y XDGA, 2003-2004.

06. Sint-Lucas, Gante, XDGA, 2002-2013.

07. COI, Lausana, XDGA, 2014.

04

Nature as Construction Material

Ophélia Mantz
Rafael Beneytez

Considering structural systems, relational events, and temporal cycles as observed in living organisms has always been a source for human inspiration. Nature, seen as an open-ended system, offers the opportunity to learn from both its results and its processes. The construction of new paradigms inspired on nature is the common thread that weaves together the article's main argument: nature as construction material for new models of thought and organization within the fields of architecture and the city.

CONTINGENCY IN ARCHITECTURE: TEMPORAL AND TECHNICAL ECOLOGY

The emergence of agriculture 9000 years ago as well as the Industrial Revolution in the 19th century has marked very significant ruptures in mankind's relationship with nature. Until the *Homo Sapiens* could master agricultural techniques, he thrived by conforming to the natural environment. From the so-called *Neolithic Revolution* onwards, man began to adapt the surroundings according to his needs. In other words, thanks to our cognitive capacities, our species today has evolved from being essentially biological to cultural.

Humans since the Industrial Revolution have heavily resorted to the use of substances found in the lithosphere, in lieu of those produced by the biosphere. Such resources like carbon, gas, oil, and sediments are products of ecosystems that disappeared hundreds of millions of years ago. Man's capacity to adapt nature to conform to his will has allowed him to break free from any ties of dependence. As a result, man has detached from any corresponding temporal cycles. The accelerated race of consumption of limited raw materials has led us to a state of hypertrophy in the present. When identifying our origins, selective amnesia prevents us from collectively projecting a long-term future, not just for a few coming years.[1]

Without having to submit to notions of a mystified nature, one has to recognize the urgency to reinvent the basis of a new "natural contract", a subject already introduced by French philosopher Michel Serres in 1990.[2]

Nature, conceived as an open system in which we belong to, is and has always been a source of inspiration. Knowledge of living organisms constructed from observation allows the under-

standing, with ever more precision, of the complexity of the systems that house them. Their permanent dynamics of evolution, adaptation, and emergency, as well as their tendency for varied multiplicities and wide range of redundant and infinite solutions, gives us the opportunity to learn from both the results and their processes.

In the field of biology, the concept of autopoiesis[3] helps us to rethink our systems of development. The acceptance of contingency, cooperative relationships, alliances, and symbiosis are presented as innovative factors for dealing with states of emergency within the world of living organisms. The natural environment displays energy and material flows, which are optimized through dynamic collaborative relations between participatory agents that exchange information.

Biomimicry, as developed by Janine Benyus in 1998, proposes to go beyond what is already known by "imitating Nature". She defends the observation and investigation of natural forms and structures (solutions of living organisms in situations of mutation) with the ambition to propel the preparation of forthcoming and necessary transformations in the realm of economy as tied to global changes that affect the ecosystems.

The regard for structural systems, relational events, and temporal cycles as observed in living organisms is part of the thematic thread of this article, which in response to the title of the magazine's call for participation, adds: *nature as construction material for new models of thought within the realm of architecture and the city.*

To defend this argument, on one hand we have resorted to the concept of *exaptation*[4] developed in Paleobiology, which refers to how living organisms in determined contexts use preexisting organs in a different way from their original state. Mutation and adaptation are two terms that reveal the underlying concept of contingency. Contingency illustrates the possibilities of a new paradigmatic shift that is clearly expressed in the work of Gilles Clément and that could promote an instituting role for contingency in architecture.

On the other hand, to achieve such an idea of contingency, the article exposes the need to reconsider technique as employed by man when acting on nature.

In considering them together, a higher esteem for the technical knowledge of nature is proposed to reconsider ecology from a technological conception[5] that can restore the bonds between humanity and the rest of the living beings.

GILLES CLÉMENT AND CONTINGENCY: TOWARD A CHANGE IN PARADIGM

The historical period and geographical location selected to approach the argument of this text defend a constituent act within ecological thinking in France: Paris, 1980-1995. In Europe by the 19th century, Germany already begins to construct an ecological thinking that questions the relationship between man and nature. The influential voyages of Alexander von Humboldt in South America in 1804, as well as the creation of the term *Ökologie*[6] by German biologist and naturalist Ernst Haeckel (1834-1919) are the primacies of German political activism that was born after the Second World War. Nevertheless in France, this kind of awareness that reconsiders the link between man and environment happened much later. In the 1930s, Bernard Charbonneau began to establish an ecological thinking through his thesis *Le sentiment de la nature. Force Révolutionnaire,* which according to Thierry Paquot[7] was the first text about political ecology in France.

The post-war period was marked by a series of historical events that reflect the will of a society who wanted to deeply restructure itself. In 1958, the fifth republic was born, and ten years later, the student-led May 1968 protests opened a period of profound questioning of French society, giving birth to new politics. New cultural values began to be sanctioned, like for example the reconsideration of the role of the natural environment within policies of territorial planning.[8]

Between 1970 and 1990, a number of political events[9] redefined the notion of *landscape* in public opinion, as well as in philosophy and architecture. Namely, two events coincided during these years. On one hand, the creation of a new philosophy department at the University of Paris VIII[10] - led by Jacques Derrida, Gilles Deleuze, Bruno Latour, Félix Guattari, and Michel Serres, who influenced the thinking of Gilles Clément. On the other, the creation of the *École Nationale Supérieure du Paysage* at Versailles in 1976 by a number of landscape architects from *DPLG*[11] like Clément, who were capable of disseminating a new outlook on the notion of *landscape*.

This avant-garde time frame, critical to the evolution of French ecological thinking, influenced a whole generation, which included the likes of Gilles Clément (1943), Jean Nouvel (1945), and Dominique Perrault (1953).

The technical and aesthetic stance of Clément, French gardener and landscape architect, in relation to nature has changed the paradigms of observation on a number of architectural projects in Paris and in France overall. Examples like the National Library of France by Perrault and the Cartier Foundation by Nouvel illustrate the paradigmatic changes generated by the thinking of Clément.

To sketch out concepts linked to the world of living organisms, i.e. biology, a first line of work by Gilles Clément from the 1990s was one that, supported by the concept of the *Tiers-paysage* or Third Landscape, promoted the turn towards a new paradigm in the Citroën Park in Paris, France **(figs. 01 and 02)**. The Third Landscape is the sum of all spaces where man leaves the evolution of landscape to nature itself.[12] From there we can extrapolate that it becomes a laboratory for observing the concept of autopoiesis, i.e. the tendency of life to create favorable conditions for its perenniality.

THE THIRD LANDSCAPE AND THE GARDEN IN MOTION

From his first studies on the island of La Vassivière in Limousin, France in 1986 **(fig. 03)** for the construction of a Center for Art and Landscape with Aldo Rossi and Xavier Fabre, to his first writings,[13] which include research on *la Vallée*, and his realized public parks like André-Citroën Park **(figs. 01 and 02)**, Gilles Clément has defended a privileged space for preserving biological diversity. The space devoted to the laws of nature, considered as the planet's genetic reserve, appears as the space of the future. With it Clément showed the semantic value of the reuse of natural waste to open a new consciousness within society. This vision has been made manifest particularly in architectural proposals. His concepts transformed the perception of French architects, and more precisely Parisians, when time came to include -nature- as an element within the architectural project. From the Cartier Foundation project by Jean Nouvel from 1994 to the National Library in Paris by Dominique Perrault in 1995, the new relationship between man and nature defended by Clément opened a new line of alliance between architecture and nature. The way these two projects dealt with the employment or disposition of -nature- through their technical solutions challenged the relationship maintained between the two at that time. Given the inclusion of an agricultural engineer[14]on one hand and a new type of gardener[15] on the other, when conceiving architectural projects, Parisian architects began to use nature as a material for the construction of time[16] - and therefore of change, transformation, mutation, and evolution.[17] That gave rise to a new way of thinking, not only in the ways which nature expresses itself against the artifice, but the redefinition of the cycles and forms of organization that belong to it: time and contingency were part of the project's idea.

The concepts of Gilles Clément transcend man's relationship with nature, going beyond a decorative and recreational description inherited from the hygienist movement of the 19th century. The Garden in Motion, *Jardin en mouvement,* is inspired on the uncultivated, abandoned space where nature - liberated from cultural principles that privilege the formalized aspects of the

natural world - can manifest its energies, growths, movements and exchanges. In other words, Clément wants to remind human beings of processes that are intrinsic to nature, such as its temporal cycles and its organizational and management systems, which are in turn linked to the concept of contingency.[18] This is less of a cultural vision and much more of a biological one that can perhaps inspire man to observe more and act less. This can now be considered a spontaneous garden, which attended by the hand of man, wants to serve as witness or laboratory for learning about natural processes and for restoring its cycles of time in the city. Probably one of the most valuable elements of Clément's position lies in the manifestation of contingencies and temporary textures of nature. We think that this is the element that has influenced the description and consideration of the architectural project.

The 1990s outlook of the French gardener was further inspired by another important social sphere. This position, a more intellectual one, was represented by philosophers such as Michel Serres,[19] Gilles Deleuze,[20] and Félix Guattari[21] as: nature as a material for *the construction of thought* and for raising awareness about the relationship of man with it.

The example of the rhizomatic structure presented by Deleuze and Guattari[22] promoted a profound rethinking of how to organize society in the years following May 1968. From then until today, we see these concepts becoming increasingly realized in certain social structures. The value of solidarity and of less-hierarchical systems in favor of greater collaboration tend towards new ways of organization. The observation of nature has therefore become a philosophical construction material. We can perhaps name a constitutive fact like that of the organization called *Friends of Earth*,[23] started by David Brower in 1969 in San Francisco in the United States. That federation of citizens, sensitive to environmental issues and defenders of social movements, developed in the 1970s a global network of environmentalists. This solidary structure, determined to organize an agroecological system in several countries, was based on concepts of alliance, multiformity, and interconnectivity, capable of exploring the synergies between different agents. This organization has proven apt when facing new challenges and adapting to new contexts. Today, present and active in 77 countries, they have more than 2 million members. Its expansion and perenniality is due to a policy that privileges autonomy and self-determination. These systems of management, organization, mutation, and regeneration are models inspired by biology that contemplate time as a fundamental parameter.

THE MATISSE PARK: DERBORENCE ISLAND, LILLE, FRANCE, 1990-1995

To illustrate the article's argument that defends nature as a construction material *of thought in the field of architecture and the city*, we will use the Matisse Park developed by Gilles Clément and the National Library of France in Paris by Dominique Perrault.

The Matisse Park was carried out within a larger project called Euralille, supervised by Rem Koolhaas **(fig. 04)**. The land where the park was developed represents around 8 hectares and was consequently a residual for different projects: the railway lines of the high speed train that connects Lille with European capitals such as London, Paris, and Brussels, a shopping center, a tram line, a block of flats, and several towers that attempt to recover the urban fabric.

Back then, the will to create a forest space inaccessible to the public, but guarantor of a biome, considered the forest as the future of civilization. The wild nature enclosed in the island of Derborence appears in the project as the first example of a new trend that sought to introduce the forest into the urban fabric.

In 1990, Gilles Clément proposed the constitution of a strong symbol, a manifesto *in vivo* for the man of the future: the forest, a sanctuary forged by time and history.[24] To do this, the perimeter of the island would be built with walls whose formwork was made of concrete and from the waste that was directly collected from the excavation work for the train station. It is there that a biome, inaccessible to the public, is cultivated. In this model, immersed within the full urban fabric, the island becomes a fragment of the *Tiers-paysage* or Third Landscape. On the other hand, the use of wild pines transplanted into the heart of Paris to organize the National Library of France offers an artificial forest that allows contemplation and remembrance of nature's fragility. Not only does its symbolic role decorate or recreate, but it also instructs and inspires a collective of researchers capable of contributing to new systems of thought. Behind that provocative proposal was a technical challenge assumed by agronomist Erik Jacobsen, responsible for transplanting forty-years-old adult trees. The winning proposal by the architect Dominique Perrault, seems to be directly influenced by the works of Gilles Clément. Perrault uses the construction of an artificial forest as a paradigm that represents the knowledge of humanity, inaccessible for its preservation, but capable of influencing the ways of thinking of researchers who visit the library.[25]

TEMPORAL ECOLOGY: AGROFORESTRY, A PARADIGMATIC SHIFT

Human knowledge built on the observation and conceptualization of the forest environment constitutes a field called *agroforestry*. Within ideas of biomimicry, agroforestry or the agrosilvicultural system posed at the scale of the city seems to impose itself as an ecosystem (with which to work and coexist with) as well as an organizational model. Hence, if we think of design as an open system that exchanges energy, matter, and information in an optimized way, then architecture could be understood and represented from three levels: form, process, and system.

From this perspective, architecture should represent more extensive cycles of time than those that condition its construction. A building's life should be designed as a living organism, one that anticipates future mutations and allows for cooperation or alliances within a wider network of multiple ecosystems that shape its local context.[26]

For this reason, this article does not exclusively defend a literal position of nature as a construction material, but also as a symbolic, semantic, and philosophical one.

To redefine the relationship we have with the surrounding natural context, we think it is necessary to understand first that we have to completely reevaluate the temporal cycles that mold our present. According to theorist and urban planner Paul Virilio, the development of technologies has subjected us to an acceleration of a global time.[27] Therefore considering nature as a construction material in architecture implies reconsidering the temporal cycles in order to relearn how to live with greater contingency in the domestic and urban space.

Recently in her conference[28] *Medium Design* about the construction of media, Keller Easterling proposes to reassess the representation of time in architecture and in the city. The author presents the advantages of using a contemporary tool, the *time-lapse document*, to represent contingency in architecture. The objective of this type of document can address larger-scale cycles absent in conventional methods that define buildings or cities.

Starting from the Neolithic, the Homo Sapiens observes the different cycles of plants in order to progressively domesticate them and develop agriculture. **(fig. 05)**

Knowledge of the rhythms of living beings gave rise to a science called *chronobiology*. Such science observes and analyzes the synchronizing and de-synchronizing elements within the evolutionary cycles of nature to integrate a system of thought called *temporal ecology*.[29] This science recognizes and defends certain temporary cycles that are specific to living systems, which organize them and determine their endurance.

The recognition of time as a parameter is defended by Gilles Clément in the symbol of the "forest" . Clément's concept

of the Third Landscape reveals a reformulation of time within the construction of the urban environment. As we have seen previously, the systematic observation of the forest can help to transform our paradigms within the discipline of architecture: energy, matter, information, and contingency. Beyond just controlling atmospheric parameters, protecting soil, and regulating water systems,[30] the forest plays an equally important role over the welfare of man. The forest's temporal system could be a regulator or synchronizer for the cycles of time of city dwellers: both individual and social time. Consequently, the forest could regulate his psychophysical state. A state that could in turn cultivate greater harmony or synergy within society.

This natural good represents a very important economic wager, which has been reconsidered in territorial development strategies for over a decade. For example, the forest is a natural resource capable of playing the role of productive cycles for food, energy, and the wood industry as a material. For physiological, environmental, and economic reasons, the world of agroforestry has become fundamental in current political strategies in countries such as France.[31]

The introduction of the forest in the urban milieu proposed in 1968 by Yves Bétolau[32] (1926-2003), a rural engineer for water and forests in Paris, seems to predict what we are experiencing today in France's capital city with the Agriville project proposed by a group constituted by three architecture studios, agence XTU, Arep and Jean-Paul Viguier & Associés **(fig. 06)**.

As it was presented by the French agronomist, the forest begins to impose itself as an urban facility on the same level as a school, a hospital, or a library. We could say that the forest educates, sanitizes, and instructs in addition to being able to feed and supply us with energy.

But Paul Arnould,[33] French geographer and biogeographer, warns us that the desire for nature in urban contexts and in the domestic space also seems to have generated other problems. He reminds us that the autopoietic model of wild nature entails specific problems of the world of living beings: nature knows no limits. But he also alerts that planned nature is heavily indebted to technology and fossil fuels. The example of green roofs, landscape facades, and requalified river banks carry other types of systemic complexities, such as less desirable animal proliferations like cockroaches, rats, or mosquitoes, which are symptomatic of the agitation of equilibria required between many other parameters and factors.

The development of nature within the city first requires a technical conception of time as a primordial factor that defends temporal ecology. This is a factor that, among others, slows down the degradation of energy systems, thus making feasible the coexistence between the natural and the artificial.

ECOLOGY FROM A TECHNICAL CONCEPTION

In 1968 Ilya Prigogine showed that every open system must consider a part of entropy at an inflection point from which the system evolves to a chaotic state or self-organizes around a new complex equilibrium. For this reason, technique appears as a tool capable of slowing down the level of entropy to which the coexistence between architecture and nature tends to reach quickly.

As we are seeing, the construction of new paradigms inspired by nature and more specifically those that rely on the internal systems that organize forests cannot be articulated without technical considerations developed in various directions.

If we want to understand the way in which technique is presented as a vehicle for a shift in the paradigm of man with nature as expressed in forests, we must present the meaning of technique in general and more specifically within the world of agroforestry.

In *Du mode d'existence des objets techniques*, Gilbert Simondon defends that technique is not a set of means or tools, but a mode *d'être-au-monde*, or of being in the world: a phase of culture.[34] The philosopher says that to understand its failures, technical knowledge looks for its true deep values, which is how it produces science.[35]

In other words, projected into our concerns, agroforestry or the agrosilvicultural system as a sphere of knowing would be the technical medium that gathers all the knowledge of man on the management of forests. The science of agroforestry, based on the knowledge acquired through man's observation and conceptualization of said biological system, allows man to develop technical objects capable of slowing down the degradation of energy intrinsically contained in the "forest" system.[36]

The technical object, according to Simondon's definitions, represents both concrete and abstract knowledge of a given field. The artisan, or forest gardener, maintains a concrete relationship between the world and the technical object. However, the object conceived by the engineer is an abstract technical one, detached from the natural world.[37] Technique has to be viewed further from two - sometimes opposite - angles: within a statute of the majority and of the minority.[38] Following Simondon's definition, the first would be that of the engineer and the second that of the craftsman. Both are the links or transmitters of knowledge of said field to the rest of society. Each of them represents this notion of technique in very different ways, contributing to diverse ways that it can be incorporated into culture. According to the French philosopher, technical progress ultimately consists of slowing down the entropy contained in any system in the universe. Therefore the technique, in its ultimate purpose, is presented to man as the means of managing the temporal cycles contained in the system. The technical consideration of agroforestry can act as a mediator in the face of energy degradation in the forest system, as long as the agronomist and the forest gardener are integrated in a social role, and not only in relation to their scientific knowledge of nature. From the perspective of this article, they are the agents capable of allowing the coexistence of the natural with the artificial. This relationship is subject to many dysfunctions or degradations of energy, as Paul Arnould has pointed out.[39] This declaration is made visible through tangible problems such as the appearance of animals, abundant and invasive plants, or pandemics that lead to the death of urban ecosystems. Therefore, if the consideration of nature as a construction material of thought in architecture helps us to reevaluate temporal relationships with the elements in our environment, the technique is imposed as the manager of the degradation of the system's energy.

Here we would like to defend the forest as a construction material for our cities from a biological and cultural standpoint. The forest environment appears as a synchronizing and socializing element. As we have said, an ecosystem that should be considered as an urban facility at the height of a library, a school, or a hospital. The forest would allow the introduction of paradigmatic temporary cycles within the city. However we warn that this will only be possible from a revaluation of technique, as it mediates between man and nature. The forest together with the technique of agroforestry, transmitted by the agronomist and the gardener, could enhance the concept of contingency in our urban environment. The development of the city as well as architectural projects that participate in its growth should reconsider the role of these agents within the conception of new proposals.

CONCLUSION

To realize *nature as a construction material of thought* and therefore *architectural thought*, we urgently need an architecture interpreted from a dynamic and dialectical system that restores time and uncertainty, consubstantial to nature.[40]

The representation of nature as an ecosystem such as the forest must remember and even impose the concept of contingency in man. The forest is essentially the result of a confrontation between natural restrictions and human interventions.[41] The forest ecosystem is the result of contingency and therefore symbolizes it before society **(fig. 07)**.

The coexistence between a living system and a system governed by other organizing laws such as the urban environment requires a reconsideration of our relationship with technique. This should

be assimilated by culture and therefore represented in architectural and urban proposals. By virtue of the technical knowledge and its transmitting agents, such as the agronomist and the forestry gardener, we can integrate nature as construction material in a literal sense.

Gilles Clément, proponent of the Garden in Motion and the Third Landscape, is aware that the hand of man is the one that, day after day, shapes, organizes, and manages the "natural" system. The intervention of man, within a concept of a temporal and technical ecology, could contribute to the reduction of the degradation of the system's energy, but without altering its evolution. Nature tends to create suitable conditions for its sustainability, but every system in turn involves some part of energy degradation.

In an urban context, the relationship of contingency that man must maintain with the forest ecosystem also becomes an intellectual and cultural resource. For this reason, this article takes advantage of the original title of the call for proposals and goes further to consider nature as a construction material *of ways of thinking, organizing, and relating.* In other words, in the observation of nature, a body of knowledge can be built that influences both our physical and cultural environment. The process of technification of nature helps us to reframe organizational and relational systems through concepts of mutation, autopoiesis, or exaptation,[42] providing new directions and sources of inspiration for the development of society and therefore of its habitat.

Nature, beyond what it can produce, sanitize, and recreate, is a book manifested *in vivo*, equivalent to a philosophical work by Gilles Deleuze, from which we can be inspired. That condition of contingency present in the world of living beings is a strong symbol to reconsider in our daily life. Although the wild appearance of nature is required to be controlled within the city, its temporary cycles continue transcending the psychophysical state of the urban dweller. The garden of the Cartier Foundation created by the artist Lothar Baumgarten in 1992 works with the space of the living. The garden, apparently wild, integrates the notion of time and uses the cycles of time as a building material thanks to the wise control of the gardener.

The transmission of nature's transformation processes over time allows the urban dweller to experience its potential of contingency. Nature assumes the accident, the unforeseen that favors the construction of social and individual bonds. The forest, then, should be considered not only as a natural equipment but also as a cultural one that drives in several directions our way of relating with it individually, socially, and with nature in general.

The urban demand for continuous actions, which are without limits and above all support, neglects the consideration of time in spaces and therefore of its actors.[43] For this reason, we want to defend the recognition of the agrosilvicultural system from its physical presence in the urban environment and the architectural project to the value of the agents that participate in its existence and permanence. These two elements would allow us to consider nature as a building material for new paradigms in the field of architecture and the city: time and contingency.

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Notes

01. DELANNOY Emmanuel, *Dictionnaire de la pensée écologique* sous la direction de Dominique Bourg et Alain Papaux, Edición PUF 2015, p. 88.

02. SERRES, Michel, *Le contrat naturel,* Paris, François Bourin, 1990.

03. In 1972, Chilean biologists Humberto Maturana and Francisco Varela proposed this concept to define the chemistry of self-maintenance of living cells. Autopoiesis is the tendency of life to create favorable conditions for its survival.

04. GOULD, S. J., y VRBA, E. S. "Exaptation - a missing term in the science of form", *Paleobiology*, 1982.

05. SIMONDON, Gilbert, *Du mode d'existence des objets techniques,* Paris Aubier, 2012.

06. CANS, Roger, *Dictionnaire de la pensée écologique* sous la direction de Dominique Bourg et Alain Papaux, Edición PUF 2015, p. 322-325.

07. PAQUOT, Thierry, *Dictionnaire de la pensée écologique* sous la direction de Dominique Bourg et Alain Papaux, Edición PUF 2015, p. 144-147.

08. In 1971, the Center National d'Etude et de Recherche du Paysage, CNERP, was created to promote a new education about landscape through the development of studies at a territorial scale as well as the formation of senior administrative and technical positions. In 1977, the CAUE were created, which stand for *Conseils d'Architecture, d'Urbanisme et d'*Environnement, translated as the Councils of Architecture, Urbanism, and the Environment, These councils were able to establish new ties, since then unalterable, between architecture, urbanism, and landscape. They promoted new landscape values within the POS, or the Soil Occupancy Plan. In 1977, a law on architecture governs the principles of the CAUE, *La création architecturale, la qualité des constructions, leur insertion harmonieuse dans le milieu environnant, le respect des paysages naturels ou urbains ainsi que du patrimoine sont d'intérêt public. [ ] Des Conseils d'architecture, d'urbanisme et d'environnement sont institués".* Data collected from *Carnet de Recherches du Comité d'Histoire du Ministère de la Culture sur les politiques, les institutions et les pratiques culturelles* written by Pascal Desvaux, https://chmcc.hypotheses.org/4051.

09. In 1971, the Ministry of the Environment was created under the direction of Pierre Poujade. During the 1970s in France, the defense of nature began to be legitimized: René Dumont obtains his first candidacy for the 1974 presidential election. However, it was not until the 1980s that France witnessed an overwhelming representation of environmental policy, thanks to Brice Lalonde who obtained more than a million votes in the 1981 presidential race. In 1985, the direction of architecture merges with that of landscape and urbanism.

10. SOULIÉ, Charles, *Le destin d'une institution d'avant-garde: Histoire du department de Philosophie Parix VIII,* Histoire de l'éducation n. 77, janvier 1998, pp. 47-69.

11. DPLG means Diplômé par le Gouvernement, which can be translated as Commision for the Government.

12. CLÉMENT, Gilles, JONES, Louisa, *Gilles Clément une écologie humaniste,* Aubanel, Genève, Suisse, 2006.

13. CLÉMENT, Gilles, *La friche apprivoisée*, Urba 209, sept. 1985.

14. NOUGARÈDE, Olivier, ALPHANDÉRY, Pierre, *le silvarium de la Grande Bibliothèque*, INRA, Economie et Sociologie rurales, unité STEPE, Courrier de l'Environnement de l'iNRA n. 24. Article extracted from *Arbre Actuel,* n. 18, avril-mai 1995, pp. 16-20, Le cloître forestier de la Bibliothèque nationale de France.

15. MOSBACH, Catherine, CLARAMUNT, Marc, *La nature des interventions paysagères. Exemples de créations et de transformations*, In: Les Annales de la recherche urbaine, n. 74, 1997, Natures en villes, pp. 137-142.

16. Ibid.

17. NOUGARÈDE, Olivier, ALPHANDÉRY, Pierre, *le silvarium de la Grande Bibliothèque*, INRA, Economie et Sociologie rurales, unité STEPE, Courrier de l'Environnement de l'iNRA n" 24, Article extracted from *Arbre Actuel,* n'18, avril-mai 1995, pp. 16-20*, Le cloître forestier de la Bibliothèque nationale de France.*

18. ARNOULD, Paul, *Un jardin dans la ville, quelle biodiversité urbaine pour demain? L'exemple de Gilles Clément à L'ENS de Lyon*, artículo "Environnement Ville Société", 2012.

19. SERRES, Michel, Le contrat naturel, François Bourin, Paris, 1990.

20. DELEUZE, Gilles, GUATTARI, Félix, Capitalisme et Schizophrénie 2, Mille Plateaux, Editions de Minuit, Paris, 1980.

21. GUATTARI, Félix, Les trois écologies, Galilée, Paris, 1989.

22. DELEUZE, Gilles, GUATTARI, Félix, *Capitalisme et Schizophrénie 2. Mille Plateaux,* Editions de Minuit, Paris, 1980.

23. CHARTIER, Denis, *Dictionnaire de la pensée écologique* sous la direction de Dominique Bourg et Alain Papaux, Edición PUF 2015, p. 17-19.

24. CLÉMENT, Gilles, JONES, Louisa, Gilles Clément une écologie humaniste, Aubanel, Genève, Suisse, 2006 p. 140-147.

25. NOUGARÈDE, Olivier, ALPHANDÉRY, Pierre, le silvarium de la Grande Bibliothèque, INRA, Economie et Sociologie rurales, unité STEPE, Courrier de l'Environnement de l'iNRA n. 24. Article extracted from *Arbre Actuel*, n'18, avril-mai 1995, pp. 16-20, Le cloître forestier de la Bibliothèque nationale de France.

26. WILES, Graham, "Cardboard to Caviar". Graham Wiles conceived of a lucrative cycle of processes, demonstrating the 'closed-loop' model. He identified a path of operations emerging from a common waste product (cardboard boxes) and turning it into a high value end product (caviar), which could then be sold back to the original producer of waste.

27. VIRILIO, Paul, *El cibermundo, la política de lo peor*, Ediciones Cátedra, Madrid, España, 1997.

28. EASTERLING, Keller, *Medium Design,* Strelka, 2018.

29. PAQUOT, Thierry, *Dictionnaire de la pensée écologique* sous la direction de Dominique Bourg et Alain Papaux, Edición PUF 2015, p. 346-349.

30. BÉTOLAUD, Yves, *Forêts et civilisation urbaine,* Paris, 1968, accesible http://documents.irevues.inist.fr

31. In 2008, the General Council of agriculture, food and rural spaces in France presented a prospective essay in regards to French forests in the coming 2050-2100 with several scenarios for the development of forest parks in the territory.

32. BÉTOLAUD , Yves, *Forêt et civilisation urbaine,* Class. Oxford 907, Paris, 1968, p. 535-545.

33. ARNOULD, Paul, et al., *La Nature en ville: l'improbable biodiversité,* Géographie, économie, société 2011/1 (Vol. 13), p. 45-68.

34. BONTEMS, Vincent, *Dictionnaire de la pensée écologique* sous la direction de Dominique Bourg et Alain Papaux, Edition PUF, Paris, 2015, p. 935.

35. Ibid., p. 935.

36. SIMONDON, Gilbert, *Du mode d'existence des objets techniques,* Editions Aubier, Paris, 2012.

37. Ibid., p. 126.

38. Ibid., p. 123.

39. ARNOULD, Paul, *La Nature en ville: l'improbable biodiversité,* Géographie, économie, société 2011/1 (Vol. 13), pp. 45-68.

40. BOYER R.,CHAVANCE B., GODARD O. *Les figures de l'irréversabilité en économie,* Paris EHESS, 1991.

41. ARNOULD, Paul, *Un jardin dans la ville, quelle biodiversité urbaine pour demain? L'exemple de Gilles Clément à L'ENS de Lyon,* article "Environnement Ville Société", 2012.

42. DELANNOY, Emmanuel, *Dictionnaire de la pensée écologique* sous la direction de Dominique Bourg et Alain Papaux, Edición PUF 2015, p. 91. The concept of exaptation used in biology refers to how living organisms in certain contexts use pre-existing organs differently from their original state.

43. MOSBACH, Catherine, CLARAMUNT, Marc, *La nature des interventions paysagères. Exemples de créations et de transformations*, In: Les Annales de la recherche urbaine, n. 74, 1997. Natures en villes. pp. 137-142.

Images

01. Photo of Gilles Clément, The Garden in Motion, Citroën Park in Paris, France. 1986-1992.

02. Gilles Clément, The Garden in Motion, Citroën Park in Paris, France.

03. *Prairie fleurie,* Gilles Clément, Vassivière Island in Limousin, France.

04. Gilles Clément, Derborence Island, Euralille, Lille, Francia. The Third Landscape. Inaccessible forest of 2.5 hectares on a 7-meters-high mound in the Matisse Park.

05. Artistic reconstruction of a scene of plowing and sowing in the Old Middle East at the beginning of the 8th century.

06. Competition for "Inventons la Metropôle du Grand Paris", *Agriville* project, Gonesse Northeast of Paris.

07. National Library of Paris, architect Dominique Perrault, Paris, France.

05

"Landscapes with figures with gadgets": The Picturesque in British Experimental Architecture circa 1970

Rodrigo de la O

Around 1970, Cedric Price and the Archigram group presented proposals for inserting inflatables, geodesic domes, robots and other prefabricated systems into the landscape. This article discusses these proposals as part of a historical trend with important cultural significance. Historians Leo Marx and Reyner Banham considered such proposals to reflect the difficult search for a *middle landscape*: a landscape model in which nature is balanced and stabilized by art. Since the 19th century, this search has been guided by the belief that the *machine* will build the *garden*.

TWO TREES AND NO MORE

In November 1971, British architect Cedric Price began work on a plan to renovate Two Tree Island, an uninhabited islet at the mouth of the Thames near Southend-on-Sea[1]. Price had accepted an assignment from local businessman David Keddie to construct a marina, housing and recreation areas to accommodate the growth in tourism that southeastern Great Britain was experiencing at the time. Photographs taken during one of Prices's first visits to the site show a marshy landscape with a flat, solitary horizon. The land was partially flooded and covered by herbaceous plants.

According to Price, the natural surroundings of Two Tree Island provided "a unique opportunity on an economically sound basis to establish in Southend an exciting place of excitement, repose and delight unequalled in the United Kingdom"[2]. These conditions prompted Price to document the ecological characteristics of the location, to investigate compatible land uses and to design an intricate zoning plan[3]. The final proposal included activities and housing suited to the island's various ecosystems: marshes, a breakwater, a meadow and a port. The proposed housing included a wide variety of residence types, such as tents, caravans, cabins and houseboats.

When the plans were released, controversy commenced, and in April 1972, Southend's local authorities and property owners commissioned a committee to determine Two Tree Island's future. The commission heard testimony from a substantial number of interested parties and sent proposals to forty local associations and public figures to solicit their input[4]. In November, the commission published its final report with an unequivocal decision: it did not accept any of the proposed plans and requested guarantees that the island be maintained in its natural state. One of the document's seven recommendations summarizes the overall tone of the report by suggesting that "as a nostalgic gesture in accord with the nomenclature of the island ... two trees be planted on the island and no more"[5].

The report used scientific reasons to oppose a project that, a priori, involved the transformation of a site of ecological interest. However, it also incorporated emotional resistance, as expressed by its nostalgic tree-planting suggestion. Such an argument might have been predicted if one had considered the culture of conservation in Great Britain, which prioritizes aesthetic impulses ahead of environmental concerns[6]. In fact, British planning originated as a reaction against the growth of 19th century industrial cities and expressed the desire to preserve rural landscapes. In 1969, Peter Cowan commented as follows:

> The British have a very special attitude towards their countryside and landscape. They like their landscape tamed but romantic, and they care greatly that the countryside should be designed [...]. Above all the British have felt that the city must be contained - it cannot be allowed to spread across the face of the nation, eating up land unchecked[7].

As noted by J. M. Wiener, this attitude reflects the deep ethical and aesthetic alliance that British culture forged with the rural landscape as the country moved into the 20th century[8]. Identifying the countryside as the only clear alternative to the failing industrial city, those who shared this attitude viewed the world in terms of starkly opposed values: rural versus urban, simple versus complex, cooperation versus competition, stability versus change as well as harmony versus alienation[9].

The aesthetic and ethical challenge that Price's ideas represented slipped into the background in the course of the numerous unsuccessful appeals that Price made to the authorities after the project was rejected. In these documents, he argued that the plan for Two Tree Island ensured a carefully controlled development process, improved the area's character and interest and guaranteed the enjoyment of nature[10]. Price aimed to achieve this complex goal through an intricate composition of nature, architecture and human activities in which he sought to reconcile antithetical positions[11].

The best example of Price's convictions is provided in a series of landscape scenes that he created to define the visual, or, rather, sensorial, aspects of his proposals. These scenes include sixteen graphite, crayon, ink and watercolour postcards **(fig. 01)**. Despite his project's lack of formal definition yet without providing precise visual depictions, Price's illustrations nevertheless define the character of the landscape. Some scenes focus on nature, while others inject artifice by depicting alternative ways of exploring the environment: flying in a hot air balloon, living or working on water, building observatories in the treetops.

ARCHITECTURE OF THE *MIDDLE LANDSCAPE*

The Two Tree Island controversy embodies the British version of a broader dichotomy whose origins in North America were described by Leo Marx in his influential book *The Machine in the Garden: Technology and the Pastoral Ideal in America* (1964)[12]. Marx studied notable works of American literature since the 18th century that were set against a backdrop of technology's incursion into the rural landscape and used them as a mean to investigate deep-seated cultural values. Works by Henry David Thoreau, Herman Melville, Ralph Waldo Emerson, Frank Norris, Henry Adams and Henry James enabled him to consider the

intersection of literature, general ideas and certain products of the collective imagination that he termed "cultural symbols"[13]. On the basis of numerous examples, Marx showed how the rapid transformation of the American landscape resulted in large contradictions in value and meaning between the country's former bucolic image and its new image as an industrial power.

Marx's book reveals the coexistence of two pure aesthetic models: *garden* and *machine*. The first views landscapes as objects of enjoyment, a tradition that Marx believes was introduced to America by the first European settlers[14]. Marx relates the strength of the first model to its origins in the English garden and its accompanying body of aesthetic theory, which makes complex distinctions between beautiful, picturesque and sublime landscapes[15]. The garden model shaped artists' first look at the American landscape, stimulating works such as *The Hudson River Portfolio* or *Picturesque Views of American Scenery*, both from the 1820s[16] **(fig. 02)**. In contrast, the second model is an authentically American model of technological exaltation. Marx identifies its origin in the country's westward expansion, when man and machine together first entered the forest landscape. The settlement of the new territories relied above all on the railroad, thus elevating it to a symbol of progress and source of artistic inspiration[17]. This development inaugurated a *machine* rhetoric that intensified until by the end of the 19th century a new aesthetic category had been established: the technologically sublime[18]. The new images stirred sensations in humans that in the mid-1800s had been reserved for natural disasters and other large-scale natural phenomena.

Marx's contribution was not limited to identifying and describing the two models. His most important achievement was to reveal how a tense but productive compromise emerged between the *garden* and the *machine* during the second half of the 19th century[19]. *The Lackawanna Valley* (1855), a painting by landscape artist George Innes, is representative of this phenomenon. Commissioned by the first president of the Delaware, Lackawanna and Western Railroad to provide the public a preview of the natural magnificence they would encounter on a journey, Innes's depiction of the Lackawanna Valley in northwestern Pennsylvania seeks an ideal balance between the celebration of nature and the newfound enthusiasm for technology[20] **(fig. 03)**. Marx considered Innes's painting a *middle landscape*, i.e., a view of nature balanced and stabilized by art and informed by the belief that the *machine* would build a *garden*[21]. However, as noted by Charles Sheeler in *American Landscape* (1930), around the turn of the century, an imbalance developed that favoured the *machine* and disrupted the relationship between the two models **(fig. 04)**. Marx's book concludes without resolution although he argues for the opportunity to re-explore the *middle landscape* through cultural productions capable of adding meaning to the post-industrial environment[22].

After *The Machine in the Garden* was published in 1965, Reyner Banham acknowledged the significance of Marx's contribution[23]. Banham identified architecture as another cultural product that, like literature or painting, helped consolidate the American *middle landscape* in the latter half of the 19th century. The most credible evidence was found in *The American Woman's Home* (1869), in which Catherine Beecher presented innovative proposals for homes in the new territories[24]. Banham notes the remarkable evolution of the author from her previous book *Domestic Economy* (1942), attributing the change to the reality of life and technology in the newly settled Midwest.[25]. He described Beecher's compositional scheme, a light and free-standing framework with a central core of services, as the idealized ancestor of every suburban home in which energies were balanced[26]. The relationship of the home's protective outer shell with the abundance of equipment it contained even enables him to establish a historical association between the *middle landscape* and "Wright's Usonian houses, the Eames house, Philip Johnson's glass house and most of the U.S. domestic architecture we have been brought up to admire"[27].

This line of formal inquiry also provided Banham an opportunity to advocate his well-known ideas regarding mobile architecture in his article *The Great Gizmo*: "Portable technology closes Leo Marx's contradiction as surely as do the meanings discovered by serious writers"[28]. The essence of the argument extends to *A home is not a house*, another of Banham's well-known essays, also published in 1965[29]. Banham proposes architectural artefacts that bear more than a slight resemblance to Beecher's. In addition to sharing a formal radial design, both writers always locate their buildings near adequate transportation and highly value the mental and physical benefits of a landscape setting[30]. Easy-to-assemble devices, caravans, geodesics, inflatables and other systems of temporary environmental conditioning now offered the opportunity to follow historical antecedents and readdress the *middle landscape*, that is, to resolve the conflict between *machine* and *garden*.

Developing his architectural style, Banham invokes in *The Great Gizmo* a picture of the new landscape to be built. He does so by imposing requirements for highlighting seasonal changes in Connecticut's forests, which he describes as "perhaps the most paradisiacal suburban landscape in the world", and in the Midwest, described as "a landscape that could have come from the brush of Claude Lorraine"[31]. Thus, mobile technology fits into landscapes with figures (the populated or humanized scenes that reflected the tastes of 18th century landscape painters) while returning the landscape ideal to where Innes positioned it in the mid-19th century. One must appreciate the fine point suggested by the title Banham used to characterize the new *middle landscape*: *"Landscapes with figures with gadgets"*.

SCENES OF ANALOGY AND CHANGE

Urban ideas from the US strongly influenced the British academic debate during the 1960s[32]. The Californian model was particularly influential. However, the geographical, historical and cultural differences (primarily differences in land-use ratios, the city's relevance and the appreciation of the constructed landscape) forced one to question the relevance of Europe applying new urbanization models centred on the automobile and a low population density[33]. These differences did not prevent the development of shared ideas on both sides of the Atlantic, reinforced by the effects of globalization and the increasing resemblance between post-industrial urban areas.

This discussion formed the context for *Non-Plan: An Experiment in Freedom* (1969), an article-manifesto by Banham, Price, editor Paul Barker and geographer Peter Hall that, inspired by the systemic self-organization of the terrain, breaks with the British planning tradition[34]. The application of such non-plans results in a model of smaller residential nuclei, scattered across the land but close to the city and connected by modern communication channels. Such residential nuclei are preferably temporary and suited to the new lifestyle. Whether due to British flight from the city or because of local cultural conditions inherent to the US, the suburb becomes a popular locus for the most experimental architecture[35].

For these architects, planners and theoreticians, the new settlements required architecture consistent with their ephemerality. As such, they adopted a housing model with a central service centre enclosed by conditioned spaces enveloped in their own shells. Price elaborates on this discussion in his brief essay *Camping with Fred and James* (1967), citing the radial layout and creating variations of this layout by using the spatial relationship provided by the conditioning devices and the areas they serve[36]. Price categorizes Banham and Dallegret's proposal, Fuller's domes and inflatable systems according to the spatial organization they offer and discusses the innovations introduced by Archigram's robots and mega-structures.

This background explains why Price and Archigram could emerge as the advocates in Great Britain of the *middle landscape* Banham described in connection with America. Price's

distinguished research in search of innovative architectural objects and his lesser-known proposals to implement alternative modes of territorial organization came to fruition around 1970 in the form of landscapes that strongly resonate with the landscapes with figures of the picturesque tradition.

In 1969, Archigram member David Greene created *Park Scene with Mobot Facilities* for his LAWUN speculative series **(fig. 05)**[37]. It shows people in a park on a cold and wintry day. In contrast with the warmly clothed passers-by, a couple sits on a lawn wearing light clothing. They are protected by a thin, transparent membrane typical of the inflatable architecture with which Archigram, Price and Banham were experimenting at the time. Behind the couple, a person lying on the lawn seems to be watching a portable television. An editorial in *Archigram 9* described the work as one that alleviates the tension between the mechanical and the natural[38]. Therefore, the word "scene" in the title is not without meaning, particularly considering that the park displays several highly distinctive features. The composition refers to an English garden, and the title refers to the construction of the pictorial scene.

In contrast, the idealized image of Hedgerow Village, located somewhere in Sussex County, has a somewhat more built-up appearance[39] **(fig. 06)**. This image is a collage created by Peter Cook in 1971 that unifies through visual coherence the habitats of a stream and a lake, adding swaths of vegetation for a leafy look with more colour variety. In the centre, architecture appears. It is constructed of modular, perhaps removable panels, and partly camouflaged by the vegetation. Adjoining it are a car, a caravan and several tents. The collage was presented as an alternative model for a suburb in the environs of the future airport of Foulness, with a number of small neighbourhoods hidden in the airport's rural surroundings[40].

Cook, Greene and Ron Herron created numerous such scenes of suburbs and rural settlements using a variety of techniques: large format drawing, collages of photographs, prints on transparencies and acrylic paint. Most were produced between 1966 and 1974 and deviate slightly from the group's main themes at that time. In the scenes, mega-structures are broken up by technology and temporary conditioning robots, enabling the designers to define their own version of what the British post-industrial landscape should or could be. This approach to disintegrating the architectural object Hadas Steiner has termed Archigram's *technological picturesque*[41].

Beginning in 1967, Price too created landscape scenes. Several of the first such scenes appeared in his Potteries Thinkbelt, Port Eliot & Port Hole and Atom projects[42]. However, Price's most characteristic efforts began in 1969 and include the previously noted Two Tree Island proposals, the scenes that supplement his projects in Glasgow and Abu Dhabi as well as in the last Generator[43]. The progress represented by these scenes results from paying less attention to the architectural object and more attention to the intricate combination of artifice and nature and to the use of more colour. They reveal a special quality in the use of 22x30 cm note cards for the project layout, in which Price displays agile technical skills **(fig. 07)**. In addition, Price offers variants, such as collages and simple drawings on photocopies of photographs, a particularly effective means to highlight pre-existing artefacts. Generally, Price's approach is less elaborate than that of the Archigram group, and he creates products more aligned to the traditional canon but no less significant for that.

Several postcards of this type created by Price in 1973 depict the envisioned vista of the Abu Dhabi beach once the Sea Garden has been constructed, a great protective barrier for the coast equipped with recreation equipment[44]. A maritime funicular, footbridges between coral reefs, underwater gardens, observation domes, floating stages for events and mobile buoys on the ocean's surface are examples of technology that guide the user to discover the artificial bay through new modes of observation. The horizons illustrated on the postcards are full of motion: the sun's rays, the fountains, the breeze, the movement of boats **(fig. 08)**. Combining ink, gouache and wax, Price explored the dynamic whole, including the spectacle of water, light and colour that occurs when, once daily, spouts and fountains are turned on in the artificial bay.

Another series of eight scenes was created in the latter half of the 1970s for Generator, an activity and rest centre to be located in a rural environment of Georgia or Florida[45] **(fig. 09)**. Price starts with two sketches of the natural environment in which the project would theoretically be located. The perspectives face northeast and southwest of the site. Price then photocopies these sketches to create a number of different scenes. The panoramas interweave nature and artifice and evoke the changes and possibilities of various landscapes all constructed on the same site, thus creating more or less figurative representations. Radiant points, planes of light or compositions with fluorescent elements are among the resources used to evoke the sensations of a body immersed in the dynamic landscape.

A variant of this technique appears in Price's proposal for an idea competition sponsored by the city of Glasgow in 1972 for the purpose of revitalizing the obsolete Clyde River industrial area[46]. Price produced a collection of twenty-two small scenes using photocopies of photographs of the current state, on which he draws freely with bright colours **(fig. 10)**. The technique enables him to incorporate the ruins of the existing large artefacts into the composition and address the sky, river and ground. This approach reveals Price's propensity to add grass and other vegetation, which lends the designed area the atmosphere of a park. However, the greenery plays more than an ornamental role. Plantings could be placed on land and supported by a hydroponic system or float on the surface of the river. In either case, they are designed to combine productivity and aesthetic enjoyment.

PICTURESQUE CONDITION IN EXPERIMENTAL ARCHITECTURE

If we consider the historical development traced by Banham, these landscapes can no longer be viewed as a radical and disruptive innovations but instead associated with an established historical trend. The works mentioned here extend the British picturesque to a new phase, partly analogous to the American *middle landscape*. That is, the scenes introduce variations on the traditional picturesque while seeking to imbue it with qualities that emerged spontaneously in mid-19th century North America. Thus, access to the suburban neighbourhoods depicted in the scenes requires extending effective transportation networks, and the architecture of these neighbourhoods could thus be categorized as spokes of residences emanating from a hub of services and with free-standing outer shells. The proposals, therefore, assume the basic characteristics that Banham identifies in the *middle landscape* and that he sought to reproduce in the form of landscapes with figures with gadgets.

The first variation on the tradition of the British picturesque is the creation of a dialectic between the rural landscape, as the beautiful, and technology, as the repository of the renewed experience of the sublime. In the picturesque aesthetic, a dialectical synthesis between pastoral beauty and sublime landscapes of nature was customary. Gilpin recognized picturesque beauty (as he did in those paintings in which the changes and roughness of the scene positioned the work in the middle) to occupy a position between the beautiful and the sublime. Acknowledging the picturesque as a category, Uvedale Price allowed its individuation as a third option. However, he did not fail to recognize its intermediating capacity. Thus, in response to the need to define the beautiful and sublime pairing to achieve the picturesque, the path of renovation is presented. The new landscapes continue to combine nature and artifice. However, the aesthetic power of the artefact has been renewed. Now, inflatable, transformable or mobile architecture acquires a role superior to that assigned to artifice in the picturesque scenes because it embodies the technological sublime.

In addition, the scenes exemplify how the solitary aristocrat who strolled through his lavish estate, thus connecting the garden with property and private life, has been replaced by the citizen of a democratic state[47]. For Banham, this transformation was an inherent element of an American ruralism that was born free but not of European ruralism, given its feudal origins. Different from the urban and social pattern in Europe, the US had no society or land ownership until the advent of the railroad, which introduced the first pattern of human organization in the country. For the British experimenters, overcoming this difference was facilitated by profound changes in their country's lifestyle in areas such as family, education, work and free time, with direct consequences for mobility, tourism and leisure[48]. Thus, the picturesque environments depicted in Price's watercolours for Two Tree Island and in Greene's park collages are not accidental inventions but reflect the social demands of their time, which had become opportunities for architecture. Therefore, another aspect of the picturesque renewal concerns the democratization of aesthetic experience.

As Uvedale Price wrote at the end of the 18th century (thus surpassing most theorists, who limited the picturesque genre to the visual), to consider the outside world in terms of perspectives and the overall effect of the picturesque "is delight or pleasure of some kind to the eye, to the imagination, or to both" and reflects that "the mind requires to be stimulated as well as soothed"[49]. Generally, the new landscapes continue the search for aesthetic enjoyment based on psychological stimulation and the imagination through kinaesthetic delight, to use one of Cedric Price's favourite phrases. However, the duration of the aesthetic experience is now considered in its temporal and spatial *continuity*. Escaping its confinement to the garden, it spreads to the everyday landscape[50]. The active aesthetic experience that concerns the stimulation of the imagination and links knowledge to emotion and memory to discovery appears as an ideal: it is the act of knowing through feeling.

Similarly, the new scenes of the *middle landscape* cannot be read in their visual configuration in the same way as the sequence of views of the garden tour or the townscape sketches of the past[51]. Given the indeterminate nature of the projects, such a reading would be impossible. If the English garden adopts nature as its model, now, the process proceeds a further step. The fantasy scenes depict the exasperated search for a reference model for the image of nature in post-industrial times. They occupy a front-row seat, as a communicative medium that acts as a guide, stimulating the imagination through memories and the phenomenological mysteries inherent in the landscape. As in the past, they distinguish a landscape endowed with artistic qualities. However, at the same time, they envision a landscape that does not exist yet deserves and needs to be built.

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Notes

01. The project was published in a monograph edited by Price: PRICE, Cedric, *Cedric Price: Works II*, Architectural Association, London, 1984, pp. 86-87. A longer review appears in HARDINGHAM, Samantha, *Cedric Price works 1952-2003: a forward-minded retrospective*, Architectural Association & Canadian Centre for Architecture, London, 2016, pp. 359-363.

02. CPA & YRMA, *Two Tree Island Project for David Keddie Consultant's Report*, London, February 1972. Background document by Cedric Price, Canadian Centre for Architecture, Montréal.

03. DE LA O CABRERA, Manuel Rodrigo, "Planning for enabling: an analysis of Cedric Price's proposal for Two Tree Island, 1971-1973", in *Planning Perspectives*, 2017, pp. 1-22.

04. COUNTY BOROUGH OF SOUTHEND-ON-SEA, *Report of Two Tree Island and Leigh Marshes Development Sub-Committee of the Policy and Finance Committee*, November 1972. Background document by Cedric Price, Canadian Centre for Architecture, Montréal.

05. Ibid., p. 9.

06. MATLESS, David, *Landscape and Englishness*, Reaktion Books, London, 1998, pp. 25-42.

07. COWAN, Peter, "Introduction", in COWAN, P. (Ed.) *Developing Patterns of Urbanisation*, Oliver & Boyd, Edinburgh, 1970, p. 3. Renowned geographer, Peter Cowan, was director of the Joint Unit for Planning Research of University College London. Beginning in 1967, Price participated with other academics in a workgroup led by Cowan on new patterns of urbanization in the Centre for Environmental Studies. There is a clear coincidence between Cowan's agenda and the issues discussed by Price in his articles and projects of this time. On the affiliations of Price in the planning discussions in the late 1960s, see DE LA O CABRERA, M.R., op. cit., pp. 4-7.

08. WIENER, J. Martin, *English culture and the decline of the industrial spirit 1850-1980*, Penguin, London, 1981.

09. Ibid., pp. 157-159.

10. Price relied on two government documents: *Leisure in the Countryside* and *Planning for Leisure*. Both assumed a change in the planning of and conservation policies that affected the British countryside, recognizing a need for nature by the inhabitants of the cities and linking leisure, agriculture and ecology. See SILLITOE, Kenneth K., *Planning for leisure*, H.M.S.O., London, 1969, and CMND 2928, *Leisure in the Countryside of England and Wales*, H.M.S.O., London, 1967.

11. DE LA O CABRERA, M.R., op. cit., pp. 15-18.

12. MARX, Leo, *The Machine in the Garden: Technology and the Pastoral Ideal in America,* Oxford University Press, New York, 1964. See the analysis by CANNAVO, Peter F., "American contradictions and pastoral visions: An appraisal of Leo Marx, The Machine in the Garden", *Organization & Environment*, March 2001, vol. 14, n. 1, pp. 74-92.

13. BRYANT, John L., "A Usable pastoralism: Leo Marx's method in the machine in the garden", in *American Studies*, Spring 1975, vol. 16, n. 1, pp. 63-72.

14. MARX, L., op. cit., pp. 88-89.

15. Ibid. Marx relies on but does not cite HUSSEY, Christopher, *The picturesque: studies in a point of view*, Frank Cass & Co, London, 1927; reedited in 1967.

16. On the cultural process of appreciation of the North American landscape through painting and literature influenced by the aesthetic theory of the English garden, see FITCH, Jamers Marston, "American Pleasure Garden", in *Architecture and the Esthetics*

of Plenty, New York, Columbia University Press, 1961, pp. 180-187.

17. The passenger train first appeared in America in the 1830s and quickly attracted the attention of several of the most celebrated landscape painters, such as Thomas Cole, Thomas Doughty, Asher Durand and John Kensett. See MARX, L., "The Railroad-in-the-Landscape, An Iconological Reading of a Theme in American Art", in DANLY, S and MARX, L., (Eds.), *The Railroad in American Art: Representations of Technological Change*, Cambridge, MIT Press, 1988, pp. 183-208.

18. MARX, L., op. cit., pp. 195.

19. Ibid., p. 226.

20. CIKOVSKY, Nicolai, "George Inness and the Hudson River School, 'The Lackawanna Valley'", in *American Art Journal*, 1970, vol. 2, n. 2, pp. 36-57.

21. MARX, L., op. cit., pp. 228-229.

22. Ibid., pp. 364-365.

23. REYNER, Banham, "The Great Gizmo", in *Industrial Design*, 1965, n. 12, pp. 58-59.

24. *The American Woman's Home* was in fact authored by two sisters, Catherine and Harriet Beecher. Banham studies this book based on the analysis by FITCH, J. M., "Our Domesticated Utopians", in *Architecture and the Esthetics of Plenty*, pp. 65-85. Fitch refers to the location of the house in the landscape as follows: "the houses sit on spacious plots and the whole family gardens, but now one feels that the motive is as much moral as economic", p. 75.

25. REYNER, B., *Architecture of the Well-Tempered Environment*, University of Chicago Press, Chicago, 1969, p. 102.

26. REYNER, B., "The Wilderness Years of Frank Lloyd Wright", in *A Critic Writes: Selected Essays by Reyner Banham*, University of California Press, Berkeley, 1996, pp137-151. Originally published in RIBA Journal, 1969, n. 76, pp. 512-518.

27. Ibid., pp. 139-140.

28. REYNER, B., "The Great Gizmo", p. 58.

29. REYNER, B., "A Home is not a House", in *Art in America*, 1965, n. 2, pp. 109-118. In the article, Banham presents an inflatable architecture proposal developed together with François Dallegret.

30. See reference 24.

31. Ibid.

32. COWAN, P., op. cit., p. 4, notes: "And if there are profound differences between the two cultures in their attitudes towards urbanization, are we correct in taking the western United States as a model for the future of this country?" See reference 7.

33. The arguments of Banham in *The Great Gizmo* and Cowan in their introduction to *Developing Patterns of Urbanization* coincide in noting the territorial, historical and cultural differences between the UK and the US.

34. BANHAM, R., BARKER, P., HALL, P., PRICE, C., *Non-Plan: An Experiment in Freedom,* in New Society, 1969, n. 338, pp. 435-443.

35. If 20th century British ruralism emerged as an idealized antidote to the evils of cities, North America was revealed as the essence of a nation capable of maintaining "a creative culture full of life without cities". See REYNER, B., "The Wilderness Years of Frank Lloyd Wright", p. 138.

36. PRICE, C. *Camping with Fred and James*, in Architectural Design, March 1967, p. 106.

37. GREEN, David, "Gardener's Notebook: LAWUN Project Number One", in *Architectural Design*, 1970, n. 8, pp. 385-387. A year earlier, the project appeared in GREEN, David, "Gardener's Notebook", *Architectural Design*, 1969, p. 507.

38. *Archigram*, n. 9, 1970, p. 1.

39. COOK, Peter, et al., in *Archigram*, Studio Vista, London, 1972.

40. Not coincidentally, Two Tree Island is also located in Essex County, and the future construction of Foulness airport was one of the strategic reasons that led local businessman Keddie to promote the project.

41. STEINER, Hadas A., *Bathrooms, Bubbles and Systems: Archigram and the Landscapes of Transience*, PhD Dissertation, Massachusetts Institute of Technology, 2001. See also STEINER, H. A., *Beyond Archigram: the structure of circulation*, Routledge, New York, 2009, pp. 222-242. Steiner considers Archigram's tendency to represent ephemeral environments in which the artefact melts away as a picturesque technology. He adds that while the traditional picturesque presented nature and culture as indistinguishable Archigram presented technology as a landscape inextricably intertwined with architecture. In addition, instead of a stable set of forms, the picturesque technology would be determined by projections of desire.

42. HARDINGHAM, S., op. cit., pp. 192-207, 230-237, 242-253. More scenes can be found in PRICE, Cedric, op. cit., pp. 24-25, 27-29, 60, 86, 91, 95. Regarding the Potteries Thinkbelt project, Abalos has identified "a genuine picturesque inspiration" in the amalgam of new construction and industrial ruins. See ABALOS, Iñaki, *Atlas pintoresco, vol. 2: Los Viajes*, Gustavo Gili, Barcelona, 2008, p. 214.

43. HARDINGHAM, S., op. cit., pp. 358-365.

44. DE LA O CABRERA, M. R., "'Kinaesthetic delight': Cedric Price's plan for the Abu Dhabi Sea Garden, 1973", *Studies in the History of Gardens & Designed Landscapes*, 2017, vol. 37, n. 3, pp. 250-260.

45. Ibid., pp. 446-469. PRICE, Cedric, op. cit., pp. 91, 95.

46. Ibid., pp. 406-413.

47. PRICE, Cedric, "Public spaces and private spaces", in *London Architecture Club Magazine*, 1978, n. 2, pp. 20-22.

48. WILLMOTT, Peter, "Some Social Trends", *Urban Studies*, 1969, vol. 6, n. 3, pp. 286-308.

49. PRICE, Uvedale, *An essay on the picturesque, as compared with the sublime and the beautiful: and, on the use of studying pictures, for the purpose of improving real landscape*, James Robson Publisher, London, 1796, pp. 166, 235.

50. PRICE, Cedric, "Approaching an Architecture of Approximation", *Architectural Design*, September 1972, n. 10, pp. 645-647.

51. On the visual empiricism of the time, see MACARTHUR John and AITCHISON Mathew, "Oxford versus the Bath Road: empiricism and romanticism in The Architectural Review's picturesque revival", *The Journal of Architecture*, 2012, vol. 17, n. 1, pp. 51-68.

Images
01. Cedric Price, *Two Tree Island*, c. 1972. Watercolor showing the interior of the dock and, behind, high density homes.

02. J. Megarey Publisher, *The Hudson River Portfolio,* 1820. View near Hudson.

03. George Inness, *The Lackawanna Valley*, c. 1856. National Gallery of Art.

04. Charles Sheeler, *American Landscape*, 1930. The Museum of Modern Art, Nueva York.

05. David Greene, *Park Scene with Mobot Facilities*, L.A.W.U.N. Project, 1969.

06. Peter Cook, *Settlement in a glade*, Foulness Project, 1971.

07. Cedric Price, *Two Tree Island*, c. 1972. Watercolor, without title, showing the interior aspect of an area of the island after the intervention.

08. Cedric Price, *Abu Dhabi Sea Garden*, c. 1973. Watercolor of the set seen from the beach.

09. Cedric Price, *Generator*, c. 1976. Sketch presenting the project from the northeast corner showing the light emitted by the structures inserted in the landscape.

10. Cedric Price, *River Clyde Competition*, c. 1973. Views of some project areas covered with vegetation associated with ornamental, sporting and productive uses.

06

Echoes of Olmsted in Europe. The Park System and Origins of Contemporary European Urbanism

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With the design and construction of the Emerald Necklace in Boston by Frederick Law Olmsted (1822-1903), a new urban tool took shape directly targeted at adapting natural landscapes to the interior of a city, conceptualized as a system of parks fused within an urban structure and landscape design. This idea continues to be key to the development process of creating symbiosis between city and nature. Without claiming to be exhaustive, this paper reviews how this idea was introduced to Europe in a variety of ways and through diverse achievements. Through three 20th century "landscapers" rooted in different contexts and places, this paper aims to show how systems of parks have consolidated in Europe with distinctive yet complimentary points-of-views, all contributing to the development of the interaction between city and nature in urban architectural culture, laying the foundation of what is presently called Green Infrastructure.

With the design and construction of the Emerald Necklace in Boston by Frederick Law Olmsted (1822-1903), a new urban tool took shape directly targeted at adapting natural landscapes to the interior of a city, conceptualized as a system of parks fused within an urban structure and landscape design. This idea continues to be key to the development process of creating symbiosis between city and nature. Without claiming to be exhaustive, this paper reviews how this idea was introduced to Europe in a variety of ways and through diverse achievements. Through three 20th century "landscapers" rooted in different contexts and places, this paper aims to show how systems of parks have consolidated in Europe with distinctive yet complimentary points-of-views, all contributing to the development of the interaction between city and nature in urban architectural culture, laying the foundation of what is presently called Green Infrastructure.

The Emerald Necklace in Boston, Massachusetts, represents not only a turning point in the history of urban design but also set the precedent of sustainable urban planning instruments such as green infrastructure. Its creation attests to a "longue durèe"

idea made reality at the moment modern urbanism was beginning to emerge. This project was not a theoretical approximation but rather a much-needed *praxis* in the innovation of the principles of urban design as in the profound knowledge of the dynamics of landscapes, due to its ability to recreate *genus loci*[1]. In this project, Olmsted showed what potential effect a systematic understanding of relationship and interaction between different parts, natural landscape in an urban placement and effective integration of local elements -water, terrain, vegetation, and all their associated dynamics- could have on the development of a city. With the background of English landscaping, including the 18th century reinterpretation of *countryside*, the culture of the first public parks, and the urbanism of the French "walk", Olmsted introduced a new perspective able to provide solution to everyday problems of urban structure and metabolism. This park system clearly influenced those interested in open city spaces in European urbanism, from pioneers Howard, Geddes and Henard, to trailblazing architects of the Modern Movement like Van Eesteren and Le Corbusier. These last architects are minor references, leaving only small contributions to the questions this paper intends to address. One must look at supposed secondary figures in the development of the field of urban planning in order to find an explicit reference to the park system, and go beyond general interests in landscaping and the relevance of "green" in urban future[2].

Critics in North America have supported and hailed Olmsted, giving him a deserved heroic place in history[3]. This legacy has not carried over to Europe. The details of his thought process have been less recognized in the diffusion of the system of urban parks, which, indeed, spread quickly around the continent. Olmsted was known indirectly for his work on American cities, seen by many European urban planners, and for his influence on the City Beautiful Movement. This Movement put park systems into the DNA of American urban planning. But often an idea's success comes with the risk of trivialization. Both the intense and successful work of the office headed up by his sons as well as the decadence of the Movement led people to forget this pioneer. Nevertheless, although research on the driving force behind the incorporation of nature into modern European urban planning has identified specific references to Olmsted's work, the common denominator of this force converges mostly around the similar idea of park systems, while the figure of Olmsted remains more or less present depending on the case.

Here, the opportunity arises for this article to explore three principle figures important to the development of urban European park systems. All of these figures can be related to one another as well as to this first American landscape architect, not because of their direct relationship but rather because of their 'elective affinity.' These figures belong to the generations posterior to the creation of Central Park in an order that goes from Jan Claude Nicolas Forestier, a French contemporary of Olmsted's sons, to German, Leberecht Migge and, finally, Swede, Holger Blom. Each one proposed urban park systems in different ways framed by their logical and historical limitations, shedding light on the construction and evolution of an idea that was, at the same time, a new tool for urban planning in contemporary Europe. This paper does not focus on parks but rather the systematic conceptualization of such, which came from a structural vision of nature in cities. The connection between these figures and the historical facts are also, in a way, an echo of the thoughts and work of Olmsted. Through the ideology and circumstances of each one, the seminal idea: park systems, consolidates on the bases of a new urban vision. To this day, the outstanding work of these urbanists in cities like Paris, Frankfurt and Stockholm are still able to communicate intelligence and skill though their designs, showing how nature fits inside the city to create networks of public spaces and display urban structures as unique landscapes. These qualities are present in each one and Olmsted as well **(fig. 02)**.

THE ORIGINS OF PARK SYSTEMS, F. L. OLMSTED

Olmsted's legacy belongs to the best of western urban culture. His interest in understanding the depth of "natural processes" within an urban landscape was actually recognized much later. A specialist in nature and its interactions, with disparate yet integrated training, meticulously interpreted nature's central features inside what was the urban factory. As a self-taught, world traveler, he incorporated what he saw in Europe into his ideas. There were two keystones to his learning: the British people's parks and the tree-lined French *promenade*. From Birkenhead Park designed by Paxton in Merseyside (Liverpool,) and Victoria Park in London, Olmsted learned the value of the unique mix of beauty and social reform captured in the design of English urban parks. In a Paris caught up at the time in the transformation of public works, Olmsted discovered the new idea of urban mobility. Long walks down the *Avenue de l'Impératrice* revealed the evolution of *boulevards* and the urban character of the linear French arboretum. In his park system two factors combine the facilities of the people's park and the connectivity of wooded walks.

Olmsted indirectly learned along side the masters of urban European landscaping, Paxton and Alphand, and applied that knowledge to his first works. One can see this in the early *Promenade* proposed for San Francisco in 1865: more than 6 kilometers long, sunken in order to protect form the wind, traffic and onlookers in a desolate environment. Perhaps this was his first 'public space plan' even though the city administrators had really asked for a Central Park equivalent. In 1866, New York, Olmsted, along side the business partner he would have for the first half of his career, English architect Calvert Vaux, created a coordinated system of inter-municipal parks, linking Central Park in Manhattan with Prospect Park project in Brooklyn and the new and existing parkways, beaches, riversides, hills, and bridges, and even public transportation. With the second grand New York park project under construction, Olmsted made Buffalo his first completely natural system of public spaces: park, parade and front, intertwined together through promenades, parkways, places and circles[4].

However, these were only precedents to that would be what is for us the 'true' birth of the park system, which took place in Boston, 1880, when a more mature Olmsted had the opportunity to transform the shore of a small, muddy, formless river into a coherent group of open spaces which still is to this day not only a living document but also a key part to the structure of the city. The Emerald Necklace is an example of how open spaces can shape the urban spaces and at the same time help organize basic aspects of the daily city metabolism, for example the collection of rainwater, pedestrian movement or the urban microclimate. Olmsted, conscious of the relevance of his project, wrote to his team in 1893, "Nothing else compares in importance to us with the Boston work...I would have you decline any business that would stand in the way of doing the best for Boston all the time"[5]. When his direct disciple, Charles Eliot -director of his office between 1893 and 1897- incorporated the metropolitan area into said system, it did none less than to amplify one idea and awaken others with the potential to mobilize the sharing of ideas between disciplines. All of this occurred in time and not without challenges. However, they were witnessing the birth of an idea with concrete echoes on the other side of the Atlantic.

Olmsted stayed true to his project of tying the city to natural landscapes in each and every one of his plans, some of which never coming to fruition, but when they did, they reached an exemplary height. This happened in Chicago, where Olmsted was continuously immersed in projects later taken over by his sons from the 1870s to his retirement in 1893 (from the South Park System to the World´s Columbian Exposition), also in Rochester (1888) and in Louisville (1890).

A short time after, with the Chicago Plan of 1909 (Burnham) despite the Beaux Art logic inherited form the "Great City" style of Haussman's Paris and the Vienna Fin-dè-Siècle, we could say that green structure materialized in modernity as an urban principle, transcending the dreams of the City Beautiful movement. Long before, in 1870, Olmsted had given his *Public Parks and Enlargement of Cities* speech in Boston. When the American city was barely an embryo of what it would be, although there was a glimpse of its potential growth, Olmsted was aware of the fact that parks, and with it the systematic management of local landscape in any case, would take on an important role in urban projects, and he dedicated himself to precisely that.

GRANDES VILLES ET SYSTEMS DE PARCS: JEAN CLAUDE NICOLAS FORESTIER (1861-1930)

With a strong background as a landscaper, Forestier defined himself as "a true man of the city who loves greenery and gardens"[6]. He was formally linked to the new urban design discipline as one of the original founders of the *Société Française de Architectes et Urbanistes* in 1911. His special connection with the Olmsted's vision came through in his desire to link the *Grandes Villes et Systems de Parcs*. His thesis, published in 1908, shows his determination that Paris would wake up to the idea of parks, and finishes referring to himself as the "systematizser" of open spaces.

Hired by Alphand from 1887 on, Forestier learned while working on the *Promenades et Plantations* service of the Parisian community for 40 years. His awareness of integration appeared early on in the re-designing of *Avenue Breteuil*, in which the scale of the open space influenced the street typology that organized the urban extension. He replicated this feature in later projects, in particular with the spaces that replaced the Thiers Wall, where the "*belt stretches its white halo between intra-mural Paris and its outskirts*"[7]. While his international activity as a landscaper and urban designer spread, he did not abandon the idea of park systems, which is made evident in his 1924 *Plan des Espaces Libres*, which includes all the Department of Sena **(fig. 03)**. Here, his faith in the idea originating in Olmsted is profound and mature[8]:

> "It's in the territorial dimension where the distance between Forestier and Alphand becomes evident... For Forestier the garden as a component of urban design becomes part of territory design. It is the place where architecture and territory become reconciled. Forestier discovers and integrates territories. He is a topographer".

Before, *Grandes Villes et Systems de Parcs* gathered his articulate comprehension of open spaces in the city in a simple, original, and surprisingly methodical way. At that time, a large part of the plans that the text collected were still being carried out, including the American plans, which points to the idea that his knowledge of Olmsted's work was possibly indirect or incomplete. He visited North America later, admiring some spaces that reaffirmed his ideas, like the Bronx River Parkway in Westchester (1907-1925): "*...I never imagined you would have anything as beautiful as this continuous Woodland*"[9].

While addressing the origins of the idea of park systems, he makes no reference at all to Olmsted. He quotes Adelaida (Australia) and Letchworth (UK), both from the book *Garden Cities of To-Morrow* by Howard. Places like Vienna and Washington, and also Boston, appear. The protagonists are the cities and their administrators who, he said, understood that a 'city's plan' was not enough for its completion unless it incorporated an additional program with a special plan of the open spaces, both interior and exterior.

Forestier begins his text contrasting a sleeping Paris to one on alert, comparing his city with other western cities and denying that one could think of it as something 'finished.' He continues with his definition of a park system based on its components and distribution of the city. Among the different parts described, he assigns particular value to *avenues-promenades* (parkways, promenades, rings and *anlages*), which guarantee the continuity of the 'studied network,' as in, for example, Boston, Chicago, New York, Brooklyn as well as the *promenades* of Austria. When he speaks of the parks of some of the big cities, he begins with Boston, praising the Commission appointed in 1894 thanks to Eliot, who organized, acquired and managed the land and the available resources. He also writes about New York, Chicago, Baltimore, and Harrisburg (all on which, curiously, Olmsted and his sons worked). The text concludes with him calling on the need for Paris to act in this matter and recognize that air, light, and greenery are necessary if the city wishes to prevent decline. This particular anticipation of the message of Athens Charter reveals that Forestier is a dedicated visionary, who, nonetheless, does not find enough support in the city in which he lives, the space where he aspires to let his ideas unfold.

In effect, Forestier, well known for his gardens and parks, like those in Seville and Barcelona, was only able to give shape to his vision in foreign laboratories: in the Iberian Peninsula (in the 1910's), Morocco (1913), Buenos Aires (1923), and in Havana (1925-1929). His clients wanted more Paris, that is to say, urban projects rooted in grand late baroque layouts and in the design of parks at the end of the century, similar to those started by Alphand. However, his adaptive criteria, botanical skills and respect for the local climate, allowed him to justify his advances in the Beaux Art concept of urbanism.

His approach to park systems has remained reflected above all on paper, while his parks and gardens still are in existence, like *Parque de Maria Luisa* in Seville. His concept of the system is eloquently reflected in two of his best plans, Buenos Aires and Havana, both excellent examples of his ideas. The first was more like a reform of a city already in existence, and the second was a plan for growth of an old colonial city[10]. In both, one can recognize the landscaping and designing lessons found in the park system as a structural, organizational tool. In the reforms proposed for the El Prado and Malecon in Havana, or for the design and extension of the Costanera riverbank in Buenos Aires, one can see the parallelism of the insertion of urban greenery to the Bostonian sequence from the Common and the Public Garden, passing to the Commonwealth Avenue. Parks at the heart of the oldest and newest neighborhoods were linked together, with attention to the topography and the historic part of the city, like with the Príncipe hill and in the "Quintas" that are incorporated into the Havana system. Forestier made use of every space and drew his perspectives affirming the need for urban beautification and also a regional plan. In both cities one can easily recognize to this day elements of the proposed structural outline, contrasted definitively with the colonial parameters, substituting the grid for the hierarchal street system of diagonal avenues that link together the monumental hubs, going after the insertion of large green areas in order to create a 'system' within the city. In that way, it goes beyond the marginalization generated by the topography and creates value in natural particularities and the landscaping accidents of the urban profile[11] **(figs. 04 and 05)**.

PLANNING, SOCIAL REFORM AND GARDEN CULTURE: LEBERETCH MIGGE (1881-1935)

Recent research has discovered the exemplary figure of German urban landscape architect, Migge, from the inter war period, supporting the idea of how landscape was not an irrelevant issue for modern vanguard architects. As such, Migge's *Green Manifesto,* 1919, is "one of the most overtly political tracts ever written by a landscape architect"[12]. Migge saw himself as a horticulture architect who made putting the transition spaces between urban environment and countryside a priority, as Howard had already done with his Garden City model, though never ignoring the big city because, "as early as 1913 Migge had acknowledged the inevitable existence of the city and defined the metropolis as "the mother of gardens"[13].

Immersed in his era and its contradictions, he developed his interest for landscapes at the dawn of a new era, rational and functional, directly influenced by ideas of Olmsted's successors. German urban design culture had already been presented with work more or less focused on urban green, as in Stübben's *Der Städtebau* (1890), but above all in his writing *The Vegetation in the city* (1925), in which he includes a wide rang of influences, making clear references to the North American park system[14]. Nonetheless, the person who would introduce the North American prospective on urban and metropolitan parks to Germany was eventually urbanist and economist, W. Hegemann, who visited Olmsted's firm in Boston around 1909 and became familiar Eliot's work, although he had recently passed. Two years later while preparing for Dusseldorf, he exhibited materials used in Burnham's plan for Chicago and also drawings of the first park designed for Hamburg by Migge (the small Fuhlsbütel Park, 1909), who he probably got in contact with through Muthesius. Hegemann was aware of the transatlantic influence of the German landscape culture, particularly that of figure Pückler-Muskau, recognized by Eliot himself, but also under the mutual influence of round trip ideas[15].

During the Weimar Republic, Berlin and Frankfurt were laboratories where Migge and other professionals like Martin Wagner and Ernst May could experiment gentle functionalism and try to prove, taking into account the English garden city as inherited continuous city, the importance of urban green spaces as a mediator, offering a systematic version which could be associated in part to those of Olmsted and Forestier.

Migge started at a very young age as a gardener. In 1910 he traveled to England to experience first-hand the Garden City movement, and in 1920 he settled down in Worpswede, an artist colony since the 19th century, where Bruno Taut and others lived. He established a school for young gardeners, adding on a drawing office in 1924 as well as opening up an office in Berlin in 1926. With reformist ideas conceived 'from the ground', he became involved in modern Avant-guard actions as a member of Werkbund (1912). Above all, however, Migge was an experienced landscape architect who quickly began designing parks in Hamburg and Leipzig, where his systematic ideas of urban parks took root and developed[16].

> "Migge liked the concept of interconnected park systems, giving them a variety of social functions and spatial expressions. Migge adopted the American way of taking in meadows and woodlands as part of the cultural landscape of the park, and spaces that could be used for public gatherings".

During WWI, Migge came up with a series of strategies he called "Green Planning" and applied them for the first time in Rüstringen, where he met M. Wagner in 1911. The first step, according to Migge, was the "Green Archive", an inventory of all the open green spaces in existence together with other natural elements and areas of relevant historical significance. Next came the analysis of 'areas of influence,' borrowed from Wagner. This was an urban design standard to determine the ratio of the area of the park within a half hour's walk from each neighborhood to the overall distribution of small interior parks, connected to the 'open spaces' and the planned network of green *promenades*. This was the first of his systematic schemes.

Only later, in 1922, did Migge propose for the first time a complete green belt around Kiel, and between 1924 and 1926 he designed his first *Siedlung* called *Georgsgarten* in the city of Celle for the municipal architect, Haesler. With the collaboration of Wagner, the Berlin municipal architect from 1925 on, and with May in Frankfurt, Migge was able to develop a more integral planning of his systematic vision of open spaces.

In Berlin, where the existing municipal management had already incorporated natural pieces with a certain organizational function, Migge participated in the *siedlungen* Zehlendorf (from 1924), Britz (from 1925), and Siemensstadt (from 1929). Brit, only partly finished, was possibly the most unexpected design by Migge due to its articulated synchronization of water, topography and orchards in an urban plan where the sequence of green is the protagonist. In contrast, in Siemensstadt the subdivisions of neighboring gardens disappeared; the productive gardens were withdrawn and in their place appeared woodlands with wide, contiguous spaces that reflected the character of primitive meadows. Migge's collaboration with talented architects like Wagner and Taut helped him materialize the articulation of open space that surrounds and sustains urban and architectonic design. In the three cases mentioned, one can observe variations in the concretion of said space yet always integrated in a concept much bigger than the specific design of the park or garden. In 1930 Hegemann incorporated the systematic planning of Wagner (1929) in the *Das steinerne Berlin* that displayed this structured combination of open spaces for Greater Berlin.

Everything became clearer in Frankfurt, a smaller scaled city where Migge was able to develop a practical, more encompassing thought process. Next to the Nidda river, the *siedlung* Römerstadt coexisted with interpretation of all the urban surroundings, as Migge originally defended in the *Regional Plan for Open Spaces* in 1928. The 'mediating role' the natural space achieved in the urban design had a value that has never been highlighted enough. With his *'colonial municipal park'* Migge's theoretical-practical approach reached a more radical and coherent form for the development of a project combining together urban green areas. In his proposal he included a new type of *Volkspark*, where the interlinked green areas and the popular orchards were at the service of the interaction between city and countryside[17], a topic of great interest at the time. Frankfurt's green system connected to the driving principles behind the work of May and Migge, with the logic of a polycentric urban system with new satellite neighborhoods, May's *Trabaten Prinzip*, where open spaces -the *colonial park*- cemented the urban pieces together[18] **(figs. 6 and 7)**.

MANAGING THE URBAN PARK SYSTEM: HOLGER BLOM (1906-1926)

The Swedish writer T. Danielsson wrote in 1965, "*the song says 'only God can create a tree' but, have you ever studied the urban gardener Holger Blom?*"[19] Blom was the architect who, while serving as the head of the department of parks in Stockholm for three decades (1938-1971), not only pushed coherent policies and strategies of urban parks forward but also successfully developed a "park system" present in almost all of the existing city spaces[20]. In order to understand what some call the "Stockholm style", one must know that Blom was a 'dynamic gardener' remembered in his city with respect for his attention to civic duty and artistic work[21]. Although there is no specific reference to Olmsted in his work -to Eliot, yes- it is not difficult to identify a virtual connection between both of them.

With a solid architectonic background and degree of urban design experience after working at the Corbusier's office in Paris, Blom began to direct the Stockholm Parks Department at the young age of 32 as a successor to Osvald Almqvist (1884-1950). Almqvist had set up the office in only two years and had already begun work on the "green belt" for the metropolitan area, and, he had already taken into consideration creating cohesion between the larger areas of park in the city connected by green corridors. Stockholm was a city late to industrialize, only starting from the 1930s on, but it was undergoing a rapid process of urbanization on top of relatively well-conserved native landscape. To the city's advantage, Stockholm had an urban government concerned with providing infrastructures and services to a territory in transition, while respect for nature was supported through the original quality of the Stockholm landscape, the uniqueness of its location, and having a horto-botanical culture beyond the landscape-oriented culture[22].

At the end of the 1920s, the collaboration of top architects like Almqvist, Asplund, Lewerentz and Markelius on projects like the Universal Exposition of 1930 created a unique climate in the city and allowed the east side to be shaped together with the Djugard canal into a sector destined to have grand parks and cultural facilities. They represented new spaces that remembered the essential attitudes of natural, social enjoyment of the landscape -*exertive* or *receptive*- as touted by Olmsted. These spaces expressed a 'third way' for modernist vanguards projects, characterized by the harmony between architecture and landscape. In this context of cooperation, Blom propelled his projects forward not only with his sensitivity to nature but also with his precise knowledge of the local landscape, aided by experts like Erik Glemme (1905-1959), one of the few landscape architects with training in his area, recruited by Almqvst and who went on to be chief of the design department until 1956.

The results started to take shape in a unique model for the integration of parks into urban landscapes[23]. Key to all of this was the green network that Blom thought of as "infiltrating" into the existing city and throughout the entire city-region. He had something more than landscaping talent: he had a strategic vision of the urban project that looked toward the long term and which would have been impossible if Blom had not recognized the importance of political and information circles, with whom he connected simply and eloquently[24]. Blom was aware, like Olmsted, of the interaction between nature and democracy. "The park relieves ['opens up'] the city: The park must be an active component of urban development, forming networks through the city, and not just an isolated green oasis"[25]. With this, and working under the motto "all gardens are natural spaces", the Holmsian School was consolidated, recreating the regional landscape features within the urban parks -both new and existing- and aiming to create a fruitful dialogue between edification and open spaces **(figs. 08 and 09)**.

The chain of parks at Rålambshovsparken & Norr Mälarstrand deserves special mention: developed along 3.5 km of the Malaren lakeshores, together with relevant interventions in the north, Norrmalm. This chain was created between 1941 and 1943, although spaces continued to be added until the 1950s, starting with the appropriation of different spaces and natural elements, and incorporating existing pieces into a unique, diverse ensemble with water as the protagonist, connecting the inner city of Stockholm with its perimeter without interruption[26].

This was an important case not only because of its impact on the field of landscape design as recognized in Blom's drawings for his 1946 Park Programme, but also because it promoted a much wider urban scale. The schematic representation of the Stockholm park networks **(fig. 10)** was thought of under the concept of the city as a whole landscape[27], associating spaces and parks accumulated over centuries and 'naturally' incorporating others, from the Forest Cemetery to the open-air museums[28]. The design of this global green space has acquired an importance in Stockholm equivalent to that of the trailblazing Emerald Necklace and its extension into the *Metropolitan Park System* of Boston[29].

Indeed, Blom's work is also relatable to that of Sven Markelius, who was in charge of the Urban Planning Department starting in 1944 and who introduced the metropolitan dimension to Stockholm[30]. Markelius proposed the complementarity of the existing urban center, converting it into a central hub with a system of new communities or satellite cities strung out like pearls along the metro lines. The contrasting aspect was that quite pristine nature acquired an active function or protection, interfering with the inherited pattern of radial development like green wedges and preventing transportation from being the defining factor of the regional urban model[31]. The Stockholm plan, approved in 1952, came with a structure fully capable of making accessible, and ecologically beneficial open spaces, a structure that reached the civic scale of the new communities[32].

Since then, recognizing both success and failure (above all in some satellite cities), Stockholm has strived intensively to develop plans and documents that describe the functions and values of green structures in connection with biodiversity and also social qualities. One cannot forget Blom because in order to materialize a systematic vision of landscape, knowledge and ecology are not enough: design is also necessary.

LEARNING TO DESIGN THE CITY WITH NATURE. EPLIOGUE

The three images in figure 10 show how the "metropolitan park system" is a constant in which references to Eliot and Olmsted are unavoidable. The communication of one concept, the need to embrace local and regional landscapes in order to accommodate urban spaces in their natural environments, has become an important part of contemporary urbanism, although without a doubt more in theory than in practice. Nowadays, there are innumerable cases of cities with defined park systems, but the figures of Forestier, Migge, and Blom remind us that it is not only about drawing up a plan. The urban and regional scale are mutually dependent, and only by taking that into account can we achieve the over all objective of integration of the city into its natural environment. The most difficult part is making all of this viable. That is collaboration between urban design and architecture -landscape architecture- with opportune design and vision of the future is only achieved through a correct interpretation of the areas and appreciation of the art of gardens, not only the flora and climate, but also projects with water, relief, and architecture.

Each one of these landscapers was two decades younger than the one before and each one corresponds to a different profile: close yet far from the person and the project that Olmsted constructed for himself. Forestier traveled the world. Migge worked only on a handful of German cities, and Blom hardly ever left his city, but all three shared an all-encompassing vision that categorized open spaces an a necessary part of urban design. Landscape articulates and composes the 'system' in which urban space and the nature that sustains it can share positive dialogue. Forestier proposed a separate technical section for the urban aspect but it was made visible through his knowledge as a landscaping artist. Migge undertook a reformist adventure in which he saw in productive urban gardens opportunities that are now staring to be seen again. Blom offered constant dedication in public service to the construction and management of specific landscapes, realizing the effectiveness of willingly applying talent over a long time. As Olmsted thought, time is the sculptor of the landscape, but time is also blind. In order to blur the limits between parks and nature in an urban project, one must manage time and do so through a design that, thanks to a systematic prospective, articulates the construction process of a city, its infrastructures and neighborhoods, with a system of open public spaces that help a guarantee of unity and sense. Prior to the advent of discourse on sustainable cities was the concern for a beautiful city and for techniques that would go beyond the health agenda and, that, as with the *Emerald Necklace*, would construct local landscape, facilitate urban reform and harmonize the expansive growth of a city that cannot stop being functional and that must serve the citizens. Open spaces are common spaces and belong to the collective sustenance that provides cohesion for the urban space[33]. It is its physical bedrock.

Two essential qualities are needed for urbanization to coexist with the park system. Firstly, the structural scale of open connected spaces approaches the monumental aspects and contributes to strengthening of local identity. Olmsted knew this as he confronted "formless cities" of the mid-west, as did Forestier when he reshaped cities with a colonial past, and both Migge and Blom knew this also when they were presented with the expansive peripheries of cities that were growing without criteria. All of them were

aware of the deep connection between function and form in a city. Park systems give shape to what is urban. But a second feature is how they contribute to the betterment of a city's metabolism, fulfilling more than the function of creating social health or urban recreation. Nature that invades urban space participates in its processes and has the potential to regenerate and create necessary wellbeing, increasing the sustainability of the complex urban territory. Olmsted and Forestier understood this; Migge alluded to this in his reflections on the supply and recycling of waste for urban vegetable gardens, and Blom anticipated it, seeking not a park city but indeed a city in a park -or in nature- paraphrasing McHarg. In general, a park and all the components of its system need a specific aim: not only nature. These four figures show that man can be a negentropic agent that emanates from "design with nature"[34]. We are not dealing with an Eden once inherited and now lost but rather a constructed, civilized space, something that goes beyond the drawings Calvert Vaux made for Olmsted, beyond those of Forestier and Migge, or those Erik Glemme made for Blom, something that goes beyond them but still needs them **(fig. 11)**.

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Notes

01. The Olmsted connection with English landscapers (*Walks and Talks of an American Farmer in England*, OLMSTED, F., Putnam, Nueva York, 1852) coexists with his interest on different sciences; see BEVERIDGE, C., 'Frederick Law Olmsted's 'Theory on andscape Design*, Nineteenth Century', The Journal of the Victorian Society in America,* 20, The Olmsted connection with English landscapers (*Walks and Talks of an American Farmer in England*, OLMSTED, F., Putnam, Nueva York, 1852) coexists with his interest on different sciences; see BEVERIDGE, C., 'Frederick Law Olmsted's 'Theory on Landscape Design*, Nineteenth Century', The Journal of the Victorian Society in America,* 20, n. 2 (2000), 32-7. Olmsted was not only a great landscaper, he demonstrated specific interest on cities and talent for city planning; see SUTTON, S. B. (edr.), *Frederick Law Olmsted, Civilizing American Cities A Selection of Frederick Law Olmsted's Writings on City Landscape*, MIT, Cambridge, Mass., 1971.

02. We use the concept of 'system' in its common meaning, as these authors do, since none of them develops, specifically, a systemic vision in the sense that contemporary urbanism gives it. Bear in mind that it derives from its analogy with that developed by Von Bertalanffy from 1969 with its *General Systems Theory*. However, it is evident that today the concept of park system, in a broad ecological sense, acquires an equally wide and complex meaning. The doctoral thesis *Sistema de parques. Origen y evolución de un "principio" estructurador de lo urbano*, carried out by Marina JIMÉNEZ, under the direction of Juan Luis DE LAS RIVAS SANZ, defended at the University of Valladolid in 2009, analyzes in detail the evolution of the concept discovering a multitude of characters in the shadow.

03. Some of the many publications on Olmsted that continue to appear from the US: BEVERIDGE, C.*, Frederick Law Olmsted: Designing the American Landscape*, Rizzoli, Nueva York, 1995; RYBZCYNSKI, W., *A Clearing in the Distance: Frederick Law Olmsted and North America in the Nineteenth Century,* Scribner, Nueva York, 1999; MARTIN, J., *Genius of place. The life of Frederick Law Olmsted*, Da Capo Press, Cambridge, Mass. 2011.

04. There is a plan dated 1881, significantly entitled *Olmsted's Sketch Map of Buffalo showing the relation of the park system to the General Plan of the City.* The city proudly exhibited his plan at the Philadelphia Centenary Exhibition in 1876 under the title of *The best planned city, as to its streets, public places and grounds, in the United States, if not in the world.*

05. In ZAITZEVSKY, Cynthia, *Frederick Law Olmsted and the Boston Park System*, Harvard University Press, Cambridge, Mass., 1982, p. vii.

06. In RACINE, Michel (dir), *Créateurs de Jardins et de paysages en France du XIXe siècle au XXIe siécle, Tome II*. Actes Sud. École Nationale Supérieure du paysage, 2002, p. 138.

07. COHEN, Jean-Louis, "L'Extension de Paris", en LECLERC, B., (dir., Actas congreso 1990) *Jean Claude Nicolas Forestier 1861-1930: Du jardin au paysage urbain,* Ed. Picard, Paris, 1994, p. 150.

08. LECLERC, Benedicte, "Forestier et le Service des Promenades", in TEXIER, S., *Les parcs et jardins dans l'urbanisme parisien. XIXe - XXe siècles,* Action Artistique De La Ville de Paris, 2001, p. 142.

09. IMBERT, Dorothée, "L'Amérique de 'Grandes Villes et Systèmes de Parcs'", in LECRERC, B. & TARRAGÓ I CID, S. (dir.) *Jean Claude Nicolas Forestier. Grandes villes et*

systèmes de parcs. France, Maroc, Argentine, Institut Francais d'Architecture, Paris, 1997, p. 366. Bronx River Parkway is also indirectly indebted to a report prepared by Olmsted Jr. in 1907 for the city of New York.

10. TARRAGÓ, Salvador, "Entre Le Nôtre y Le Corbusier", in LECLERC, op. cit. 1994, p. 261.

11. SEGRE, Roberto, *Transformación urbana en Cuba: La Habana*, Barcelona, 1974, p. 56.

12. HANEY, David, "Leberecht Migge's 'Green Manifesto': Envisioning a revolution of Gardens" In *Landscape Journal*, 2007, n. 26, p. 201.

13. De MICHELIS, Marco, "The Red and the Green. Park and City in Weimar Germany", in *Lotus*, 1981, n. 30, p. 113.

14. Stübben wrote: "At the beginning of this century new ideas and excellent models reached us from the USA, where they were energetically pursuing the concept of penetrating the very core of cities with planted areas. Individual parks were integrated into so called parkways.... These layouts form what is called a "park system". One outstanding example of this is the "park system" of Boston ... As far as I am aware these internal green pathways have not been introduced yet into France or Italy but, having been created in England they have been constructed with increasing frequency in Germany in recent years..." In "La vegetazione nelle città", in *Architettura e Arti decorative*, a. V - MCMXXV (1925), pp. 127-145. This text is illustrated with the classic Olmsted Park System plan for Boston. However, both Stübben, and other relevant contemporaries, such as Camilo Sitte, very different from each other, in their urban practice did not develop the idea of a park system and they continued to observe green spaces as isolated elements of the city, apart from the relationships that tree-lined walks generate.

15. "The older Olmsted was open to these ideas, and the good old families of New England sent Charles Eliot as an understanding representative to Germany. The works of Pückler-Muskau affected Eliot like an epiphany; he carried the precious seed that would have dried up in Germany back to his homeland and brought it to an unexpected flowering in the park systems of Boston. From there, these ideas should return to Germany". HEGEMANN, 1912, in HANEY, D., "Bringing the Americanized Pückler back to Germany: Charles Eliot and the German Park Reform Movement", en *GHI Bulletin* Suplement 4, 2007, p. 91.

16. WAYMARK, J., "When Modern Was Green: Life and Work of Landscape Architect Leberecht Migge (review)", *Landscape Journal*, 2011, n. 30, p. 153.

17. De MICHELIS, M., op. cit., p. 114.

18. MOHR, C. & MÜLLER, M. *Funktionalität und Moderne. Das Neue Frankfurt und seine Bauten 1925-1933*. Ed. Fricke, Frankfurt/Main, 1984, p. 26.

19. DANIELSSON, T., 1965, Postilla. Quoted in the exhibition of Blom's work in *The Swedish Center for Architecture and Design* (today *ArkDes*).

20. ANDERSON, Thorbjorn, "To Erase the Garden: Modernity in the Swedish Garden and Landscape", in TREIB, M., *The Architecture of Landscape 1940-1960*, University of Pennsylvania Press, Philadelphia, 2002, p. 22.

21. When in 2009 the city calls a competition for a renewed position of municipal gardener, an architecture publication publishes the call with the headline *"Stockholm's parks are looking for new champio*n", www.arkitekt.se/s494789 (consulted 27-03-2012). The title *dynamisk stadsträdgårdsmästare* appears in a recent Swedish book about his figure: ÅSBRINK, B. *Holger Blom. Dynamisk trädgårdsmästare i Stockholm*. Carlsson Bokförlag, Estocolmo, 2012.

22. This process was never easy. The Swiss L. Bolin wrote in 1947: *'We have now endeavored to let nature slip into the city again, after times when we tried to destroy most of it.'* Cited by ANDERSON, Thorbjorn, "Erik Glemme and the Stockholm Park System". In TREIB, M., *Modern Landscape Architecture: a Critical Review*, University of Pennsylvania Press, Filadelfia, 1993, p. 118.

23. Blom is still seen as the great "organiser" of Stockholm's Green structure (first European Green Capital, 2010), responsible for achieving the unique relationship between the city and its natural environment.

24. To gain the support of the politicians Blom produced a poster with a condensed version of his design: *The park relieves (or opens up) the city; the park provides space for outdoor recreation; the park offers space for public gatherings; the park preserves nature and culture*... and incorporating scales, perspectives and issues of real contemporary relevance: *the urban planning aspect; the sanitary and general health aspect; the social aspect; the ecological aspect"*, Poster commented at ANDERSSON, T., "To Erase...", cit., p. 22. (fig. 8).

25. Exhibition brochure "Eating-out", June-September 2008, Stockholm Arkitekturmuseet.

26. ANDERSSON, T., "Erik Glemme...", cit.; SUNDSTROM, E., "The Restoration of Norr Mälarstrand: A linear park of the Stockholm.

27. JELLICOE, Geofrey, *The landscape of man: shaping the environment from prehistory to the present day,* Thames and Hudson, Londres, 1987, p. 301.

28. It is easy to identify: Tantolunden in Soderlman which was initiated at the end of the XIX century; the terrain at Eriksdalslunden to the south, with its active gardening communities since the 1900s; further south and virtually in its natural state, the Skogskyrkogarden, laid out from 1915 onwards by Asplund and Lewerentz; the Djurgarden South to East-Northeast, with the Skansen, the world's first open air museum; and Djurgarden North, interlinked via the Gardet zone with buildings in an open block formation constructed in the 1930s... continuing up to the Hagaparken; to the east it penetrated the green network in the central city from the satellite cities of Hässelby-Vallingby and Bromma, arriving at the interconnected system of Kungshomen, from Fredhålls Park to Rålambmovsparkeno.

29. Recognized not only by the Swedish expert T. Andersson, also by diverse authors, specialists in the subject of urban green, such as G. Jellicoe, F. Migliorini, F. Panzini, E. Battle, etc.

30. In 1968 the City of Stockholm (which comprised 19 districts under development) became fully integrated within the County, formed at that time by the 25 surrounding municipalities, with unified planning in what was the Stockholm urban region.

31. PANZINI, Francesco, *Per i Piaceri del Popolo. L'evoluzione del giardino pubblico in Europa dalle origini al XX secolo,* Zanichelli, Bolonia, 1993, p. 315.

32. From NELSON, A. Research sobre Sistemas de espacios libres developed by the University of State of Washington, EEUU. Case-study: Estockholm. 2006, p. 2. Accesible at: http://depts.washington.edu/open2100/Resources/1_OpenSpaceSystems/Open_Space_Systems/Stockholm_Case_Study.pdf. Last access 10.02.2018. In the design of some open spaces in dormitory towns, Vällingby

among others, there was an interesting linguistic innovation with Glemme as the main responsible, which Markelius and Blom support when popular opinion seemed to be contrary, as in the riverside urbanization of Hässelby at the end of the 50s. Where some critics oppose the Swedish continuity of the landscape in front of the isolated and circumscribed English park (MIGLIORINI, F., *Verde urbano: parchi, giardini, paesaggio urbano, lo aperto nella costruzione della città moderna.* Franco Angeli, Milán, 1989, p. 196), an "erased landscape" (ANDERSSON, T., "To Erase...", 2002), others see parallelism between the Swedish green space and the Anglo-Saxon *village green* or *common*, relying on its vocation of community use, although questioning the will to create a large system of unified green, PANZINI, ibíd., p. 316.

33. Important to remember here are the four basic categories that Cranz identified for American parks *Pleasure Ground* de Olmsted (1850-1900); *Reform Park* (1900-1930); *Recreational Facility -Equipment-*(1930-1965); *Open Space System* (1965-1990). See CRANZ, Galen, *The Politics of Park Design: A History of Urban Parks in American,* MIT Press, Cambridge, Mass., 1982. To these should be added from the 1990's onwards the *Sustainable Park*, CRANZ, G., "Defining the Sustainable Park: A Fith Model for Urban Parks". En *Landscape Journal,* 2004, n. 23, 2-04, pp. 102-120.

34. MCHARHG, Ian, *Design with Nature*, First edition, 1969, American Museum of Natural History, Natural History Press, Spanish edition 2000, Gustavo Gili.

Images

01. View Emerald Necklace in Boston next to Fenway / Muddy River. November 2003. Bottom: View of Rålambshovsparken & Norr Mälarstrand de Stockholm (Norr Mälarstrand / lago Mälaren). July 2010.

02. Visionaries with their feet on the ground: From left to right. Olmsted in Baltimore: J.S. Sargent, Oil on canvass, 1895. Forestier in Cuba: anonymous plate, 1929. Fonds Théodore Levau; Migge in Worsepede: H. Saebens (late 1920s), appears in HANEY, D. *When Modern was Green*, Routledge, New York, 2010; Blom in Sockholm (undated), extract from the cover of ÅSBRINK, B., *Holger blom...*, 2012.

03. Forestier's Open Space Plan for the Department of Sena (1924).

04. and **05.** From the Grand Cities to the Notebook of Plants. Analogy of the continuity between the cover of his first text (1908) and the illustrations found in his "manual". (Ed. Emile-Paul Frères, Paris, 1920).

06. and **07.** Migge's plans for Frankfurt, Diagrams of the community park and the green area policy in Frankfurt or Regional Plan for Open Spaces: the model and its adjustments to the real case. Source: *Der Städtebau*, 3 (1929), color according the original.

08. and **09.** Blom's Parks Plan; and pamphlet published in 1940.

10. From left to right: The Urbam-Metropolitan park system as illustrated by Forestier (1906) and Hegemann (1911), both re-interpreting Eliot, and the Stockholm system by Blom (1946).

11. Pictures and photographs of the work of the four figures. Top to bottom: The Long Meadow of Prospect Park in Brooklyn (Olmsted); Av. Universidad as seen from from the terraces of the University with Príncipe hill in the background, Havana (Forestier, sketch); From the stronghold of Römerstadt looking toward the Nidda Valley (Migge); Nör Mälarstrand towards Mälaren (Blom-Glemme).

07

Nature in the City: Open Space and Ruin

Luisa Alarcón
Francisco Montero-Fernández

One of the ways in which contemporary cities are re-naturalised is through urban voids. Open spaces, sites and wastelands offer unsuspected opportunities to fill the cities with green, which some architects have used as the foundation of their urban proposals, while on other occasions the passing of time has revealed the capacity for regeneration. Both these situations can teach us how to improve the urban spaces we inhabit.

NATURE IN THE CITY: OPEN SPACE AND RUIN

In *Platforms and plateaus*[1] Jorn Utzon describes how Mayans inhabited an impenetrable jungle. This hot and humid jungle acts as a background from which small plots have been cleared to form villages. This exuberant vegetation forms the habitat of a population which lives off, through and for nature. Therefore, when humans abandon these constructions, the jungle takes them over, occupying and transforming them into an almost intrinsic part of itself, in a process in which stone buildings become rocks again as if they had never been quarried. The transformation process is so extreme that it is difficult to believe that the scattered remains we now find in Yucatan might have sheltered a city of 100,000 inhabitants. This regenerating capacity of nature was also observed by members of the Situationist International, who incorporated it into the actions of Unitary Urbanism[2], which opposes cities being fixed in time and praises their permanent transformation. This is true of any city, not just those that fall into ruin after being abandoned, but also those which can appear eternal to us, as almost nothing remains in cities with the passing of time, except for the odd building. Little is left of mediaeval Paris or Beijing in the current contemporary metropolises, except perhaps for the geographical coordinates and names.

This transformation of the urban in time of space is reflected by Situationists and proposed as a specific action, with the creation of mobile cities, especially in the Mexican and Cambodian jungles where vegetation shows its ability to regenerate. These cities moved from east to west, clearing new fields and abandoning those which had been occupied previously, and would again be inhabited by the tropical jungle. This sequential process gradually created different states of transformation from the modern city to wild nature, allowing a continuous return from the country to the city and vice versa, producing, to quote the Situationists, "a marriage with nature that is more daring than the essays of Frank Lloyd Wright"[3], in which the city as a location of high human concentration, disappears and is diluted into the country, a form of habitation which Wright defines as *ruralism*[4] in contrast to the *urbanism*[5] of Le Corbusier, who never renounces the city as the main location of human habitation. None of Le Corbusier's urban proposals substantially altered the essential concept of the city, which continues to be a compact nucleus and a dense space for social interaction. It only changes internally and in scale, proposing extremely tall buildings which generate an occasional high density and liberate the space previously occupied by buildings which are now piled up, leaving large areas empty to be used as green zones for public use. In contrast, Wright's proposal is the opposite, it is the city which must be introduced into the countryside, as urban living conditions are increasingly removed from the needs and desires of humans, enslaving them. They flee from the city when conditions allow, thus starting an invasion of the rural setting. Wright believes that buildings must be erected scattered in nature for people to live in rather than transferring green to the city form large parks. He also holds that although the skyscrapers fill the spaces in the cities, these will find their true future in the country[6] **(fig. 01)**.

GREEN MOSCOW AND SOVIET DISURBANISM

If we analyse the cycle of conferences given by Wright in Princeton in 1930, published a year later[7], we can see that his concept of future forms of habitation reaches very similar conclusions to that of Soviet disurbanists[8], who had spent several years theorising on the dissolution of the city. However, the ideological starting points differ greatly, as Wright's is based on a more extreme individualism while the Soviets were looking to transform society as a whole, eliminating social classes and the differences generated in their way of life. However, their conclusions were much alike. The city was no longer suitable for humans as it was a hostile space. Dense compact built space as such had to disappear to become a large undefined space. There was barely no difference between the conclusions reached by Wright in Princeton and the writings of Okhitovich, the Russian sociologist and ideologist of disurbanism:

> "It is not a matter of transforming the countryside into a city, or trying to reduce the size of the city ... but of dispersing the centre as far as possible to eliminate the city "in general"... It is not a matter of eliminating the deformity of the city with a set of reforms ... It is a matter of combining city and countryside into one whole: eliminating the opposition between city and countryside. It is not a struggle against the city in the name of the countryside, nor is it a replacement of the countryside with the city .... Nor is it a reconcilement of the contradiction between countryside and city like that of Howard garden city or workers' garden city of comrade Kozannyj... is a "new delocalisation of humanity"[9].

Mikhail Okhitovich makes the intentions of disurbanists clear in this quote. The city is understood as a place of the past, representation of the ancient society which they wished to transform with the Socialist revolution. Proposals when beyond the collectivisation or occupation of representative buildings, and they believed that a new socialist way of life was needed. Unlike the clearly bourgeois city, disurbanism proposed scattering a habitat throughout the Soviet territory to help to eliminate internal economic imbalance, thus erasing the major social and territorial differences of pre-revolutionary Russian society.

After composing his theories on the new settlement models to be built in the USSR Okhitovich, who was looking for architects to execute these projects, contacted constructivist architects working in the Typification Section of the Stroykom of the RSFSR (Russian Soviet Federative Socialist Republic). These architects were Ginzburg (director), Barshch, Vlamidirov, Pasternak and

Sum-Shink, later joined by architects Afanasyev, Zundablat, Milinis, Savinov, Sokolov and the engineer Orlovsky[10]. They were in charge of making these ideas a reality mainly in two competitions, that organised by the Stroykom collective[11] in the city of Magnitogorsk and that of Green Moscow by Ginzburg and Barshch. Both were published in issue 1-2 of the journal *Sovremennaya Arkhitektura* in 1930, which enumerated the main ideas of this movement, born of a total rejection of traditional human settlements through discontinuous concentrations (cities) in search of a continuous homogeneous territorial occupation throughout the USSR to eliminate the differences between city and country.

The new human habitat proposed is a linear settlement, like a belt, with different functional hierarchies, manufacturing and services axes at regular intervals, and lines of housing associated to nature which gradually replaced all existing forms of inhabitation to improve the living conditions of workers, who made up the bulk of socialist society. These proposals were far removed from those of the commune or minimum community housing as they considered it insufficient for personal and intellectual needs and development, proposing small isolated individual cells at the end of the mobility axes, while the shared areas, made up of auto-stations or locations for parking motor vehicles, collective dining areas, social buildings and buildings for relaxation or sport were located on access roads, in a transition space between manufacturing spaces and living cells for personal use, similar to the service stations which Wright considers to be the new community centres[12].

The scattered proposals of the disurbanists are extreme, as the construction of living cells was proposed as industrialised, standardised and mobile. "The modular house is the decline of the immobile habitat"[13], proposing a system which was very easy to assemble and dismantle, allowing a continuous redistribution throughout the territory, as well as the grouping or ungrouping as the personal conditions of residents changed, ranging from an autonomous unit to rows of over 15 dwellings **(fig. 02)**.

Of the two competitions, Green Moscow was especially significant as, unlike the new city designed in Magnitogorsk to serve a new mining enterprise, the design for Moscow had to transform a consolidated city with 2,000,0000 inhabitants, which according to its ideals, had to disappear dissolving into the country. The interest of the action proposed lies in the fact that it does not seek a full disappearance in a brief period of time, demolishing entire areas in order to build a new ideal city. Instead, a strategy was established to progressively vacate the cities based on the natural lifespan of buildings; the only guideline in the competition was the absence of maintenance so that as buildings aged becoming uninhabitable they could be emptied, becoming ruins before becoming nature, when vegetation reappropriated the space. As with the situationist proposal for mobile cities in the jungle, this slow transformation over time suggests a natural reappropriation of the city, with nature reconquering the urban space to gradually return this territory to its original state, or at least to a new natural state independent of human activities **(fig. 03)**.

In both cases the projects take advantage of the revitalising effect of nature and the capacity it shows in being reborn in the gaps left by constructions. Fig trees crowning buildings, grouting retransformed into plant containers, daisies covering empty lots, it is easy to see the power of appropriation of nature when it finds relatively favourable conditions **(fig. 04)**. Even when conditions are extremely unfavourable the disappearance of humans allows urban spaces to be renaturalised, as was the case with Pripyat, near the nuclear power plant in Chernobyl, abandoned following the explosion in April 1986. This city amazes those who visit it now, as it was a typical Soviet city built in the 1970s with uniform apartment blocks and little vegetation. Now, without human presence, the nearby forest has slowly and constantly taken over the streets and spaces between buildings, while the wild animals, who have increased exponentially in number, roam the streets. Species have even been found that were thought extinct in the area, like the brown bears which had not been seen for 100 years. In fact, Portuguese geographer Helena Madureira, in her studies on the influence of Green areas in the city of Oporto, concludes that the greatest biodiversity is found in these empty urban spaces free from human activity in the plots which appear once a building disappears[14] **(fig. 05)**.

SITES AND OPEN SPACES: GREEN URBAN SPACES

In 1995 Ignasi de Solá-Morales published the article "Terrain vague"[15], where he describes a new urban sensitivity starting from the 1970s and in which: "Empty, abandoned space in which a series of occurrences have taken place seems to subjugate the eye of the urban photographer"[16], employing the French phrase which gives the article its title. These places, sites, open spaces, disused industrial spaces in ruins, which he described are not only spaces of opportunity for the most liberated actions of citizens, but also allow the plant kingdom the greatest capacity for action within the city, spaces taken over by plant growth, perhaps because, as Solá-Morales says "have become the areas where it can be said that the city is no longer"[17]. Unlike the classic park conceived as a controlled and ordered recreation of nature where species, often foreign, are placed by humans in a specific place to produce a particular effect, these uninhabited places show us a nature without artifice, we could even say that a real nature, as both terms (nature and artifice) are opposing, as something artificial is something "made or produced by human beings rather than occurring naturally, especially as a copy of something natural"[18]. These urban spaces were not only the focus of attention of urban photographers, but also became a place for work and experimentation by some artists in the same decade. An architect-artist like Gordon Matta-Clark transforms ruin into his main workplace, as he himself says:

> "probably the reason for looking for abandoned buildings was, first of all, a kind of very advanced concern for that condition; maybe not so much because I think I can do something about it, but because it's what dominates the "urban landscape" or the urban condition"[19].

In the 1970s Matta-Clark saw city as a ruin. These are the spaces which held his attention, which configured the urban landscape he perceived, filling his descriptions of the city to become the medium for his work, while the inhabited city in use was diluted, blurred, disappear, to be concentrated in the uncertain margins of sites and landfills. Among his urban actions highlighting the odd condition in urban sites there was a project called *Reality Properties: Fake Estates*, where he acquired a series of small lots in Queens at auction. These were small narrow lots or remains between buildings, many of them inaccessible, forgotten places which were useless for conventional urban production where Matta-Clark saw spaces to be preserved that had to remain forgotten to counter the "oppressive fixation" of architecture acting throughout the entire urban fabric.[20] **(fig. 06)**.

At present, we can also find artworks which continue to focus their attention on these vacant places in the city, such as the guides for empty spaces and openings and the protection of open spaces by Lara Almarcegui[21], who considers these voids in the urban layout to be very valuable in their vacant state, a condition which she believes must be protected, avoiding alterations and interventions. In the biographies and descriptions that Almarcegui does of the sites she highlights how they were occupied by wild vegetation which gradually reappears as abandonment sets in **(fig. 07)**. In time, the empty land begins to host its own ecosystems, populated by endemic species. Thus, they can make up small natural reserves at the very heart of the city[22]:

> "I present the open spaces as a special place, a unique experience where things happen that do not occur in the rest of the city. (...) There is nature, vegetation, freedom. Like a paradise in every site"[23].

Her action of seeking out and cataloguing these spaces contributes to returning them to the imagery of the population, as they are often forgotten behind a wall or in hard-to-access areas in the city, and the actions of opening them up, tearing down fences or obtaining permits to access them allowing citizens to rediscover the capacity of these hidden green spaces to evoke, albeit for a short period of time[24]. At times the artist's idea is to protect them from all action for certain periods of time, as happened in Rotterdam (2003-18), where Almarcegui proposed this action:

> "my project would consist in leaving the land undesigned. This is an experiment which consists in leaving a place without definition so that everything happens within it by chance, and not corresponding to a determined plan, and where nature should develop at its own pace, interrelated with the spontaneous use of the land and with other external factors like the wind, the rain, the sun and flora"[25].

Naturalist Richard Fitter also shows the power of sites and the ruins and places where nature concentrates within the city with the 1946 publication of his book *London´s Natural History*[26], a list of 126 plant and fern species found in WWII bomb sites, revealing the presence of small birds and other creatures which survived in these new empty spaces left by the war in London. His cataloguing shows how spaces of opportunity for natural life contrast with the progressive biological sterilisation undergone by the territory occupied by the city since its birth, and which he describes throughout the book.

In contrast to the 19th-century parks and romantic recreations of nature in the city, the spaces outside urban control and planning are the ones with which the residents of contemporary cities, where experiences are more intense, best identify, as Carlos García Vázquez reflects:

> "the *genius loci* [...] is not found in its architecture, but in its nature. This means that the preservation of its identity depends more on the conservation of its voids (intermediate landscapes) than on its constructions"[27].

DECOMPOSITION AND RE-NATURALISATIONS

History has shown us that there are cities hidden in jungles, forests and fields of cultivation, which can simply be left uninhabited for some time, leaving nature to work so that they disappear swallowed up by the land and vegetation. After visiting Chichen Itza Marc Augé pondered:

> "¿What past do these ruins take me back to? A Mayan past which different manuals had informed me about but whose duration (almost two millennia) deprived me of any reference. Moreover, as is known, all the kings built their monuments on the ruins of those built by their predecessors, ruins which in turn would serve as a new foundation. I therefore had no idea, no image of this city buried in the jungle and scattered over the centuries. Nor did I have any idea of the thousands of inhabitants (10,000 in the centre, 100,000 in the entire conurbation) who, according to specialists, had here inhabited about thirty square kilometres. The place which fascinated me (temples, stone monuments and pyramids, next to a clearing in the forest) therefore strictly speaking had no historic existence and did not take me back to any past: as that past was unknown (with the earliest excavations dating from the 1950s). A long time had passed since the jungle had invaded and certified the death of the lost citadel. What emerged here and there, that mix of stones and plants had only existed for some years and in no way resembled a historic reconstitution"[28].

Perhaps in five hundred years' time when visiting Detroit people may feel like Marc Augé when he visited the Mayan ruins of Chichen Itza. If the urban abandonment and decomposition process Detroit is immersed in continues, there will be mass depopulation similar to that seen in Rome after the fall of the Roman Empire[29]. By the mid 20th century, Detroit was the fourth largest city in the United States with a population of 1,900,000 inhabitants. It is now the 18th largest city, with approximately 700,000 residents and this trend is expected to continue as it continues to steadily lose population. The effect of this population is a ghost city full of abandoned buildings progressively falling to ruin, collapse and disappearance, helped by a nature which seeks to take over this location abandoned by people so that green gradually reoccupies the city in a reverse process to that of its construction **(fig. 08)**.

Present-day Detroit represents an unprogrammed execution of disurbanist ideals, continued population abandonment due to the endemic economic crisis has left a great many buildings in disuse - not just housing - but schools, factories, hotels, shopping centres... Little by little all urban infrastructures have decreased in number although not in surface occupied so that their disappearance has resulted in a powerful urban de-densification which allows us to see the urban decomposition process which must have taken place in the major cities of the past when the cultures supporting them collapsed or what Moscow would look like today if Ginzburg had won the Green Moscow competition.

In the 1960s industrial spaces in disuse, the sections of the periphery in which the city grew, attracted many artists, most notably Robert Smithson and the new monumental characterisation attached to the remains of constructions and mechanical artefacts he found when visiting his hometown, Passaic, which he compared to Rome as a new centre of monumentality[30]. Perhaps if he could walk the streets of Detroit today he would also wonder if this was the new Rome, overtaking Passaic in the list, while the monuments his eagle-eyed camera would capture would be buildings in ruins in which trees, and not people, are now the inhabitants, and rediscovering the attraction of desolation in the very centre of the city instead of its periphery.

The urban re-naturalisation observed in Detroit allows us to simultaneously sense different evolutionary processes within it. On the one hand we see the abandonment and deterioration of once-important buildings that were full of life, stirring in us nostalgia and a certain degree of unease, although we see nature being reborn, with some residents even making attempts to domesticate it, transforming empty sites into vegetable gardens and farms so that the city, the new re-naturalised city, designs new urban ways of life in a constant transformation cycle **(fig. 09)**.

Solá Morales believed that the appeal of terrains vagues for the artists and citizens of today was the result of our situation of foreignness in relation to the world, defined by the need to assume constant and rapid changes in science, in customs, in the world around us. This conflict has been resolved through negativity, seeking the opposite of the imposed order. As a result, risky or nomadic situations are sought to flee the comfort and security of the ordered and calculated life of the welfare state, which is why undefined places are also sought as the opposite of the urban order imposed through planning.

This situation puts architecture at a crossroads as it "seems that architecture has always been destined to colonise, to establish limits, order, form, introducing the identitarian elements needs to make it recognisable, identical and universal into a strange space"[31]. This is why the response of the architect to contemporary otherness must move towards these principles of negativity contemplating destruction and abandonment as elements as apt as destruction or planning.

The Green Moscow competition organised by Ginzburg and Barshch or the Situationist proposals for mobile cities show that disoccupation and abandonment can also be design strategies, paving the way for a system of partial erasure which could perhaps provide the city with some degree of porosity, of voids in which nature could exist freely taking us back to a past time or transporting us into a future time, perhaps reflecting the thinking of Robert Smithson when visiting Passaic "I am convinced that the future is lost somewhere in the dumps of the non-historical past"[32].

The city would transform into a porous urban space to avoid the claustrophobia that Lara Almarcegui confesses she feels with cities[33], making it possible to recover some degree of freedom

through unprogrammed spaces in which citizens can feel free, feeling the landscape as "pure landscape", as in prehistoric times before the settlement of the city **(fig. 10)**. The ruins, sites and urban voids appear to us as places where we have eliminated some of the built layers which humans have added to Earth over centuries, and perhaps this is why it allows us to dream of a territory like that described by Scott Fitzgerald in the closing passages of *The Great Gatsby*:

"Most of the big shore places were closed now and there were hardly any lights except the shadowy, moving glow of a ferryboat across the Sound. And as the moon rose higher the inessential houses began to melt away until gradually I became aware of the old island here that flowered once for Dutch sailors' eyes - a fresh, green breast of the new world. Its vanished trees, the trees that had made way for Gatsby's house, had once pandered in whispers to the last and greatest of all human dreams; for a transitory enchanted moment man must have held his breath in the presence of this continent, compelled into an aesthetic contemplation he neither understood nor desired, face to face for the last time in history with something commensurate to his capacity for wonder"[34].

CONCLUSIONS

The examples presented grant us a clearer understanding of how architecture must consider the passing of time, demolition, abandonment and the preservation of empty spaces in the city in the face of the systematic organisation of these places or the addition of new territories which were initially wastelands or empty lots. These ways of designing the city, not always widely accepted in architecture where it has often been relegated to the fringes, will lead to the appearance of a more porous and heterogeneous city where different simultaneous times, different paces of life and multiple superimposed actions can coexist. This is becoming increasingly necessary in the city-territories we live in. This is no longer the time for superimposing extensive and unlimited consecutive layers without looking back. Perhaps we should now think about how to eliminate fragments of some of them, partly allowing what is hidden to surface through these gaps. Among these buried layers forgotten by human constructions we also see nature which always finds cracks and fissures through which to be reborn, filling the most unsuspected spaces with green, we only have to give them the chance to return to us areas from which to escape the city even when we are still within it.

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Images

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02. Housing modules proposed by the Stroykom collective for the new socialist habitat.

03. Proposal from Green Moscow.

04. and **05.** Images from the city of Pripyat, near Chernobyl in 2017.

06. Photographic assembly by Gordon Matta-Clark.

07. Lara Almarcegui. Matadero de Arganzuela 2005.

08. Alex MacLean. Packard Factory, Detroit.

09. Area cultivated in Detroit in December 2016, managed by Michigan Urban Farming Initiative (MUFI).

10. Lara Almarcegui, 2009. Guide of open spaces of the river Lea, 12 sites waiting for the London 2012 Olympic Games.

08

Herzog & de Meuron: The (Renewed) Mimesis of Nature

Santiago Quesada-García

Nature was one of the models of premodern imitation. Its canon fell into disuse with the Enlightenment, when humans began to impose technical command over the natural environment. However, with the crisis of post-modernity, a new kind of rational, conscious and free imitation emerged. It is an intersubjective praxis that occurs between two subjects, not between object and subject as in the premodern era. The action of architectural design is based on different materials; these can come from architecture itself or from other aspects of reality, such as art, landscape or nature. Reality provides materials to be used over and over, which require an architect's skill to organize. This concept of 'design material' leads to the idea of a project as the construction of a new order from elements, models or time-tested examples through experience. When the design process is understood in this way, the abstract concept of nature as a subject can be considered a model – a dynamic and living subject oriented towards the future that, with its structural principles and rules, proposes a procedure: the desire and rational action of its use as reference material by the subject-architect. The thesis is not that the process of architectural design is an autonomous act or a consequence of a creation that emerges from a vacuum, but that architecture always refers to certain models, prototypes or memories that rise up in the architect to generate rational, free and conscious imitation. One of these models is nature, as Herzog & de Meuron exemplify in their work. This article analyses some of Swiss architects' projects as examples of this renewed mimesis. To support this point, it explains what this contemporary imitation consists of, why nature is a subject that provokes a desire for emulation and how it influences the practice of Swiss architects.

The technical superiority of man has resulted in nature being considered foreign, the 'other', a strange and alien element which must be conserved and protected, just like monuments from the past[1]. From the last third of the 19th century onwards, reserves which are home to the most outstanding natural spaces began to be created; parks and protected areas were delineated and placed under environmental protection with the aim of preserving extensive areas where nature abounded and human presence was scarce. These spaces were rarely considered the sure result of human impact, which thus reinforced an adverse mind-set among industrial society[2]. At the same time, machinery became the expression of a new culture. In the early 20th century, machinery became the saviour to which everything should look, even artistic creation. Even in architecture, it was a fundamental reference model.

One hundred years later, that enthusiasm for machinery has been replaced by amazement at the footprint it has left on the landscape. It is a panorama in which man also exorcises the inevitable role that the transforming agent has had on the earth's crust, trying to disguise its doings, its work; as if human manufacturing were part of nature, like coral reefs or beaver dams. This camouflaging approach has at some times been fuelled by ecological motives and at others by technological advances; however, it has often not gone far beyond a mask concealing interventions in which -paradoxically- nature, which must be respected, continues to be consciously or unconsciously ignored to construct a landscape in which man becomes invisible.

Now, the concepts of subject and object, differentiated during the Enlightenment, have been rediscovered; these concepts are now immersed in a world characterised by complexity, interaction and interference. In different artistic fields and spheres of thought, nature makes a bold comeback as an inexhaustible model to be imitated, as is the case in some works by Herzog and de Meuron, transcending formal and superficial environmental approaches in order to create a new and renewed architecture which draws on nature as project material **(fig. 02)**.

Since Aristotle introduced the known notion of *Ars imitatio naturae*, mimesis has been at the centre of Western culture, appearing throughout the ages and in all premodern humanistic and artistic disciplines. There were three types of premodern imitation: the imitation of nature, ideas and the by-gone. Imitation of nature is a concept that was behind thought until the 18th century. With enlightened modernity, mankind, with individual momentum and spurred on by scientific breakthroughs, freed itself from the ideal of thorough and complete perfection, which represented the timeless and static reality of a pre-existing model. Humanity replaced the model-copy relationship which had been around for centuries with an alternative structure based on the autonomy of the subject, in which the old relationship had no role. Having existed for two millennia, the concept of imitation suddenly disappeared from thought, and the idea came about that imitation was synonymous with literal, banal, simian or childish copying, erroneously identifying the action of emulation with the result obtained from imitative praxis.

However, unlike premodern imitation, contemporary imitation is free, conscious and rational, as upheld by the philosopher Javier Gomá in his general theory of imitation[3]. Presently, the imitator is capable of recognising an authentic prototype from among the myriad existing models, understanding their essences, communicating the rules laid out, and also deriving an experiment of imitation from them. Furthermore, this contemporary imitation is an intersubjective action between two subjects, rather than a subject and an object. Thus, this new mimesis is not associated with that premodern, dually structured imitation which presupposed the existence of a complete given reality which preceded mankind and which was also offered as something eternal and steadfast. The contemporary model is susceptible to evolution, change and progress. Rather than being viewed as perfect and static as it was in premodern times, nature is now perceived and understood in a completely different way.

The relationship between architecture and nature is demonstrated through the praxis of the architectural project, which today incorporates the contemporary concept of imitation. A plan is built on different materials, which can come from the architecture itself or from other aspects of reality. According to Helio Piñón, taking into account the idea of the 'material' on which the design revolves during the planning phase enables us to find the authentic principal purpose of the

project, helping to recover a defining process in which the authenticity of the structure is both a determining criterion and the real value of the architecture[4]. The landscape, art, nature and architecture itself all provide valuable materials for use and on which the ability of the architect can act to overcome a determined starting point.

This concept of 'project material' leads to the idea of the project as constructing a new order based on elements, models or examples which have been verified empirically through experience. The exact limit which configures how an architectural concept is approached lies in it being a subjective action, oriented toward achieving a consistency of form which gives the project object an aesthetic character and identity as a work of art. This identity may be found in the interaction of the formal primary material structure used -not in the mere nature of that material. An architectural work's identity, as a basic condition of its aesthetic quality, is associated with its 'meaning': how it positions itself in the historical and cultural context in which it is built and whether the work approaches conventions as an obstacle or stimulant in the context of the architectural proposal[5]. A work's identity is also associated with the 'consistency' which defines the degree of formal coherence that the object acquires in the context of a chosen aesthetic system, giving the newly created order precision and rigour. During an architectural project's design phase, the new order is conveyed through the confrontation of domains belonging to heterogeneous fields by means of an analogy which similarly derives from what is considered modern imitation.

Looking at the planning process in this way, the abstract concept of nature can be considered a model, a dynamic and living subject oriented towards the future which, with its structural rules and principles, proposes a course of action: the desire and rational initiative of the architect-subject using it as reference material. Having a reference neutralises chance and the unseen, and rationalises the novelty of an unexpected and strange situation by assigning it to a familiar, previously chosen and understood example **(fig. 03)**. As the subject assimilates the prototype example, it can be repeated in new situations, putting accumulated experience into practice. The choice of nature as a model during architectural planning gives the final product coherence, meaning and identity, projecting it towards the future.

Jacques Herzog and Pierre de Meuron knew how to reconstruct the relationship between the natural world and architecture through projects, recognising and reconceptualising nature as a model and using it as material **(fig. 04)**. These architects saw the artificial and natural worlds as a continuum in which there was no dialectical opposition between nature and society or between nature and the urban environment, a space wherein the subject and object blend into one. The emptiness left behind by the tradition lost in the premodern imitation of nature is now replaced with another approach, another vision: the reflection of the architect, artist and scientist who recaptures nature as a subjective model from which to create a new order.

Nature is continuous, made up of biological, physical and chemical processes which must be described and represented in order to be understood. The human consciousness individualises discrete units or figures with the aim of working on them[6]. Art and the artificial are also processes which work on the understanding of human beings, of their perception of the natural world and the effect which they have on it. Thus, 'artificial nature' is the concept underlined by Jacques Herzog as a project strategy. In his acceptance speech of the Pritzker prize, he states that[7]:

> We look for materials that are as breathtakingly beautiful as the cherry blossoms in Japan or as condensed and compact as the rock formations of the Alps or as enigmatic and unfathomable as the surfaces of the oceans. We look for materials that are as intelligent, as virtuous, as complex as natural phenomena.

Scientific investigation explores reality, and there it finds images which, although invisible, are no less real; they are indiscernible representations of matter and the world. Scientists create models to recognise and understand the reality of nature in order to classify and describe it. Herzog & de Meuron use nature as a model when analysing and searching for the relationship between visible and invisible images; they are interested in the intangible image as it enables them to choose the tangible image as an aspect in their design, as one piece of a whole **(fig. 05)**. They look at chemical processes and descriptions which compare microstructures with aspects and qualities that those materials reveal about everyday life. These processes, not discernible by the human eye, are important because they are responsible for the form, colour and physical stability of an object. All natural substances, all organic and inorganic matter, whether plants and stones, have a linked complex structure which is both visible and invisible and which makes a mound of granite and another of sandstone adopt different forms. The scientific research into this complexity in the work by Herzog & de Meuron goes so far as to look into those limits which appear unexplored[8].

Studying the molecular structure of matter reveals that it is not the atoms which define the specificity properties of each element or substance, but rather the relationship between the atoms -their energy. This is also the case for art and architecture. The matter used in both fields lacks value on its own. The materials are incidental and can vary from one project to another; their value lies in the complexity and conceptualisation which binds them together and increases with each work **(fig. 06)**.

The Swiss architects' approach to the project when using nature as a prototype is particularly felt in some of their projects and works, such as the competition for the Avenida Diagonal in Barcelona (1989), the Ricola Europe production and storage building (1994), the Dominus Winery (1998), the Prada Aoyama shop (2003), the Cottbus University Library (2004), the Young Museum (2005) and the Tenerife Art Space (2008), among others.

In the project for the competition on the Avenida Diagonal in Barcelona, the architects manifest their intention to propose a new natural order, without the practical rationale which expresses reality. In this plan, they present a scheme of vegetation and ponds which function simultaneously as a biological water purification plant and as a public garden organised attractively. The site forms a range of sinusoidal curves, like chains of DNA, positioned between the sea and the city **(fig. 07)**. The implemented solution acts like a treatment plant but instead of chemical and mechanical systems, it uses ponds to offer the city's residents a visible and architectural structure (a public park), which is also productive and useful (purifying the air and water), without utilising the disguised architecture of conventional treatment plants[9].

The Swiss architects find solid foundations for their projects in the essential relationships between the invisible elements, giving the conscious world validity and stability. There is a desire for imitation stemming from the logic of nature as the ultimate truth. In works such as the Prada shop in Tokyo, a crystallographic prism, they use architectural language to such an extent that it forces them to cover the building with a continuous rhomboidal mesh which holds the glass mass in place, calling to mind the wire cages of the stony gabions in the Dominus Winery in California. Herzog & de Meuron make new landscapes using an architecture in which nature is geologically echoed, whereby, contrary to the accelerated time of history, the slow pace of the natural world is used as another construction paradigm, forming an apparently immobile landscape, like the geological folds or the evolution of species which happen so gradually that they provide an almost timeless backdrop to the turmoil of human societies[10].

Herzog & de Meuron's projects, more alchemical than organic, approximate and use nature as a model with caution, fearing the vacuous simulation typical of theme parks, thematic zoos and

nature parks[11]. Thus, the strata they propose are tainted with artificial geometric perforations, crystalline edges are softened with bubbles and creased skin is at times imprinted with pixelated images, just as pop art used oversized Ben-Day dots. Through the use of repeated and juxtaposed sequences, the appearance of emblematic nature is disfigured and becomes textural. Their geological and biological references avoid analogy and literal copy, colouring nature with the artifice of architectural design by means of rational imitation. Their architectural works are objects which reveal and transmit the hidden order of nature, its principles and values; they eloquently express the deliberated order of creation by creating a new artificial order **(fig. 08)**.

The specificity of each project materialises in each of its elements or levels of organisation, which do not need to be subjected to any hierarchy to produce meaning. For this reason, they at times use a fractal concept in some buildings. This self-similar fractal system affects repeated elements and also spheres of different conceptual scales and levels. The elements are syntactically separated from the whole, becoming a summary of the body. This type of self-similar architecture, common in nature, is especially efficient when working on an unstable medium, as it not only gives the object extraordinary sturdiness in light of a possible disjoining or enlargement, but also makes it more independent in its relationship with the context from the moment in which scale is removed as an established root of the project.

Herzog & de Meuron's architecture is dominated by their perception of the world; however, it does not force the onlooker to assume their perspective in order to understand it. The attention dedicated to the perception and understanding of natural phenomena is one of the strategies by which their architecture is upheld. Their stance is phenomenological, and by approaching reality in this way, they combine ontological aspects which are strongly repeated in their works. As previously mentioned, the physical presence of the materials themselves is not important; they require a natural or artificial context to be seen in a specific way, to be converted into objects of human perception, to be named and become essences. It is necessary to have a 'spiritual quality' for their material organisation and to achieve the maximum ontological state of the matter, which is one of the objectives of these architects' architecture[12].

Thus, the place is used by the Swiss architects as a type of 'quarry' from which the materials to be used, in an untraditional way, are extracted to form a new order. Their idea of context leads them to develop determined qualities with the objective of making them more apparent or specific. The materials found at the site can be of diverse nature; however, they are always subject to an intense analytical and critical study before use in the design process. Herzog & de Meuron's entire collection of work has the immediacy of the architecture's material qualities; an extraordinary tactile intensity which speaks directly to your senses, not wanting to limit its critical review to just one conceptual dimension.

In the case of the Dominus Winery, it can be said that the legitimate vehicle expressing the architecture is the way in which the materials are used. The building is a normal, rectangular solid, intensified and adapted to the context by its transformation of the material, an authentic invention whereby stone gabions, previously regarded only as opaque material to strengthen banks, are transformed into translucent walls by the Swiss architects[13]. Between the uniformity and the bareness, the power of this work does not come from revealing a body which is bare due to the absence of covering and the rough texture of the stones; rather, it comes from the internal structure of the supports and the appeal of the rocks **(fig. 09)**.

In other works, the workings on the surface of the material are not used with the intention of achieving new effects, but rather to give the appearance of a stratified material. In efforts to produce a 'disfigured figuration'[14], the surfaces of the materials are the object of serigraph processes, incisions or engravings. The idea of employing the image of nature as construction material is used in the Ricola Europe production and storage building in Mulhouse **(fig. 10)**. The model used is that of palms screen-printed onto the inside of u-glass panels positioned on large glass walls. Due to the repetition of the same motif, the image tends to disappear as a figure and is perceived above all as a specific quality of light which flickers when passing through the image filter. The entire façade acquires an almost textile-like quality as a large, semi-transparent marquee, creating a link between the interior and exterior. As a result, this façade is perceived as diametrically opposed to the intangibility and transparency of traditional stained glass, taking on thickness and also weight. This use of images to obtain ever-new perceptual effects, not to communicate semiotic messages, leads to experimenting with extremely innovative solutions. The ambivalence between figurative and abstract language profoundly shows the artistic dominance in the projects undertaken by Herzog & de Meuron in order to intensify the architectural object and create works invested with exceptional vigour, maintained by the work itself and not by the temporal power of fashion.

Herzog & de Meuron's works are identifiable as contemporary architectural work based on an aesthetic coherence and consistency which originates in a subjective initiative, using nature as a model in some projects. When designing, they look for references which, due to their properties, help them resolve the problem posed by each specific situation. In certain cases, among the multiple possible models, they choose nature, as together with their principles, rules and values, it provokes desire and suggests a course of action: the rational initiative of emulating nature through their recognition, knowledge and understanding of it. Furthermore, they do not use just one element in a unique experiment. Rather, throughout their work, they use a plurality of natural elements, choosing those which serve as examples and counterexamples and bringing together those which are most useful for their designs.

The collection of tested models is knowledge which contributes to building awareness of the concept of project material on which architectural thought acts; it provides criteria for the use of said materials, teaches about the nature of the project and allows the veiled order of nature to be reconstructed. The screen-printed concrete, the copper bands, the basalt gabions, the convex glass, etc., are materials which, with their expressive innovations and internal structures, give each of their works an exemplary and universal character, converting them into new models which generate an inchoative desire for emulation in other subjects and thus projecting them into the future.

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Notes

01. Cfr. ARGULLOL, R., TRIAS, E., *El cansancio de Occidente*, Destino, Barcelona, 1992, p. 103.

02. Cfr. SCHAMA, S., *Paesagio e Memoria*, trad. it. P. Mazarelli, Mondadori, Milano, 1997, pp. 7-15.

03. GOMÁ, J., *Imitación y Eperiencia*, Pre-textos, Valecia, 2003, pp. 329-395.

04. PIÑÓN, H., *El proyecto como (re)construcción*, Edicions UPC, Barcelona, 2005, p. 9.

05. Ibid., p. 10.

06. ZAERA, A., "Continuidades. Entrevista con Herzog & de Meuron", en *El Croquis*, 1993, n. 60, p. 8.

07. HERZOG, J., "El ideario de Monticello", en *Arquitectura Viva*, 2001, n. 77, p. 75.

08. One idea clearly expressed by the Swiss architects is that "most of the objects that we use in everyday life have for us a clear identity, which is defined only by their utilitarian value. [...] Here, the original form would not even be the natural one. [...] The culture in which we live today, especially the Western one, is a culture of blending and mixing substances until they are unrecognizable. [...] It is never lost. However, in innumerable products of our industrial age, these substances, this matter, can only re-enter a natural cycle with great difficulty. [...] There seems to be a connection between aesthetic critical perception resulting in physical discomfort and the real measurable destruction of the natural world. [...] Our interest in the invisible world is in finding a form for it in the visible world. That is, in breaking through the deceptive, visible and familiar guise to take it apart, to atomize it, before relating to it anew. The invisible world is not a mystic one, but it is also not a world of natural sciences, of invisible atomic crystalline structures. With this we mean the complexity of a system of relationships which exists in nature, in an unresearchable perfection, and whose analogy in the realm of art and society interests us. Our interest is thus the hidden geometry of nature, a spiritual principle and not primarily the outer appearance of nature". HERZOG, J., "La Geometría Oculta de la Naturaleza", en *Quaderns d'Arquitectura i Urbanisme*, 1989, n. 181-182, pp. 96-109.

09. HERZOG, J., "Ideas de proyecto. Una conversación de José Luis Mateo con Jacques Herzog", en *Herzog & de Meuron. Catálogos de Arquitectura Moderna,* Gustavo Gili, Barcelona, 1989, pp. 7-8.

10. It is no coincidence that in an exhibition housed in the Canadian Centre for Architecture, the architects exhibited over eight hundred study models mixed with fossils and insects, minerals, ethnographic objects, photographs and daguerreotypes, games, product catalogues, sculptures and paintings, which together created a fascinating ambience characteristic of the encyclopedic collections of 19th-century museums. URSPRUNG, P. (ed.), *Herzog & de Meuron Natural History*, Canadian Centre for Architecture, Lars Müller Publishers, Montreal, 2002.

11. HERZOG, J., "Sui materiali", en *Domus*, 1994, n. 765, p. 75.

12. This conceptual strategy of using materials is summarised, as Fernández-Galiano states, in the known phrase by Nietzsche: "the stone is more stone than before", which the Swiss architects then transfer to the rest of their construction materials. FERNÁNDEZ-GALIANO, L., "Dionisio en Basilea", en *A&V Monografías*, 1999, n. 77, p. 14.

13. MONEO, R., "Celebración de la materia", en *A&V Monografías*, 1999, n. 77, p. 22.

14. As Alejandro Zaera states, figurative and abstract categories are produced within the realm of the representation; it is already a kind of abstraction of reality, a form of art. It is the crisis of the representation which leads to overcoming the figurative-abstract duality. The work by H&dM has a continuity which goes beyond the traditional artistic classifications of the abstract and figurative. Introducing figurative motifs occurs inversely to abstraction, which is necessary to produce order and intelligibility in chaotic material organisation. The representation is disfigured, turning into texture in order to abandon its representative nature. This is a process with a clear precedent in some works by Warhol. The ambivalence between abstract and figurative language distinguishes Warhol and Herzog and de Meuron from Oldenburg and Venturi, Rauch and Scott-Brown; while for the former, the figurative element tends to disappear into texture, for the latter, it is used as a recognisable and recontextualised element. The work by the latter still occurs within the linguistic-representative paradigm, whereas in the work by Warhol and Herzog and de Meuron, the figure becomes a rhythmic occurrence, producing the transfer between the mediums: the rhythm works by connecting social construct with material structure. ZAERA, A., "Entre el rostro y el paisaje", en *El Croquis*, 1993, n. 60, p. 36.

Images

01. Leaf of Achillea umbellata increased 30 times. Herzog & de Meuron.

02. Herzog & de Meuron, Studies for the facade of the Young Museum, 2001.

03. Leaf of Achillea umbellata increased 30 times. Herzog & de Meuron. 1994. Images of Karl Blossfeldt's Herbalist, 1900.

04. Herzog & de Meuron, Detail of a sketch for the store Ricola Europe, 1997.

05. Herzog & de Meuron, Models of study of the University Library of Cottbus, 2002.

06. Herzog & de Meuron, Chains of DNA and sketches for the contest of the Diagonal of Barcelona, 1989.

07. Herzog & de Meuron, Facade studies, sheet of water and model of the interior space of the Tenerife Space for the Arts, 1997.

08. Herzog & de Meuron, Strata of land and studies for Schaulager for the Emanuel Hoffmann Foundation, 2002.

09. Herzog & de Meuron, Dominus Wineries, 1997.

10. Herzog & de Meuron, Xerographed panels with vegetal motif in the walls of the Ricola Europe warehouse, 1994.

09

Strategies of Effect and Mimesis: Naturalized Architectures and Architecturalized Natures

Miguel Guitart

The architect has taken nature as a model for centuries, tracing two general lines of approach to architectural design: one that reinterprets natural structures in a direct way, and one that explores the potential of natural materials as a means to propose new structures and spaces. While the former represents a recurring architectural presence, as their production is visually and conceptually understandable by a larger public, the latter may be less common, making up a range of unexpected solutions since their application is limited mainly to purely natural resources or environments producing exercises of architectural nature.

NATURE AS A BASIC MODEL

"In the wildest nature, there is not only the material of the most cultivated life, and a sort of anticipation of the last result, but a greater refinement already than is ever attained by man".

Henry David Thoreau[1].

"Man comes from nature and returns to it".
Peter Zumthor[2].

Architecture as the constructive science for mankind's intellectual and physical inhabitation has often departed from nature as a basic model. However, more specifically, a very interesting period takes place between the 18th and the 20th century, when, as Barry Bergdoll states, "research into the form-giving mechanisms of nature [...] turned to forms resonant with natural laws of growth to guide their quest for a vocabulary freed from the imitation of historic styles".[3] After the thesis posed by Abate Laugier in the 18th century, and the later observations on the natural world by French Georges Buffon and his *Histoire Naturelle* (1749-1778), Bergdoll suggests that in the last decade of the 19th century, Victor Horta and Henry van de Velde in Brussels; Hector Guimard and René Binet in Paris; Antoni Gaudí in Barcelona; Hermann Obrist and August Endell in Munich; and Louis Sullivan in Chicago, among many others, explicitly explored nature as a model for architecture to move away from a predominant historic vocabulary **(fig. 01)**.

We could explore a comprehensive evolution of generative laws underlying the diversity of natural forms. The idea that these forms might "engender an art which could itself parallel the productive forces of nature was a recurrent concern of architects and design theorists convinced of the adage, first explored by Johann Wolfgang von Goethe and other German Romantic theorists, that nature is characterized by underlying unity in variety".[4] But Goethe's investigations barely had any repercusion on the architecture discipline for more than a generation, until, "they were popularized by his disciple and friend Alexander von Humboldt with his *Cosmos* lectures in Berlin (1827-28)" **(figs. 02 and 03)**. The author reminds us that in 1828:

> "Schinkel helped Humboldt decorate the interior of Berlin's Schauspielhaus [...] to receive the first convention of natural scientists. [...] [Some projects by] Schinkel were also designs in which a search for the primordial forms of architecture brought the quest for the new into close dialogue with the romantic tradition of morphology. [...] Thirty-five years later, Friedrich Adler celebrated the Bauakademie as both a revival of Goethe's idea of the primordial seed and as an impetus for a new generation of natural historical and architectural research"[5].

For Schinkel, the meaning of the Bauakademie was based as much in its terra-cotta ornamentation as in its brick construction: "One must not understand the word ornament or decoration to signify the imitation of something that lies outside the object and its essence or essential idea".[6] This intense exchange of ideas developed progressively after the fruitful and close collaboration between the scientist Humboldt and the architect Schinkel, both highly influenced by Goethe. The German writer had, in fact, written *Metamorphosis of Plants* in 1790 as "the source for all morphological explanation and study".[7] **(fig. 04)** Bergdoll sustains that for Goethe "all previous natural history had concentrated on superficial taxonomies of form rather than on what he called the 'inner economy' of organic form. Goethe noted the morphological signs of development within each plant and explained the stages of plant development, which could reveal the generative and formal unity of the natural world".[8] In Schinkel's words: "Architecture is the continuation of nature in her constructive activity. This activity is conducted through that natural product: Mankind".[9]

Later on, two additional authors deserve our attention for their approach and understanding of the role of nature in the configuration of the built environment: Gottfried Semper and Viollet-le-Duc. Gottfried Semper was inspired by Humboldt's perseverant vision that "the study of history and of nature were parallel quests for truth: 'We find its noblest and most important result to be a knowledge of the chain of connections by which all natural forces are linked together, and made mutually dependent upon each other; and it is the perception of these relations that exalts our views and ennobles our enjoyments'".[10] **(fig. 05)** Eugène Emmanuel Viollet-le-Duc wrote in the late 19th century that "Architecture as an art is a human creation. Such is our inferiority that, in order to achieve this type of creation, we are obliged to proceed as nature proceeds in the things she creates. We are obliged to employ the same elements and the same logical method as nature; we are obliged to observe the same transitions".[11]

Inspired by Semper's interest in natural relations and connections, and Viollet-le-Duc's defense of nature's methods of transition, architects grew more and more interested in the idea of unifying concepts in relation to natural form, in spite of the increasing specialization of science and the "growing fragmentation of the natural order it depicted". Bergdoll insists on this observation by sharing an episode "in the discourse between the quest to penetrate to the underlying laws of form generation in nature and the quest for an architecture freed from antiquarian research":

> "[In the 1860s] The architect Simon Claude Constant-Dufeux subscribed to the doctrine of Eclecticism defined by the philosopher Victor Cousin as a reaction against French idealist aesthetics, particularly Cousin's axiom of 'Unity in Diversity.' Victor-Marie Ruprich-Robert transformed Constant-Dufeux's influential oral instruction into a published teaching method.[12] [...] Ruprich-Robert was one of several intermediaries between natural science research and drawing instruction in mid-century Paris. [...] Ruprich-Robert proposed instead that ornament could help designers escape from historicism [...]"

These approaches to the exploration of natural models took place in parallel in France and Germany at the end of the 19th century. A mutual influence developed between German and French authors, scientists, intellectuals and architects. And it was Louis Sullivan who brought these visions to America. Sullivan traveled from Chicago to Paris in July 1874. The American architect was particularly interested in the new school of ornamental research, the figure of academic Victor-Marie Ruprich-Robert, and his statements on ornament exploration as a mechanism to move away from historicism. Sullivan wrote 'Ornament in Architecture' in 1906, highly influenced by Schinkel's work some 70 years earlier. Sullivan's career might be summarized as the gradual realization of an ever-greater coordination of structure and ornament. A good example is the Guaranty Building (1894) in Buffalo, where "every surface seems quite literally to leaf and to flower"[13] **(figs. 06 and 07)**.

At the turn of the 20th century, the German biologist and oceanographer Ernst Haeckel had captivated a whole generation of artists with images of jellyfish, coral, and microscopic ocean creatures, especially radiolarian **(figs. 08 and 09)**. Bergdoll gives a good description of Haeckel's direct influence in architecture:

> "[...] The lack of a clear distinction between the animal and the vegetable realms, were among the subjects of Haeckel's research into the myriad of new species of microscopic life discovered in the sea, and transformed into the lurid color plates of his *Kunstformen der Natur* (1899-1904). [...] Perhaps no artist was more enamored with Haeckel's discoveries than René Binet, whose great three-legged, forty-five-meter tall metal portal to the Exposition Universelle of 1900 was nothing less than a monumentalized form of one of the phormocyrtida published by Haeckel in his 1887 *Report on the Radiolaria*. [...] Like the sponges and corals of Haeckel's universe, he conceived a form in which structure and decoration were integral, in which structure and space created one another[14] **(figs. 10 and 11)**. For over a decade he maintained an active correspondence with Haeckel in Jena. [...] Binet insisted that these forms were not to be the basis for a new style. Rather, Binet urged architects to 'turn to the great laboratory of Nature, always in movement, always in production, without a moment of arrest or of hesitation.'[15] [...] The aim was to encourage readers to connect with Binet's higher ambition: 'The effort from which it derives will be retained, categorized, and utilized by reason which embraces it for a whole order of necessary works, and which will bring to the execution of those works a remarkable spirit of unity and of method'.[16] [...] In his fascination, shared by Haeckel, for the similarity of cells and crystals, Binet looks forward to one of the central fascinations of twentieth-century architecture -from the German Expressionists in the 1920s to the Metabolists in the 1960- of finding a form of architectural abstraction in resonance with the building blocks of the universe"[17] **(fig. 12)**.

Today, the development of architecture keeps exploring nature as a generator of structural, material and spatial solutions. An inevitable evolution has led to the incorporation of new materials and techniques, diversifying the connection between nature and architecture. Some could argue that the former has remained mostly as an environment of the latter, which often became stated as an artifact. However, this distinction could be considered superficial and imprecise, as not all environments have remained as such, and not all architectural artifacts have evolved as extemporaneous to nature. Moreover, the boundaries between architecture and nature have blurred considerably in the last few decades, sometimes following ancient strategies where architecture was not conceived in discontinuity with its natural environment. As a consequence, today we see ambiguous productions creating new potential classifications of ambivalent content which have deep roots in history and tradition, reinforcing the concept of Critical Regionalism as coined by Alex Tzonis and Liane Lefaivre in 1981.[18] The rediscovery of genuine local solutions that conjoin man-made architecture and the existing natural conditions can pose a critical perspective within an anthropocenic approach to human contemporary built environment.

FROM THE MASSIVE ENCLOSURE TO THE ARTICULATED MESH

Having set a certain theoretical and historic frame in the approach to the relation between nature and architecture, we could differentiate two general groups of construction strategies in architecture: one that generates spaces through enclosed structures with massive and rigid planes of matter, where the gravitational presence of compressive forces prevails; and another one that generates spaces through the growth of open mechanisms or mobile structures that work primarily in tension, where flexible articulations and knots prevail. The former structures could be described as *enclosures*, and constitute materially continuous solutions that are largely defined by heavy and immovable constructions. The latter conform lighter structures that could be referred to as *meshes*, and are mostly defined by fragile and unstable collection of interlocking pieces.[19]

Enclosures define spaces within scalable limits that produce experiences whose built form could be described as opaque, heavy, dark, and impenetrable, separated from the outer world with which it has no visual connection. The strength of these structures belongs to the realm of the finished and the static. The continuous massive envelopes that characterize these architectures pose a gravitational language that links the observer to the earth conceptually and physically by means of vertical forces. These spaces convey a sense of weight, dimension, and concretion to the senses, and relate to the mass and its gravity through a boundary that is constructed by the accumulation of matter. Enclosed spaces in these architectures are generally perceived as unified panoptic experiences.

Meshes, on the contrary, constitute architectures of unstable and unpredictable boundaries that shape an indefinite and ambiguous spatial experience.[20] A mesh of this kind is easily penetrated by light and sight, involving interior and exterior in the same perceptive process. This quality characterizes the continuity of its architectural section, and promotes cross-connections between the two different sides, as opposed to enclosed spaces of continuous boundaries, which tend to block all visual connections.[21] In meshes, the space is broken into successive overlaps where the liasions between the parties lie in the interstitial air. The architecture of the mesh is light, diffuse and imprecise, and its perception refers to the weightlessness of scattered matter that seem to float in the air. The mesh shapes a discontinuous, unstable, and changing space, of which Spanish Professor José Antonio Sosa writes: "[The mesh] enables the function and the organization with no apparent order [...], with no precise limits, and with a permeable boundary condition".[22] These two structural approaches, enclosure and mesh, are conceptually and physically antagonistic, and constitute two differentiated architectural operations: a box-like construction refers to a state of compactness and concealment, whereas a mesh-like construction suggests a state of dissolution and openness. In both cases, the study of natural structures and the forms of their growth have extensively been replicated and reinterpreted in artificial terms. If we look for examples in nature to illustrate the differences, we could establish a comparison between the cave as an enclosure and the forest as a mesh, respectively.

The cave can be considered a primitive space modeled through a continuous structure that relates to the outside only through stereotomic openings (*stereo*: stone; *tomos*: cut) **(fig. 13)**. Connections with the outside occur through gaps in the mass that contains the space. The cave acts as an enclosure that is completed and consolidated by its circumdating mass. Its structure clearly outlines the difference between matter and air, and between interior

space and exterior space, conforming a definite place where the senses seek an explicit relationship with the other side through the intentionality of its openings.

The forest, on the contrary, provides the counterpoint to the cave as an open and changing structural model that participates of the events that take place beyond its boundaries. The spontaneous warp of the tree branches shapes a visually and physically complex, unpredictable framework that determines spatial relationships with the environment **(fig. 14)**. The forest is a space of unconsolidated perceptions that constitute complex systems as a result of a sum of changing conditions. Branches, leaves or other trees produce an overlap of layered matter with varying parameters like color, movement, or the forms of leaves and branches, among others. The natural configuration of these trees is inevitably unpredictable in the definition of its contours, and constitutes a dynamic and mechanically unstable mesh. The physical and visual relationships that the forest promotes as a structure of flexible growth stays far from the statism explored in the previous model of the cave.

The stereotomic enclosure establishes a primary occupational strategy that can be considered a primitive architectural operation, but the tectonic mesh seems to operate with more complex conditions to which some contemporary interests are closer. In this case, we would be operating with systems that are capable of incorporating additional parameters in spatial relationships. The cave poses a *physical continuity* of the enclosure but a *spatial discontinuity* between interior and exterior, where connections are mostly blocked by the continuity of the mass. Here, the viewers are attached to the built environment and forced to participate of the architectural severity in which they are immersed. However, the forest behaves in the opposite way, and the *physical discontinuity* of the mesh evidences a *spatial continuity* between different sides as these systems facilitate visual and physical cross-permeability. These qualities allow the observers to be free from physical bondage and entirely engaged with the space around through the permeable network of trees within the continuity of air. The former cases involve an *imposing architecture in the natural environment*, whereas the latter entail a *submission of architecture to the natural environment*.[23]

NATURAL AND ARTIFICIAL: STRUCTURAL AMBIGUITIES

> "Light cities like kites, perforated like laces, cities transparent like mosquito nets, cities nerved as a leaf rib cities, hand-line cities, filigree cities to see through its opaque and fictional thickness appear in her dreams".
> Italo Calvino[24]

The line that divides the structural groups of the natural and the artificial is not always visible but imprecise and exchangeable. To illustrate this architectural ambiguity between a natural growth and an artificial construction, we may start by reading Paul Valéry's *Eupalinos* in the precise moment when Phaedrus speaks to Socrates of an object found in the sand:

> "Socrates: [...] Its singular form left the rest of my thoughts in abeyance. Who made you? I thought. You do not resemble anything familiar and yet you are not formless. Are you a whim of nature?
>
> Phaedrus: And what kind of matter was it made of?
>
> Socrates: Of the same matter of its shape: matter of doubt"[25].

The description that Phaedrus makes of the ambiguous object found in the sand speaks of its uncertain and indistinguishable natural or artificial origin in a similar way than Haeckel explored the unclear origin of his illustrated forms at the turn of the 20th century. Some questions may be particularly pertinent at this point. Do all natures manipulated by mankind automatically abandon their natural essence? Does the "matter of doubt" that shapes the object found by Phaedrus have a natural origin or is it an artificial product? When does one start to become the other?

There is no real sense in discussing about "natural architecture", as every architecture always involves a degree of intended physical manipulation and is, therefore, explicitly artificial. But we could *a priori* speak of considering that a structure is *natural* when its origin and development stem from direct natural sources with no artificial modification; on the other hand, we could consider that a structure is *artificial* when it is predominantly affected or produced by explicit human action over nature. However, the use of nature as a model in the manipulation of the environment and, in particular, in the direct application of vegetal structures with a low degree of physical manipulation, could lead to a renovated discussion about the ambiguous distinction between artificial and natural constructions.

In taking nature as a model, mankind has developed two approaches to the manipulation of the environment: one that reinterprets nature in a direct way and produces a *naturalized* architecture, and one that explores the direct potential of natural resources as a means to propose new spaces and structures, producing an *architecturalized* nature. While the former are at the risk of being literal in their final solution, projects under these guidelines represent a recurring presence as their production is visually immediate and conceptually understandable by a larger public. The latter, however, may be less common since their application is mainly limited to purely natural resources or environments, and they give way to a range of unexpected options. *Naturalized architectures* have a greater presence as an architectural strategy, whereas *architecturalized natures* have, by contrast, additional limitations given the material restrictions *per se*, often resulting in anonymous or restricted proposals. The former strategies lead mostly to an image-oriented design understanding that conveys a very precise message based on the direct inspiration from natural structures, and the parallelism established between the new construction and its natural reference is highly evident. As a consequence, the result generally exposes a literal connection with sometimes limited interpretations. On the contrary, the latter strategies look into the opposite direction, producing a sort of anti-image: they conform a sort of re-arrangement of the natural materials and structures, resulting in natural environments with integrated interventions. We could consider that *naturalized architectures* are notable for their *effect*, while *architecturalized natures* tend to disappear in a process of *mimesis*.

Naturalized architectures: strategies of effect

Naturalized architectures take place when the execution of the design explicitly aims at literally imitating the organic spontaneity of a vegetal growth. This strategy is developed in examples in which architects have tried to recreate a nature that they long for or admire by reproducing vegetal-looking structures through artificial, material and constructive means. Mostly concerned with the *representational*, we could say that these operations can be referred to as mechanisms of *effect*, as they are mostly image-driven and display powerful and comprehensible visual results.[26] These cases can be illustrated with architectures where the tectonics emulate a figurative approach ready to be understood by the larger public, and even become commodified. Some works that exemplify this intention are the projects by Hans Hollein for the main branch of the Austrian Travel Agency in Vienna (1978), and the Jewish Welcome Center (1979) **(fig. 15)**; the pool at the SPA at the Hotel Mielmonte, in Nikko, Japan, by Venturi Scott Brown and Associates (1992-1997) **(fig. 16)**; the Departmental building for the University Pompeu Fabra in Barcelona, by Juan Navarro Baldeweg (1996-2007) **(fig. 17)**; or the proposal for the perimetral *tree* structure at Tod's headquarters in the Omotesando district in Tokyo, by Toyo Ito (2002-2004) **(fig. 18)**. Hollein recreates the qualities of the exotic at the travel agency by means of a postmodern representation of the desert through a series of fake palm trees, which have no other mission than the recreation of the experience that can be *purchased* at the office.[27]

Venturi Scott Brown and Associates recreate a *faux* ivy roof at the hotel's pool; Navarro Baldeweg presents a facade solution with red abstract vegetation that works as a *brise-soleil*; and Toyo Ito conceives his project as a unitary exercise where the constructed artifice is presented as a recreation of a natural mechanism -a forest of nine trees. Although the tectonics developed by Ito assume the structural work of the building- something neither Hans Hollein introduce with the palm trees, nor Venturi or Navarro with their respective *graphic* operations-, Ito's final design emphasizes the construction as a representation of a tree-like structure, thus emulating a natural element that the Japanese architect admires so much. Disregarding the degree of figuration in the more or less literal exploration of the natural model, the vegetation and the tree are used as a strategy of *effect* that raises a metaphoric -and sometimes ironic- exercise of artificially *naturalized* architecture.

Architecturalized Natures: Strategies of Mimesis

There are cases that take place when strictly natural formations are manipulated in time and space without altering their material or structural essence. This type of solutions may not be considered architecture *per se*, but rather some sort of *de-naturalized* natural formations or, more accurately, *architecturalized* natures. A controlled alteration in the growth of these ambiguous formations can be pictured with very ordinary examples such as the vines that form deliberate canopies to protect from the harsh sun in certain countries, like Greece, Spain or Portugal, or the intentional planting of aligning cypresses in an imposing vertical sequence flanking roads to Mediterranean cemeteries as a metaphorical representation of incorruptibility and immortality **(figs. 19 and 20)**. These cases illustrate how the manipulation or the arrangement of natural structures can go from purely practical standards, as we see in the grape vines, to allegoric representations that produce scenographic experiences, like those with the cypresses. These are exercises of *mimesis*, where the resulting arrangement or manipulation is not detached from its original natural medium but still displays an undeniable spatial intention. These operations are far from the evident and, although they result in a manipulated environment, the impact is not image-driven but fully integrated and non-disruptive with the existing natural context. There is an artificial component in the intentional organization of the natural growth; however, the material and the structure still pertain to the realm of the purely natural. The traditional gardens of Japan offer a very keen example of this thesis. Their *architecturalized* natures hold a great affinity with the country's culture and sensitivity, allowing us to establish here a coherent geographic and cultural context with the previous example by Toyo Ito [28].

The Kenroku-en garden in the city of Kanazawa, on the island of Honshu, dates from the sixteenth century, and can be considered one of the most relevant gardens of Japan's Edo period (1603-1868). The garden covers an area of about twelve acres located in the heights of the city of Kanazawa, near the homonymous castle and not far from the renown Museum of XXI Century by Kazuyo Sejima and Rye Nishizawa. The name Kenroku-en means "the one that has six elements", since the parameters leading to the perfect landscape were spaciousness, tranquility, artifice, antiquity, watercourses, and views from the garden. However, one of the most characteristic elements of the garden is formed by the system known as *yukitsuri*, which literally means *pendants of snow*. This system refers to the rope structures tied in conical arrangements around the trees that protect the branches from the excessive weight of snow accumulation **(figs. 21 and 22)**. The practice of this technique in the Kenroku-en garden began during the Edo period as a purely functional solution that prevented the breaking of the branches during the winter time, helping them to continue their manipulated growth. The strings, along with the auxiliary supports -elements similar to crutches- give shelter to the tree as the natural element *par excellence*, embrace the branches that extend beyond the trunk, and direct the very precise growth of the tree.

Of the seemingly natural dimension of this garden, we could highlight two accents in the relationship between the natural and the artificial conditions. First, the concept of the Japanese garden itself, which is proposed as an exercise of natural artifice as opposed to one of artificial nature; second, the *yukitsuri* or the small constructions made with bamboo and ropes as a unique scaffolding system, whose function is to protect the trees' overall shape commensurate with the landscape design. The trees of the garden are obviously natural, but are arranged in a premeditated order and, in turn, are controlled by the strings and reeds that work as auxiliary structures that provide the final shape with the help of tenacity and time. Tradition requires that the branches become transformed through an exercise of artificial beauty, and the natural growth of the foliage is built alongside the purely artificial arrangement of the ropes. However, it is the complementary scaffolding structure that in parallel acquires a tree-like form, generating roped-cones around the tree, or vertical arms of bamboo poles as splints to a still limb, anticipating the forms that the Japanese seek for the tree branches **(figs. 23 and 24)**. The Kenroku-en garden is conceived as a global intervention in which natural growth is treated as a matter of artificial work, where the artificial operation acquires natural connotations. The result is an ambiguous natural-artificial landscape that is mimetically manipulated by means of the combination of artificially treated branches and naturally-treated strings and reeds.

The same strategies inspired a recent proposal by Jin Young Song and Miguel Guitart for a temporary garden at the 2014 International Garden Festival at the Jardins de Métis, in Québec, Canada. The design revolved around the idea of artificial-come-natural screens of bamboo poles that kept plants at the very top, letting them grow down the pole over time to cover the artificial grid of natural vertical elements arranged artificially **(figs. 25 and 26)**. The memo reads:

> "The bamboo poles propose a floating garden [...] whose condition becomes defined by the virtual surface that changes over time as the plants grow atop the bamboo poles. The visitor enters the garden through the permeable arrangement of bamboo poles that modify their perception as the visitor walks in. The top of the poles conform a virtual surface that descends towards the center of the garden and ascends towards the borders. As a result, the visitor eventually finds him/herself surrounded by a surface that is configured by the top ends of the standing poles, the borders being slightly taller that an average person. The experience leads to the consciousness of the self moving around the virtual surface of the lifted greenery in a process of introspection. The bamboo pole garden provides with the experience of a garden within a garden and the opportunity to concentrate on the surrounding surface that the pole tops configure around the visitor"[29].

The pole tops are not just the end, but the beginning of a new form of life: the poles are cut and hollowed out so as to contain a portion of soil and a plant that grows over time. The greenery sprouts at the top of the pole and wraps down the bamboo. As time goes by, all the poles flourish like vertical planters that transform the skeleton of the initial bamboo structure into a softer green vertical construction that intentionally surrounds the visitor in dramatic ways as stations change. Therefore, the perception through time is critical in the proposed bamboo garden: Far from being a static experience, the garden intends to signify the changes over time and the ambiguous dialogue between the natural and the artificial **(fig. 27)**.

As the planting grows, the perceptions of the smell, the sound, and the vision change. The design is expected to evolve dramatically over time as the naked poles flourish, creating a sort of green heads that conform a new plant surface floating above the tilted ground. The pole garden creates an architectural space whose configuration is achieved through the transformation of an artificial

grid-like arrangement into a natural scenery of vertical growth. The resulting experience enhances the *architecturalized* nature and the *naturalized* architecture that happen simultaneously. The use of bamboo speaks of a new awareness in the use of sustainable materials in contemporary architecture. The exploration of construction techniques and materials that emphasize a respectful and mutually enriching understanding between artificial and natural is demonstrated here by the explicitly artificial arrangement of bamboo poles as the means to configure a new type of garden through both its artificial and natural qualities.

Strategies like these seem to unequivocally be opening new pathways in the way nature is incorporated into the design and construction processes, departing from the very properties of the natural form and structure, and promoting a discoursive ambiguity between the natural and the artificial. These structures, the *artificially* natural and the *naturally* artificial, eventually become a single piece in a kind of extraordinary symbiosis of double ambiguity.

CONCLUSIONS: THE MANUFACTURED ENVIRONMENT

"Nature has a different sense of time. Time is big in the landscape, while in the city it is condensed, just like the city's space".
Peter Zumthor[30]

Throughout the building tradition in history, the architect has consciously taken nature as a referential model, from which it was possible to draw two general approaches to architectural design: on the one hand, a prevailing strategy that reinterprets nature so as to produce a *naturalized* architecture, where the form of vegetal structures is *abstracized* to produce an effective visual result with material techniques and constructive procedures that are foreign to their material essence; on the other hand, a strategy that utilizes natural resources as a means to manipulate and transform natural structures artificially to configure *architecturalized* natures where the basic structural materials remain entirely natural.

While the former models are in the risk of conforming literal results with approaches that are too direct or evident, even playful with the iconography thay produce, they are nonetheless a design line with a recurrent presence, due to a production that is immediately iconic and, therefore, conceptually comprehensive **(fig. 28)**; their material execution is not necessarily conditioned by a particular building system steming from the original model; moreover, the construction and the structural process are open to different solutions that are entirely artificial -detached from natural procedures or constrains. The latter model, however, may be a less common option, making up an unexpected range of solutions, because their application is mostly limited to purely natural production and landscaped environments with important material and constructive limitations **(fig. 29)**.

While both groups have been in one way or another present in the history of architecture, we can assume that *naturalized architectures* have had a greater presence as an effective architectural product, with examples like Hans Hollein's designs for the Austria Travel Agency, Venturi Scott Brown's proposal for the SPA at the Hotel Mielmonte, Juan Navarro Baldeweg's facade design for the Pompeu Fabra University, or Toyo Ito's Tod's headquarters in Omotesando; *Architecturalized natures*, on the contrary, have bigger limitations, and are often a result of the manipulative work that is often absorbed by the nature it operates with -for instance, the application of *yukitsuri* in Kanazawa **(fig. 30)**. If the former structural model points mostly to a conscious image-driven production, the latter model operates in the opposite direction producing an anti-image through an exercise of disappearance within the existing environment. The former are notable for their *effect* and iconographic presence, whereas the latter disappear in a process of integration through *mimesis*. While both approaches are based on natural schemes, in the anthropocenic context of the transformation of the environment, we could debate on the manipulation of nature and how the process by which the natural becomes the artificial can be ambiguous. We could perhaps conclude that the option of direct work on natural architecture can be assumed as a path of work with increasing potential given its characteristics of renewed ingenuity and logical application for their economic, environmental, and landscape benefits.[31] This work strategy is therefore susceptible of experiencing a growing interest from design professionals caused largely by the growing awareness of environmental sustainability and a renewed interest in the manufactured work, where process, matter, and environment are major players in our increasingly manufactured world.

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Notes

01. THOREAU, Henry David, *A Week on the Concord and Merrimack Rivers*. (1849), New York, Literary Classics of the United States. 1985, p. 258.

02. ZUMTHOR, Peter, "Does Beauty Have a Form?" *Thinking Architecture*, Basel, Birkhäuser. 1998, p. 73.

03. BERGDOLL, Barry, "Nature's Architecture: The Quest for the Laws of Form and the Critique of Historicism", *Nature Design. From Inspiration to Innovation*. (Angeli Sachs ed), Zurich, Lars Müller/ Museum für Gestaltung Zürich, 2007, pp. 46-59.

04. Barry Bergdoll indicates the source as: WAENERBERG, Annika, *Urpflanze und Ornament: Pflanzenmorphologische Anregungen in der Kunsttheorie und Kunst von Goethe bis zum Jugendstil*, Commentationes Humanarum Litterarum 98, Helsinki, 1992, In BERGDOLL, Barry, Ibid.

05. ADLER, Friedrich, "De Bauschule zu Berlin von K. F. Schinkel" (1869), reprinted in *Schinkel zu Ehren: Festreden, 1846-1980*, Berlin, Julius Posener, 1981, pp. 101-20. In BERGDOLL, Barry, Ibid.

06. Karl Friedrich Schinkel, quoted in PESCHKEN, Goerd, ed.: *Karl Friedrich Schinkel: Das Architektonische Lehrbuch*, Munich, 1979, p. 50. In BERGDOLL, Barry, Ibid.

07. Schinkel received a copy of this book when he visited Goethe in Weimar in 1816. See BERGDOLL, Barry, Ibid.

08. Johann Wolfgang von Goethe, *Metamorphosis of Plants*, sec. 3, trans. Agnes R. Arber in *Goethe's Botany: The Metamorphosis of Plants* (1782), Waltham, MA., 1946. In BERGDOLL, Barry, Ibid.

09. K. F. Schinkel, quoted in PESCHKEN, Goerd, op. cit., p. 50. In BERGDOLL, Barry, Ibid.

10. Alexander von Humboldt, in *Cosmos*, vol. 1, p. 41. For Semper, "just as nature in her infinite variety [...] renews continually the same skeletons by modifying them a thousand fold according to the formative stages reached, [...] works of art are also based on certain standard forms conditioned by primordial ideas, yet permit an infinite variety of phenomena according to the particular needs that affect them". See SEMPER, Gottfried, "Prospectus, Comparative Theory of Building" (1852) in: MALLGRAVE, Harry Francis; HERRMANN, Wolfgang, *Gottfried Semper: The Four Elements of Architecture*, p. 170. As Bergdoll explains, by the late 1840s, Semper had drawn up a prospectus for a *Vergleichende Baulehre* (comparative building theory) modeled on Humboldt's *Cosmos*. In BERGDOLL, Barry, Ibid.

11. E. E. Viollet-le-Duc, "Style", *Dictionnaire Raissoné de l'architecture...*, vol. 8, Paris, 1858-1870, pp. 477-501. See English translations in BERGDOLL, Barry, ed.: *Viollet-le-Duc: The Foundations of Architecture; Selections from the Dictionnaire Raisonné*, introduction by B. Bergdoll, trans. Kenneth D. Whitehead, New York, G. Braziller, 1990, p. 235.

12. Constant-Dufeux was in the mid-nineteenth century one of the most celebrated pedagoges associated with both the École des Beaux-Arts and romanticism in architecture.

13. "Between 1855 and 1860, the German Karl Krumholz, influenced by Gottfried Semper, among others, began work in Paris on his own illustrated works of plants, beginning with the publication of *Composition des fleures d'après nature... à l'usages des artistes industriels in 1859*. Krumholz's *Das vegetable Ornament* of 1880, one of his last works, served in turn as a fundamental source for much of Jugendstil. [...]" See BERGDOLL, Barry, Ibid.

14. Bergdoll indicates that recent research has shown possible contacts between Binet and Sullivan. See Marie-Laure Crosnier-Lecomte, "René Binet" in *Thieme-Becker / Vollmer Gesamtregister: Register zum Allgemeine Lexikon der bildenden Künstler von der Antike bis zur Gegenwart und zum Allgemeinen Lexikon des XX. Jahrhunderts*, Munich and Leipzig, 1996. In BERGDOLL, Barry, Ibid.

15. Gustave Geffroy, preface to *Esquisses décoratives*, by René Binet, Paris, 1902-03, p. 1. BERGDOLL, Barry, Ibid.

16. As explained by Binet's friend Gustave Geffroy. BERGDOLL, Barry, Ibid.

17. Ibid.

18. See TZONIS, Alex; LEFAIVRE, Liane, "The Grid and The Pathway. An introduction to the work of Dimitris and Suzana Antonakakis", *Architecture in Greece* n. 15, (Athens, 1981). See FRAMPTON, Kenneth, "Towards a Critical Regionalism: Six Points for an Architecture of Resistance", *Labour, Work and Architecture. Collected Essays on Architecture and Design*, London, Phaidon Press, 2002.

19. Both terms are explained in a text by Miguel Guitart in *The Depth of the Skin*, Madrid, Ediciones Asimétricas, 2014.

20. Regarding the concept of instability, the texts by Professor Ilya Prigogine (1917-2003), a notorious Belgian Physical Chemist and Nobel Laureate noted for his work on dissipative structures, complex systems and irreversibility, are of great interest. See PRIGOGINE, Ilya, "Why Thermodynamics?" and "Structural Instability and Biochemical Evolution", in: *Modern Thermodynamics. From Heat Engines to Dissipative Structures*, New York, John Wiley & Sons, 2015.

21. See GUITART, Miguel, "Through the Pores of the Skin", *The Depth of the Skin*, Madrid, Asimétricas, 2015, p. 37.

22. SOSA DÍAZ-SAAVEDRA, José Antonio, "Armazones", *Transfer* n. 5, Valencia, University of Valencia. 2003, pp. 7-10.

23. Architectural solutions in warm geographies benefit from massive strategies that facilitate passive thermal insulation at very effective costs; the future evolution of mesh structures leads, like their natural counterparts, to technically more complex architectures with lighter solutions due to a more efficient use of materials that adapt to changing spatial relations and external variable parameters. Due to the material inflexibility of the former constructive model and the flexibility of the latter, the growing set of parameters that intervene in architectural production today is more likely to consider mesh solutions rather than enclosure systems.

24. CALVINO, Italo, *Invisible Cities*, Milan, Giulio Einaudi, 1972.

25. VALÉRY, Paul, *Eupalinos or The Architect*, 1921, *Dialogues* Bollingen Series XLV 4, Princeton, NJ: Princeton University Press, 1989. Translated by William McCausland Stewart.

26. In relation with the tectonic distinction between *representational* and *ontological*, the texts by professor Kenneth Frampton are highly recommended. See: FRAMPTON, Kenneth, "Introduction: Reflections on the Scope of the Tectonic", and "Postscriptum: The Tectonic Trajectory. 1903-1994", *Studies in Tectonic Culture: The Poetics of Construction in Nineteenth and Twentieth Century Architecture*, Cambridge, MA, The MIT Press, 2001.

27. In a clear parallelism with Robert Venturi and Denise Scott Brown's "decorated shed", term coined in the book *Learning From Las Vegas* of 1972.

28. See BOGNAR, Botond, "The Japanese Order of Things", *Kochuu. Arquitectura Japonesa. Influencia y Origen*, Barcelona, Fundación Arquia - Caja de Arquitectos. 2003, and GROPIUS, Walter, "Architecture in Japan", *Perspecta* Vol. 3, Cambridge, MA, The MIT Press. 1995, pp. 8-2, 79-80.

29. http://dioinno.com/floating-garden-evolving-surface, and http://miguel-guitart.com.

30. ZUMTHOR, Peter, "Architecture and Landscape", *Thinking Architecture*, Basel, Birkhäuser, 1998, p. 96.

31. The search for new values is more evident in cultures that have not been commodified and are still genuine, mostly in Africa, South America, or Asia. This approach was shared by Bernard Rudofsky in his most notorious publication. See RUDOFSKY, Bernard, *Architecture Without Architects: A Short Introduction to Non-pedigreed Architecture*, Garden City, New York, Doubleday Company Inc. 1965. As part of this conversation, we could attend to the concept of the *arrière-garde*, as opposed to *avante-garde*, mentioned by Kenneth Frampton as a counterstrategy to reinforce critical regionalism as a strategy to produce architecture that is locally rooted and connected with its own history and place.

Images

01. Champ de Mars. Paris. France.

02. Alexander von Humboldt. *Cosmos* Lectures. Book cover. 1866.

03. Alexander von Humboldt. Painter: Joseph Karl Stieler. 1843.

04. Goethe. Painter: Joseph Karl Stieler. 1828.

05. Gottfried Semper, photographed in 1865.

06. Guaranty Building. Buffalo, New York. Architect: Louis Sullivan.

07. Guaranty Building. Buffalo, New York. Architect: Louis Sullivan. Cornice Detail.

08. Ernst Haeckel. Prosobranchia. https://www.biodiversitylibrary.org/item/40590#page/5/mode/1up

09. Ernst Haeckel. Monophiletischer Stammbaum der Organismen. Jena, Germany. 1866. http://www.graphicine.com

10. and **11.** Metal portal to the Exposition Universelle of 1900. Paris. Architect, René Binet.

12. City in the air. Architect: Arata Isozaki. 1961. The architect, dissatisfied with the chaos of Tokyo, raised an orderly city completely separated from that laid in its base, whose branches were born from central mega-columns.

13. Petra, Jordan.

14. Inside the forest.

15. Austrian State Travel Agency. Vienna, Austria. 1976-1979 (destroyed 1987). Architect: Hans Hollein.

16. SPA. Hotel Mielmonte. Nikko Kirifuri. Nikko, Japan. 1992-1997. Venturi, Scott Brown and Associates.

17. Pompeu Fabra University. Department Building. Barcelona, Spain. Architect: Juan Navarro Baldeweg. 2008.

18. Tod's flagship. Omotesando. Tokyo, Japan. Architect: Toyo Ito. 2004.

19. Vine covering. South of Spain.

20. German Cemetery (Kriegsgräberstätt). Caira, Cassino, Italy.

21. 22. and 23. Yukitsuri. Kenroku-en Garden. Kanazawa, Japan.

24. Yukitsuri. Kenroku-en Garden. Kanazawa, Japan. Assembly process. (Photograph by Unknown Author).

25. 26. and 27. Jin Young Song & Miguel Guitart. Proposal for Garden of Métis. Canada. 2014. Model interior view.

28. Tod's flagship. Omotesando. Tokyo, Japan. Architect: Toyo Ito. 2004.

29. Bamboo garden construction, Japan.

30. Kenroku-en Garden. Kanazawa, Japan.

10

Welbeck Estate. From the Entrails of the Earth John Cavendish-Scott-Bentinck, 5th Duke of Portland (1800-1879)

Tomás García García
Francisco Montero-Fernández

The life of the 5th Duke of Portland is the story of the obsession with finding a spot of quiet, a zone free of worry, a place to feel safe. Perhaps he found there, in that natural and unfolded space of the visible world, the forces to overcome his difficulty, to understand the scale of space; that is, the way in which others establish relationships of similarity, distance or closeness with oneself. Following his appointment as heir to this immense state, almost immediately began a series of investments of an unprecedented scale, which have been considered, technically and conceptually, pioneers in the domestic and landscape transformations of the nineteenth century. Welbeck Estate is a double city, one visible and the other hidden, one in surface, constructed with physical materials; the other less obvious, submerged between shadows and natural substances, flows, energies, scales, processes and senses.This is the story of a city transformed from the bowels of the earth, beyond where the laws of reason are suspended. A kind of "other nature", understood as an immaterial unknown with which to reflect on the way things happen in space, and those that happen in time. Spaces and times unfolded and folded over themselves, as materials with which the 5th Duke built this fascinating scenery in which to represent his own life.

MOLE, INVISIBLE AND SOLITARY

The story of Welbeck Estate's transformation begins at a decisive stage during the succession in 1845, of John William Cavendish-Scott-Bentinck, Marquess of Titchfield as the 5th Duke of Portland. It was he who was responsible for designing and building the mysterious underground spaces for which these lands are known for and have recently been nominated at the Venice Biennale of Architecture. Thousands of tunnels were marked by the duke into Welbeck's subsoil, creating a fascinating underground labyrinth of more than 10 km in length which remains hidden beneath the surface of his estate in Sherwood Forest, Nottinghamshire, England.

Legend and myth have woven the history of this enigmatic place, profoundly marked by the extravagant personality of its owner. A figure that, by his trajectory and status, is wrapped in a halo of exceptionality, fictitious or not, deserved or not, which elevates him, without a doubt, to the category of genius. In the archives consulted at the University of Nottingham on the occasion of this investigation, he is referred to several times as the underground man, the mole, the burrow duke, invisible and solitary. His manuscript correspondence reveals a fascinating personality and a most exciting archetype English aristocrat. In one of the very few letters found written by the 6th Duke of Portland referring to the unique life of his predecessor, it is narrated that as he was arriving for the first time at Welbeck's Abbey during Christmas of 1879, just after his death, he found that in order to access the house they had to put temporary boards to go over the swamp of rubble. As they entered the abbey that day, the reception room had no floor; it had collapsed. No doubt the late duke was so absorbed in his ambitious task underground that he forgot what was happening on the surface[1]. He had a curious obsession with concealment and camouflage, which led him away from human contact, to immerse himself for life in the depths of his own land.

Many unconfirmed rumours have surrounded the duke's personality, multiplying in number and fantasy to create an eccentric tale of his life, which without being confirmed, has managed to endure to this day. It is said that he spent most of his life inside his home, concealed within a five room suite and connected to the rest of the world by a system of corridors and caves that stretched out right under his estate.

It's said that this ingenious maze made many of his extravagant requests possible, such as having a freshly roasted chicken at any time of day or night; traveling to London without being seen, using the tunnel that extended to Worksop station tens of miles away from the abbey; servants who ever encountered him in the corridors were forbidden to look into his eyes and had to leave immediately whilst facing the wall. Remarks and anecdotes, some of which we have been able to confirm in the correspondence consulted in the family archives, and others which are part of the constellation of ideas have helped construct the biography of this enigmatic figure[2].

William John Cavendish Bentinck Scott was born in 1800, the second son of the IV Duke of Portland, known as Lord John Bentinck. At the age of 24, he became the Marquis of Titchfield and future heir to the Duchy as a result of the unexpected death of his eldest brother. With no worries other than horses, racing and hunting, he resigned as a Member of Parliament for King's Lynn and handed over the position to his younger brother, Lord George Bentinck, claiming that his ill health prevented him from participating in public affairs. This is the first indication of the difficulty he had in assuming the expectations according to his social position, deciding from this moment onwards to disappear from the public eye forever.

He was a solitary traveller; after leaving the army, he spent some time travelling alone in Europe. Even when he moved to Italy, he did so without any company. All the preparations for the trip were made previously by his trusted staff. When it became known that he had arrived in the Italian capital, the whole of aristocracy requested a formal visit with the duke. The attention was so disproportionate compared to his habit of solitude that he decided to pull out of Rome's social life, probably to visit the subterranean structures of Villa Adriana. In the archives consulted at the University of Nottingham there are notes kept in which the duke himself, who is overwhelmed and stunned by the number of social visits required, publicly thanks the interest shown but in the end reports that he would be spending a few reclusive weeks in the Roman city to later

return to Paris for a couple of days and immediately proceed to Calais and then back to London. These journeys undoubtedly meant the encounter of something the duke was looking for, the discovery of a space, a hole, a burrow to build and dedicate the rest of his life to.

Other than having an overwhelming enthusiasm for travelling and opera, there aren't many references to his life during these years, which is reflected in a series of letters written in 1842 to the Kemble family which show his kind appreciation towards the world of scenography. Years later, with the death of his father and his appointment as 5th Duke of Portland, he decides to retire from public life and dedicate himself exclusively to the management of his properties in London, Scotland and especially to undertake his plans at Welbeck Estate, an ambitious task that in time will become his only obsession. The story of the transformation of this beautiful landscape enters a decisive stage with his appointment. He will be remembered for having undertaken one of the largest projects of underground domestic architecture in the country and for having dedicated his life to the design and construction of the mysterious underground spaces that are hidden beneath the surface of this incredible place.

The duke always showed great interest in the social and technological advances during his time, an attitude surely learnt from his own father, the 4th Duke of Portland, who brought the steam train to Scotland. His enormous creative qualities made him a gadget inventor, which allowed him to create a life surrounded by the idea of concealment **(fig. 02)**. His inventions favoured his own invisibility, from his horse carriage to his own bed. The network of tunnels that are hidden under Welbeck built a kind of scenery for life in which its actors, spaces and objects could appear and disappear in a ritual launched day after day. A sort of magician whose innate technical virtuosity is put at disposal of his only obsession: to live without being seen, Even to this day, when visiting this place, you can perceive his thirty-four year reign, from 1845 to 1879, which made Welbeck a national reference as a place full of life and prosperity.

There are many doubts about the true causes underlying his obsession with camouflage and concealment; amongst the family papers we find some letters that could justify this attitude. Many have been the queries, but very few the documented reasons of what many critics have described as a psychological disturbance. The first reason could be for his own personal pleasure to hide, the enjoyment of technical novelties and admiration towards them, as well as an interest in the knowledge and application of these techniques to build a hidden face of his life.

It seems curious to use correspondence as the only form of contact with family members, as well as his circle of agents, managers, foremen, and servants. Thanks to the many letters that are preserved in his archives we know of his health problems. A skin disease in the form of acute psoriasis, which further on is aggravated by an arthritis and terrible neuralgia, leading him away from light and noise.

His curious obsession leads him to invent, with much ingenuity, a whole series of spaces and gadgets, building a kind of invisibility and deception game. A horse carriage specially designed to move around without being seen, trapdoors, double doors, a communication system for the staff, unattainable passages and secret shortcuts. They all built a parallel world, a background in which to establish his life. In the way he dressed, the objects and gadgets designed around his lifestyle, the spaces and corridors hidden under the abbey, the tunnels and caves built under the whole landscape; in all of which invisibility and delusion are a prominent aspect. He always sneaked around, appearing here and there without warning, moving through a functional and suggestive space that he managed to build for himself.

Rumour has it that his first love had never been reciprocal[3], leading him to a state of rejection towards women and extending to humanity itself. It is said that he rarely walked out in public, when he did, it was always at night. He never greeted back and often accused people for their intrusion in his domains. There's no doubt he preferred to wander beneath the ground, to use that other place, that strange unfolded space he had built for himself. Architectural mechanisms devised by this what you could call genius, secrets to achieve invisibility that did nothing but increase an interest in revealing his presence. Strategies that gradually made him become a fantasy character, a more and more desirable icon, masked and always hidden.

The curious room that he used during the day shows his wit. It was provided with a trapdoor on the floor, by which he could descend underground to wander through the tunnels without anyone noticing his absence. The trapdoor had incorporated a reversible opening and closing system, which meant he could walk hidden beneath his estate and reappear in the abbey as mysteriously as he had left it. In addition, the room also had another access door to the anteroom; it was this that served as a communication link to his service. There were two small mailboxes on the door and in which he wrote the orders that had to be carried out. The duke wrote on paper what he needed and deposited it in the mailbox, which opened from the anteroom. Then a bell rang, warning service that a certain order should be executed.

The bed in this room had also been designed by him and built in the estate workshops. Its structure was an immense square construction, a kind of box in the middle of an empty room; a huge piece of furniture, a hideout, a place of intimacy. The bed had large vertical boards arranged in such a way that when they unfolded, it was impossible to know if the bed was occupied by its owner. Concealments, traps and deceptions, objects and spaces, truths that pretend to be lies and lies that pretend to be truths, these are the phenomena present in his life. The result is a camouflaged room; a cluster of ticks practiced by a human and the objects that surrounded his behaviour.

William John Cavendish Bentinck Scott, fifth Duke of Portland, Marquis of Tichfield, Earl of Portland, Viscount Woodstock, Baron of Cirencester and Coheir to the Barony of Ogle, of Welbeck Abbey, Nottinghamshire; Fullarton House, Ayrshire; Langwell Goldspie, Caithness; Bothal Castle, Northumberland, and Harcourt House, Cavendish Square, London, died in 1879, reached almost eighty years of life. He spent his last years hiding amongst his people, hidden in the depths of his world, where he died strolling on a rainy December afternoon. That was his last journey, a last immersion as a farewell. As he himself used to end his letters of condolence,

Peace to his ashes.

BLACK EARTH

John William Cavendish-Scott-Bentinck, fifth Duke of Portland, transformed his home into an extension of his own personality and behaviour. Even at the risk of transmitting information that may be frivolous, we've tried to show a certain attitude of exceptionality in his way of life. At Welbeck Estate, personality and architecture are intertwined, obsession and engineering, showing the indelible mark of its owner. It is a tailor-made set, full of objects and strategies that can't be generalized. His home and by extension his estate, became an authentic laboratory of architectural experimentation in which to leave his own non-transferable mark. He turned his estate into a gigantic invisibility mechanism, transformed his property into a double city, visible and constructed with materials from earth's crust and installed into the landscape. Unfolded and inverted, hidden in a lower strata, becoming part of a submerged world, immaterial and invisible. The Duke used an extensive repertoire of tactics and hidden spaces, technical solutions of disguise surely learnt from his love for opera[4].

Welbeck Estate is unveiled as a constructed scenery, a magical ritual of approach and invisibility that turns fantasy into reality **(fig. 03)**. This is a mysterious city, as a top hat or a theater stage, in which dreams and secrets overlap to create an indivisible part of everyday reality **(fig. 04).** Seeing this city in action is a fascinating

experience, attending with naturalness and emotion to unexplainable situations, things never seen before that defies all logic. The way the duke made possible, for example, the dream of owning simultaneously in the same house several of different styles and time periods, concentric and hidden in their interstices; or better yet, different houses that converge into one. The result has been that of an architecture communicated by temporary spaces[5], labyrinths and corridors, which as in the real transported man allow us to decide at any moment the desired occupation.

Holes and gates, hollows, dips, roads and shortcuts, intersect to lead to the same place or to different places, they only make sense when drawn together. We could access through a nineteenth-century hole and appear in the twenty-first century, or the other way round as if we were in a time tunnel with which we could reach the origins of the family itself. A built scenery that connects time and history; Doors that lead us to unusual spaces, tunnels for nobility and its servants, mechanisms and scenic devices capable of sheltering, surprising and entertaining the monarchy itself **(fig. 05)**.

Welbeck Abbey retains a beautiful history, having had various owners throughout time. Initially retained by Sweyn Saxon before the Norman invasion, it became after the conquest Chuckney's manor house, who founded the abbey, dedicating it to St. James during the reign of Henry II. Four hundred years later, the abbey was partially destroyed along with other similar institutions throughout the country. After several decades in which we have been able to identify several owners, it finally falls into the hands of the Cavendish family, who ends up turning it into a noble mansion. As proof of the importance the property acquires from this moment on are two visits between 1619 and 1663, captured in the family archives. On one occasion King James visited Sir William Cavendish, later King Charles I himself was invited for a few days of entertainment at Welbeck Abbey, some notes speak of *such an excess at the banquet, it had never been seen before in England*.

Especially interesting are the paragraphs dedicated to the description of hydraulic elevators. A technically complex mechanism used for the vertical movement and manipulation of large furniture and heavy objects, as well as to link the kitchens to the dining room and bedrooms. This network of vertical ducts continued under the main building, extending all over the territory through the underground tunnels where rails were arranged for the displacement of this curious domestic machinery. Inside the abbey, this contraption's functioning and size is comparable to that of a narrow-gauge streetcar, ending at the vertical communication systems, to where the small carriages were driven to carry away food. Iron cabinets were arranged in each anteroom to keep the food warm until it was required for consumption in the adjoining rooms.

We are undoubtedly standing before one of the 5th Duke of Portland's most ingenious inventions, it allows not only to supply the abbey with warm dishes, but also favours the entry and exit of other objects (furniture, works of art, fuel, etc.) and service personnel, without interfering with the normal functioning of the building. Without a doubt his mind is exceptional; It's the mind of a genius, of a wizard who pursues and insists on the discovery and surprise of staging. It is the mind of an architect, of an engineer who ingeniously projects pieces for this complex stage machinery.

This underground passage, which connects the abbey to the old Riding School, is entered by using a trapdoor, an architectural shortcut that is opened by a huge crank. Only those who have had access to this room have an idea of its proportions, its richness and the amazing sensation that one has when accessing it. During the time of the duke it was used as a riding school but currently its use is more noble, serving as a museum and art room, in which they hang long threads of selected paintings. This room must have hundreds of pictures, treasured portraits and landscapes by famous artists. The floor is polished oak, very dark and shimmering, and the ceiling, white and thick, carved to represent a glorious intense sky.

This is undoubtedly the greatness of this space, compared to what could be expected, its value is in its trick, in what can't be seen. This spatial mechanism emitted a gravitational force so great that it left all the attendants absolutely amazed. In a handwritten letter found in the archives narrates: "A servant precedes us, showing us the way to the Ballroom. We follow him through a dimly lit corridor that looks more like a theatres elevator than a stately house. We have entered from the park through a kind of covered lodge, in which several carts await the entrance ritual. The sounds of the dance are filtered, like a joyful noise in the street; the echo of a wave of applause resounds from within the earth, and as if fleeing from them the duke appears, hurrying up that ramp; we descended from our carriage and without knowing very well how it happened, he disappeared before our eyes". Without a doubt the duke turned this theatricality into his signature and way of life. His home is an extension of his behaviour, it's a stage, as big and complex as that of an opera, in which a certain subjectivity unfolds, an incredible space, unfolded and parallel; A territory of real architectural experimentation.

This architecture, this extraordinary space in which the visible and the hidden seem to get confused, shares some of its strategies with those of a theatrical stage. A double bottom filled with tensions and articulations, a double world offered as a game to which one feels invited to. This territory ceases to just be a place in which to install privacy, to become a space for its own representation, with which to introduce itself to the world to foment its myth. Even to this day it impresses when visited and Robert activates before us some of the mechanisms with which we can recreate in our imagination its function. Levers, pulleys and platforms that we've seen located all throughout the duke's buildings; Ingenious encounters between the underground tunnels and the built spaces on the surface **(fig. 06)**.

CONCLUSIONS, INVERTED TOPOGRAPHY

The main author of this s tory, the reader and the secondary characters intertwine in order to show the boundaries between fiction and reality. The obsessive work of a person suffering from a skin disease, trying to live without being seen, moving in the interstices of his estate, in a double world invented for his own life. The story's pulse coexists with the vertigo raised by the 5th Duke, about the possibility of transforming the laws of physics that govern our idea of movement, time and space. At Welbeck Estate these laws seem to be suspended and reveal the ineffectiveness of what sustains them. The main character's movement is multiplied in a whole series of heterodox actions that modify the notions of space and time. Everything that happens in this narrative creates a kind of domestic scenery that conspires against the world as we know it **(fig. 07)**.

The renovations by the fifth Duke of Portland at Welbeck Estate can be considered, technically and conceptually, pioneers in the evolution of nineteenth century country houses. Welbeck is the best example of Chase and Levenson's theory of theatricalized domestic spaces[7], of this kind of spectacle of intimacy, of a domestic architecture conceived as a scenographic mechanism that allows the public exposure of its owner's life. The duke claims the thickness of earth, the underground as a private place, a burrow, a hole in which to keep his own privacy with zeal **(fig. 08)**. A new space associated with home, a hidden and buried super structure, which has become a model of architectural landscape. The corridors and cells network has reached, with the Duke's projects, the largest domestic dimensions known to date, turning the ground of his estate into a space of voluntary occupation, a labyrinth of connections and territorial relations that extends without limits under his estate **(fig. 09)**.

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09. GARCÍA, T., *Underground Welbeck*, Universidad de Sevilla, Sevilla, 2017. La maqueta fue elaborada por los alumnos de la asignatura Proyectos 9, dentro del proyecto docente de la asignatura para el curso 2016-2017.

Images

01. Welbeck Tunnel Run, 2015. The author prefers not to disclose his identity, 2015.

02. Welbeck Abbey, 1860.

03. The Portland Collection, Harley Gallery, Welbeck Estate.

04. Walks by Welbeck Estate. Burrows and tunnels.

05. Underground nature, Welbeck Estate.

06. Underground nature, abandoned infrastructures.

07. Welbeck Estate, The image shows the interior of this inverted nature. Open model, DM 10 mm, laser cut, closed dimensions 300x180 cm.

08. Architectural natures.

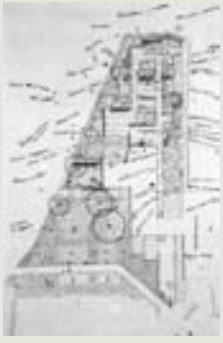
09. Welbeck Estate, The image shows the interior of this inverted nature. Open model, DM 10mm, laser cut, closed dimensions 300x180 cm.

11

The Garden of Arne Jacobsen's own House in 'Søholm I': an Open Space for Landscape Design Testing

Rodrigo Almonacid

The Danish architect Arne Jacobsen (1902-71) made the most of every project for his own family houses by designing avant-garde, highly experimental solutions. For his single-family house in the Søholm row-houses (Klampenborg, 1946-50) the experimentation with the architectural project not only entailed designing domestic architecture but also the private garden. Although Søholm housing is widely known in strict architectural terms as an example of the *New Empiricism* developed in Nordic countries in post-war period, its gardening has been scarcely studied. The aim of this current research is try to verify the hypothesis of understanding the garden of Jacobsen's own house as a "landscape design laboratory", a real testing ground for his late works during the 50s and 60s. His botanical trials due to his fondness for gardening, his dedication to stare at the natural forms taking photographs and painting watercolors, and his architectural tests with the spatial screening thanks to "vegetal walls" and movable screens will turn out to be the basis for his following works such as the Munkegårds school, the Tom's chocolate factory, the St. Catherine's College in Oxford or the headquarters for the H.E.W. company in Hamburg. Through the analysis of Søholm "work-in-progress" garden it is possible to discover the importance of gardening, photography, watercolor painting and textile designs in the work of Arne Jacobsen, since he brings together all his hobbies with his professional activity as an architect. All of these experiences, besides his outstanding sensitivity towards natural landscape, make this case study into a melting pot of ideas, evocations and landscape sensations which are essential to understand the core of his architectural work.



Throughout his life, Arne Jacobsen (1902-1971) has the opportunity of designing and building every one of the houses in which he lives with his family. This biographical circumstance makes that each architectural project for his own houses is made at a very high experimental level, showing truly avant-garde achieves within its Nordic contemporary context. The special architect's sensitivity towards nature is reflected in his architecture through several landscape key elements related to natural conditions of each specific location, and thanks to gardens that balance the whole composition and justify the connection between inner and outer spaces of each architectural design.

In all of his five family houses, the garden and the landscape turn out to be essential aspects due to different reasons: in his modern, functionalist house in Ordrup-Charlottenlund (1928-29), the garden is a little more than a lawn with a pair of trees because the real garden is placed in the house, creating a dense, vegetal atmosphere in the living-room; in the vernacular house in Gudmindrup Lyng (1936-38) near the Sejrø bay, the garden becomes a just quiet haven outdoors sheltered by a sand dune and a nearby pine wood, since growing plants is not feasible only in summer holidays; in the modest row-houses at Sløjfen street in Gentofte (1943), the garden becomes a domestic patch for growing some vegetables and fruits just after the Second World War; at the innovating housing "Søholm I" in Klampenborg (1946-50) on the shores of the Øresund sea, the garden of his office-house turns into a living courtyard for continuous enjoyment in which he can develop his abilities as a gardener, photographer and painter of vegetal species, and as an architect by using it like testing grounds for spatial configurations in the outdoors; and at the farm-house close to the Tissø lake (1966-67) with a view of the Big Belt, the garden is developed as an enclosed courtyard like an *hortus conclusus*, as an open area surrounding the building like a *zen* garden, and also as a small garden for growing flowers and vegetables for his own entertainment as an old gardener[1], where he also enjoys painting beautiful landscapes.

These facts not only have to do with the own architect's houses. He also takes advantage of these experiments and discoveries for his architectural designs in other houses and public buildings, as we will see later. Therefore, it is not strange at all that professor Tobias Faber[2], author of the first monograph dedicated to the architect, pointed out in his introduction that:

> "His architecture respects the character of the landscape as something of primary importance. Invariably, this landscape and the vegetation have been planned by himself as an integral part of the architectural task".

The garden in Søholm row-houses is especially interesting because of his particular consideration of the local landscape conditions in his architectural design, and, above all, the experimental understanding of his domestic garden as an unfinished vegetal scenery.

First of all, it should be known that this garden is conceived as a natural extension of his single-family, attached house in which the architect joins together his family life and his professional activity by placing his architectural office at the basement floor. Jacobsen
takes advantage of good weather to spend his time out of his office planning and growing plants and flowers in his contiguous garden, painting them in watercolor as he used to do since his childhood[3] -following the Danish tradition of the Skagen naturalistic painters[4]-, and taking photographs meticulously of the natural forms that caught his attention in different ways throughout the seasons[5]. Thus, this open-air room is where he cultivates his botanical and pictorial interests **(fig. 02)**, and from where his imagination will be naturally slipped into his post-war projects, the most internationally recognised period by modern historiography in the XXth century.

With reference to the state of the art, this Søholm garden has not been studied in great depth by the main authors in the work of Jacobsen[6]. What is more, it has been scarcely considered by modern garden researchers, not even by Danish ones, although Jacobsen is always mentioned in almost every monograph about modern garden or landscape designed in the XXth century[7]. This might be caused by the fact that this garden's lack of a memorable fixed image, or maybe because it faded into the background since the house reached an international, remarkable impact in strict

architectural terms as it may be seen in contemporary professional journals. Nevertheless, the importance of this garden does not lie in his "final" design but in his empiric interest for the upcoming gardening designs developed during his mature period, much more renowned because of the famous public buildings they belonged to, such as Munkegårds School, St. Catherine's College or the Danish National Bank, among others.

Consequently, the current research is mainly focused on Søholm garden as a case study in an analytical and introspective way, studying the link between the architectural design of the house to the landscape and the consequences in the idea of this domestic garden. And, in a complementary approach, it will be studied in order to probe that his permanent "work-in-progress" condition **(fig. 03)** -since there was not a "final" design or a "steady" configuration- is basic of the following gardens due to the experiments developed in this one.

LANDSCAPE AND ARCHITECTURE IN 'SØHOLM I'

The site for Søholm row-houses is located in Klampenborg, a little town where Jacobsen made many projects for its social facilities and dwellings around Bellevue beach in the 30s. In fact, the specific plot borders on other housing one to the North adjacent to the one for Bellavista apartments and for the Bellevue Theatre and Restaurant. The main coastal road, known as the *Strandvejen*, goes all along its eastern edge, in identical position separating the beach and the housing plots as he had to deal with long ago. The place is very favoured for its landscape conditions, since anyone can contemplate the sea of the Øresund Strait looking to the East, provided that the eyes' height are arisen above the road level. The worst disadvantages are due to the wind, very common in the island of *Sjæland*, and particularly in this exposed coastal location.

It cannot be ignored the constant noise caused by the traffic of cars and trams all along the *Strandvejen*, after the consolidation of Klampenborg as a place for summer holidays near the northern outskirts of Copenhagen.

On looking over the evolution of every general plan for Søholm housing[8] from the very first sketches made in 1940 to the last stage in 1953-54 **(fig. 04)**, several basic premises can be observed in an increasing strengthening: the determined wish for the vista of the sea horizon from every house; the individual identification of every house amongst the residential group, both in terms of volume and in the empty spaces left between them used as private gardens[9]; the arrangement of each housing group in the entire site according to the most appropriated solar orientation; and the contribution of building, vegetation and topography as protection against the traffic noise and the dominant wind, not only in the inner spaces but also in the open-air gardens of every single plot[10].

After some preliminary studies, the final decision was to develop the whole housing in three consecutive stages. The first of them -"Søholm I" (1946-50)-, occupies the most favoured side of the site in terms of sun exposure and southern views, although it is relatively small compared to the entire available plot. Jacobsen would purchase the house located in the closest corner to the sea amongst the five houses initially built.

His plot has the most interesting conditions according to the architect's personal wishes, since any other house would be blocking his view of the Øresund at all[11] and also because it has an alternative access to the plot directly from the coastal road. Thanks to its position at the end of these row-houses, his plot is a little larger than the rest, which allows him more freedom for the design of his own house as long as he has only one neighbour to the North side. In fact, his house is the largest one of them all, since he adds an "extra" volume in the East side for installing his professional office in his own house[12], thus taking advantage of the independent entry from the *Strandvejen*. However, his adjacent proximity to the road and the higher exposure to prevailing winds are clear disadvantages that he would have to deal with, both in his house and his garden, in order to achieve a comfortable place in this specific plot.

The connection between house and garden reaches an unprecedented balance in terms of functionality and design. The house has the daytime rooms open out to both floors **(fig. 05)**: on the street level, the dining room becomes a transitional space between the kitchen and the bedrooms, and is extended outdoors in a very cozy corner of the garden; on the upper level and opened to the dining room[13], the living room becomes the only raised room in the house, a privileged "watchtower" from where to enjoy the view of the distant sea and also to look down to the garden from its balcony.

THE ARCHITECT'S EXPERIMENTAL GARDEN IN 'SOHOLM I'

Even more genuine than the architectural idea of his house is the one of his garden, a really experimental laboratory in the architect's hands. Allover its 300 square meter of ground surface turn into a kind of "garden centre" thanks to the "architect-gardener" Arne Jacobsen, who planted more than a hundred types of vegetal species.

The seaside front of "Søholm I" housing is solved with a powerful, low masonry wall, with a dense vegetal cornice on its top **(fig. 06)**. Thus it covers up the road and the sea seems to be closer to the site for anyone who may be looking at it from Søholm's raised ground. In this seaside façade, the continuity of the stonework wall is interrupted to insert a pedestrian access to the five houses firstly built, although the architect's one has another one directly opening to the *Strandvejen*, taking advantage of its position and its increased height in the part of the wall that borders his plot.

From the Strandvejen pavement a pedestrian path goes up to the plot like a "vegetal trench"[14]. Its height is below eyes' level to avoid the broken appearance of the masonry wall with its isolated accesses to the houses from the housing's inner roadway. The "vegetal atmosphere" is completed with the flowering climbers that, almost from the beginning and just as it happened in precedent works, spread thickly throughout the visible façades of the houses from the public space.

In the northern part of the architect's private garden -the one facing the rear side of the house, visible from the street- three different trees are planted for several purposes: an *ulmus* (elm), a very big and stout one, placed by the "trench" to indicate the access to the whole housing of "Søholm I" thanks to its big scale; a *robinia pseudoacacia* (honey locust), with a medium bearing and lower stoutness, flanking the door of the house opened directly to the Strandvejen but not interfering either with the vista of the sea or with the visual control of the gate from the interior of the house; and, marking that entrance by the gate, a modest *laburnum*, commonly named as "golden rain" because of its flashy yellow foliage shown during the spring, in a chromatic harmony with the yellowish hue of the usual brickworks in Jacobsen's houses. Therefore, the architect not only shows his fondness for gardening but also for painting, since he seems to be working with his yellow and green watercolours for the public area of his private garden.

The southern side of his garden -the most intimate and sheltered one- had all the possibilities that Jacobsen probably longed for. In an overall view it is essential to understand it both as a scenery and as a laboratory, that is to say, like a space continuously changing in arrangement in order to experiment not only with the outdoor room in an architectural way but also with the vegetal species in a botanical way.

From an architectonic point of view, there is not a unitary, spatial idea linked to the garden. Jacobsen fragments the courtyard in a series of scenes, corners and nooks in which he may display some gardening effects of great beauty. This range of situations is not conceived in a continuous way so as not to downplay the value of every one

of them individually. The architect's intention -here transfigured into a gardener- is to be able to enjoy every new vegetal specie planted in his garden. The detailed description made by P. E. Skriver[15] about this garden is a clear proof of Jacobsen's will:

> "The clipped larch hedges, the large bamboo plantings and the surfaces of the ground cover create a carefully chosen background for the more unusually shaped individual plants. (...) The house's wall form the background for a dozen different climbing plants".

As a result, whoever goes out to the garden from the dining room is not able to have a whole view of the courtyard in a single glimpse. At most, certain corridors may be seen making its way through the lush vegetation that let the rest of the plantings and flowers hidden behind **(fig. 07)**. The only way to have an entire view of the garden is from the raised balcony next to the upper living room. Skriver[16] explains the spatial conception in these terms:

> "Arne Jacobsen has covered such a large part of the area in his garden with gray limestone tiles that we conceive of it visually as a terrace. This is namely what it looks like from the living room on the second story, which has a full view of the garden. From ground level, however, the garden is conceived of more in pieces, as a progression of events, in which the plants' proximity makes it possible to characterize with greater contrast what only seemed nuances from above. The screen plants lead the visitor in broken lines past low beds, small garden areas, niche-like recesses in the plantings, through almost overgrown pathways in dense bamboo boscages, back to the house along a lush vegetation of ground cover".

From a spatial point of view, we can find some values really unknown for landscape tradition. They would give rise to new strategies of design for larger gardens or even for buildings, as Malene Hauxner notes[17], when it comes to spatial definition in gardens after the Second World War.

The key element for the spatial configuration of Søholm's garden is the "vegetal wall": a larch hedge, limited in height but very thin (about 20 cms. wide). They are arranged as sliding screens oriented parallel to the house's South façade -the only side of the garden closed by an architectonic element-, dividing the courtyard into scenes that appear consecutively while the visitor keeps on moving forward following any of the garden's paved paths.

Essentially, the "vegetal walls" form a topiary quite simple. In addition to showing the garden as a sequence of fragments, they provide support to different small groups of flowers or exotic species planted in horizontal beds at floor level. They work very well as neutral backdrops for the attractive flowers and plants pictured by Jacobsen.

Regarding the vegetal range used in this garden, it is wonderfully reflected in its graphic representation. The garden's plan**(fig. 08)** is a real *collage* made out of textures fitted in amongst regular, paved areas -the living areas beside the dining room or the main bedroom, apart from the walkways-, in such a way that the remaining areas are reserved for vegetal plantings that occupy every small piece of land with different forms and sizes almost overfilling the garden.

In his drawing, Jacobsen uses all kinds of calligraphic features to represent lots of nuances, as a way of expressing the variety of natural impressions anyone might find right there. He uses a basic plan for the arrangement of every planting, where the house outline, the fences in the plot's edges, the entrances and connections with the house, and even the pieces along the flagstone pavement are drawn. The remaining space is free, available, and works as a flexible support for marking each vegetal specie that will occupy every garden's corner. In one of the draft plans there may be seen how this procedure is liable to be changeable: the basic plan comes out filled with plenty of notes (some of them corrected), with the scientific name of every vegetal specie and the specific location in the courtyard.

Up to ninety vegetal species are part of the final list written in the botanical key of the most famous garden's plan, although some authors state that there were up to three hundred species planted[18]. Either way, the plan turn up to be a "still image" of an ever-changing garden. This is not only because of the seasons but the normal garden's evolution since some of the species were replaced by new ones in order to keep on testing new natural effects with them.

The special sensitivity of Jacobsen towards natural world is reflected in the particular selection of plants for his garden. On answering to the questions in an interview for the Danish broadcast[19], he declared his weakness for grayish and greenish colours, the huge range of green shades given by the plantings, and his personal experiences walking in the Nordic woods. Despite certain flowers may captivate the architect -such as the roses or the "Imperial Crowns" he always loved-, his colour scheme basically ranges from pale blue or green tones to grey ones found in the plants he grew. The diversity of nuances and the texture's contrasts will give plastic intensity to his compositions, always in a restrained way and very far from any garish appearance. This calm, cautious chromatic selection is what distinguishes the façades designed for the most renowned Danish buildings: the Stelling Hus, Aarhus and Søllerød town halls, the SAS building or the Danish National Bank.

Apart from his vegetal or floral paintings, Jacobsen discovers the subtlety of these vegetal textures by taking photographs to herbs and moss that grow next to or between the pavement's marble slabs **(fig. 09)**. The irregular forms become very attractive for his senses and he does not hesitate to use these chance findings for the layout of the paved courtyards at Munkegårds elementary school shortly after[20].

The chromatic interplay between greenish and grayish hues found in the texture of the Norwegian marble slabs from Porsgrunn -first used in Aarhus Town Hall a decade before- is again used for other interesting, complementary gardening elements: a rectangular stone table fixed to the ground, a concave slab used as a natural birdbath, and a pair of cylindrical drums partially buried like if they were archaeological pieces that happened to be at the site[21], a previous test for the ones scattered in one of the Danish National Bank courtyards. In any case, every one of these pieces were to be found by chance on a slow walk through the garden, and could even go unnoticed.

CONCLUSION: A "WORK-IN-PROGRESS" GARDEN

The Søholm's garden is used as testing grounds at several scales for almost a decade. Immediately after, Jacobsen will not hesitate in putting into practice in some of the works designed in the fifties: at first, partially, as botanical experiments in the gardening for the Munkegårds school courtyards (1951-56); afterwards, as an entire project for the important garden at the Møller house (1950-51); and finally, by the end of the decade, at the Tom's Chocolates factory in Ballerup (1959-61), where he takes the vegetal screen system to a larger scale, now extended to the huge and free grounds of this garden and setting a "sliding order" with the help of tree rows, some service installations, access roads, ground banks and copses. The arrangement of them, both on the front and the rear side of the industrial buildings, enlarge the scale at open spaces, where high bearing vegetal walls play a leading role **(fig. 10)** by organizing the garden into wide lawns ad trees that run off the ground towards the white buildings.

On working with the tiled walls for this Tom's factory Jacobsen realized that the heavy prefabricated panels could also be useful in his domestic garden: he makes them into two windbreak movable screens just by putting the panels on a metallic frame supplied with wheels so as to be moved freely according to the wind's direction. It is not a coincidence that the "final" gardening plan was not to be drawn until then, reflecting both the definitive paved areas

and the pair of windbreaks. Nevertheless, although the tiled windbreaks are higher than the vegetal walls, the movable screens are drawn like black, strong lines but with no thickness at all and without the shadows on the stone pavement -unlike the vegetal wall's drawing-, thus indicating their "unstable" presence in the garden space[22]. Whatever happens, this "late" incorporation of the windbreaks prove the hypothesis of understanding the garden as an "experimental laboratory" and directly related to the ongoing projects in the architect's office. This let us come to the conclusion that it is truly a "garden under construction" -a real work-in-progress-, a feature that reflects its modernity as long as it is an unfinished and opened work **(fig. 09)**. That is how it may be seen in the photographs of the different "stages", always changing in density, vegetation, spatial fluidity and components.

But the gardening experiments will not end at this point. In the sixties, once Søholm's garden became established and proved useful at other scales, Jacobsen uses again the vegetal screen system for the garden at the H.E.W. electric company in Hamburg (1962-69). The screens are part of a general sliding stripes layout in which the buildings were included. In fact, he was already using this pattern in his textile designs[23], some of which even refer to a zenithal view of an abstract garden ('Sky View', c.1958) **(fig. 11)**.

The last noteworthy landscaping experiment is the plan for the St. Catherine's College in Oxford (1959-64), where the spatial screening of Søholm's garden is carried out with brickwork walls instead of vegetal hedges, accordingly to the modular layout used for the whole building complex. Perhaps in this case the geometrical pattern's stiffness prevent it from being a freer spatial configuration compared to previous works. However, the large number of brick walls accurately positioned help the overall open space arrangement in the same way as the concrete bearing structure do in the brickwork façades of the buildings, thanks to the pavement's grid in which the college's architecture and garden are settled. Like in Søholm, the walls divide the space while the visitor moves forward to the end of the garden **(fig. 12)**, working as supports for glass shelters that cover several walkways between the buildings or as fences along the plot boundaries to enclose some parterres next to the English green countryside.

The current analysis of Søholm's garden has shown the relevance of gardening, photography, watercolour painting[24], and even textile designs in the work of Arne Jacobsen, since he was able to combine naturally his hobbies with his professional activity as an architect[25]. The amount of experiences he had in those fields, in addition to his particular sensitivity towards natural landscape, make this work a mixture of ideas, evocations and landscaping sensations that become a particular architectural background during his lifetime -especially after the Second World War-, without which the essence of his entire architectural work and life could not be completely understood[26].

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Notes

01. On answering to a question about his retirement, Arne Jacobsen replied, "I will not, if I am in a good health; I look forward to seeing the National Bank in six or seven years. Otherwise, I am going to focus in my garden, perhaps I may finish my days as an old gardener". Interview given to *Politiken* newspaper, on February 28th 1971. Published in Spanish language with the title "The new ideas are always criticised" in: SOLAGUREN-BEASCOA, Félix, *Jacobsen*, Barcelona, Santa & Cole Ediciones de Diseño y E.T.S.A, Barcelona, colección "Clásicos del diseño", 1991, pp. 203-205.

02. FABER, Tobias, *Arne Jacobsen*, Nueva York, Frederick A. Praeger Inc. Publisher, 1964. See the "Introduction", page VI (translated from German to English by E. Rockwell, and translated again into Spanish by the author).

03. BALSLEV JØRGENSEN, Lisbet, "Arne Jacobsen 1902-1971", *Revista Internacional de Arquitectura 2G*, n. 4 1997/IV, ("Arne Jacobsen. Public buildings"), Barcelona, Gustavo Gili, 1997, pp. 4-15.

04. The "Skagen School" is a group of naturalistic Danish painters from the second half of the XIXth century that joined together every summertime in Skagen. They had the nineteenth-century tradition of painting natural landscapes in open air just in that particular location in the northern end of Jutland's peninsula. SVANHOLM, Lise, *Northern Light - The Skagen Painters*, Copenhague, Gyldendal, 2004.

05. About this special fondness for Photography by Arne Jacobsen, ARIZA CASTRO, Felipe, *Fotografía y arquitectura moderna: forma e imagen en la obra de Arne Jacobsen*, Doctoral thesis, Departament de Projectes Arquitectònics, E.T.S.A. Barcelona - UPC, 2011.

06. P. E. Skriver was the first author who wrote a short but really interesting review about this garden: SKRIVER, Poul Erik, "En rækehushave", *Arkitektur* n. 5 (1962), p. 210-211. C.Thau y K.Vindum focused basically on the house, with a slight text about this garden in his huge monograph: THAU, Carsten, VINDUM, Kjeld,

Arne Jacobsen. Copenhague, Arkitektens Forlag, 1998 (English edition, *Arne Jacobsen*. Copenhague, Danish Architectural Press, 2001, p. 346). F. Solaguren only writes about the architect's house very briefly, but ignoring the garden: SOLAGUREN-BEASCOA, Félix, *Arne Jacobsen: Aproximación a la obra completa 1926-1949*, Barcelona, Fundación Caja de arquitectos, Colección "Arquíthemas" n. 8, 2001, p. 176. M. Sheridan includes it amongst the "built landscapes" with more attention but from a landscape architecture point of view, without analysing the garden itself: SHERIDAN, Michael, Room 606. *The SAS House and the Work of Arne Jacobsen*, Londres, Phaidon Press Limited, 2003, p. 49. R. Almonacid explains the whole work of the Danish architect based on landscaping keys, considering Søholm's garden as an important step towards landscape abstraction in his career: ALMONACID, Rodrigo, *Arne Jacobsen: el paisaje codificado*. Doctoral thesis, Departamento de Teoría de la Arquitectura y Proyectos Arquitectónicos, E.T.S. Arquitectura de la Universidad de Valladolid, Valladolid, 2012.

07. The St.Catherine's College garden is fully explained by J. Brown in the fifth chaper of her book, but nothing is said about Søholm's one: BROWN, Jane, *El jardín moderno*, Barcelona, Gustavo Gili, 2000. Professor D. Álvarez makes reference to "biomorphic" gardens such as the one for Pedersen House (1937) or for public buildings, but without recognising its domestic origins in Søholm: ÁLVAREZ, Darío, *El jardín en la arquitectura del siglo XX. Naturaleza artificial en la cultura moderna*, Barcelona, Reverté, colección "Estudios Universitarios de Arquitectura" n. 14, 2007. Danish landscape architect M. Hauxner does refer to Søholm's garden but in a more general context related to Landscape and Garden disciplines in the post-war period: HAUXNER, Malene, *Open to the Sky. The second phase of the modern breakthrough 1950-1970*, Copenhague, Arkitektens Forlag/The Danish Architectural Press, 2003. Frampton does not even mention it either in his famous *Modern Architecture: A Critical History* or in his article on modern landscape: FRAMPTON, Kenneth, "En busca del Paisaje Moderno", *Arquitectura COAM,* n. 285, 1990, pp. 52-73. And Benevolo, although payed large attention to many of his works, just mentions Søholm as part of his housing designs in the XXIth chapter of his book: BENEVOLO, Leonardo, *Historia de la Arquitectura moderna*, Barcelona, Gustavo Gili, 8ª edición revisada y ampliada, 2007 (1960),

08. About the evolution of the design for the whole housing complex at Søholm: BARDÍ i MILÁ, Berta, *Las casas de Arne Jacobsen: el patio y el pabellón*. Doctoral thesis, Departament de Projectes Arquitectònics, E.T.S.A. Barcelona - UPC, 2013, p. 114-119.

09. In his row houses Jacobsen always linked carefully every house with its own garden, as it may be seen in the ones built before Søholm: row houses (student project, 1923); 18 attached houses in Ellebaekvej (Gentofte, 1943); 8 row houses in Sløjfen (Gentofte, 1943); row houses in Ridebanevang (Gentofte, 1943); and the Caroline Amalievej housing (Lyngby, 1945, unbuilt).

10. This topographical condition was managed successfully in the terracing of the Bellevue Restaurant front garden (1935-37), where he decided to set back the whole building and raised ground level. Since the building ground floor was placed above *Strandvejen* the diners could enjoy the Øresund views freely and without any road noise.

11. The respect for the sea views was so important that in Søholm it was forbidden to plant any tree that may disturb any neighbour. That is the reason why all the trees are placed along the edges or in some common corners of the plot, where no visual troubles are caused.

12. Jacobsen managed to fit in the extension of every house in "Søholm I" to a maximum of 110 sqm. following the housing instructions for public subsidized houses at that time. The "extra" volume added to his house was admitted since it was declared as his architectural office (although it was not exactly true), saying that his professional office will occupy the whole basement floor and this attached volume placed in the East façade. The first floor would become a library connected to the living room; and the ground floor would work as a meeting room with clients, with direct access from the *Strandvejen*; and the basement floor would be used as a workspace for models and architectural files. THAU, C., y VINDUM, K., op. cit., p. 342.

13. This solution is previously tested by Jacobsen in his own summer house in Gudmindrup Lyng (1936-38). The living room is raised at a higher level than the dining room and bedrooms general floor, and "climbes up" a natural existing dune so as the large window of the living room looks directly to the Sejrø bay.

14. This idea of a "vegetal trench" has already been tested by in his own Graduation Project, and afterwards he also used it in Gentofte stadium (1936-42) and in the gardening for the Aarhus Town Hall (1937-42), where several vegetal slopes connect the street level with the higher level of the rear garden.

15. SKRIVER, P. E., op. cit. (see note 6). Mentioned by: THAU, C. y VINDUM, K., op. cit., p. 346. (Translated into English by the author).

16. Idem. Note seen at: THAU, C.y VINDUM, K., op. cit., p. 126. (Translated into English by the author).

17. See the chapter entitled "Green Spanish walls" in HAUXNER, M., op. cit, p. 162 et seq.

18. THAU, C. y VINDUM, K., op. cit., p. 123. In his prelude to his monography on Jacobsen, Faber even states that "there [he] grow nearly a thousand different species of plants". This must be interpreted just as a literary hyperbole and not as a scientific description. FABER, T., op. cit., p. XVI.

19. Interview given to Ole Dreyer in 1969 for the TV programme "Arne Jacobsen i Oxford" of the *Danish Broacasting Corporation*, THAU, C., y VINDUM, K., *Arne Jacobsen*. op. cit., p. 135.

20. In this elementary school Jacobsen would not use Norwegian marble for the pavements of the classroom's courtyards so as to make cheaper solutions but without forgetting about the plastic effects that he could have just realized at his own house's garden.

21. This "archaeological issue" would be recovered as the main idea for the gardening of one of the Danish National Bank patios in the following decade.

22. This special feature of the drawing of the movable screens maybe somehow related to the fact that they are arranged at right angle to the hedges and, therefore, changing the general parallelism of the garden. By drawing the screen shades, they would have gained much more importance than they actually have in the real courtyard.

23. Although Jacobsen had already shown personal interest in textile design before II World War, the truth is that it is during his exile in Sweden (1943-45) when he started doing graphic experiments due to his lack of work, and tried to look for income thanks to his designs for the 'Nordiske Kompagniet' in Stockholm. His

second wife, Jonna, would turn out to be really important for the professional development of his textile designs, since she has studied in the graphic design office founded in 1935 by Marie Gudme Leth, a pioneer in wallpapers and textiles in Denmark. The evolution from a mere natural forms designer to a real illustrator will coincide with his most abstract period at the end of the fifties, and will be at his peak with his designs for the SAS Building and for the C. Olesen Company (Cotil).

24. Jacobsen would become a real expert in watercolours when he was a young student (a skill that made him been hired by some of his professors very soon). As a matter of fact, in 2002 a retrospective was displayed at the Louisiana Museum in Denmark as a recognition of his great talent in watercolours, and is reflected in that exhibition catalogue: TØJNER, Poul Eric (ed.): *Atlas. Arne Jacobsens akvareller*, Dinamarca, Aschehoug Dansk Forlag A/S, 2002.

25. In this sense, we totally agree with F. Solaguren's statement: "This visual appreciation of his environment and life was one of the best Jacobsen's qualities. His fondness for photography, gardening, besides his drawing skill, made him focus deeply on the details, which may be therefore seen with the same energy in all his architectural production". SOLAGUREN-BEASCOA, Félix, *Arne Jacobsen: Dibujos 1958-1965*, Barcelona, Fundación Caja de arquitectos, Colección "Arquíthemas" n. 10, 2002, p. 19.

26. This is the main conclusion drawn in the recent book written by R. Almonacid, where all the Danish architect's career is reviewed from landscape fundamentals: ALMONACID, Rodrigo, *El paisaje codificado en la arquitectura de Arne Jacobsen*, Ciudad Autónoma de Buenos Aires (Argentina), Diseño, 2016. Prólogo de Darío Álvarez. ISBN: 978-987-4000-74-3.

Figures

01. Draft plan for Søholm garden showing architect's notes about the plantings planned for every corner of the courtyard (undated plan, c. 1961).

02. Portrait of Arne Jacobsen in Søholm garden (c.1951) painting watercolors in open-air (left) and taking photographs from the balcony at the raised living-room of his house (right).

03. 'Søholm I' garden as a *work-in-progress*: photographs taken by Jacobsen from the raised balcony next to the living-room in two different moments during its evolution in the 50s.

04. Final plan with the three stages for the Søholm housing designed in 1953. The architect's own house (bottom left) is part of the 5 row-houses developed in the first phase known as "Søholm I" (1946-50).

05. View of the garden's living area coverd by an awning next to the dining room (left). Interior view of the living room placed on the upper floor with the vista of the Øresund Sea in the distance (right).

06. 'Søholm I' row-houses seen from the Strandvejen (author's photo, 2005). The door in the masonry wall leads to the architect's house from the pavement, just after the pedestrian entry to the housing.

07. Views of the garden with the "vegetal walls" screening system creating different nooks and spatial sequences depending on the vegetation and flowers arranged in every one of them.

08. Draft plan for Søholm garden showing architect's notes about the plantings planned for every corner of the courtyard (undated plan, c. 1961).

09. Jacobsen's own photographs of the moss growing between the marble slabs in Søholm's garden (left), and partial view of one of the courtyards in Munkegårds elementary school (right).

10. Tom's Chocolates Factory garden (1959-61).

11. H.E.W. electric company's garden in Hamburg (c.1969) and abstract design for a textile recalling a garden, entitled "Sky View" (c.1958).

12. Brickwork walls at the garden of the St. Catherine's College in Oxford (1959-64).

12

The Garden-terraces of the Figini House in Milan. The Reconstruction of the Lost Paradise

Anna Martínez
Fabiola Meignen

In the book *L'elemento verde e l'abitazione*, Luigi Figini compiles his life's experience in the garden-terraces of his Milan home. The house was constructed in 1935 and the book was published in 1950. Fifteen years in which the architect, among the different solutions to introduce green near the dwelling of man, collects and systematizes the terrace-garden. As a conquest of the modern architecture, it will provide to the urban living, the forgotten benefit of contact with the mother-earth: the green, the sky and the water. In these years, terraces became pleasant gardens, and for the architect and his wife were the background of their poetic activity. In his house, Figini reconstructs the lost Paradise. It is the childhood of man, and the infancy of times, rediscovered.

THE GREEN ELEMENT AND THE HOUSE

In 1950, after 15 years living in the Journalist District house in Milan, Luigi figini published *L'elemento verde e l'abitazione*. In the book, edited by Domus, the author, in a poetic rendering, reviews the history and the relationship between architecture and the elements of nature: greenery, water, the sun and the sky, to finally systematize architectonic solutions for the implementation of green elements in urban housing.

In the Garden of Eden man walked the Earth, his roof consisted of the crowns of trees and the starry sky. There were no seasons, it was always eternal spring "the relationship between man and the natural world had reached perfection: the exterior world was associated with man's house and the man's house with the exterior world"[1]. After the original sin, there came the need to take shelter from climate conditions, from wild animals and from his own fellow men. Man constructed his shelter with non-living elements: branches, tree trunks, stones, soil. He had lost his idyllic grip over the elements.

This is how the first house and the first city were born. They were sad, as the rest of man's creations were, representing the penance of "after the sin"[2]. Since then, nostalgia for the happiness, lost in the infancy of man and the world, has accompanied the existence of man. Man has tried to reproduce on Earth, near his habitat where his deserted life evolves, an image of that garden that saw the sun rise for the first time. This include the Pompeyian house, the medieval Orto Conclusus, the Arab Riad, the patio of the popular Mediterranean house.

But in the city, where men are stacked on top of each other "cubicle by cubicle vertically; where a little land is enough not only for one, but for many families, when man builds multiple storey houses and brings these houses closer together to form a city, the historic patio dies"[3]. In order not to die, the patio can only be transformed into a garden terrace, a conquest of the new architecture for urban housing, which will return to all men, "a concrete benefit: greenery; and the illusion of another benefit: isolation and solitude"[4] **(fig. 02)**.

Among the images that illustrate the chapter, terrace-gardens are represented by examples in all the geographies, in the work of Le Corbusier, Lurçat, Guevrekian, Neutra, Vietti, or Burle Marx, among others. Four of them correspond to his own house in Milan, ten to the Beistiegui penthouse in Paris: empty spaces, high walls, deep shadows, furniture, fireplaces, hedges extensions of lawns and flowering trees. The interior is installed outside; the exterior invades the interior space.

A HOUSE SUSPENDED IN THE AIR, BETWEEN THE SKY AND THE EARTH

References to important episodes of the history of architecture and art can be found in this house in Milan, a paradigmatic example of a new era. And even then, it is not a house on the ground floor, attached to the soil, but built in the air, raised on *pilotis*. It is the Roman patio, the medieval vegetable court, the Arab garden, suspended between earth and heaven. Luigi figini "a passionate man full of poetic impulses"[5] constructed this house in 1934, and lived there with his wife until 1984, the year in which he died. It is a work of youth, built shortly before his marriage, as a family home in Milan, the architect's hometown, where he studied and built most of his works[6], in a residential neighbourhood with city-garden ordinances **(fig. 03)**. At that time the building was surrounded by some dwellings, but above all by vegetable plots and fields. This house, a pure prism, white, clearly seeks air light and heat in a misty, rainy climate which is so typical of the Lombard capital, and it has outstanding views -given its high position, on clear days -to the Lecco Mountains on the north, at the foothills of the Alps. Because of this, the building sits on 12 pillars, regularly arranged in the centre of the site, 4.80m above the ground. In this way, the entire land surface is left free, and is used as a garden and a vegetable plot. The occupied area (18x5.5 = 99 m^2) is exactly 1/3 of the total plot, that became a green wild garden.

The orientation of the house is practically north-south, with access from Via Perrone San Martino to the northeast. Its program is arranged on two levels, with the regular structure of concrete pillars set back from the facade, and horizontal sliding windows along the facades. An external single staircase section, narrow and steep between the facade and the line of pillars, leads directly to the centre of the main floor. To one side is the single space of the living-dining room, which is open to the terrace; on the other side there are the service rooms. On the upper level, there is a single bedroom with a bathroom and a dressing room in the centre. The rest of the area is occupied by the terraces and the empty exterior space below the lower floor. The height of the two floors is higher than that of the white prism, so that the upper room is set back from three of the facades, except the one from the northwest, where it is set at a lower height **(fig. 04)**.

The house is precise and unequivocal in its approach. The prism, the structure and the openings are ruled by slight adjustments over squared and Golden Rules proportions. On the outside, it looks austere, almost naked; its interiors are beautiful, luxurious

and refined. There are marble floors, steel joinery, and in the living room, bright round pillars, a sideboard that rests on metal legs, from the Villa Studio, and cowhide armchairs also designed by figini himself. Very few objects were visible: some pots with plants and the sculpture of the "Decapitated warrior", a gift from Fausto Melotti to the figini couple[7] **(fig. 05)**.

THE TERRACE-GARDENS

In this house the terrace-gardens occupy almost as much surface as the interiors. They are located on both levels and in all directions, with different uses and characteristics. There are very few artificial elements -the work of man- facing natural elements: greenery, water, soil and sky. They are enclosed within walls, so that the individual can present himself, in solitude, in conversation with himself and with the Creator.

On the main level terrace, to the northeast, the living room opens to the garden through a large, dark metallic sliding window that is set back from the wall. The interior and exterior merge together spatially, climatically, visually and functionally. Life goes on indistinctively both inside and outside **(fig. 06)**.

An orange tree grows frailly from a squared planting recipient, measuring 55x55x45cm, built into the paved flooring: "A tree in the forest, a thread of water in the torrent are not distinguished; a green tree standing alone in a never-ending clearing, a clear thread of water in the desert sands, can reach our emotions, and even bring us to tears".[8]. According to the architect, with abundant blooming and a quarantine of ripened fruits in the harsh climate of Milan.

The gym is located in the upper floor, where the terrace opens to a double space; it is close to the bathroom, with distant views to the Alps through the façade openings. Ropes, rings and bars hang up from an exterior beam, which was projected for a future extension of the house. On the ground there are sand, grass and a planter, the rest is pavement **(fig. 07)**. A step further in the southeast façade leads us to another terrace, at the opposite side of the prism, which is conceived as a garden courtyard. Here, the 2.6 m high facades are completely solid. This terrace provides access to the main bedroom through a porch, and thanks to its design, only in winter does the mid-day sunlight enter the room below the horizon.

Here we have a sandy area where one can sunbathe, in privacy and sheltered from the wind, a pond, and a substantial grassed area placed 20cm above floor level, where zinnias and anemones grow -and a cherry tree is planted which is "full of blossom in spring"[9], undoubtedly the focal point of many of the photographs of the house.

The rainwater is collected in an outdoor marble tank, "dead-water, which given its temperature and composition, more suitable for irrigation purposes than tap water"[10].

The vapours and smoke from the kitchen and the boiler are sent up through the pink circular chimney pipe, and conducted far away, above the living areas as "we have to eliminate the inconveniences of the smoke and vapours as much as possible; and give the extractor more of a cared for and aesthetic look, to get away from the typically disorder associated with chimneys"[11].

A RECORD OF THE EVERYDAY THINGS

In a meticulously ordered file, Luigi figini keeps his collection of hundreds of his photographs and drawings of the day-to-day of the dwellers of the home, not only of the architect and his wife, but also of the trees, the flowers and the birds in the garden terraces. Far from more important social events, it is the daily activities which mark this album and constitute the architectonical record of the house. Many of them will have been used in collages and other artistic assignments. figini's love of painting and photography -shared with his wife- becomes almost a secret, methodical and quite personal activity, which evolves over his lifetime, which was practically entirely spent in this beautiful house in Milan [12].

It is these photographs, which many refer to the life of the birds in the garden-terrace, that figini would use to compile a book. To do this, he installed a photographic observatory in the porch, next to his bedroom, where he could freeze the image of the birds as they flew into the terrace in search of insects, water from the pond, or fruits from the cherry tree. Blackbirds, sparrows and robins would peck at the berries, drink from the pond or sip on the remains of watermelon left on a plate. In this silent house, far from the noise of the city, the comings and goings of the birds in the grass, their pecking on the window, their welcome visit in search of crumbs on the patio paving, became the most attractive events in the life of its inhabitants.

The Italian architect also noted -in a small school notebook- different reflections on various aspects of the architecture of the house, which he distinguishes as "aesthetic notes" and "practical notes". Among the first set of notes, he contemplates the idea of converting one of the windows into an aquarium, like live nature show; or the ability of the numerous tiny reflectors to create "infinite direct and indirect variables of light"[13].

In other pages he drew detailed and sophisticated zinc containers, with inbuilt cleaning and transport mechanisms, to hang in the trees on the terrace. In the bathroom, small lamps reflect light upon the water in the bath making it like a "blue cave". If we turn to the back of the notebook we can find some technical and practical notes in which the architect refers to the growing house, which can adapt itself to the changing needs of the family, and the *thermos* house which aims to control the climate through passive systems, which fill "the house with the cool air from the North in the morning, before closing tightly provided that the temperature inside the house is lower than that outside it", flooding the roof when "it gets extremely hot", or placing small recipients outside on the terrace, in the south so that the sun can heat the water inside them, and to the north with a small waterfall with red fish, aquatic plants, moss and fern"[14]

Gegé Bottinelli is the main character of the living pictures, in which the feminine figure is situated together with the natural and handcrafted elements of the Mediterranean culture: clay pottery, starfish. Photography is used as an efficient instrument to register, modify and superimpose images and fleeting compositions, and all this takes place with the terraces of the house in the background. Through these expressions Giuliano Gresleri detects a methodical order, which surpasses the traditional methods of organising clutter based on the Greeks, in search of a formal balance through Dadaist or Purist montages[15].

CONSTRUCTING THE ANTI-CITY WTHIN A CITY

In his report of 1935, figini projects this house as a piece which could form part of an 10, 25 or even 50 floor apartment block, given that "no one should be deprived of a view of the sky and fresh air: a minimum m^2 per persona, an undefined height, heading to the zenith"[16]. It was all about covering "the minimum materialistic and spiritual needs so that man can feel comfortable in his home" [17]. Behind this project, which so well depicted the rational Italian architecture, was the desire of Luis figini to provide each one, in the "anti-barracks home"[18], the possibility of reencountering the individuality and the intimacy lost in the dark and noisy metropolis[19]. Constructing the anti-city within the city: "For centuries man has lived in touch with the earth, with rooms stuck to the ground, next to flowers, fruits, trees; with his feet touching soil every day. Perhaps he has once felt happy (or at least, as happy as he would be in our world). The city has separated him from Mother Earth: man has become sad and life has become shorter, and so the myth of Anteaus returns"[20].

In his proposal for dwelling, this beneficial and necessary contact with the Earth evolves into the desire to "eliminate, purify, isolate and reduce to human size, to another scale of proportions, the elements of a city"[21]. That is to say, to reverse the percentages of sunlight, of sky and of green -all-natural elements, those from the Creator- with respect to the building, dust, signs.... artificial elements made by man.

The garden-terrace is above ground level, opens to the sky, and is surrounded by walls, in the way to minimize the distractions and the "visible elements of a mechanical society"[22]. To filter, separate, with fabrics, blinds, sliding doors, the views in order to "set the sun, the green, the blue, alone, and introduce them individually into the dwelling of man" [23] The plastic part of the process consists of cutting, separating and superimposing in a different order, in the form of a collage, pieces of the sun, the green and the blue, and introducing them into the dwelling, between walls. On the horizontal plain: grass, sand and water; and on the vertical: the sky, clouds and the sun. Precise and geometric cuttings, which change with the orientation, with the passing of days and with the seasons **(fig. 08)**. Far from the central axis-based composition of the Pompeyian house, the author prefers the more formal freedom of the medieval vegetable plots, the common patios, which facilitate the distribution of these green areas, fountains and ponds, in a more "metaphysical" way, in an abstract way, with relation to the orientation, the visuals, the uses and circulations. With no geometric order imposed, to serve man, in the way to help him find himself once more, in these tiniest elements, a reflection of the greatest dream man has had in all his existence time.

The author refers to "Yadwigha" by Rousseau, or "Interior" and "Interior in a valley" by De Chirico. A divan bed in the tropical forest; chairs, tables and pillars set in an open landscape; a tree, the sea, in a room. In these daily scenes filled with serenity, the interior and exterior of the house co-exist. "Never as today has man felt so alone and so bereft, trapped in a prison built with his own hands (this prison is called home, this prison is called city). And never as today has man felt such a strong need to escape to the kingdom of trees, which is today a lost world of vegetation, in order to return to his roots, and to become reunited with the domestic elements which form part of his day to day life"[24].

With the passing of time the stage changed, given the fact that "a garden-terrace is not an abstract expression of dead nature, nor is it an architectural perspective cast in plaster, concrete or marble. It is a living and growing complex with an underlying need to transform itself"[25]. To the geometric stage, classic, invented by man, overlaps every season, romantic, "the Arabesque woven by nature"[26]. The laws of nature stream into the house, they move into the day-to-day life of man, who had forgotten them, and offer new ways of life for the body: health, sport, and for the spirit: climate, abstraction **(fig. 09)**.

MEMORIES IN WHITE AGAINST A BLACK BACKGROUND

In the introduction the architect writes in the book, we find the reason behind this almost mythical relationship between the air, the Sun and green. It is a very personal motive which inspires this proposal and is none other than a tribute by the architect to the memory of his father. In this text, figini acknowledges the importance of memories, which remain so neatly recorded in our minds, in white chalk over a black background, as if it were a blackboard. That is where they remain, only to come back, in form of clear and unforgettable marks of a past life, "hours and days, things and groups of things, obsessions, absurd climates and fictional atmospheres, intimate tales and personal mythologies, all gathered together in a fantasy, still protected and untouchable"[27]. Sealed and indifferent to the others, these memories return to us over the years, often unexpectedly, to show us a new path to take, a new way in thought or in life itself.

Childhood memories of days spent on the terrace of the family home in Milan, where his father had created a hanging garden, with climbing plants in boxes and tubs, fruits trees and bushes. A small vegetable plot set between apple trees, cherry trees, persimmon trees and berries and vines which also provided shade for the rings, ropes and bars installed for morning fitness activities. The paragraph in which the architect describes his mornings in the "kingdom-terrace of the old town", is particularly attractive: "cycling an old iron tricycle examining all the limits of the terrace. In the hottest summer days, my mother would fill the big zinc tank with water from the well, used to irrigate the plants. The sun would heat the water for our evening bath. A few hours later, we would dine outside, on the green terrace, and my day would come to an end"[28]. This was a neoliberal building, at that time the only one with a terrace among the dark roofs of the neighbouring houses. The same way in which today, some 80 years later, his house is found, set among these other buildings which remain deprived of sun, sky and green **(fig. 10)**.

Building his own home, for this architect, meant finding himself with the Lost Paradise once more, given that "in the years that were to come, everything would change. Dark and austere houses, rooms facing North with no sun and no terraces would come later. On the horizon of my exile, all I could see were gloomy courtyards, where dishevelled woman would shake the dust-off rugs in the mornings, hang out the washing to dry in the afternoons: there were no geraniums or oleanders in the balconies, just boxes, dead chickens, grey concrete walls, and above all, a feeling of sadness and frustration. The exile in the land of men"[29]. In his house, the architect managed to create a beautiful place, a private world reminiscing that of his childhood, in which the everyday actions -those of a child of that era, those of the man-architect-painter of the time- became almost sacred, immaculate and pure. The childhood of the man, the childhood of the era, rediscovered.

From the first images -in which we can see a scrawny tree against the background of the white wall- the terraces became, over time and with great care, fresh, pleasant hanging gardens full of flowers, because "the efforts made to plant and look after the garden over time will be duly rewarded"[30]. The cherry tree continues to grow and blossom, and the architect proudly shows it off in a series of photographs taken over the years **(fig. 11)**.

A strict Catholic, with a profound Franciscan faith, of anti-hierarchal convictions and with a strong desire to return to Paleo Christian roots[31] **(fig. 12)**, the architect finally lets nature invade the patios as he would affirm in later life: "I myself wanted to be surrounded by a forest. In reality, this house has become a purification ritual. So many geometric architects and engineers have ended up quashing nature through their architecture. I, on the other hand (or at least I have tried to) have let nature rule my architecture. Perhaps "rule" is too strong a word, but gently rule or even warmly embrace"[32] It is quite possible that he envisaged the hand of the Creator in the birds that flew in, and out of the plants and trees that invaded his home.

This embrace with nature has been present not only in the architect's construction of this house, but also as a "new way of living and acting collectively"[33]. This work -which at the time was offered as a prototype to be repeated- ended up, in the life and artistic activity of its owner, a sacred place, a temple for the daily practice of poetry, because "The Christian God does not prohibit Man from trying to reconstruct, albeit desperately, innocently or ingeniously, "by heart" (from past memories, as he wants to bring the disappeared beloved into his present life), a provisional ima3, however pale, meagre or untrue may it be, of the Lost Paradise"[34].

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Notes

01. FIGINI, Luigi, *L'elemento verde e l'abitazione*, Quaderni di Domus n. 7 Ed. Domus, Milán, 1950, p. 27.

02. Ibid., p. 12.

03. Ibid., p. 67.

04. Ibid., p. 73.

05. GREGOTTI, Vittorio",Un prisma di cielo", A.A.V.V, in *Luigi Figini-Gino Pollini. Opera completa*, Ed. Electa, Milán, 1996. p 23.

06. Although he signed this construction alone, Luigi Figini worked from 1926 - the year in which he completed his studies- with Gino Pollini, and both formed part of the Gruppo 7 studio.

07. F. Melotti was the brother of Gino Pollini's wife. A poet, painter and sculptor, whose works can be seen in different works of the Milanese architects: bar Craja 1930, villa-studio for an artist 1933, or the Campari restuarant 1937.

08. FIGINI, Luigi, *L'elemento verde e l'abitazione*, Quaderni di Domus n. 7 Ed. Domus, Milán, 1950, p. 7.

09. FIGINI, Luigi, *L'elemento verde e l'abitazione*, Quaderni di Domus n. 7 Ed. Domus, Milán, 1950, p. 74.

10. Ibid., p. 77.

11. Ibid., p. 78.

12. Gegé Bottinelli and Luigi Figini exhibited their photographs at the V Trienal de Milan in 1933, together with ManRay, Hans Arp, Max Ernst, and Moholy-Nagy.

13. Manuscript of the notebook of Luigi Figini, in: DE CARLI, Margherita, "Lo spazio segreto", *Ottagono*, 1993, n. 108, p. 63.

14. ACERBONI, Francesca, in POSTIGLIONE, Gennaro (ed), One hundred houses for one hundred european architects of the twentieth century, Ed. Taschen, Colonia, 2004, pp. 124-127.

15. GRESLERI, Giuliano, "Minnesánger, il cantore d'amore. Prime note sul pittore Luigi Figini", A.A.V.V, in *Luigi Figini-Gino Pollini. Opera completa*, op. cit., pp. 467-482.

16. FIGINI, Luigi, "Appunti per una casa", *Quadrante*, 1936, n. 33, in SAVI, Vittorio, *Figini e Pollini. Architetture 1927-1989*, Ed. Electa, Milán 1990, p. 133.

17. Ibid.

18. Ibid.

19. In this case -as in many other similar cases- the house that the architect designs for his personal use is used as an example to be repeated on a greater scale, to be use in large-scale housing develoPments. See MARTINEZ, Anna, *La casa del arquitecto,* unpublished doctoral thesis, Universidad Politécnica Catalunya, 2008.

20. FIGINI, Luigi, *L'elemento verde e l'abitazione*, Quaderni di Domus n. 7 Ed. Domus, Milano, 1950, p. 74.

21. FIGINI, Luigi, "Appunti per una casa", *Quadrante*, 1936, n. 33, in SAVI, Vittorio, *Figini e Pollini. Architetture 1927-1989*, Ed. Electa, Milán 1990, p. 133.

22. FIGINI, Luigi, *L'elemento verde e l'abitazione*, op. cit., p. 73. Richard Neutra also provides written instuctions on how to avoid the visuals on mechanical elements, in his book *Mystery and Realities of the Site*.

23. FIGINI, Luigi, "Appunti per una casa", *Quadrante*, 1936, n. 33, in SAVI, Vittorio, *op. cit.*, p. 133.

24. FIGINI, Luigi, *L'elemento verde e l'abitazione*, Quaderni di Domus n. 7 Ed. Domus, Milán, 1950, p. 28.

25. Ibid., p. 79.

26. Ibid., p. 79.

27. Ibid., p. 7.

28. Ibid., p. 8.

29. Ibid., p. 8.

30. Ibid., p. 79.

31. POLIN, Giacomo, "Five memos for Figini & Pollini", A.A.V.V, en *Luigi Figini-Gino Pollini. Opera completa*, Ed. Electa, Milán, 1996, p. 169.

32. Case che durano. "L'abitazione di un architetto, 1935", *Abitare*, 1978, n. 167, p. 39. Similar thoughts are found in the experience of líving, and the relationship with the garden in the house of Tacubaya, by Luis Barragán. See MARTÍNEZ, Anna, *La casa del arquitecto,* unpublished doctoral thesis, Universidad Politécnica Catalunya, 2008.

33. FIGINI, L., "Appunti per una casa", op. cit., p. 133.

34. FIGINI, Luigi, *L'elemento verde e l'abitazione*, Quaderni di Domus n. 7 Ed. Domus, Milán, 1950, p. 8.

Images
01. Figini House in Milan. The dining room from the terrace.

02. The terrace-garden on the upper floor.

03. Luigi Figini and Gegé Bottinelli in the Villa.

04. The green element and the house.

05. The living room from the terrace.

06. Gege Bottinelli and Luigi Figini on the terrace of the room.

07. The terraces on the upper floor.

08. The garden terrace on the second floor.

09. Cuts of green, water, and sky.

10. Aerial view of Villa Figini.

11. The garden terrace on the second floor.

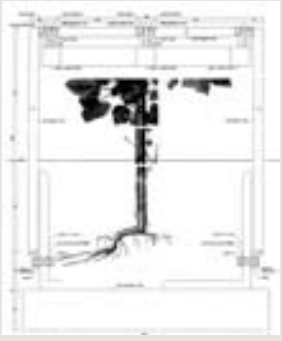
12. View of the garden terrace from the living room.

13

Nature as a Constructive Experiment. Japanese Pavilion for the 11th Venice Biennale (Junya Ishigami, 2008)

Ángela Juarranz

The work of Junya Ishigami has been a frequent object of study in the context of close-to-nature architecture, an area of interest shared by the constellation of Japanese architects between the end of the 20th century and the beginning of the 21st. This article looks at the work of Ishigami with a specific focus on nature as a construction laboratory, in line with the dual purpose of pieces to be exhibited in galleries or to be formalized as architecture. This parallel approach allows us to discuss the functionality of strategies that focus on the material implementation of permanent mediums that, however, only reach their goal as a temporary art installation. The case study chosen is "Extreme Nature: Landscape of Ambiguous Spaces"; the project designed by Ishigami for the Japanese Pavilion in the 11th *Mostra Internazionale di Architettura* at the *Biennale di Venezia* in 2008.



BETWEEN ARCHITECTURE AND LANDSCAPE; THE BLURRING OF THE BOUNDARY

Extreme Nature: Landscape of Ambiguous Spaces was the installation designed by the architect Junya Ishigami (Kanazawa, 1974) for the Japanese Pavilion in the 11th *Mostra Internazionale di Architettura* at the *Biennale di Venezia* in 2008. The piece by Ishigami, the youngest of the "Japanese constellation"[1], represented the theme provided by the director of the biennale, Aaron Betsky, "Out There: Architecture Beyond Building", yet it also proposed spaces that envisaged a new architecture. Four metal and glass structures outside the main pavilion took on the role of greenhouses while also constituting a complementary landscape to the pavilion itself. The pieces contained different ecosystems, so their size depended on the needs of light and growth of the plants. Also, the concentration of vegetation in each of the spaces was such that the density generated inside and outside was equivalent. The photographs of the garden show how the greenhouses, due to their size, material quality, and atmosphere, blurred the boundaries of the volumes and defined a new, unified landscape **(fig. 02)**.

The part of the intervention located inside the pavilion also followed the idea of proximity with nature. Within a completely empty space, with the exception of a few white chairs, the walls revealed drawings that connected the city and the landscape. These consisted of a sequence of utopian visions of the metropolis of the future, accompanied by inscriptions describing new building typologies. They presented types such as "Plant Buildings", plots of land where natural wilderness would grow freely within the urban environment, or the "Greenhouse Buildings", blocks formed by piles of different ecosystems depending on their environment and height.[2] In these drawings, the hustle and bustle of the city, the intimacy of the home, and the sensibility of the park all come together into one sole entity. The intervention, both inside and outside the pavilion, imagined an architecture where the construction, the furnishings, and the landscape transcended relative categories and intermixed freely. The diffuse limits between the pieces and the landscape opened a avenue of investigation into new spatial and material relations, with a design and technique of their own.

The experimental quality of the Venice pavilion makes it pertinent to study the work of Ishigami from the process of its devising and based on a double-pronged practice, halfway between art and architecture.[3] For example, the degree of attention to detail required for the installation in Venice, from the idea to the execution, responds more to the obsessive character of artistic production than to the traditional descriptions of architectural representation. The project was based on the plans by architect Takamasa Yoshizaka for the construction of the Japanese Pavilion in 1956. The photographs that document the design process show scale models of the greenhouses distributed on a reprint of Yoshizaka's drawings, respecting yet tightening the relationship between the volumes and their surrounding natural environment, playing with the distribution of the greenhouses, the vegetation, the clearings, the stones, and the paths **(fig. 03)**.Yoshizaka designed the pavilion with such coherence that it is difficult to distinguish a clear difference between inside and outside; building and landscape are understood as a single whole. To this effect, the pavilion stands lightly on pillars, encourages multiple routes on the lower level, and helps generate the relationship between the volume and the gardened hillside. Taking the work of Yoshizaka as a starting point meant that all these parameters of experience were incorporated into the interior and the exterior of the new proposal **(figs. 04 and 05)**.

The photographs taken by visitors reflect the diaphanous character of the whole installation and the coordinated positions of the all the elements. In the garden, around the greenhouses and the pre-existent trees, there were a few pieces of furniture and many ceramic pots. The drawings of the project, along with the countless instructions provided during the exhibition set-up, are an indicator of the importance of each of the elements.[4] Defining each of the objects in the space with such a level of detail made it possible for all the pieces to take on importance in unison: the plants, the chairs, the glass cases, the ceramics, the stones, the landscape, and the original vegetation. The execution of the new garden, attuned with the aims of the paper model, managed to generate new architectural registers in this installation.

THE PLURIDISCIPLINARY CONDITION: FROM BOTANY TO ARCHITECTURE

The photographs, drawings, and texts that document the construction of the pavilion reflect a pluridisciplinary knowledge. Through expertise in botany, the solution of the greenhouses was not aimed at creating an extreme habitat such as those of tropical gardens in colder climates. They were not even equipped with thermal regulators or other air-conditioning systems. They were designed in the context of an experimental architecture that sought minimal changes in temperature and humidity. For some plants, these temperature variations meant such a slight deviation that they could grow both inside and outside the structure, generating one single environment and diluting the functional role of the greenhouse. According to the guidelines of the collaborating botanist Hideaki Oba,[5] the chosen plants were those that perhaps grew naturally in Venice, or that could potentially grow in the city's own changing climate.[6] The sensitivity with which these plants where cultivated reminds us of traditional heritage practices in Japanese culture, such as *ikebana*-the Japanese art of flower arrangement- and *shakkei* - the creation of realistic landscapes incorporating existing elements.[7] This attitude aligns with John Dixon Hunt's theories, where, in contrast to gardening understood as a practical activity, these practices emphasized the theoretical and conceptual basis of art in the garden.[8] According to Hunt, this implied understanding the garden in its cultural context over different periods and settings, treating it as the epitome of the creation of a new environment. Certainly, the installation, both in its landscape design and in the technical development of the pieces, sought new habitable environments. Ishigami's installation, even as a temporary element and without a defined function, opened lines of investigation committed to the search of new architectures.

The technical definition of the pavilion underscores the areas of interest explored during the design process, such as physical connections and similar indoor-outdoor temperatures. The radical character of the initial aims required specific structural expertise. The volumes were built using a white metal structural grid consisting of 16mm square-section pillars and beams and an 8mm-thick float glass skin **(fig. 06)**. The pillars, both in their position and dimension, were determined by a structural analysis that minimized the loads and forces of the piece, in the same way as the beams, with a center-to-center distance that varied from 20 to 85cm.[9] At the same time, the perimeter glass panes hung from the grid of beams and served the purpose of tie bars to absorb the horizontal loads of the pavilion. The joints between the steel structure and the glass barely added up to 0.3 cubic meters and 800 kilograms in weight. With the aim of hiding the foundation work and the irrigation systems installed above ground, the surface was added to and embellished with a new layer of soil, over half a meter high, that had to be extended over the whole Japanese area in order to adjust the topography to the new landscape. Each of these elements was designed to participate mechanically, yet they also took on the appropriate scale so as to become part of the natural fabric. Instead of creating a strange environment, the greenhouses and the plants intermixed with the existing surroundings. The construction confirmed Ishigami's interest to bring together architecture's structural language and the image and perception of nature. Instead of the formal, or even ecological implication of organic geometry, the architect was reflecting around the poetics of natural and physical structures. It could be said that, in this case, the author's investigation was more sensorial than pragmatic.

In the dual work of Ishigami as an artist and as an architect, his production reveals architectural qualities yet also points towards the preeminence of a sculptural value. In the context of an architecture as part of the landscape, the development of prototypes and the design process does invite one to delve into this double condition of the author. On one hand, the development of prototypes was characterized by a meticulous and artisan execution through models that reproduced themes related to nature obsessively.[10] Often, the fate of these models has been as exhibits in galleries and art museums. Both the small objects in exhibition spaces and the built architectural ones confirm a common experimentation process. For example, the investigation carried out for the Japanese Pavilion was completed with the models called "Greenhouses", of lightweight structure and different shapes and proportions, which showcased the new architectural strategy in the interior of the Toyota Municipal Museum of Art (Toyota, 2010), Shisheido Gallery (Tokyo, 2010), deSingel (Amberes, 2013), and Arc en Rêve (Bordeaux, 2014)[11] **(fig. 07)**. In contrast, the extreme slenderness of the "Sky" models (2010)

reduced the feasibility of that proposal in a 1/3000 reproduction. Here, the limitation of contemporary technology made it impossible to directly translate a natural concept closer to sculpture than to a realistic solution.[12]

In terms of the design process, the degree of freedom with which Ishigami begins his commissions sets a methodological protocol that opens new research paths. In each project, he approaches irregular, unstable, and uncertain values with the aim of freeing architecture from preconceived ideas, such as uniform typologies or specific styles. The new proposals seek an alternative by incorporating parameters that are past or future, regional or foreign, architectural or not.[13] For this purpose, Ishigami justifies a certain flexibility understood as autonomy, which he operates as a genuine search and incorporates both specific and abstract aspects. The Venice Pavilion project emerges from these degrees of freedom that wish to push away from a preconceived architecture and highlight the natural materiality of the pavilion. Firstly, the blurring of the greenhouse within nature introduces the notion of the environment's freedom. The extrapolation of domestic, urban, and natural scenes by means of a shared space reveals the freedom of scale. Lastly, liberation of uses and the free appropriation of the landscape by the user represents the freedom of function. In the Venice installation, these strategies are in fact transcribed on a real scale, although in other cases they remain as idealization of another potential architecture.

THE NATURAL CONDITION FOR THE FREEDOM OF THE ENVIRONMENT, OF SCALE, AND OF FUNCTION

The study of the functionality of Ishigami's artistic and architectural proposals uncovers a critical reading of the location's conditions and the natural quality of its environment, scale, and function. Regarding the environment, Ishigami's work incorporates notions that reference fields, forests, mountains, valleys, rivers, lakes, clouds, and fog. As experiments, these systems exist in the way of themes that are later transferred to the architecture itself. What makes the resulting pieces unique is the fact that these natural features and phenomena are the materials with which the architecture is built. In contrast to the common assumption that architecture is the shelter that protects us from the surrounding elements, it is now the natural elements that are part of the built environment. This inversion makes it possible to conceive a space where the artificial and the natural come together. In the Venice Pavilion, the environment created by the mutual influence between the artificial and the natural generates a space as such, free from the differentiation between one condition and the other. Walking around the garden or coming in and out of the greenhouses did not correspond to the sense of being inside or outside. Following its explorative protocol, the installation modified the aim of the shelter in order to generate a new environment along with the surrounding landscape.

Just like the Venice Pavilion, some of Ishigami's other projects examine the relationship modes between architecture and nature. "Tables for a Restaurant" (2005) and "House with Plants" (2012) pose systems of spatial organization where the plants characterize areas of exclusive space over the artificial grid. "Tables for a Restaurant" is the design and disposition of a various tables for several pairs of diners. Each table has a large surface brimming with plant pots, combining the natural condition and the needs of the program **(fig. 08)**. In the "House with Plants", the ground comes inside the building and creates a succession of green inhabitable spaces. In this house, the freedom of the environment, or in other words, the incorporation of nature, is effective both in the scale models and in the final architecture. In turn, this incorporation of the natural can be understood not as the accomplishment of experimenting with art-related processes, but as an echo of the common denominators of the "Japanese constellation", with examples such as "Teshima Art Museum" (2010) or "Garden and House" (2013) by Ryue Nishizawa.

In terms of scale, Ishigami understands it as the reach of human perception, both in the discernment of long distances as in that of the smallest things. Against the background of the grandiose machine, the front figure of past times, he gives preference to a natural context that contains simultaneously, and in equal measure, the indomitable and the delicate. The scales of natural spaces extend limitlessly between both points: the endlessness of the sky, the lightness of a cloud, the triviality of a drop of water. In the Venice Pavilion, the lightweight structure and the density of the plants are patterns that emphasize this freedom of scale.

Projects such as "Little Gardens" (2007) and "Island Garden" (2010) also highlight the extent of scales in the natural environment.[14] In "Little Gardens", 370 small containers scarcely centimeters in size serve as bowls holding pressed flowers. The whole image is that of a city formed by successive gardened grounds **(fig. 09)**. The "Island Gardens" proposal, in a kind of urban paradigm of "Little Gardens", is a group of islands occupying a lake through a parceling system. The model reflects a landscape made of floating sheets available for future building. These studies underline the connection between the setting and the occupation on a quantitative level, yet they ignore other conditions intrinsic to scale. To reduce the concept of scale to a dimensional variable implies losing other features like those that deal with the ecosystem, the virtual, or those related to life or information, which are however more in line with contemporary environmental awareness. Ishigami's methodological approach along the freedom of scale takes us to an abstraction maneuver in which structural intentions are given priority over experience.

Ishigami introduces one more variable. By characterizing the space in binaries like large and small, low and extended or high and narrow, he incorporates the content of diverse forms and complex programs; there is comfort and tension, clarity and vagueness, breadth and narrowness. Faced with changing circumstances in economic, political, or personal activities, Ishigami proposes spaces based on adaptability with the tolerance for accommodating almost any use. He calls for a flexible system as an ideal instrument for architecture to deal with the speed and uncertainty of our current world. He does not see flexibility in the context of expectations, but rather in the "non-uniformity"[15] characteristic of natural phenomena, and in an "uncertainty"[16]where the actual system of change is in a state of transition. With this, he avoids applying uniform functions and standard architectures. Without a specific aim, the Venice Pavilion is an appropriation of the landscape, with open-ended functions, halfway between the urban, the domestic, and the intimate.

Examples such as "Forest" (2008) and "KAIT Workshop" (2008) conceive space as a forest, a multipurpose place to be freely appropriated. The model for "Forest" shows how the growth of a forest is conditioned by the grouping or dispersion of the vegetation **(fig. 10)**. For example, depending on the density of plants in a park, different varieties of larger or smaller sizes will reproduce. In the "KAIT" building -the workshop space annex to the University of Kanazawa-, the ambiguity of the forest translates into an organic principle distributing the space. The value of the building resides in the fluctuating condition of function, dependent on the form and dimension of the spaces, and how these are joined or separated. In this case, both the art installation "Forest" and the built piece "KAIT", materialize the freedom of function of the natural environment and generate a new occupation strategy. This understanding of freedom of function not only characterizes the work of Ishigami, but relates to the concept of "public" in contemporary Japanese architecture. In Japanese, the term "public" is related to the use and occupation of the space, incorporating notions such as physical openness, functional spontaneity, and processes of public decision-making,[17] key features in SANAA's "Rolex Learning Center" (2010).

NATURE AS A LABORATORY OF TEMPORARY CONSTRUCTION

In the achievement of the freedom of environment, scale, and function, and thanks to pluridisciplinary work processes, Ishigami researches an architecture of intrinsically-natural character. In the face of an architecture subject to legal, economic, and social regulations, he introduces a protocol that reformulates these concerns and explores a different materialization. Such is the case in the Japanese Pavilion and the degrees of autonomy used to construct the project. In its design, as an archetype, Ishigami unfolds the possibilities of nature as a new building material[18] **(fig. 11)**.

There is one last reflection worth exploring regarding the degrees of freedom in art installations and in their functionality as operators of a new natural architecture. In Ishigami's office, the models, beyond being simple work tools, are pieces with their own research and formalization. For example, the "Greenhouses" models explore the slenderness and transparency of the greenhouses and make it possible to reinterpret the relationship between people, the pavilion, and the surrounding environment. By contrast, the models designed to oscillate in the winds, which constitute a structural typology with similar behaviors to natural species, doubtfully have any direct architectural applications. Also, like an optical illusion, they create impossible photomontages from photos of models taken from different perspectives. The fact that these pieces are produced through a distancing from needs of environment, scale, and function -intrinsic values to architecture- seems to complicate the transcription of some of nature's concepts to specific works.

In the search towards a new architecture, Ishigami states: "To embody in architecture that which has never been architecture before -I wish to explore this possibility. Likely, this will mean fundamentally re-thinking our methods of constructing architecture. In doing so, we will surely discover an expansive new world of another scale, never perceivable before".[19]Given the radical nature of these interests, a large part of the proposals are shown in temporary exhibitions, yet they fail to consolidate as designs of permanent architecture. This justifies the success of installations such as "Magic Table" (2005), "Cuboid Balloon" (2008), or "Extreme Nature" (2008) yet it highlights the technical limitation of the projects "Greenhouse Building" (2008) and "Island Gardens" (2010). Two years after the exhibition "Extreme Nature", Ishigami's team returned to the Venice Biennial with the work "Architecture as Air: Study for Château La Coste". The installation, inspired by a natural ethereal condition and executed with thin and slender carbon fiber filaments, almost invisible, collapsed hours before the inauguration. Days later, Ishigami was awarded the Golden Lion for the best project, having gone beyond "the limits of materiality, visibility, tectonics, lightness, and actual architecture". The project was a real-scale test run for a future pavilion in the *Château La Coste* complex. The success of the temporary installation reveals an experimentation that seeks the development of the discipline through nature's logic, but that fails in the attempt to ensure its survival under the condition of permanence that architecture imposes. "KAIT Workshop" (2008) or "House with Plants" (2012) have indeed become consolidated architectural references of the 21st century, although for now, the reach of these works seems to be more like the continuation of the "Japanese constellation's" aspirations, and not so much the constructive achievement of the most radical natural imaginaries.

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Notes

01. The exhibition "A Japanese Constellation" (2015), in the Museum of Modern Art (MoMA, New York) and curated by Pedro Gadanho, included the work of Toyo Ito, Kazuyo Sejima, SANAA, Ryue Nishizawa, Sou Fujimoto, Akihisa Hirata, and Junya Ishigami. In the article "The Deep Field: Resolving a Japanese Constellation", included in the exhibition catalogue, the architect and critic Julian Worral, specialist in contemporary Japanese architecture, characterizes the architecture of this generation with common interests in the natural, the public, lightness, and abstraction. GADANHO, Pedro, "A Japanese Constellation", New York City, Museum of Modern Art, 2015, pp. 245-249.

02. ISHIGAMI, Junya, "Greenhouse designing with Yoshizaka". In *JA 79, Junya Ishigami*, 79, 2010, pp. 40, 43.

03. Taro Igarashi refers to Ishigami's interest in visual art not simply as a consequence of the difficulties to find work for Japanese architects after the economic bubble of the 80s, but also due to their understanding of architecture as utopia. Ishigami imagines temporary installations as another kind of architecture. Progressively, some of the investigations have been had the change to be adapted to concrete and permanent designs. IGARASHO, Taro, "A Few Things I Know About Junya Ishigami". In *Junya Ishigami: Another Scale of Architecture*, Junya Ishigami, Kyoto, Seigensha Art Publishing, 2010, pp. 270-289.

04. IGARASHO, Taro, "A Few Things I Know About Junya Ishigami". In *Junya Ishigami: Another Scale of Architecture*, Junya Ishigami, Kyoto, Seigensha Art Publishing, 2010, p. 284.

05. Hideaki Oba is a professor in the Department of Botany at Tokyo University and the former head of the Koishikawa Botanical Gardens. He was also Junya Ishigami's collaborator in the installation "Baloon" (2007) for the Tokyo Museum of Modern Art.

06. The execution plans noted the exact position and species in each greenhouse. Among many other plants, the narrowest of the four enclosures (1.9 x 3.2 x 6.1m) included slender and graceful plants and flowers from humid climates such as *gledtsia triacanthos*, *bougainvillea*, *cyperus papyrus* and *acacia saligna*. The lowest of them (5.2 x 3.8 x 2.1m) contained native flora of the tropical regions of South and Central America such as *solanum jasminoides*, *cleome spinosa*, *echium fastuosum* and *púnica granatum*. The medium-sized ones (3.1 x 3.5 x 4.7m and 2.2 x 2.7 x 4.7m) had humid plants native to the north hemisphere such as *jasminium officinalis*, *rosa banksiae*, *hederea hélix* and *mandevilla boliviensis*.

ISHIGAMI, Junya, "Pabellón de Japón, XI Exposición Internacional de Arquitectura, Bienal de Venecia", *El Croquis, 184, Christian Kerez (2010-2015), Junya Ishigami (2005-2015)* 184, 2016, pp. 180-181.

07. Somewhat unintentionally, the Venice Pavilion acquired a Japanese image due to the resemblance to the *ikebana* and *shakkei* traditions in its calculated disposition of the plants and the design of a garden that appropriated what was already there. The tradition of *ikebana* dates back to the 7th century; an ancient art stemming from a respect towards nature, deeply rooted in Japanese culture, like calligraphy, the tea ceremony, and *haiku* poetry. The technique of *shakkei*, of Chinese origin, was introduced into Japanese gardens in the 17th century. Termed as "borrowed scenery" in English, it consists in the appropriation of a scene through the design of a garden where pre-existent elements are included.

08. HUNT, John Dixon, *Greater Perfections The Practice of Garden Theory*, Philadelphia, University of Pennsylvania Press, 2000, p. 273.

09. The structure of the Venice Pavilion was designed in collaboration with Jun Sato Structural Engineers, who were responsible for the design of the structures for other projects by Ishigami such as "Balloon" (2007) and "House with Plants", 2012.

10. Taro Igarashi, on the topic of the pavilion's indoor drawings, emphasizes their character as a pieces of art: "In the field of art, one can find minimal elements obsessively repeated, like works of Outsider Art, or artists such as Yayoi Deki, yet not in the representation of architecture". IGARASHO, Taro, "A Few Things I Know About Junya Ishigami". In *Junya Ishigami: Another Scale of Architecture*, Junya Ishigami, Kyoto, Seigensha Art Publishing, 2010, p. 282.

11. These are monographic exhibitions on themes exploring new architectures: "Another Scale of Architecture" (Toyota Municipal Museum of Art, Toyota City, 2010); "How small? How vast? How architecture grows" (Shiseido Gallery, Tokyo, 2010); and "Junya Ishigami: petit? grand? l'espace infini de l'architecture", de Singel, Ambers, 2013 and Arc en Rêve, Bordeaux, 2014.

12. The memory of the "Sky" project acknowledges the lack of technological capabilities to implement these models. It also makes reference to the utopian character of the proposal: "In order to go beyond standard proportions, with infinitely high and slender buildings, the idea is not so much to build on the ground but to build in the sky. [...] Here, a new world, previously unknown, probably awaits us". ISHIGAMI, Junya, *Junya Ishigami: Another Scale of Architecture*, Kyoto, Seigensha Art Publishing, 2010, p. 135.

13. Ishigami incorporates a wide and varied range of references, such as the first greenhouses by Salomon de Caus in Heidelberg (1619), illustrations from the 70s by the American artist Nancy Graces, old maps of the compact city of Srinagar next to the Himalayas, aviation analyses from bird morphology, or botany studies on the profiling of tropical forests. A number of these references are included in: ISHIGAMI, Junya. *Junya Ishigami: Another Scale of Architecture*. Kyoto, Seigensha Art Publishing, 2010; and ISHIGAMI, Junya, *Junya Ishigami: Small images*, Tokyo, INAX, 2008.

14. The exhibition and catalogue of "Another Scale of Architecture" presents this diversity of scales through drawings that encompass from atmospheric layers to the structure of a water drop. The book compiles these diagrams in five chapters: clouds, forest, horizon, sky, rain. ISHIGAMI, Junya, *Junya Ishigami: Another Scale of Architecture*, Kyoto, Seigensha Art Publishing, 2010.

15. In defense of an architecture free of uniform functions, Ishigami defines the term "non-uniformity" as ambiguous flexibility, or in other words, that which cannot be considered within a set of specific expectations. ISHIGAMI, Junya, "De la libertad en arquitectura", *El Croquis 184, Christian Kerez (2010-2015), Junya Ishigami (2005-2015)*, 2016, p. 158.

16. Ishigami translates the concept of "uncertainty" in architecture as the quality of a system where the mechanism of change is also in transition. ISHIGAMI, Junya. "De la libertad en arquitectura", *El Croquis 184, Christian Kerez (2010-2015), Junya Ishigami (2005-2015)*, 2016, p. 158.

17. Julian Worrall, in his article "The Deep Field: Resolving a Japanese Constellation" included in the catalogue for the 2015 exhibition at MoMA, makes reference to the concept of "publicness" and its connotations of radical politics. GADANHO, Pedro, *A Japanese Constellation*, New York City, The Museum of Modern Art, 2015, p. 216.

18. Taro Igarashi defines Ishigami's pavilion as a new architecture in itself, far from being a piece replicating the past: "Just as the Crystal Palace for the 1851 Great Exhibition in London or the Barcelona Pavilion by Mies for the 1929 International Exposition exemplified in their day, international exhibitions are places where experimental architecture is publicly presented, opening up the paths towards new possibilities". IGARASHO, Taro, "A Few Things I Know About Junya Ishigami". In *Junya Ishigami: Another Scale of Architecture*, Junya Ishigami, Kyoto, Seigensha Art Publishing, 2010, p. 283.

19. In *Junya Ishigami: Another Scale of Architecture*, Junya Ishigami, Kyoto, Seigensha Art Publishing, 2010, p. 4.

Images

01. ISHIGAMI, Junya. Design solution of the 'Japanese Pavilion', 2008.

02. ISHIGAMI, Junya. 'Japanese Pavilion', 2008.

03. 04. and 05. ISHIGAMI, Junya. Model of the 'Japanese Pavilion', 2008.

06. ISHIGAMI, Junya. Design solution of the 'Japanese Pavilion', 2008.

07. ISHIGAMI, Junya: 'Greenhouses', 2010.

08. ISHIGAMI, Junya. 'Tables for a Restaurant', 2008.

09. ISHIGAMI, Junya. 'Little Gardens', 2008.

10. ISHIGAMI, Junya. 'Forest', 2010.

11. ISHIGAMI, Junya. 'Japanese Pavilion', 2008.

14

Prefabricating with Natural Elements. Eco-materials in the Age of Mechanical Reproduction[1]

Juan Carlos Bamba
Alejandro Jesús González

Prefabrication of natural resources builds a bridge that links agriculture with architecture, turning natural fibers into sustainable construction materials. The current research assumes natural resources as inexhaustible sources for architecture, suggesting the construction of emergency shelter prototypes built with eco-materials and taking them to their limit in extreme climatic conditions. The results generated out of the prototypes allow the evaluation of the mechanical, physical and chemical behavior of these eco-materials. Progressive improvement of the prototypes is aimed at the implementation of these eco-materials within the construction industry.

FROM AGRICULTURE TO ARCHITECTURE

The structure of the current report is based on the actual nature of the research, that is, the need of understanding the production of both prototypes as a process of progressive improvement of the characteristics of the prefabricated components and their adaptation to the specific conditions of each place. First, the premises of the research will be presented and the key characteristics common to both prototypes[4] will be described to subsequently establish a comparison that refutes false opposites and redefines the possibilities of prefabricated eco-materials within the housing industry **(figs. 02 and 03)**.

The lack of resources, the unrestrained exploitation of nature, the growth of population, the need for food and housing, and the technological advances have guided architecture towards the exploration of ancestral practices -towards "the primitive", but with an ability to mass-produce through prefabrication processes- "the future"- [5] linked to the basic needs of human beings; agriculture and architecture approach each other: food and housing. Natural resources are harvested as raw material and turned into construction materials through different processes. Human beings separate food from waste, and by recycling, this waste is given constructive value and a role in environmental protection.

This research project relies on the utilization of natural fibers, most of them discarded in agroindustrial processes, to develop new products for the construction industry -eco-materials- that are as useful as the conventional materials. It aims to innovate through traditional craftsmanship, to recover the "technology of what is necessary" mindset, but using prefabrication and standardization processes of raw materials into eco-materials that can provide solutions for contemporary housing. The use of natural materials to produce eco-materials for the construction industry seems to be the necessary tool to tackle two problems at the same time: massive demand of economic and sustainable housing, and waste of valuable natural materials.

In this research, what is considered "natural" is the group of "free raw material"[6] that can be classified according to their origin: "inexhaustible resources", those that can be harvested (bamboo, hay, cattail and loofah), "local materials", those that are mineral and inorganic and they are found in the same construction area (volcanic rocks at Mount Chimborazo and snow in Antarctica), and "waste material", those resources discarded after extracting food products (rice and corn husks, banana trunks, coconut shells and corn shanks) **(fig. 04)**.

With the "prefabrication of natural materials" as a medium of approximation to agriculture, architecture will gain access to unlimited resources, where nature will provide for the physical, mechanical and chemical requirements for the construction of habitat for human being. The complex process of transformation of raw materials into material is ecological in each phase (treatment, drying, extraction of fibers, gluing, pressing, and panelization) so the final product can be regarded as genuine eco-material **(fig. 05)**.

FROM TRADITIONAL CRAFTSMANSHIP TO MECHANIC INDUSTRIAL PROCESSES

The design process of the prototypes, just as the prefabrication process, is empirical and systematic. Each piece of the shelter is built in the factory so it can be tested; manufacturers make sure that the characteristics and measures are adequate for the conditions under which they will be put at test. In this way, mistakes and problems in construction can be detected and fixed in the design of the prototype. Therefore, this project is constantly being modified in accordance with empirical results to adjust it to the established construction requirements.

Conversely, this process, which solves the problems in the project, must be systematized to produce a manufacturing chain inside the factory that provides precise measures and mechanized steps. This systematization is a step added to the manufacturing process so it reaches the stage of prefabrication of standardized components or materials: we call this process "prefabricating with natural elements". The standardization of the measures of the elements of each module and the modulation itself, which is aiming at possible growth, allows to systematize the prefabrication process in the factory, which, yet being a research laboratory, acts as a drill for potential massive production in the construction industry. Therefore, the design process of the prototype shelter in the eco-materials factory is not linear, but empirical and systematic.

Ecuadorian construction, through the traditional craftsmanship that has been inherited in some communities, takes advantage of natural resources and uses them in their local architecture construction systems. In the Coastal Region, specifically, there are many natural fibers, originated out of traditional crops such as toquilla straw, palm leaves and bijao; clear components of the vernacular architecture which have solved housing issues through history. According to Desplazes, in the "construction of architectural projects as a growing chain"[7], the following steps take place: raw materials, modules, elements, structures, and the final construction. The manufacturing process turns the "raw material" into construction material as with bricks ("module"); prefabrication (or "*semifabrication*" according to Desplazes) involves optimized, systematized and standardized

processes that accumulate more energy and generate components as with the eco-material panels or with bamboo fans ("elements") **(fig. 06)**.

Prototype # 1 is produced within this framework of prefabrication, from specifics; the natural resources, the traditional craftsmanship ad the local workforce recover the cultural heritage of an entire region -the Highlands- , which knows the material and knows how to work with it. Desplazes also assures that the weave of the fibers before the panel pressing has a connection with textile art, which is the "original art" as a tectonic principle of the lightweight construction in the primal handicraft of men. The value of "handmade products" opposite to the industrialization of them, leads architecture to reduce its production, its precision, admits errors and variations, and replaces quantity with quality **(fig. 07)**.

FROM IRREDUCIBLE SPACE TO EXTRA SPACE

Prototype # 1 is conceived from the perception of the minimum space required, an irreducible space, with a capacity of four people, frontal and direct access from an outside staircase, with double door (outside and inside with a window) separated from the ground by a gabion superficial footing system, which protects it. The irreducibility of an object is the property of not altering its design unless something essential is taken away. When lacking resources, "the architect must produce as many solutions as possible. Architecture is similar to synthetizing: to say what one wants to say, but using two words instead of three, to solve the problem with the smallest amount of possible movements"[8] **(fig. 08)**.

Once the irreducible natural space has been defined, prototype # 2 seeks to build security levels through "extra space"[9], flexible and hybrid, which allows safer indirect and lateral access. Since it is a shelter in a hostile environment, where it is difficult to provide assistance, it needs the security of the workforce and the materials to protect it while being built. Thus, the concept of "the shelter of the shelter"[10] emerges as another condition. Besides, assembling and dismantling simplicity of the flexible structure of the second prototype allows the users to provide ideas for its design; the person adapts the space according to their personal needs. This is an idea already mentioned by Yona Friedman in her book *Ville Spatiale* in 1956: "architecture must provide a reference framework where the inhabitants build their homes in accordance with their needs"[11], or Habraken in his "theory of supports"[12] with the open participation of the inhabitant in their shelters. The incremental system enhances the programmatic modules by integrating new functions to the shelter, also extending its capacity and improving its facilities **(fig. 09)**.

The stability and permanence of the irreducible natural space of the first prototype contrasts with the growing and ephemeral character of the second one. These different characters are expressed clearly in constructive and structural logic, this is, the relationship between the structure and the enclosure of both prototypes. In the first one, the structural logic is similar to a "shell", or the internal structure of a bamboo fan (irregular and deformable), this means that the enclosure -the natural panels- in this prototype are structural: they match the enclosure. In prototype #2, the structural logic is similar to an "exoskeleton", with steel frames (regular and rigid), which protects the natural panels that couple it like a piece of furniture: the structure does not match the enclosure.

FROM "GENIUS LOCI" TO A MOBILE ARCHITECTURE

One of the conditions determining prefabrication more precisely is the capability of the prototype to be assembled and dismantled, whilst adaptability and durability is determined by the place. Architecture must supply the needs of the preexisting context where it was implanted, until it reaches the balance and the spirit of the place: the "genius loci"[13]. When the area where a structure is going to be built is unknown, when the place does not establish the project, it is not determined by the conditions of the place, and it needs to be adaptable to many conditions in different possible locations (atopic objects[14]).

Prototype #1 is characterized by its relation with the Chimborazo volcano, the location, the access roads, the previous shelter of the Guardian and the connection with the ground through a superficial gabion foundation filled with volcanic rock. Its architecture should be represented by the landscape, whose unique and necessary location determines the prefabrication system of the natural resources and at the same time defines the assembling and dismantling process, with the intention of making it last for long without changing its location **(fig. 10)**. Prototype #2 is not determined by its exact location. The fact that a specific place in the Antarctic islands is not necessary, the obligation of not invading or impacting the land, and the logistic difficulties to transport materials far from the "Pedro Vicente Maldonado" base made researchers think of mobility solutions. Linked to the need for providing opportunities to scientific researches so they are able to change their location, the project is divided into three movable units that can be transported together (train) o separately (sled) and it is possible to carry, dismantled and saved, the rest of components of the shelter. Dismantling, transportation and adaptation to the user determines the mobility capacity of the unit **(fig. 11)**.

FROM BOX TO CASE

In in-situ constructions the processes are dilated with time; a total plan of the project is required so every agent intervening in the project understands it; the final product depends on the constructive process and the precision in its execution; logistics can be altered during the process due to the margins of time. Prefabrication works along with precision and quality control of the product obtained, the construction deadlines are reduced, the modulation and measures of parts are adjusted to the endless and varied needs of the inhabitants and to the manipulation of the assembly and dismantling of the components of the unit. In prefabrication, transportation logistics, after manufacturing of the parts, determines the design, the utilization of resources and the constructive system. This is another stage in the project: the constructive process starts with logistics.

In a scenario where the point of production is close to the point of construction, logistics does not determine the process. Transportation by land to the building site is carried out in trucks chosen according to the dimensions of the components. Once the prototype has been designed and manufactured, a container capable of carrying all the components is selected; this means that the size of the components is not predetermined by the size of the container **(fig. 12)**. In the second prototype, logistics is part of the project generators: it determines the design, the cutting, the assembling and dismantling. The prototype must be adjusted to the space of a twenty-foot container, which will be transported by water from Guayaquil (Ecuador) to Greenwich Island or Dee Island (Antarctica). This implies a reduction on the size of the prototype components, which must be designed according to the dimensions of the container **(fig. 13)**. In this sense, the containers or the logistics and consequently the logic of the prototypes could be classified according to the simile often used when talking about housing: the box and the case; the container heading to Chimborazo would be the box and the one heading to Antarctica would be the case. Ignacio Patricio says:

> "The case is a protecting package which is adjusted to the shape of the object inside. The strict shapes of lens or even cutlery are reproduced carefully in the case. (...) The box, on the other hand, is a featureless protecting wrapping which can carry many objects"[15].

In the case of this research, the process is reversed and it is related to the kind of vehicle carrying the prototype. Prototype #1 has been projected for a "box" which could contain great diversity of elements related to the size, shape and location inside the container, whilst prototype #2 was conditioned by the size and shape of the twenty-foot "case", which was assigned for the expedition of the INAE in Antarctica.

BETWEEN THE UNIVERSALITY OF MECHANICAL REPRODUCTION AND THE SPECIFICITY OF VERNACULAR CONSTRUCTION

Reflections on the current essay lead us to establish connections with the idea of "mechanical reproduction" proposed by Walter Benjamin in his essay "The Work of Art in the Age of Mechanical Reproduction":

> "One might generalize by saying: the technique of reproduction detaches the reproduced object from the domain of tradition. By making many reproductions it substitutes a plurality of copies for a unique existence. And in permitting the reproduction to meet the beholder or listener in his own particular situation, it reactivates the object reproduced. These two processes lead to a tremendous shattering of tradition"[16].

With this thesis, the identity or "aura" of the "original" object that could be similar to the local or handcrafted products is distressed before the "manufactured" object, which loses that quality and gets closer to the global or industrialized architecture: the ideal of perfect architecture with an "international style" encouraged by the image of the machine and the possibility of rationalizing and standardizing everything. In contrast, "sensitivity to vernacular values" according to Terrados is one of the ways of "informal" attitude in the production of architecture:

> "Efficient and productive use of limited resources often flows out into informality. Imperfection, management of composition collage techniques, *already made* culture and the double and triple interpretation of multipurpose elements"[17].

On the one hand, a state-of-the-art attitude before technology, which understands it as an invisible entity; on the other hand, an emphasis on the local and specific needs, not only regarding users but also implementing elements that are responsive to specific weather conditions. As mentioned before, this is about the dialectic that confronts these two opposites: the trinomial that states the global industrialized architecture "form+style+visible technology", against the duality of the local vernacular architecture "user+invisible technology". Prefabrication of natural resources as an integral means to solve housing issues in developing countries such as Ecuador refuses these false opposites and establishes the fundamentals not only for scientific and strict, but also for sustainable and social architecture, which solves the housing problems and the lack of resources.

Prefabrication of natural elements reviews the current economic and political situation in the Latin-American context, and it also studies the possibility of taking advantage of natural resources produced by mankind for their consumption, as a basic need, in the manufacturing of natural materials that enables the construction of decent and sustainable dwelling. The products and techniques used by men for feeding are reinterpreted and applied in their protection and shelter.

Eco-materials in the age of mechanical reproduction present a new scenario of reflection about the value of handicraft when it is taken to industrialization due to social needs. In a context of increasing social inequality, it is necessary to link the country with the city, agriculture with architecture, craftsmanship with manufacturing. This is also taken as a relevant instrument in politics because it deals with the problems of the "new urban situation"[18]

A third industrial revolution, based on the theories of communication and renewable energy, sustains this research in its temporal context, from human need for finding solutions for housing needs of society. A contemporary redefinition of the relationship between agriculture and architecture that changes the process of going from craftsmanship to industrialization **(figs. 14 y 15)**.

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Notes

01. The title refers to the essay "The Work of Art in the Age of Mechanical Reproduction" written by Walter Benjamin between 1935 and 1936, which was an organized group of theses regarding art and its relationship with technological changes.

02. Ecuadorian Antarctic Refuge (RAE) is a research project subsidized by the SINDE (System of Investigation and Development) of the UCSG with a budget of USD $172.712, developed from 2015 to 2018 by 18 researchers (teachers, students and freelance professionals) whose objective is to build a refuge for Ecuador in Antarctica.

03. The Eco-materials Academic Research Unit is part of the IHADIC and belongs to the Faculty of Architecture of the Catholic University of Santiago de Guayaquil. It is in charge of developing research through experimentation with different kinds of natural and recycled fibers, such as guadua, and residual fibers produced by the agroindustry such as rice husks, coconut coir, banana, corn, abaca, and so forth. The unit has some patents registered in the IEPI system.

04. The Guardian of Mount Chimborazo (prototype # 1) is the first prototype refuge of the research project located on the Chimborazo volcano (Ecuadorian highlands), at 15912.07 ft. above sea level, which allows monitoring its effectiveness in extreme weather conditions. The Ecuadorian Antarctic Refuge (prototype # 2)4 is a refuge prototype proposed to be built in Dee Island, located in Antarctica, at 0 ft. above sea level, in front of Greenwich Island, where the Ecuadorian station "Pedro Vicente Maldonado", of the INAE, is located. Prototype # 1 has already been built on Mount Chimborazo and prototype # 2 has been assembled and dismantled at the university to verify the assembling process and it is ready to be transported to Antarctica as its final location.

05. "Primitive Future" is the *leitmotiv* of architecture that projects Sou Fujimoto in the homonymous book: an opportunity to learn from the an-

cestral techniques used in the past to project the architecture of the future.

06. See the article *Technology of what is free. Taking advantage of the discarded natural fibers as construction materials* published at "The power of the skin. New materials in contemporary architectonic projects" organized by COMPAC The Surfaces Company and the research Group ARKRIT of the Technical University of Madrid.

07. DESPLAZES, Andrea, *Changing the architecture of raw materials into a building, A manual*, Barcelona, Gustavo Gili, 2010, p. 12.

08. KIMMELMAN, M., (June 8th, 2016), *Interview with Alejadro Aravena -Alejandro Aravena, architect who saved an entire country,* New York, USA, New York Times.

09. Term used for describing certain spaces of the architecture of Lacaton and Vassal in the text of Ilka and Andreas Ruby called "Extra, Extra Large Space" which appears in the introduction of the book *2G Book Lacaton & Vassal.*

10. This concept facilitates fast assembly of the metallic structure, which is the skeleton of the prototype, and then it is necessary to cover it with a plastic poncho that instantly generates space to protect construction materials and tools from inclement weather, start assembling the panels of the shelter with the workforce already protected.

11. Abstract of the text "Ville Spatiale" included in the manifesto *L'architecture mobile* that Yona Friedman presented in 1956 at the International Congress of Modern Architecture n. 10 held in Dubrovnik, Croatia, published and translated years later.

12. Habraken, John, *Design of Supports*, Barcelona, Gustavo Gili, 2000.

13. In modern architecture theory, the "genius loci" has profound implications in the projection of public spaces and it is linked to the philosophical branch of phenomenology. Christian Norberg-Schulz in *Genius Loci. Approximation to an architecture phenomenology,* talks about the importance of the environment of the place.

14. According to Antonio Miranda in *Neither Robot, nor jester* design is the "graphic creation for the manufacturing of atopic objects without a specific place, and prototypes. The architecture project, conversely, refers to the construction -not the creation- of objects for a specific place.

15. IGNACIO, P., *Building habits. Alternatives for housing: from the case to the box.* Live Architecture, 49, 1996, pp. 20-21.

16. BENJAMIN, W., *The Work of Art in the Age of Mechanical Reproduction and other texts*, Buenos Aires, Godot, Argentina, 2012, pp. 28-29.

17. TERRADOS, J., *Lightweight Habitat Prefabrication. New premises,* Sevilla, University of Sevilla, publications bureau, 2012, p. 183.

18. SECCHI, B., *The Rich City and the Poor City,* Madrid, La Catarata, 2014.

Images

01. Doors open of the "Guardián del Chimborazo" (prototipe #1).

02. East facade of the Ecuatorian Antartic Refuge (prototipe #2).

03. Southwest facade of the "Guardián del Chimborazo" (prototipe #1).

04. Gathering of raw materials (rachis, coconut, lechuguin and corn husk) in the Ecomaterials plant of the UCSG.

05. Samples of panels 50x50x5 cm(from top to bottom): páramo straw, large loofa, totora, banana rachis, abaca, tiny lufa, abaca residue, coconut fiber, rice husk, wool residue, and balsa residue.

06. External abaca skin of the "Guardián del Chimborazo" (prototipe #1).

07. Protective galvanized bamboo mesh in the Ecuatorian Antartic Refuge (prototipe #2).

08. Floor Plan of the "Guardián del Chimborazo" (prototipe #1).

09. Floor plan of the Ecuatorian Antartic Refuge (prototipo #2).

10. Access on the southwest facade of the "Guardián del Chimborazo" (prototipe #1).

11. Access on the eastern facade of the Ecuatorian Antartic Refuge (prototipe #2).

12. Landing of materials of the "Guardián del Chimborazo" (prototipe #1).

13. Container of the prototypes components of the Ecuatorian Antartic Refuge (prototipe #2).

14. Doors opened of the "Guardián del Chimborazo" (prototipe #1).

15. Ecuatorian Antartic Refuge (prototipe #2).

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El autómata aprendiz y la nave espacial en el jardín. IA y el diseño de la naturaleza planetaria

Andrew Toland

Los sistemas de inteligencia artificial de escala planetaria están recibiendo un impulso creciente por parte de empresas tecnológicas mediante proyectos como "Inteligencia Artificial al Servicio de la Tierra" de Microsoft o el "Earth Engine" de Google. Este artículo cuestiona algunas dimensiones conceptuales y la evolución histórica de la idea del "cuadro de mandos" para la gestión de la "nave espacial Tierra" en el mundo del arte, la arquitectura y el paisajismo; y reflexiona sobre los efectos de una labor proyectual progresivamente enmarañada que aglutina la naturaleza con los datos, el aprendizaje automático, la robótica y la tecnología autónoma.

"Lógicamente, querrán preguntarme cómo vamos a salir de este callejón cada vez más peligroso de dogmas ideológicos y de políticos que parecen oponerse al mundo. Tenemos la respuesta en los ordenadores. [...] Así que, urbanistas, arquitectos e ingenieros, tomen la iniciativa. Pónganse a trabajar...".

R. Buckminster Fuller, *Operating Manual for Spaceship Earth*, 1963[1]

"El resultado ha sido prácticamente el mismo. [...] En la imagen final, el jardín siempre aparece descuidado o muerto".

Joseph Santarromana, codirector del proyecto Tele-Garden, 1996[2]

"UN CUADRO DE MANDOS PARA LA TIERRA"

En diciembre de 2017, la revista *Nature* publicó un artículo del director de investigación medioambiental de Microsoft, Lucas N. Joppa[3], en el que instaba a la creación de una "plataforma de inteligencia artificial para todo el planeta"[4]. Esta llamada a la acción era consecuencia del debate que se había planteado sobre el *big-data* o *datos globalizados*, la inteligencia artificial y el medioambiente, y estaba relacionado con la puesta en marcha de un programa colaborativo quinquenal de investigación, impulsado por Microsoft y denominado "AI for Earth"[5]. A simple vista, este concepto evoca la imagen de una especie de "cuadro de mandos" o "panel de control" de escala planetaria en los tiempos de la IA **(fig. 02)**, como si en la era de los datos globalizados en Silicon Valley les hubiera dado por actualizar el *Operating Manual for Spaceship Earth* de Buckminster Fuller o el *Whole Earth Catalog* de Stewart Brand (cabría preguntarse si no se trata simplemente de otro ejemplo del afán de Silicon Valley por atribuirse todo lo que sea visionario y contracultural). El artículo menciona una serie de avances tecnológicos recientes que están transformando rápidamente la *naturaleza* en datos y los datos en diseño (datos que pueden recopilarse, procesarse, analizarse y, en el escenario más ambicioso, manipularse físicamente mediante sistemas de respuesta que incidan en el mundo "real" o "natural"). Es interesante reflexionar sobre cómo ese tipo de tecnología puede repercutir en la forma en que los arquitectos y paisajistas conciben el "proyectar con la naturaleza" dentro de un amplio *continuum* de interacciones entre cultura y naturaleza, y sobre cómo el diseño algorítmico arquitectónico podría estar migrando desde el reino de lo formal y estructural, en el que se encuentra desde hace ya un tiempo, hasta el reino de lo "natural".

El proyecto AI for Earth surge de una corriente de investigación de ciencias de la tierra que ha tomado un fuerte impulso durante los últimos años. En el artículo titulado "A Dashboard for the Earth" ("Un cuadro de mandos para la Tierra"), que puede encontrarse en *The Dirt*, la publicación digital de la American Society for Landscape Architects, Jared Green se hacía eco de una conferencia organizada en 2016 por la Renewable Natural Resources Foundation (RNRF) sobre "aprovechar los datos globalizados para el medioambiente", en la que se anunciaba que las nuevas tecnologías podrían alimentar "minuto a minuto bases de datos sobre distintas funciones de los ecosistemas", una especie de ""terminal Bloomberg" para el planeta"[6]. Sin embargo, como ilustra el libro de Fuller, la idea de un cuadro de mandos, sala de control o cabina de mandos de escala planetaria lleva bastante tiempo presente en el pensamiento arquitectónico. A pesar del sugerente título, Green lamenta comunicar que los expertos del congreso de la RNRF confirmaron que estamos todavía muy lejos de alcanzar esta utopía de un control total provechoso apoyado en la inteligencia artificial que nos permita pilotar la "nave espacial Tierra". El principal escollo, según Green, radica en la dificultad de integrar satisfactoriamente los datos medioambientales con los sociales y económicos[7], aunque del resumen del congreso publicado en el *Renewable Resources Jounal* de la RNRF se desprende que el mayor obstáculo deriva de la falta de "disponibilidad" de datos sociales (parece que se refieren a su escasa fiabilidad epistemológica, a su tendencia a desvirtuarse por sesgos normativos). Al claudicar, la promesa y la eficacia del *big data* se sacrifican en el ara del "*big judgement*" o *valoración globalizada*[8]:

> "Las decisiones más comunes acerca del uso y conservación de los recursos naturales, incluidos el uso del suelo y las decisiones sobre los estándares medioambientales, deben tener en cuenta los factores sociales, económicos y políticos. Como ha venido ocurriendo desde que comenzamos a debatir qué valor podía tener un pato o el espacio abierto o cuánta polución podía ser admisible, los factores sociales se consideran un complemento a los datos referidos a evaluaciones físicas. Sin embargo, lo cierto es que los datos sociales no son [tan] fáciles de obtener como los datos globalizados, y apenas se dedica tiempo y esfuerzo a aplicar los procedimientos de los datos globalizados a la toma de decisiones medioambientales. Por lo tanto, la mayoría de cuestiones relativas al medioambiente continuará decidiéndose mediante la integración humana de los datos físicos y sociales; o lo que es lo mismo, mediante una *valoración globalizada*".

La preocupación por el hecho de que los datos empíricos deban someterse a aspectos normativizados por el hombre aparece de nuevo en el artículo de *Nature* escrito por Joppa (quien también había participado en el congreso de la RNRF de diciembre de 2016), pero el director de investigación medioambiental de Microsoft es más optimista respecto a una posible solución: si los datos empíricos fueran aún "más exhaustivos", podrían vencer con facilidad los sesgos normativos. Joppa arguye que "las decisiones sobre qué acciones llevar a cabo [en asuntos medioambientales] serán

más fáciles de tomar -y menos susceptibles de politización- cuando sepamos [todavía con más detalle] qué pasa en la Tierra, cuándo y dónde"[9]. Está claro que los científicos no terminan de encontrarse cómodos con las valoraciones políticas y sociales.

Sin embargo, también es interesante incidir en la transformación producida entre la postura de los científicos y la del arquitecto (o, más exactamente en este caso, del escritor paisajista) cuando el artículo de Jared Green recoge la discusión del congreso de la RNRF de 2016. La RNRF es una fundación para la investigación de políticas públicas de Estados Unidos compuesta por organismos profesionales de ciencias de la tierra y otras afines (como la Unión Geofísica Estadounidense, la Sociedad Estadounidense de Meteorología o la Sociedad de Química y Toxicología Medioambiental), e incluye a la Sociedad Estadounidense de Arquitectos Paisajistas, lo que quizá explica que Green informara del congreso en *The Dirt*. El artículo de Green logró cierta divulgación y fue republicado íntegramente en *The Huffington Post* unos meses más tarde (y actualizado a comienzos de este mismo año)[10]. La representación que hace Green de estas tecnologías emergentes parece estar condicionada por el reciente interés de los estudiosos del urbanismo y la comunicación en proyectos materializables de "salas de control", "cuadros de mandos" y "centros de operaciones" urbanos[11], junto a la fascinación por las tecnologías de *machine learning* o aprendizaje automático e inteligencia artificial mediante "redes neuronales de aprendizaje profundo" (tanto el artículo de *The Dirt* como el de *The Huffington Post* utilizan la misma imagen extraída de la página web *ExtremeTech* en la que se muestra una red neuronal al más puro estilo de un documental sobre biología humana acerca de sinapsis cerebrales y neurotransmisores)[12]. Más que referirse a la incomodidad de los científicos frente a la torpeza política, la versión de Green parece querer inyectar en la familiaridad de la producción cultural una dosis del temor de la cultura pop hacia a la inteligencia artificial, la vigilancia y el control.

En cualquier caso, la plataforma planetaria de inteligencia artificial de Microsoft perfilada por Joppa en su artículo de *Nature* es en realidad un sistema colaborativo para poner en contacto a expertos en tecnología con organizaciones medioambientales con el objetivo de llevar a cabo análisis algorítmicos de datos para "monitorizar, modelizar y en última instancia gestionar los sistemas naturales de la Tierra"[13]. De hecho, la discusión se centra fundamentalmente en los modos de automatización de la recopilación y análisis de los datos, pero aún presenta un modelo en el que la componente "de gestión" exigida para llevar a la práctica los resultados de los análisis sigue descansando en el procedimiento tradicional de toma de decisiones por parte de urbanistas y gestores de uso del suelo. Sin embargo, la posibilidad de un cuadro de mandos de escala planetaria mediante IA resulta inquietante, especialmente en relación con otras aplicaciones novedosas en el campo de la teledetección, la centralización de datos y la inteligencia artificial.

A lo largo de su análisis de los "cuadros de mandos urbanos", Shannon Mattern bosqueja unos "centros de operaciones" y unos "cuadros de mando" para gobernar la ciudad, y analiza pormenorizadamente los principios en que se sustentan[14]. El objetivo de esas salas de control urbano es facilitar información sobre el funcionamiento de la ciudad en tiempo real a sus dirigentes o a otras instituciones públicas, como se pone de manifiesto en proyectos como el Operations Center para Río de Janeiro, diseñado por IBM: videovigilancia, estadísticas de delitos, monitorización de los sistemas de tráfico y transporte, información instantánea acerca de los servicios e infraestructuras, datos climatológicos, accidentes y servicios de emergencias... Mattern establece una vinculación con el origen etimológico del "cuadro de mandos" o *dashboard* en inglés, término acuñado a mediados del siglo XIX y que, al igual que *salpicadero* en español, se refería al faldón de madera o piel que en el pescante de los carruajes servía para proteger de las salpicaduras de barro que levantaban los cascos de los caballos. De manera similar, sus dispositivos electrónicos sirven para higienizar o aislar del "barro" real las dinámicas y los procesos urbanos, convirtiéndolos en variables homogeneizadas y traduciéndolos en datos representativos que "estructuran la intervención y la subjetividad de los usuarios de los cuadros de mando", y determinan de qué manera el administrador puede intervenir en el sistema y prescribir las "herramientas" que pueden utilizarse[15]. Aunque Mattern no entra a discutir este aspecto, es lógico pensar que la inteligencia artificial podría llegar a facilitar o incrementar estas decisiones operativas, como ya puede verse en los nuevos sistemas de control social y urbano basados en IA implantados por el gobierno de China que emplean redes de millones de cámaras de seguridad, incluso provistas *zooms* ópticos, conectadas a programas de reconocimiento facial y otras bases de datos que facilitan las detenciones, evalúan la "puntuación como ciudadano" de los individuos e incentivan su "buen comportamiento"[16].

LA ARQUITECTURA COMO INSTRUMENTO DE CONTROL MEDIOAMBIENTAL

En la actualidad existe un buen número de programadores dedicados a diseñar sistemas de control social prácticamente instantáneo, pero la arquitectura cuenta con una larga trayectoria de diseño de sistemas, mucho más lentos, que han empleado el control medioambiental para proyectar ciertos ideales de orden social (y global). En su estudio *Outlaw Territories*, Felicity D. Scott recupera los primeros ejemplos de arquitectura implicada en el "control medioambiental" global, en la medida en que contribuía a dar forma a condicionantes medioambientales, políticos y geopolíticos al servicio de un gerencialismo corporativo globalizado, tanto en los sectores privados como públicos, proveniente de los Estados Unidos[17]. En su análisis del diseño de Kevin Roche para la sede de la Fundación Ford en Nueva York, examina el descomunal jardín interior diseñado por Roche junto al arquitecto paisajista Dan Kiley **(fig. 03)**. El jardín era un microcosmos delimitado por la edificación, con especies vegetales de todo el mundo, controlado ambientalmente y alimentado mediante unos inyectores de fertilizante artificial y un sistema de riego automático. El observador contemporáneo no puede escapar a la evidencia de que se este jardín tecnológico era un símbolo del control global y medioambiental. Scott reproduce un comentario de la revista *Life* de 1968, que lo interpretaba como una visión de las ciudades futuras en las que, para posibilitar la vida urbana y escapar de una polución descontrolada, "se acristalarán manzanas enteras, se llenarán de plantas y se controlará el ambiente con un termostato"[18]. Una cita de la entrevista con un directivo de la Fundación Ford publicada en *Village Voice* confirma la opinión de Scott de que este "espacio interno y controlado reproducía una sensación de control a escala global". El directivo se entusiasma al afirmar: "Puedes contemplar un escenario rural y otro urbano y dos estaciones distintas al mismo tiempo. [...] Me ayuda a mantener una perspectiva global"[19]. En aquellos años de *Pax Americana*, uno de cuyos exponentes era la Fundación Ford y su sede general, el control global y la hegemonía de los Estados Unidos iba a verse amenazada por un sistema de ayuda y de instituciones internacionales. Se trataba de un sistema de control gerencialista, cuyos resortes eran manejados por tipos como el descrito por William H. Whyte en *El hombre organización*; tipos que, en el mundo real, se encarnaron en personajes como el famoso "Whiz Kid" que presidió la Ford Motor Company o Robert McNamara, secretario de Defensa de las administraciones de Kennedy y Johnson que basaba sus decisiones exclusivamente en datos (y que abogó por el recrudecimiento de la guerra de Vietnam). Teniendo esto en cuenta, la sede de la Fundación Ford en Nueva York bien podría recordar un grito lejano de la jungla de Vietnam, y para Scott demuestra su connivencia ideológica con un sistema que produjo tanto gerentes defensores del taylorismo como economistas defensores del belicismo.

EL JARDÍN (DES)ORDENADO COMO INSTRUMENTO DE CONTROL SOCIAL

Mientras que el atrio ajardinado de Roche y Kiley puede considerarse una reproducción a escala vegetal del imperio estadounidense, treinta años después surgió un modelo global diferente de control de un microcosmos natural en la era de internet: se trataba del proyecto Tele-Garden, una iniciativa que unía arte y computación para poner a prueba las capacidades de las comunidades digitales emergentes de monitorizar situaciones del "mundo real" e incidir sobre ellas. Con la ventaja de analizarlo desde la perspectiva contemporánea, puede afirmarse que el Tele-Garden sobrevive en una virtualidad electrónica: continúa existiendo en páginas web archivadas, en vídeos de YouTube, en publicaciones de arte electrónico y digital, y como punto de partida de un libro de texto editado en 2000 or uno de sus creadores[20]. En un jpg de alta resolución descargable desde su página web aparece iluminado sobre un fondo negro, limpiamente colocado sobre una alfombra negra con sus conexiones umbilicales de agua, electricidad y datos, que se prolongan más allá del borde de la imagen **(fig. 04)**. En un parterre dispuesto con la misma pulcritud, se observa un cuidado conjunto de distintas especies de plantas, flores de colores vivos y hojas de variados tonos de verde. Sobre el brazo robótico aparece el único texto de la imagen, "adept" ('experto, erudito'), un nombre casi demasiado perfecto para la empresa que fabrica el robot.

El servicio de almacenamiento Wayback Machine de Internet Archive contiene 620 guardados de la página principal de la instalación Tele-Garden en el Ars Electronica Center de Linz, en Austria[21]. La instalación se publicó en internet en junio de 1995 desde un laboratorio de la University of Southern California. En septiembre de 1996 se trasladó al vestíbulo del Ars Electronica Center hasta que fue desmantelada en agosto de 2004. Estaba formada por una bandeja de unos cuarenta y cinco centímetros de profundidad rellena de tierra, un brazo robótico industrial al que se había incorporado una cámara, iluminación y una serie de actuadores neumáticos que dejaban pasar el agua y permitían excavar pequeños hoyos en la tierra y plantar semillas. Para que el experimento tuviera éxito, era crucial que el Tele-Garden estuviera conectado mediante una cámara web que transmitiera imágenes a una comunidad dispersa de "miembros-jardineros". Y precisamente esta capacidad de interacción fue lo que permitió las labores de "jardinería", y al mismo tiempo generó una red social espontánea alrededor del proyecto. Además, el sistema estaba programado para que los miembros pudieran solicitar una serie de imágenes fijas durante varias semanas, ya que el brazo robótico dirigía la cámara hacia los puntos de interés para grabar las imágenes periódicamente durante los intervalos de inactividad[22].

Visto en retrospectiva, resulta hoy perfectamente posible ver el Tele-Garden como un miembro más de la familia de cultivos robóticos cuyos ejemplos más recientes varían desde los *FarmBots* de código abierto para producción doméstica automatizada[23] hasta el empleo de la teledetección, los vehículos autónomos y la tecnología de IA en la agricultura industrial[24]. No obstante, el marco inicial del proyecto Tele-Garden le otorgó una extraordinaria relevancia dentro de la trayectoria evolutiva social y tecnológica, condensada en dos párrafos de la página de inicio del sitio web del proyecto. El primero es una cita de la *Historia del Arte* de H. W. Janson[25]:

> "La revolución neolítica [...] comenzó alrededor del año 8000 a. C., cuando la humanidad consiguió domesticar algunos animales y cultivar cereales [...] Tras asegurarse el suministro de alimentos por sus propios medios, se asentaron en poblados permanentes".

Y el segundo de la *Compton's Encyclopedia*[26]:

> "Los jardines son tan antiguos como la propia civilización [...] las vívidas descripciones de los científicos, naturalistas e historiadores han soportado el paso del tiempo mucho mejor que los jardines que las inspiraron. Aristóteles [...] describió con todo detalle durante sus dos años de estudios los jardines silvestres de la isla de Lesbos. Su convicción de que el mundo natural debía recibir una mayor atención por parte de los científicos allanó el camino a todo lo que habría de venir más adelante".

Esta última cita refuerza el significado simbólico y epistemológico de la rudimentaria cámara web CCD del Tele-Garden, y la posiciona en modelo de flujo unidireccional del conocimiento y la información en la ciencia: desde la naturaleza hasta el ojo y el cerebro de un observador instruido. Sin embargo, desde la perspectiva de la arquitectura y el urbanismo, la primera cita resulta más elocuente. La simplificación de Janson sobre la evolución de las sociedades, los sistemas de producción y los asentamientos humanos es fácilmente reconocible como la típica explicación posilustrada sobre la transición del nomadismo hacia la agricultura rural para finalizar en la ciudad industrial y comercial. Este es el modelo estereotipado de desarrollo urbano desde los cazadores-recolectores hasta la moderna ciudad comercial representado gráficamente en la famosa "Sección del valle de la civilización" de Patrick Geddes. Al igual que esta analogía histórica propone un proceso social darwiniano de trayectoria intelectual y tecnológica lineal desde el "primitivismo" a la "civilización", el Tele-Garden servía como prueba experimental de que una cooperación organizada e instruida era el siguiente estadio evolutivo de las comunidades digitales. Si los usuarios no lograban coordinarse en comunidades con intereses comunes, el jardín moriría o se descuidaría (el motivo de darle forma de una jardinera con flores silvestres tan escrupulosamente plantada y escardada nunca quedó del todo claro por los comentarios de sus creadores).

DESDE EL MODELO A ESCALA HASTA EL UNO A UNO

El jardín interior de la Fundación Ford y el Tele-Garden son una imagen especular el uno del otro. El jardín de la Fundación Ford se sitúa en un extremo de la larga estirpe de jardines microcósmicos, como el jardín de plantas medicinales y el posterior jardín botánico, que reúnen distintas especies para dar forma a una situación global que será apreciada desde una perspectiva única personificada en un humano. El Tele-Garden, por su parte, congregaba múltiples perspectivas humanas dispersas por todo el planeta gracias a un incipiente internet, cuyo nexo era un compromiso incorpóreo centrado en un único arriate con unas pocas plantas (daba la sensación de que las especies concretas del Tele-Garden no constituían un aspecto importante del proyecto). Sin embargo, tanto en el jardín de la Fundación Ford como en el Tele-Garden puede apreciarse la fusión de la mecánica y la electrónica con la naturaleza y el hombre, y por tanto ambos forman parte de un *continuum* que entrelaza conocimiento, técnica y naturaleza y que permite el progreso de la modernidad.

A la luz de este progreso, puede decirse que los proyectos más recientes de inteligencia artificial global llevan estas aspiraciones a escala planetaria; ya no se trata de modelos a escala o microcosmos, sino que retoman la idea de Borges sobre el conocimiento que albergan las representaciones y las cosas en sí mismas con una relación de uno a uno: "un mapa del imperio, que tenía el tamaño del imperio y coincidía puntualmente con él"[27].

¿LA IA AL RESCATE?

Volviendo a la representación de Green del congreso de la RNRF como la visión de un cuadro de mandos planetario y ubicándola al final de un lapso de veinte años a partir del Tele-Garden y su primitivo sistema de interacción con humanos mediante la teledetección y la respuesta a distancia, es posible imaginar un incremento de los datos en tiempo real y de los sistemas de interacción como el que describía Mattern que desemboque en un inmenso sistema integrado y orquestado exclusivamente por máquinas para la detección y respuesta ambiental. Si tenemos en

cuenta el debate del congreso de la RNRF, también podríamos volver la mirada a Buckminster Fuller y los primeros intentos derivados de las reflexiones internacionales sobre el progreso y la conservación del medioambiente con el objetivo de establecer nuevos sistemas exhaustivos para obtener información. En el simposio de la Declaración de Vancouver (entre cuyos signatarios se encontraba el propio Fuller) se demandaba una planificación medioambiental progresiva a escala global[28]:

> "Nuevas instituciones académicas y modelos de investigación, así como nuevos métodos adecuados para recopilar y organizar los datos [...] en los que basar el nuevo esfuerzo en políticas de asentamiento. En este sentido, los inventarios de los tipos de suelo del país, de los ecosistemas naturales, de las reservas minerales, de las presiones y movimientos migratorios de la población y otras formas básicas de información están casi siempre desactualizadas o simplemente no existen".

Fuller ya había dado forma a tal sistema de recopilación exhaustiva de información en su World Resource Inventory, y quiso llevarlo a la práctica en lo que quizá sea todavía hoy el cuadro de mandos con información medioambiental planetaria más ambicioso del mundo: el denominado "World Game". En sus tiempos en la Southern Illinois University de Carbondale, quería conseguir una descomunal infraestructura de simulación informática sobre la que sustentar el World Game construido en el campus, con una pantalla gigante que mostraría datos en tiempo real de los recursos globales. Por su complejidad, hacer realidad el colosal inventario global de Fuller, o ni tan siquiera el modesto enfoque nacional y colectivo de la Declaración de Vancouver, sigue fuera de nuestro alcance incluso en la época del *big data*, y adecuarlo a la visión ecoutópica de Fuller, todavía más.

Fuller perseguía un reequilibrio medioambiental para el planeta mediante la incorporación de los modelos de recursos mundiales de que carecía Malthus (y, más próximos cronológicamente, el Club de Roma y Jay Forrester). El World Game y la recopilación exhaustiva de datos en tiempo real estaba diseñada para que la abundancia de recursos fuera claramente perceptible por todo el mundo. Esta estrategia de Fuller puede recordar a Pollyanna y parecer lamentablemente ingenua cuando se contempla desde una época que mide el impacto de la humanidad en el medioambiente mediante la curva exponencial del agotamiento de los recursos y la extinción de especies como consecuencia de la Gran Aceleración. Y llegados a este punto, el terror a la escasez de recursos y la omnipresente amenaza de que el sistema global colapse vuelven dispuestos a vengarse, pues exigen el *big judgement* o valoración globalizada de una serie de decisiones esencialmente políticas sobre dónde y cómo aportar recursos personales y económicos para mejorar el medioambiente. El proyecto AI for Earth y el *big data* aplicado al medioambiente quieren mantener la promesa de una especie de cuadro de mandos medioambiental que proporcione todos esos *datos globalizados* y actualizados minuto a minuto para permitirnos (a nosotros o a nuestros gobiernos) dictar las *valoraciones globalizadas* definitivas en materia político-ambiental.

Este modelo ideológico-cognitivo de "diseño" medioambiental planetario recuerda las ideas de la "nave espacial Tierra" de los años setenta. Peder Anker argumenta que el discurso sobre el medioambiente de esa década se apoyaba en imágenes de una vida espacial autosuficiente y hermética, lo que pretendía reproducir en el diseño arquitectónico un modelo mucho más atractivo de alternativa pacífica, racional y medioambientalmente viable a los conflictos del mundo real, la irracionalidad y la crisis energética de aquellos años[29]. Por ejemplo, el arquitecto paisajista Ian McHarg empleaba constantemente la imagen de la Tierra como si fuera una cápsula espacial en su influyente *Proyectar con la naturaleza*[30]. En el momento álgido de la conferencia "Day of Awareness" organizada en 1970 por la American Institute of Architects, reivindicó que la "definición real de *arquitectura*" era la "búsqueda de la adaptación para sobrevivir", y que esa adaptación exigía "pensar en el diseño como una adecuación del entorno construido que permitiera la supervivencia de la humanidad del mismo modo que los sistemas y procesos de la cápsula espacial se diseñaban para permitir la supervivencia del astronauta"[31]. Según esta teoría, el fallo de los sistemas no es culpa de la tecnología, sino de una intervención defectuosa de los actuadores humanos. La primera temporada de cultivo del Tele-Garden finalizó cuando un único usuario se excedió con el riego e inundó el jardín; en otros casos, el jardín crecía descontrolado sin que los miembros se pusieran de acuerdo para gestionar la poda, retirar las malas hierbas y replantar una superficie mayor. En la encarnación contemporánea del Tele-Garden, las FarmBots automatizan muchos de esos procedimientos mediante secuencias, regímenes y "farmware", como el empleo de procesos de reconocimiento de imagen para identificar malas hierbas, lo que simplifica la gestión y la producción de ciclos de cultivo preestablecidos. En la actualidad, es cada vez más clara la convergencia de la escala planetaria de la teledetección y de los proyectos más ambiciosos con la pequeña escala de los procesos de gestión robotizada de cultivos. En la escala planetaria, el director de investigación medioambiental de Microsoft, Lucas N. Joppa, argumenta que los humanos no deberían intervenir en las valoraciones: "Necesitamos que la inteligencia artificial nos salve de nosotros mismos" y añade: "Lo que me preocupa es que la IA llegue demasiado tarde"[32]. Más concretamente, Joppa opina que la inteligencia artificial deberá ocuparse de identificar tendencias y predecir escenarios gracias al *big data*: "Estamos comenzando a juntar las piezas de un sistema capaz de monitorizar el funcionamiento de la Tierra y de concebir métodos para corregir los fallos cuando las cosas empiezan a torcerse"[33]. El riesgo es que este razonamiento sea víctima de la falacia de composición, un concepto popularizado por Keynes como parte de su crítica a la economía clásica y que indudablemente los arquitectos reconocerán en el problema de la escala y la relación entre las partes y el conjunto. La falacia se centra en el problema de que el simple hecho de que algo sea cierto en una parte de un sistema, o incluso en todas las partes del sistema cuando se tratan individualmente, no implica necesariamente que sea cierto para la globalidad del sistema.

El aspecto más revelador del Tele-Garden es la forma en que estaba gobernado por impulsos humanos. Uno de los sueños de la IA (en su versión más científica y tecnófila, no en el universo cultural pop de las distopías robóticas) es eliminar la irracionalidad humana y sustituirla por cadenas de código algorítmicamente perfectas. De hecho, se trata de la máxima aspiración del proyecto Enlightenment y quizá el verdadero nacimiento del *homo economicus*. Sin embargo, en última instancia este podría resultar ser otro caso de pensamiento mágico en su sentido antropológico más estricto. El reciente debate sobre el racismo inherente a los algoritmos muestra hasta qué punto literalmente codifican los prejuicios culturales[34]. No es difícil imaginar que suceda lo mismo con los proyectos relacionados con los datos globalizados, la inteligencia artificial, la robótica, el medioambiente y los cuadros de mandos planetarios. Sin necesidad de llegar a la escala global, las propuestas de teledetección, *big data* e IA ya evidencian algunos de esos ángulos muertos. Según el Foro Económico Mundial, la "agricultura de precisión e inteligencia artificial" permite "la recopilación automatizada de datos, la toma de decisiones y de acciones correctivas mediante autómatas que hagan posible la detección precoz de enfermedades y otros problemas en los cultivos, que regulen la alimentación del ganado y que en líneas generales optimicen los recursos y la producción agrícola de acuerdo con la oferta y la demanda". El lenguaje resulta al mismo tiempo revelador y desconcertante, sobre todo por venir del también conocido como Foro de Davos, ya que hasta entonces se había afirmado (y aún se afirma en algunos círculos) que la "mano invisible" del mercado sería la encargada de optimizar esas dinámicas. Desde luego, el razonamiento consiste en que el mercado está dirigiendo la inversión tecnológica hacia una utopía agrícola perfeccionada

mediante la IA, por lo que en última instancia deberíamos confiar en el mercado. Sin embargo, también da la impresión de que se está reconociendo la ineficacia del mercado (tradicional), e incluso su fracaso. Joppa menciona la adquisición de la tecnología de Blue River por parte de Descartes Labs y John Deere como "ejemplos inspiradores"[35] en la producción agrícola, pero es evidente que las valoraciones de esos proyectos de capital-riesgo y fondos de gestión libre aspiran a la maximizar su cuenta de resultados (algo que sin duda definirá su evolución), lo que dará lugar a un mercado de futuros automatizado y calibrado cada vez con más precisión en el primer caso y a una producción a gran escala más agresiva y dominada por las grandes empresas, capaz de adaptarse a la promoción de nuevos mercados y productos de los gigantes de la alimentación.

Los inversores en empresas tecnológicas y los ingenieros de programación se han convertido en un nuevo Buckminster Fuller: el ordenador es el *deus ex machina* que viene a salvarnos. Pero en el mundo de la cultura, los arquitectos e ingenieros necesitan encontrar nuevas rutas espaciales para esta nave, hacerse con los controles del cuadro de mandos en lugar de dejarlos en manos de los mesías del capital y la tecnología, y descubrir vías críticas y alternativas para "ponerse a trabajar" (con el debido respeto a Bucky). Conforme avanza la transformación de la "naturaleza" en "datos", mayor es el reto de los diseñadores de construir futuros medioambientales, más que "medioambientalmente controlados".

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Imágenes

01. Jardín de la Fundación Ford, Nueva York, del arquitecto paisajista Dan Kiley, 1964. Fotografía de David Leventi, 2013. Cortesía de Rick Wester Fine Art, New York.

02. "Cuadro de mandos medioambiental", diseño de interfaz de N sketch Inc. (Yuki Anezaki y Kohei Tsuji) para Fujitsu. Participante de los premios iF Design Awards 2015.

03. Jardín de la Fundación Ford, Nueva York, del arquitecto paisajista Dan Kiley, 1964. Fotografía de David Leventi, 2013. Cortesía de Rick Wester Fine Art, New York.

04. El Tele-Garden de Ken Goldberg y Joseph Santarromana, University of Southern California y Ars Electronica Museum, Linz, Austria, 1995-2004.

16

The Naturalisation of Architectural Space. Three Critical Positions far from Naturalism

Javier de Esteban

The article analyses three coincident projects, developed at the turn of the century, which delve into the relation between nature and architectural space. In the three cases, the interpretation of nature, understood as a cultural construct, is integrated into the architectural conception and the ideation itself. Under what could be called a 'naturalisation' process, these practices get away from those self-proclaimed sustainable or naturalist, usually of short-term view, recovering some traditions and sharing a critical attitude that allow us to reflect on new ways of visualizing nature and its relation with architecture.

NATURALISATION VERSUS NATURALISM

"So what is it that I know? Is it nature? Nature as such has no 'real' essence - no truthful secrets to be revealed. I have not come closer to anything essential other than myself and, besides, isn't nature a cultural state anyway? What I have come to know better is my own relation to so-called nature (i.e., my capacity to orient myself in this particular space), my ability to see and sense and move through the landscapes around me. Looking at nature, I find nothing... only my own relationship to the spaces, or aspects of my relationship to them. We see nature with cultivated eyes. Again, there is no truthful nature; there is only your and my construct of such. Just by looking at nature, we cultivate it into an image"[1].

The American artist Robert Smithson described nature as "simply another fiction of the eighteenth and nineteenth centuries". This provocative statement come to say that nature should be understood as a cultural construct that has been different interpretations by human being throughout the stages of history. As can be interpreted in works such as the iconic Spiral Jetty, Smithson tries to leave behind numerous conventions to delve into the relationship between technology and natural forms. The artist emphasizes that nature can not be separated from its own interpretation, showing an interesting framework based on technological changes and their possibilities in its visualization and understanding[2].

This conception acquires greater relevance if we think that the interpretation of nature has changed substantially during the 20th century. At present, it seems to be shaped by an environmen-

tal awareness that has been increasing since the 1970s, reflected in publications such *The Limits to Growth* and the frequent use of terms as 'energy crisis' or 'climate change'. Thus, the vision of nature as something obvious, given, coherent and inexhaustible seems to have diminished. We are in a situation in which global perspectives have progressed considerably in our daily lives, being essential to think about the environmental consequences of our individual actions. In this sense, it seems opportune to ask about how to integrate these themes into our aesthetic conceptions.

If we observe the conception of nature throughout modernity, it has constantly developed the difference between preindustrial and industrial, between nature and the products manufactured by the human being, whether specific to the industry or any built environment. Cases such as the conception of Central Park by Frederick Law Olmsted are paradigmatic. In the text "Public Parks and the Enlargement of Towns" of 1870, Olmsted understands the park as something linked to the nature, as a focus of healthiness (alluding to the social hygiene movement), opposed to the city and the urban environment. This fact is also evidenced in Le Corubusier's urban projects, as Ville Radieuse (1922), where the housing towers spread out on uninterrupted nature. The fifth point for the new architecture also fosters this duality, conceived the garden terrace as return to nature the space occupied by building footprints.

But perhaps the case of the Crystal Palace is more manifest for what the building itself means for the modern conception. In this case, Joseph Paxton had to preserve a row of centenarian elms to achieve the permission, given by aristocratic Hyde Park neighbourhood, to carry out the pavilion for the 1851 London Great Exhibition. Thus, the building, which represents the advances of industrialization, both in the use of new materials (glass and steel) and in its own construction (assembled by an army of railway workers in four months), incorporates the nature that had rejected as an image **(fig. 02)**.

The historian and critic Philip Ursprung calls to this attitude, or ideology, "naturalist", "on the assumption that there is actually such a thing as nature on the one hand, and that architecture's meaning resides in its capacity to articulate, frame, enhance and control the forces of nature". Ursprung proposes to leave this duality strengthen in modernity behind; "as the distinction between and wall and ceiling, inside and outside, become more difficult to make, the distinction between what is nature and what is not becomes obsolete". He adds: "nature and all the emblems it used to be represented by are totally absorbed into this new spatial realm"[3].

If we pick up Robert Smithson's idea of nature as fiction, either from the notion of integration or from its existence as something independent, then we should reformulate the question of how nature affects and shapes the built environment. And, if we understand nature as an image, text or system of symbols, emerge also the possibility to transform and manipulate. Within this perspective, the idea of 'naturalisation' gets away from a conception of nature as something given or autonomous to the built environment, to assume it as a projection of the human being and consubstantial to the design itself.

The development of architecture from the conception of the nature itself, which lays out a specific visualization of this, is showed a way to explore, especially because the relevance that environmental awareness has acquired in recent decades. On the aesthetic dimensions of this perspective, Iñaki Ábalos points out that "only if there is genuine aesthetic debate, if there is an idea of beauty associated with sustainability, will the latter be able to appeal to architecture in a non-circumstantial way and will encourage architects to work on it". In his "Picturesque Atlas", Ábalos outlines a series of strategies to explore, drawing a narrative on parks and artificial landscapes, what is not known and its transformation into images[4].

The idea of 'naturalisation' must be placed in this context and understood as a progress from those practices self-proclaimed sustainable or 'naturalist'. The latter seem to have polarized in two opposing strategies: one associated with the strictly technical and another with a kind of expressionism of natural aesthetics. In the first one, the architecture seems to be reduced to mere statistic, justifying any solution from the fulfilment of zero-energy building and to obtain the 'green building' certificate. And, on the other hand, we usually find a literal translation of natural forms, either through a green facade that envelops the building or converting the building directly into landscape. Unlike this view dominated by marketing that has made sustainability its all-purpose word, essentially of short-term view, the following projects build a critical framework to delve into the relation between nature and architecture.

NATURE AS METAPHOR: RENEW THE MODERN ARCHITECTURAL SPACE

"With this simple construction, the Mediatheque will be the archetype of an entirely new architecture. It will serve as a place where the two bodies of the contemporary human being inhabit, the body that contains the flow of electrons and the primitive body responsive to nature"[5].

The Sendai Mediatheque is the result of an international competition that led Toyo Ito to carry out, during 1995 and 2001, one of his most celebrated buildings. Its iconic image, the structural innovation or the programmatic flexibility give to the building an undoubted interest, but we can add the attempt to represent some topics of contemporary culture such as the fluidity condition, the functional multiplicity, the virtually of the limits or the advances of digital technology and electronic media. These topics have also been developed by Ito in various texts and articles in an effort to reflect on the changes of contemporary society.

Despite his awareness about the specificity of architecture recognizing its codes and a certain tradition, Ito considers essential finding in topicality part of the meaning of architecture (its contemporary condition). In order to introduce certain meanings in his work, the use of metaphor is frequent, as the Mediatheque exemplified, finding in the interpretation of nature or natural forms its main starting point. It should be noted that metaphor comes from the Greek term 'metaphora', which comes to say 'translation' or 'transfer', and which is based on the articulation of relationships of one thing with something different from itself to define a field of recognition and association as well as a transmission of certain meaning[6].

The idea of column as a tree dominates the conception of the Mediatheque; while the building spatial definition seems to be based on the idea of forest, with a oscillation between open and close areas or lightness and darkness, setting up a varied composition **(fig. 03)**. But atmospheric phenomena are also used in order to suggest an atmosphere composed of fluctuating activities; in this case, the information flows replace the natural ones. The diverse activities of each floor are conceived from this information exchange through conventional or micro-electronic systems. The multiplicity of layers (programs, or functions) or the phenomenalism completes this association, validating the idea that "architecture should not claim its own physical form but must become a device to interpret the form as a phenomenon"[7].

In the article "Arquitectura pública como punto de paso" (or "The Transparent Urban Forest") Ito stands up for a city composed of transparent and permeable public buildings, as "relativized objects", with heterogeneous functions and spaces that can encourage the flows exchange **(fig. 04)**. Following this principle, the Mediatheque is based on an open system of interchangeable activities trying to achieve a certain functional undefinedness. The integration of an art gallery, a municipal library and an audio-visual media centre seems analogous to an organic process of decomposition, combination or fusion.

In the Mediateque's formal description, understood as an archetype, Ito points out three kind of categories: plates (steel plates), tubes (steel structure) and skin (glass facade). It is referred, again, to the field of natural forms. The plates turn into a square steel slabs of 50 x 50 meters (seven), represented in the drawings as places that contain the flow of users and objects. It is favoured, thus,

a system of variable densities able to guarantee a high diversity (the artificial lighting also acquires a important role in the exchange and variations of each floor)[8]. The section also contains this planimetric freedom through variation of heights between plates that accentuates the flexibility of the system. It should be added that the freedom achieved by Le Corbusier in the 'domino system' or Mies van der Rohe in the 'universal space', now is accompanied by a randomness character **(fig. 05)**[9].

The Mediatheque's structure order and qualify the plan, since its strategic position in each platform guarantees the occupation and an adequate distribution of space. It is formed by 13 biomorphic tubes (like a trees), which penetrate vertically in the plates and support them. Each one, in addition to transport weight, allows the exchange of diverse energies, such as light, air, water or sound. The conception of the structure as something more than a bearing system is also observed in its ornamental dimension, leaves behind the conventions that insist on their independence. The structural function, thus, loses its foundation condition to camouflage itself in a decorative system defining environments and accentuating occupations.

Regarding the corporeity of architecture, the Mediatheque involves a tension between material requirements and the architect's desire to dilute building facade and its limits. The metaphor of the skin shows Ito's aspiration to turn the facade into an interface that could articulate the tangible and the intangible or the natural and the artificial. The real impossibility of this fact, since every architectural form or object is always based on a certain tectonic expression, reveals the limitations of such attempts. Ito, however, seems to delight in this ambiguity, hence his search for the virtual develops around his concerns for the tectonics and its use for metaphorical purposes.

The neutral and abstract space acting as a starting point at the Mediatheque, linked to the modern tradition, is altered through the recovering of architecture figurative quality and its literal and metaphorical ornamentation. This fact not only manifest that the paradox is assumed as a way of thinking, but also that the rejection of form could be compatible with techniques based on figure-ground contrast. At the same time, the use of metaphor by Toyo Ito emphasizes that nature not cease to be a cultural construct. Ito's deep interest in nature, as this project suggests, is not its contemplation or its hygienist values (the romantic and modern models) but its ability to allow us to interpret the cultural changes that the Digital era has introduced in our lives.

NATURE AS ENERGY AND MEMORY: STRATIFICATION OF URBAN SPACE

"On my first visit to the place, even with eighty cars parked there, I was touched by the beauty of the stone surface, the variety of sizes and colours of the material and the way that they shone in the sun. The physical history of Stortoget is based on the movement of these native stones from the neighbouring agricultural lands, where they were stacked forming boundaries for their use in the streets and the square at baroque town. The presence of this stone in Kalmar's centre recalls its physical transformation, almost primitive, from rural to urban area"[10].

The Caruso St John's project, in collaboration with the Swedish artist Eva Löfdahl, had the task of renewing the main square of Kalmar in order to recover the old identity, lost over time and damaged by the traffic. Ruling out the strategy of *tabula rasa*, the authors conserve the existing fragmentation by restoring the patterns that had characterized the floor plan. This strategy leaves behind the artificial condition that can be perceived in many contemporary urban interventions, assuming the changes and the natural evolution of the urban space itself.

Caruso St John set out a plan based on two systems of order. On the one hand, a regulatory system through perpendicular routes to articulate flows and movements (built on smoother textures such as granite pavers and prefabricated concrete slabs); and, on the other hand, the specific definition of the areas generated by the first system through subtle changes in the stones and the granite's colour (granite boulders of different dimensions originally used in the square). If the first order gives unity to the square, the second allows an expressive richness in the floor's texture, which remembers the organic and heterogeneous condition of natural forms **(fig. 06)**.

The intervention goes beyond the scope of the square itself. The definition of the layout system refers both to its perimeter and to the farthest urban environment, in order to integrate the square itself into the energy, cultural, and material network that appeals to the memory of the city. This definition of place, which seeks to broaden its interpretation as a mere typological interpretation, dissolves the permanence of the traces in a multiple relationship between the renewed space and the surroundings.

The project also seeks the abstraction of the floor plan, without fixing areas for specific uses. This polyvalence seems to assume the memory of the place, which has had multiples uses during its 300 years of existence - from political, military or religious representations to become the commercial heart of the city. In turn, any picturesque furniture or ornament is avoided emphasising the texture of the floor plan itself. Thus, the pavement acquires a clear physical presence, as an organic surface, thanks to the thickness and *chiaroscuro* of the stone patterns **(fig. 07)**.

The matter becomes an active and sensitive object, a source of energy to deal with. The architects pay attention to this potential preserved in the displacements and the relocations of cobbles and boulders. The square organization finds in this matter's interpretation the identity of the place; a renewed *genius loci*. The possibility of understanding the square from its material memory assumes a reflective view of the natural and urban environment. The stone rests shifted and gathered, as natural entropic processes, making Stortorget a tangible sign of the city's life. As Adam Caruso points out: "We can also imagine the environment as something that can encompass human effort as well as matter, a territory in which connections can be established between energy and culture"[11].

In Stortoget, also, urban space's idea is enriched through these connections between matter and energy, as layers of meaning that seeks, in any case, an architecture that could adopt a wider environmental sphere. The transport of stones from other places of the city to relocate within a new order is conceived as an operation where energy acquires it own expression and which is accumulated in a material that makes sensitive **(fig. 08)**. This means an exchange of energy that enables to interpret the form, matter, memory or time within a process closely linked to the natural environment and its processes.

The Kalmar's stones, therefore, are shown as vehicle of energy and memory, which allow the past to emerge on the square surface, as layers of matter. All this within a process formed by stratums, which meaning is collected in the stones themselves. Time is interpreted as a discontinuous and non-linear variable, freed from ties to connect the experience of architecture with the place and life. The square, likewise, is revealed as a result of energy flows, recognizing a stratus of the past; sum of multiple levels that fixes a picture where the past and future are reduced to a specific present. We may well consider Stortoget as an instant place, whose granite stones, consist of energy and memory, dissolve between fleeting sparkles and water sounds.

NATURE AS MEDIATION: THE PERCEPTION OF ATMOSPHERIC SPACE

"Exercising the integration of the spectator, or, rather, the spectating itself, as part of the museum's undertaking has shifted the weight from the thing experienced to the experience itself. We stage the artefacts, but more importantly, we stage the way the artefacts are perceived. We cultivate nature into landscapes. So, to elude the museum's insistence that there is a nature (if you look hard enough for it), it is crucial not only to acknowledge that the experience itself is part of the process, but, more importantly, that experience must be presented undisguised to the spectator"[12].

"The Mediated Motion" proposes a physical transformation of Kunsthaus Bregenz's architectural space through adding successive layers of nature that the viewers can contemplate in a continuous itinerary. The strict geometry of Peter Zumthor's building becomes in a kind of miniaturized but sublime nature and the museum in a sequence of atmospheric spaces that involve the visitors in its aesthetic density. The artistic efficiency of the installation is based on the immediate perceptive shock produced by the atmosphere of each landscape, which far from become a gimmicky effect, underlies a rigorous staging. The connexion between building and nature, also artificial, constitutes a dialogue where the natural seems to emanate from the artificial and the artificial from the natural.

The exposed work turns into nature and nature into landscape. The landscape architect Günther Vogt collaborates on the project, on the definition of the itinerary, based on the spiral movement that characterizes Zumthor's building, to emphasize the transition from one landscape situation to another. On the ground floor, visitors first encountered a collection of logs sprouting shiitake mushrooms. Moving to the levels above, they came across a pond with floating duckweed on level one, which they could cross via a series of pontoons, and a floor of gently sloping, compressed soil on level two. On the top floor, a suspension bridge spanning a room full of fog terminated abruptly at a blank wall, forcing visitors to return along their original route. The installation generates a tension between conceptual art, with scientific roots, and emotional one, subjective, based on the experience.

Eliasson considers mediation and movement -the two concepts selected to installation's title- essentials to delve into the relation between the human being and the environment. For the Danish artist, mediation supposes "a degree of representation in the experience of a situation"; degrees or levels in continuous changing according to the factors involved in each case. In this sense, mediation is understood from its capacity to generate evaluation, criticism, or reflection; key values of artistic and cultural practice. Regarding the movement, the installation emphasizes the idea of the travel and flow, whereby the spectator builds a critical attitude towards what is observed and perceived. The itinerary is not far from a funfair. The visitor is waiting the next room, expects the following trick **(fig. 09)**. As Eliasson points out: "On all four levels, odours, fog, water, plants, and soil caused the strictly orthogonal, concrete-and-glass architecture of Peter Zumthor to metamorphose into a path of experience and awareness of experiencing"[13].

The installation also aims to make us reflect on the weather and its capacity for mediation, understood as "nature in the city" whose interest lies in its unpredictability and variability. In the installation, Eliasson manipulates some basic elements of weather such as the water, light, temperature or atmospheric pressure itself. Through the natural phenomenon introduction, the installation promotes to think about how nature is perceived and how it affects in our perception of the environment; "As inhabitants, we have grown accustomed through our progressive experience of city space to the weather as mediated by the city. We experience the weather through the 'city-filter', as well as the other way around"[14].

The use of nature goes with a process of dematerialization, where the atmospheres seem to dilute the limits that contain them. This accentuates the condition of the atmospheric model in which the exhibition aims to become, and encourages to reflect on the changing characteristics of architectural space. The light, projections or fog, used to manipulate the observer perception, provoke feelings that could be described as oneiric. At the same time, the perceptive mechanism tries to broaden those that act as only visual way to emphasize the non-visible ones. From this point of view, Eliasson defines an architectural reality where could be possible a deeper reflection on atmospheric space. These themes would be continued two years later in "The Weather Project", an installation held at the turbine hall of the Tate Modern in London **(fig. 10)**[15].

Both installations emphasise the landscape's idea as a projected image of nature. At the Kunsthaus Bregenz and the Tate Modern, the relation between nature and architecture must be understood from the idea of mediation, where the visitor becomes the protagonist in the interaction with the artistic work. The Danish artist also gets away from the debate 'nature versus culture', to reconsider a field of experience constituted by both. Eliasson proposes that the nature should not be understood as a store of alternative forms to replace the conventional ones, but as energy source to activate our lives and as a backdrop to project them.

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Notes

01. ELIASSON, Olafur, "Seeing Yourself Sensing", in *Leer es respirar, es devenir*, Gustavo Gili, Barcelona, 2012, pp. 24.

02. SMITHSON, Robert, "A Museum of Language in the Vicinity of Art", *Art International*, march 1968. Also in FLAM, Jack, *Robert Smithson: The Collected Writings*, University of California Press, Berkeley, Los Ángeles, Londres, 1996.

03. URSPRUNG, Philip, *Brechas y conexiones: ensayos sobre arquitectura, arte y economía*, Puente Editores, Barcelona, 2016.

04. The "Picturesque Atlas" leads the reader to the history of the nature's invention during nineteenth and twentieth centuries, in harmony with Robert Smithson's ideas. ABALOS, Iñaki, *Atlas pintoresco. Vol. 1: el observatorio pintoresco. Vol. 2: los viajes*. Gustavo Gili, Barcelona, 2005 y 2008. Also: ABALOS, Iñaki, "Thermodynamic beauty", in "Abalos+Sentkiewicz", *2G*, 2010, n. 56, pp. 127-136.

05. ITO, Toyo, "Mediatheque in Sendai", in "Toyo Ito, Sección 1997", *2G*, 1997, n. 2, pp. 26.

06. As the philosopher Mark Johnson points out, the metaphor may be understood as a mode of understanding through which certain fields of our experience are translated in order to structure another field of different type. JOHNSON, Mark, *The body in the mind: the bodily basis of meaning, imagination, and reason*, University of Chicago Press, Chicago, 1987, pp. XIII.

07. ITO, Toyo, "A Garden of Microchips. The Architectural Image of the Microelectronic Age", in *Escrito*s, Colegio Oficial de Aparejadores y Arquitectos Técnicos de Murcia, Murcia, 2000, pp. 146-147.

08. As far as the artificial lighting is concerned, it is clearly visible in the building's images. The different heights of each floor acquire presence and formal and spatial relevance as a consequence of lighting variations - difference in intensity, in colour, or in warmth. These variations are responsible for the spatial diversities between floors, which constitutes a clearly anti-modern use of technology, considering that the representation through iconography is replaced by the spatial manipulation.

09. ITO, Toyo, "La mediateca de Sendai. Informe sobre su proceso de construcción", in *Escrito*s, Colegio Oficial de Aparejadores y Arquitectos Técnicos de Murcia, Murcia, 2000, pp. 229-230.

10. CARUSO, Adam, "La energía y la materia", in *The feeling of things: escritos de arquitectura*, Polígrafa, Barcelona, 2008, pp. 19-20.

11. Ibid., pp. 15.

12. ELIASSON, Olafur, "Seeing Yourself Sensing", in *Leer es respirar, es devenir*, Gustavo Gili, Barcelona, 2012, pp. 24-25.

13. "In my search for clues to unlock the building -since the building is surely full of preconceptions of how to see and experience- I discovered the generous aspect of the spiral movement that takes you from one floor to the next. In order to take the greatest advantage of your tutored eye and to integrate you as a central player in the exhibition, I realised that enhancing the principle of movement would be the key. Since your movement and orientation is a process in time, I looked for an opportunity and medium to turn this particular process into the object. In one field in particular, the process as object has been cultivated -landscape architecture- which is why I have turned to Günther Vogt, whose ideas on cultivating process have been a farsighted source for the development of this project: *The mediated motion*", ELIASSON, Olafur, "Dear Everybody", ibid., pp. 14.

14. Eliasson points out: "one might mistakenly take a situation for granted as a 'natural' state of things, being unaware of the constructions lying behind this situation. The challenge of orienting ourselves in a mediated realm is therefore to see through and know when, to what extent, and by whom a situation has been mediated; to be aware of a situation's relationship with time (...) When we can 'see through' the mediation of a situation, when it is transparent, we may experience a degree of heightened self-awareness due to the self-evaluative potential that lies within a situation like this", ELIASSON, Olafur, "Museums Are Radicals", Ibid., pp. 49.

15. In "The Weather Project", the representation of the sun and the sky dominates the space of the Turbine Hall in the Tate Modern. A fine fog expands through space as if it would have come from outside, varying during the day to simulate an atmospheric phenomena. Looking at the ceilings, the fog makes that the roof goes missing, replaced by the reflection of the floor. At the back of the room, we find a giant circle formed by hundreds of mono-frequency lamps. The repeated arc in the mirror produces a brilliant sphere linking the real space with the reflection itself. Generally used in public lighting, mono-frequency lamps emit a low-frequency light that mitigates all the colours except yellow and black. This installation transforms the visual field around the sun into a duotone landscape. PRIETO, Eduardo, "Ars meteorológica. Naturaleza y arquitectura en la obra de Olafur Eliasson", *Arquitectura Viva*, 2011, n. 141, pp. 74-75.

Images

01. Idea of city; where natural environment and built form an indivisible unit that favors the fluidity and interchangeability. El Croquis, Toyo Ito, 19 febrero 2011.

02. A) Villle Radieuse, Le Corbusier, 1922. B) Crystal Palace, Joseph Paxton, Gran Exposición de Londres de 1951.

03. Model, Sendai Media library, Toyo Ito, 1995-2001.

04. Idea of city; where natural environment and built form an indivisible unit that favors the fluidity and interchangeability. El Croquis, Toyo Ito, 19 febrero 2011.

05. Sketch of the plants and section, Model, Sendai Media library, Toyo Ito, 1995-2001.

06. Floor plan, Stortoget, Kalmar, Caruso St. John, 1999-2003.

07. Pavement detail, Stortoget, Kalmar, Caruso St. John, 1999-2003.

08. Stortoget, Kalmar, Caruso St. John, 1999- 2003.

09. "The Mediated Motion", 31.03-13.05 2001, Kunsthaus Bregenz, Olafur Eliasson.

10. A) "The Mediated Motion", 31.03- 13.05, 2001, Kunsthaus Bregenz. B) "The Weather Project", 16.10.2003 - 21.03.2004, Tate Modern London. Olafur Eliasson.