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Inheritable Resilience:
Sharing Values of Global Modernities **VOLUME 2**

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Yoshiyuki Yamana

- 04. **Technological / Material Legacies**
- 05. **Regional Timber Structure**
- 06. **Pedagogies of Docomomo**
- 07. **Documentation and Dissemination**

Inheritable Resilience

Sharing Values of Global Modernities

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Access Point: Architecture-Tokyo

4

TECHNOLOGICAL/
MATERIAL LEGACIES

Session 4-a

CONSERVATION PLANNING: FROM RE-PROGRAMMING TO CONCRETE INTERVENTION

Wessel de Jonge

Architect, Professor of Heritage and Design at Delft University of Technology

This session is about hands-on conservation and how to move forward in conservation planning. This all starts with understanding the existing building, its values, significance and features, but in real life we have to match such a level of theory with the reality of a functional program, a budget and a time schedule. DOCOMOMO is fortunate to have a wealth of experienced consultants amongst its members that can provide a perspective of how to actually preserve key works of the Modern Movement for future generations.

The first paper in this session is about re-programming. For obvious icons, like Konstantin Melnikov's own house or Siza's bathing establishments, the cultural significance of the building itself may be sufficient to spark an initiative for its preservation. But how different it is for an industrial complex that rather represents technological values and societal significance. Francesco Cianfarani explores the cultural legacy and future possibilities of industrial architecture from the early 20th century, using as an example the massive Evans-Fintube plant in Tulsa, originally intended for the oil industry in Oklahoma, USA.

At the other end of the scale is the example of the famous Melnikov House in Moscow that Tapani Mustonen and Mariël Polman present as a *Gesamtkunstwerk*. Comprehensive archival-historical research as well as meticulous material, constructional and colour research took place between 2017-2019, funded by a Getty grant. Their contribution demonstrates the importance of careful planning and the input from international experts in the conservation planning for such Modern Movement icons. This includes a response to the expected growth in the number of visitors and the related increase of wear and tear, humidity levels and so on, that many iconic modern houses have to deal with. In doing so, it illustrates the tendency in 'Modern Conservation' towards a preventive approach rather than a curative one.

Teresa Cunha Ferreira and Eduardo Fernandes introduce two of Siza's works at Leça da Palmeira. The location of these beach establishments along the Portuguese coast immediately raises questions regarding the conservation of reinforced concrete that is prone to ocean spray. Siza's own office developed an interesting conceptual approach to address time layers in concrete conservation, even for buildings as young as these. Perhaps even more intriguing is how Siza acknowledged the differences in both — almost, but not essentially — contemporary works. It is a rare exception that an author of modern icons like these is able to refrain from improving his own 'juvenile works'. In this, he shows his true mastery.

Concrete conservation in the hands of a master may turn out right but in most cases decision-making in concrete conservation is still randomly structured. Ana Paula Arato Gonçalves argues how the well-established concrete repair field and professionals in conservation could join forces if shared conservation principles would guide the decision-making process. Her paper promotes a better dialogue between these disciplines by comparing the concrete conservation principles recently proposed by the Getty Conservation Institute with current standards in concrete repair.

In a kaleidoscopic way this session takes the audience through a wide range of arguments that represent essential steps in designating the future of modern heritage: a complex process that we can't stop learning from.



THE MELNIKOV HOUSE. RESEARCH, ANALYSES, FUTURE

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ABSTRACT.

The Melnikov House, a building designed by architect Konstantin Melnikov in Moscow for himself and his family, is an icon of the architectural avant-garde. The house was originally built as an experimental cylindrical house to test Konstantin Melnikov's own concept for mass housing construction. The original layout, the elegant spatial arrangement and the ingenious building techniques have made this masterpiece world-famous.

The Melnikov House was awarded the Getty Keeping It Modern Grant (KIM) in 2017, after which extensive research into the building and its site was carried out in late 2017 and in 2018. Architectural paint research was undertaken in 2018–2019 and completed the KIM project.

Comprehensive research, including the history, restoration phases, solutions adopted, materials and colours used, helped to understand how the building and its structure function. Just like the building, everything is interconnected.

The paper will give basic information about each research phase and will illustrate the most important factors for the future conservation of the Melnikov House.

After the research phase, the architectural analysis will form the basis for further decision-making and proposals on how to proceed. Different aspects and qualities of the Melnikov House will be analysed and explained in written form, with drawings, photographs, etc.

The Melnikov House is a total work of art with its history and inhabitants, architectural solutions, structures and technology, materials, light, colours, and details.

1. THE ICON

The Melnikov House, a building designed by architect Konstantin Melnikov in Moscow for himself and his family, is an icon of the architectural avant-garde. The house was originally built as an experimental cylindrical house to test Konstantin Melnikov's own concept for the mass construction of housing. The original layout, elegant spatial arrangement and ingenious building techniques have made this masterpiece world-famous (Fig. 1).¹

The Melnikov House has many historic phases. Melnikov, who got his education in the Russian Empire, designed and built a unique building during the early Soviet period, mostly with traditional methods and his very own style. The building later suffered damage during WWII and had sporadic repairs in the late 1940s, 1958, 1964, and 1976. During the 1990s, the House was restored and renovated in a more ambitious way, trying to follow original methods, materials, and techniques.

The Melnikov House is located close to the City Centre in the Arbat Municipal District and near the Arbat pedestrian street. The site is small, 836 sqm². The smaller cylinder of the building has two floors, a basement and a roof terrace. The height of the smaller cylinder is about 8.5 metres. The larger rear cylinder consists of three stories and a single sloping roof with a maintenance attic. The height of the larger cylinder is between 11 and 12.3 metres.

2. RESEARCH

Konstantin Melnikov lived at the House from 1929 until his death in 1974, as did his son the artist Viktor Melnikov who died in 2006. It was Viktor Melnikov's will that the House should be donated to the Schusev State Museum of Architecture. The building is still partly owned by the family, but actions have been taken for the whole ownership to pass to the State Museum. The Melnikov Museum, a branch of the Schusev State Museum, was established in 2014.

The Melnikov House was awarded the Getty Keeping It Modern 2017 Grant (KIM) and the comprehensive research into the building and its site was carried out during late 2017 and 2018. In 2018–2019 specific colour and material research was undertaken to complete the project.

An international Advisory Committee was founded, specialists hired and seminars held to establish guidelines for each phase of research.

2.1. Archives and memories

The research was divided into Historical, Architectural and Technical sections. Through the Historical Research new information and unpublished material was found. Melnikov's sketch books revealed the progress of the design and construction phases; his diaries gave information on the site, on difficulties with the construction, works and with his economy, as well as on his life in general.

On September 20th, 1927 Melnikov wrote in his diary:



Fig. 1. View of the House with open living room window, 1930s_State Museum of Konstantin and Viktor Melnikov (Moscow).

"Big Day. The house is under construction — I threw the first stone into the pit".

On November 22nd: *"Finally! Installation of the ceiling joists is over: settlement is 14mm (from Wedges)".* Two days later he wrote: *"Still afraid to remove the scaffolding from the side of the cylinder".*

On November 26th he decided to reinforce the ceiling: *"Installing a roof truss and covering the grid of the large cylinder with wood planks from the bottom".*

Then on December 1st Melnikov could write: *"All scaffolding removed, the ceiling joists are in place. The House is amazing".* It took only three months to finish the outer structure of the building.

The following year conditions were very unfavourable for continuing the works. It was not until October 1928 that gas, electricity and stoves were installed in the house. The construction of an air-heating system started in November,

and in December the partition wall between the children's rooms was plastered.

Finishing works took the whole year 1929, including the plastering and painting works both inside and outside. On August 28th, 1929 the family finally moved into the House.

During the 1930s, adjustments and renovations were carried out, but the 1940s were cruel to both the family and the house. In July 1941 a bomb blast hit the building, breaking most of the window panels, which remained unrepaired for the rest of the war.

The family spent the war winters of 1941 to 1944 in the basement, where beds and a cooking stove had been installed.²

2.2. Architectural and Technical Research phases

The building went through a very thorough research programme: including a geotechnical survey and monitoring,



Fig. 2. Bedroom floor opening_2018_Tapani Mustonen, architects mustonen ltd.

structural, technical and material research, paint and colour surveys, studies of fungi, HVAC and electrical studies (Fig. 2).

The principal challenge was to find out ways to make examinations without causing harm to original structures and authentic materials. All openings were carefully planned and then used for other sectors of surveys, like fungi or technical system research.

The House was examined from inside to outside through construction openings, then material samples were collected for colour and material as well as for fungi studies. The cellar, the attic and the staircase bases were studied in situ, often involving crawling in tight spaces. Thousands of photos, measurements and free-hand drawings were done in order to understand spaces, structures, and materials.

2.3. Architectural Paint Research

Soon after the start of the historical research and the architectural and technical field research it became clear that a professional architectural paint research survey had to be included in the work programme. Both the interior and exterior surfaces were like jigsaw puzzles with many different layers of paint and colour from which the different phases of the history of the house and its illustrious occupants could be examined.

In addition to the essence of the 'equivalence of weight, light, air and warmth', the colours could also be considered an essential quality of the house, since architect Konstantin Melnikov and his son Viktor were both painters. The essence of the colour design was also recognised when the house was restored in 1990. An architectural painting study was carried out and the original colour was reconstructed using reversible layers of paint (Fig. 3).³

The current situation reflects the original colour scheme: white plastered facades with dark-brown painted windows, bright interiors with predominantly white windows and doors, children's rooms with yellow and blue triangles on the ceilings, the dressing-room with a pink-red ceiling surface, the walls in the stairwell sea-green, in the living room light pink-red, in the bedroom gold (as well as the ceiling and originally the floor and the beds) and in the atelier white and yellow. The palette of bright white, yellow, blue, red, sea-green and metallic colours bears a remarkable resemblance to the colours of the Van Nelle Factory, a Dutch icon of modernism from the same period. The focus of the colour research therefore does not involve the discovery of the original palette but a deepening of knowledge.

Viktor Melnikov, in an interview with Oleg Adamov (see Lit. 3), clearly indicates that the reversible layers of paint do

not sufficiently reflect the sublime quality of the original finish. He remembers well the extraordinary subtle shades of the finishing layers, the colours, the texture, the light and the reflection of the façades and the interior spaces. He even mentions the pigments and the method of application. Viktor Melnikov was not satisfied with some of the results.

We must show respect for his points of view and do our best to reach the level of mastery of Konstantin and Viktor Melnikov.

In order to understand the contradiction between what we can see and what Viktor Melnikov explains, it is necessary to collect and record the scientific facts. In 2018 the basic principle was quantified.

The basic principle is to leave the current finish intact. Architectural paint research, starting with scientific research of samples of the paint layers in the Melnikov House — here and elsewhere — should be the same throughout and is the contribution offered within the framework of the KIM for technical research and the preparation of a conservation plan for the Melnikov House.

Within this framework, it was possible to collect 120 paint samples, analyse 18 paint samples and collect data.

The architectural paint research serves as a basis for two purposes: matching the quality of the paint layers in colour, structure and character and supporting facts and details of the residential history and changes. The approach was as modest and discrete and accurate as possible: to sample all finishes and determine the pigments, bindings and composition using current scientific research possibilities.⁴

3. RESULTS

The Architectural and Technical Research phases showed that Melnikov House is in a rather satisfactory condition. No emergency repairs are needed, and that is good news for later planning and implementation phases.

The Geotechnical survey (incl. 2 wells of 44 metres, laboratory analyses of soil samples etc.) showed that even the surroundings of Melnikov House have been heavily built on, and as Moscow stands on Karst land the geotechnical risks are low.

The Structural Survey revealed some bigger worries. Generally, the foundation and the walls are in satisfactory condition, but the upper wooden intermediate floors with original joist grids are in a doubtful state. The joists (200 x 25mm) are in a 500mm. grid. Because of the grid form the joists are notched out at half-width and therefore stretching down on both sides of the intermediate structure where wooden boards are nailed diagonally to strengthen it. In addition, the areas where wooden floor structures are connected with bearing brick walls are partly damaged by rot.

In the late 1950s, the original anthracite coal heating was changed to City Central Heating, but the original ventilation system and all heating ducts have survived. Because of the State heating policy, the central-heating system is off during



Fig. 3. Damage in the yellow cylindrical wall of the white atelier shows the previous layers_ 2018_ Mariël Polman, RCE.

the summer months. In the future there should be a minor secondary system for humid periods in summer and autumn.

The inner cast-iron sewerage system is original and according to the survey badly deteriorated. Cold- and hot-water pipes are mostly original and in the future it will need to be decided whether these systems should be replaced or not.

Originally, and until the 1960s, the power supply was 110 V; after that the present 220V. The wiring system is rather close to the original, and simple systems are essential both architecturally and for the feelings they evoke.

4. ANALYSES AND STRATEGIES

The idea of thorough research is to find tools for deci-



Fig. 4. Plaster ad window sill research_2018_Tapani Mustonen, architects mustonen ltd.

sion-making, for the evaluation of results and, naturally, guidelines for coming conservation and implementation phases.

Historical research has been as important as the architectural and technical research in showing the overall picture of the condition of the House. Evaluation and Analyses will give guidelines for the next planning phase.

After the survey, the Project Team and the International Advisory Committee held a Seminar where the results were discussed, the present situation evaluated and guidelines for future actions were drawn up. In the upcoming conservation and restoration period, efforts should be focused on eliminating physical deterioration, strengthening the exterior finishing layers, and preserving important and identified features of the building.

The Schusev State Museum of Architecture was advised to proceed to the next phase in saving the House and to pre-

pare a detailed conservation project with the involvement of both local and international specialists. The building should be kept open during the Funding Campaign and also as much as possible during the conservation works, as it is evident that the conservation project of the Melnikov House has a huge educational possibility.

5. FUTURE

5.1. Funding the Conservation design

The aim is to start planning a detailed conservation programme in 2021–2022. Getting funding organised is challenging due to the present COVID-19 situation and because public funding is accessible only after the ownership of the building has been completely solved. Part of the property is still owned by K. Melnikov's relatives. Funding campaigns are targeted to Russian private sources and international

Foundations.

By the time of the 2021 Docomomo Congress the Conservation planning phase should have been started.

5.2. Conservation strategy

Future conservation strategy is focused rather on preserving than on restoring. The building, its materials, interiors and furnishing are extremely fragile and that must be kept in mind when deciding on actions. Authenticity, materiality, finishes and technologies as well as Melnikov's design are the crucial borderlines for conservation actions. Here again "Less is More" is a perfect slogan for the future conservation of the Melnikov House.

The building has been renovated and restored in various phases from the 1940s to the 1990s, the heating system changed and other technical installations were modified during the years. However, the house is now a functional entity. As an example, replacing present central heating with coal heating would no longer be an option.

The first floor main bedroom catafalque-like beds and linoleum flooring were removed during the 1940s and it might be better to show the original presentation at a future Melnikov showroom at the Schusev Museum rather than on site.

Structural improvements must be applied to the intermediate floor connections with the brick walls. The building suffered from the poor conditions during WWII, and damp and cold weather caused damage to timber connections inside the brick walls. Rotten wooden parts will be replaced with sound boards. Fortunately, these improvements will not be visible when the work is completed.

Regarding the interiors, it is important that the Life lived here will be understood, felt and even inhaled.

The only real change will be in the exteriors. During the renovation of the 1990s all facades were plastered with cement-based plasters and painted with organic paints and later painted again with acrylic paints. Cement plasters and organic paints will be replaced with lime plasters and lime paints. In addition, some galvanized window sills will be renewed (Fig. 4).

Colours: the scientific research will produce information on the history of the finishes in the building at different periods both aesthetically and practically, and allow reproduction of the original finishes on samples to show to visitors and use as a basis for a digital 4-D version.

5.3. Implementation

With the implementation phase there are many important elements that will directly influence the quality of the work. Present Russian construction tradition is in many ways different to Western tradition, but it has its moments. When the right constructors and conservators are found, the strong motivation among craftsmen is of decisive importance. The restoration of the Viipuri Library (Alvar Aalto

1935 in Vyborg, then Finland and after 1944 Russia) between 1994–2013 showed that Russia is full of highly talented and skilful professionals. The important factors are the right kind of guidance, communication, motivation and above all constant follow-up and presence on site.

5.4. Visitors

The question of visitors has been discussed during the whole time of the Getty project, also with the Advisory Committee. Normally the Melnikov House is accessible for 8 visitors at a time and reservations are made via the Schusev museum.

The worldwide tendency is that the pressure of architectural tourism on the masterpieces of Architecture and House Museums is growing rapidly. Bearing that in mind, the idea has been launched to create a special Visitor Centre for Melnikov House in order to keep tourism at a sustainable level for the House and its interiors and materials.

6. CONCLUSIONS

The Getty Keeping it Modern project has given a unique possibility to investigate the history of Konstantin Melnikov's legacy, of his House and its construction, technologies, materials, life, and spirit. The Melnikov House is a total work of art.

Time will show whether the Melnikov House and Konstantin Melnikov's archive and heritage could be the subject for an application for World Heritage nomination.

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REFERENCES

- KUZNETSOV, Pavel, *The Melnikov House. Icon of the avant-garde, Family Home, Architecture Museum*, Berlin, 2017.
Atlas of Architecture Colors, USSR Academy of Architecture, Moscow, 1937.
MELNIKOV, Viktor, & ADAMOV, Oleg, "The present condition of the Melnikov House", *Heritage at risk*, Moscow, 17–20 April 2006.

NOTES

- 1 Kuznetsov Pavel, et al., *Melnikov House, Final Report*, Schusev State Museum, Getty Foundation, August 2019.
- 2 Kuznetsov Pavel, et al., *Melnikov House, Final Report*, Schusev State Museum, Getty Foundation, August 2019.
- 3 Brandi Cesare, *Teoria del Restauro*, Piccola Biblioteca Einaudi, 1963.
- 4 Scientific researcher Luc Megens, RCE Heritage Laboratory: Scanning Electron Microscopy Energy-Dispersive X-ray Spectroscopy (SEM-EDS), Fourier Transform Infrared Spectrometry (FT-IR), Composition research binding medium (gas chromatography-mass spectroscopy GS-MS), as well as archival research.

CONSERVATION PRINCIPLES FOR CONCRETE: MULTIDISCIPLINARY CONTEXT

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ABSTRACT.

Concrete experienced rapid development and widespread use during the twentieth century. Modern Movement architects were particularly keen in exploring the new plastic and structural possibilities of this material. As a result, many heritage sites of that era are currently tackling the question of how best to conserve culturally significant concrete elements. Differently from more traditional heritage building materials, concrete is an everyday contemporary material, which poses both challenges and opportunities to its conservation. On one hand, stakeholders outside the conservation field often do not recognize the need to apply the highest level of care prioritizing conservation of significance. On the other hand, the well-established concrete repair field has an abundance of knowledge and resources on concrete deterioration, diagnosis, testing, repair, and treatments. Many of these techniques can be successfully applied in concrete conservation if conservation principles guide the decision-making process. In recognizing the need to establish a clear methodology bridging the conservation and concrete repair fields, the Getty Conservation Institute (GCI) published recently the document *Conservation Principles for Concrete of Cultural Significance*. This document provides a framework for architects, engineers, conservators, contractors, and stewards to make informed decisions for conserving culturally significant concrete by referencing both concrete repair standards and conservation principles. This paper compares the concrete conservation principles proposed by the GCI with current literature in conservation and standards in concrete repair, highlighting key point of divergence and convergence with the goal of establishing better dialogue between these disciplines.

1. INTRODUCTION

Concrete experienced rapid development and widespread use during the twentieth century. This was only possible due to the growing Portland cement industry and the multiplying concrete construction technologies, starting from the nineteenth century, and the resulting cost decrease of building in concrete. Although the timeline varies per country, by the end of the twentieth century, concrete had made its mark on built heritage worldwide, whether as the material of choice for everyday buildings and infrastructure, or for masterful works of architecture, engineering, and sculptures.

The Modern Movement was particularly keen in exploring the new plastic and structural possibilities of this material contributing to its spread. Many of these works were made possible by collaborations between daring architects and engineers, such as Berthold Lubetkin and Ove Arup, Oscar Niemeyer and Joaquim Cardozo, and Louis I. Kahn and August Komendant. The cultural significance of concrete-made buildings began to be recognized from the 1960s, with rare earlier listings in reaction to imminent threat, like the case of the São Francisco de Assis Church (Oscar Niemeyer, 1943) listed in the Brazilian national register in 1947. These initiatives grew from the late 1980s, with the realization that twentieth-century materials, including concrete, presented many conservation challenges.¹

Concrete is present in many ways in twentieth-century heritage with direct consequences to its conservation. It was applied using different methods, from prefabrication with rigorous quality control to built-in-place highly hand-crafted with varying quality. Concrete was used at all scales of construction, from single-family homes to entire cities.

Many applications in culturally significant sites represent technological breakthroughs that stretched the structure and material behavior knowledge of their time. It can have various finishes, some more protective than others, with exposed concrete notoriously being the most vulnerable to deterioration. Other important factors in the durability of these sites are the lack of proper maintenance and the use of materials that cause concrete deterioration issues that were unknown at the time of construction, such as aggregates susceptible to alkali-silica reaction, and the use of calcium chloride as additive to speed setting. As a result, many heritage sites are currently facing deteriorating culturally significant concrete elements.

Differently from other building materials more commonly associated with heritage sites, concrete is an everyday contemporary building material, even though current concrete materials and building techniques much differ from what was available until the mid-twentieth century. This contemporary nature of concrete poses both challenges and opportunities to its conservation. On one hand, it brings challenges in terms of advocacy and owner awareness. This can lead to the hiring of professionals that lack the required high level of qualification and experience to remediate deterioration, since there is no recognition that the complexity of repairing and treating culturally significant concrete is beyond the daily practice of many concrete repair professionals. On the other hand, the well-established concrete repair field has an abundance of knowledge and resources on concrete deterioration, diagnosis, testing, repair, and treatments. Though not developed specifically for conservation, many of these techniques can be successfully applied in concrete conservation as long as there is:

- clarity about the added conservation requirements

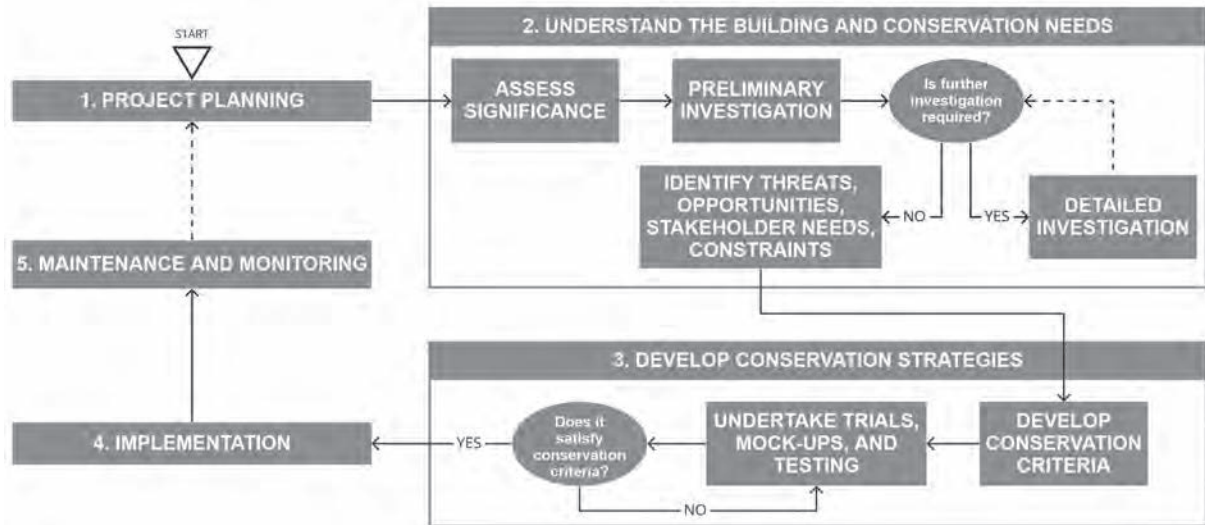


Fig. 1. Simplified flowchart of the Concrete Conservation Process. © J. Paul Getty Trust, 2021.

from the start of the project,

- and adoption of a decision-making process guided by conservation principles.

The ability to draw from knowledge and collaborate with professionals from the concrete repair field is particularly valuable given that concrete is still a relatively new material to many conservation professionals. Moreover, concrete is often carrying structural loads in which case its repair necessarily involves professionals habilitated in that specific field. This multidisciplinary collaboration and the adaptation of repair techniques from another field to conservation purposes is not unique to concrete, but may present initial conflicts. Such as:²

- the impact of typical concrete repair and evaluation techniques on material authenticity due to loss of original material,
- the need to design a repair material with compatible performance and aesthetics to the aged concrete resulting in a mix different from the original concrete,
- the difficulty of designing and executing repairs that will develop patina in the same way and rate as the original, while providing enough protection to the reinforcement.

Solving these conflicts requires professional experience and the adoption of a shared methodology. However, professionals experienced in both concrete repair and conservation are difficult to find, a situation that is aggravated by insufficient training opportunities and publications on methodology specific to conservation of concrete. These challenges were documented at an experts meeting held by the Getty Conservation Institute (GCI) in 2014.³ The GCI's Concrete Conservation project under the Conserving Modern Architecture Initiative is responding to some of these

challenges with development of scientific research, training, and publications.

As part of this project, the GCI published in 2020 the document *Conservation Principles for Concrete of Cultural Significance* recognizing the need for a clear methodology bridging the conservation and concrete repair fields. This document provides a step-by-step approach for architects, engineers, conservators, contractors, and stewards to guide decisions in the conservation of culturally significant concrete, without giving guidance on repair or treatment.⁴ It explicitly draws information from concrete repair standards and from widely adopted conservation charters and guiding documents. In the document, the description of the steps is complemented by a flowchart (see figure 1 for a simplified version) that illustrates the cyclic nature of the process (Fig. 1).

This paper presents the key point of divergence and convergence between the conservation principles proposed by the GCI and current standards in concrete repair and widely adopted conservation principles, with the goal of establishing better dialogue between the disciplines of conservation and concrete repair. The organization of the paper is based on the steps defined in the *Conservation Principles for Concrete*.

2. PROJECT PLANNING

The Project Planning step focuses on key aspects that should be considered in concrete conservation.⁵ According to article 2.2 of the Burra Charter, "the aim of conservation is to retain cultural significance of a place".⁶ As a consequence concrete conservation projects are inherently more complex than concrete repair. The main reason for this higher complexity is the need to preserve the values that the concrete

contributes to the significance of a site. In such cases, the loss of certain attributes of the concrete element and of the material itself can be considered unacceptable. Consequently, these projects have to deal with more requirements and a higher emphasis on minimizing risks and loss of original material.

A consequence from the complexity involved in concrete conservation is the need for a highly experienced multi-disciplinary team, in line with recommendations from article 2.5 of the Madrid-New Delhi Document⁷ and article 1.1 of the ICOMOS Charter: "Principles for the Analysis, Conservation and Structural Restoration of Architectural Heritage".⁸ The section describes the role and experience of each professional category involved in concrete conservation, including: engineers, architects, structural engineers, conservators, sampling and testing professionals, manufacturers, and contractors. Conservators are the only category unfamiliar to ordinary concrete repair, but their knowledge of conservation goals and experience with building materials and craft is a valuable contribution, especially when the aesthetic of the repair can impact the site's cultural significance. Likewise, the inclusion of manufacturers is less common in conservation, but in some cases they may be able to custom-make repair mixes.

Clear project goal and requirements and an experienced multidisciplinary team from the start of the project are key to an efficient understanding of the building, and in defining and balancing the criteria for developing a conservation strategy.

3. UNDERSTAND THE BUILDING AND CONSERVATION NEEDS

The goal of this step is to gather all the information needed to guide the development of a conservation strategy.⁹ The methodology adopted is common to both conservation and concrete repair fields, with a few differences on how the information is collected and used.

In accordance with current conservation methodology^{10 11 12}, the conservation project should start with understanding significance. This could be as simple as reading an existing statement of significance and analyzing how the concrete element in question contributes to the significance of the site. Or as complex as having to develop a statement of significance for the site in order to contextualize the concrete element. This information is essential as conservation of this significance will constitute a key criteria in prioritizing action and in guiding decisions during planning for investigation and development of a conservation strategy.

Once significance is well understood, evaluation of the building can start with assessing physical conditions that pose threat to cultural significance, safety, and performance of the structure. The process described in the document follows what is recommended mainly in ACI 364.1R-07¹³, but also in EN 1504-Part 9,¹⁴ EN 16096,¹⁵ and ISO 16311-Part 1.¹⁶ It

starts with a preliminary investigation that includes review of existing documentation, visual condition survey, simple non-destructive evaluation (NDE) techniques, and examination of loose material if found on site. Depending on how much information is already known about the concrete and the extent and severity of deterioration, this work may be enough or conclude that detailed and comprehensive investigation is needed.

Detailed investigation will likely include some level of sampling and in situ testing that can damage the surface of the concrete, therefore it is important to carefully consider the need and benefits of these results against possible threat to significance. As a consequence, the document advocates for prioritizing use of NDE techniques, but recognizing that inspection openings and sampling are needed to guarantee reliability of NDE results. In addition, NDEs are currently limited in how much they can reveal about concrete material characteristics and deterioration mechanisms. In the cases when destructive investigation techniques are needed, a well-planned strategy should be used to maximize results while minimizing loss of original material. The heterogeneous nature of concrete means that test standards call for samples that are larger and more numerous than what is required for other materials more familiar to conservation. Engaging an experienced team of concrete repair and testing specialists will go a long way in negotiating how much sampling is actually needed.

In addition to investigation results, evaluation of the building should also consider threats, opportunities, user and stakeholder needs, and constraints to guarantee the feasibility and long-term sustainability of a conservation strategy. User and stakeholder requirements may need to be negotiated if in conflict with preservation of significance.

4. DEVELOP CONSERVATION STRATEGIES

Based on the evaluation of the building, the team in charge of developing a conservation strategy for the concrete should consider advantages and disadvantages of different degrees of intervention, from doing nothing and monitoring to demolition and reconstruction of concrete elements that are beyond salvation and threatening user safety.¹⁷ This is a practice shared by both conservation^{18 19} and concrete repair fields.^{20 21 22}

The selection of the most appropriate conservation strategy should keep in mind the goal of conserving significance of the site. The document recommends a list of criteria that merges performance requirements found in ISO 16311-Part 1,²³ ACI 364.1R-07,²⁴ ACI 546R-04,²⁵ and EN1504-Part 9,²⁶ and typical conservation criteria found in ICOMOS Charter: Principles for the Analysis, Conservation and Structural Restoration of Architectural Heritage,²⁷ and the Madrid-New Delhi Document.²⁸

It is important to realize that concrete conservation requirements can severely limit the repair and treatment op-

tions for each case and that achieving optimal results under all criteria may be unfeasible. In such cases, any compromises should be justified and long-term consequences well understood by the team and stewards of the site.

Once a conservation strategy is defined, it is essential to conduct enough cycles of trials and mock-ups to optimize the proposed materials and techniques and to prove that the strategy is feasible and meets all project requirements. The document emphasizes the importance of this phase of work, in line with Preservation Briefs 15²⁹ and ACI 546R-04.³⁰ It recommends the execution of mock-ups and trials off the structure and only executing them on the structure on their final stage of development. Though time-consuming, this process contributes immensely to effective implementation and quality control.

5. IMPLEMENTATION

Due to the complexity of successfully implementing a concrete conservation strategy, especially when including repair and treatment, the document stresses the importance of working with contractors that can meet the required skill level. According to ACI 546R-04³¹ and Preservation Briefs 15³² this is a key pre-requisite in achieving successful concrete repair.

In addition, the document follows ACI 546R-04,³³ EN 1504-Part 10,³⁴ ICOMOS Charter: Principles for the Analysis, Conservation and Structural Restoration of Architectural Heritage,³⁵ and ISO 16311-Part 1³⁶ in recommending the adoption of a quality control plan. This should include clearly establishing standards, such as the final mock-ups executed on the previous step, implementing regular inspections, and testing of the work completed.³⁷

The document also highlights the need to document the implementation process, methods and materials applied, and results as they will be useful in informing future maintenance and monitoring efforts.

6. MAINTENANCE AND MONITORING

The last step described in the document recommends adoption of a maintenance plan that includes monitoring of conditions, inspection of repairs and treatments, protocols for periodic cleaning and minor repair, and documentation of activities.³⁸ This is, unsurprisingly, another common recommendation from both concrete repair^{39 40 41} and conservation fields.^{42 43} The goal is to delay deterioration and increase durability of repairs and treatments, not only because this is a cost-effective and sustainable way of managing the structure, but also because it prevents further loss of original material by minimizing the need for repairs. This step can reveal the need to restart the conservation process if a new or reoccurring condition is observed in routine inspections or if any performance issues with treatments or repairs are detected.

7. CONCLUSIONS

Conservation Principles for Concrete of Cultural Significance advocates for the adoption of an approach to concrete conservation that merges well-established methodologies in the fields of conservation and of concrete repair. It recognizes that there might be instances where conservation and concrete repair practices may be in conflict, but that solutions that balance both are ultimately the most effective in achieving the goal of conserving cultural significance of sites where concrete plays an important role.

The intention of the document was to facilitate collaboration between these fields as they are both key contributors in the conservation of culturally significant concrete. As a consequence the references cited here can and should be used to complement the Conservation Principles for Concrete as they provide more detail in their specific areas.

REFERENCES

- American Concrete Institute and International Concrete Repair Institute, *Concrete Repair Manual*, Vols. 1–2, Farmington Hills, MI, Des Plaines, IL, American Concrete Institute and International Concrete Repair Institute, 2013.
- Australia ICOMOS, *The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance*, 2013, Burwood, Victoria, Australia ICOMOS, 2013, accessed on June 29, 2021, <https://australia.icomos.org/wp-content/uploads/The-Burra-Charter-2013-Adopted-31.10.2013.pdf>.
- CUSTANCE-BAKER, Alice, & MACDONALD, Susan, *Conserving Concrete Heritage Experts Meeting: The Getty Center, Los Angeles, California, June 9–11, 2014*, Los Angeles, Getty Conservation Institute, 2015.
- European Committee for Standardization, *EN 16096: Conservation of Cultural Property: Condition Survey and Report of Built Cultural Heritage*, Brussels, European Committee for Standardization, 2012.
- European Committee for Standardization, *EN 1504: Products and Systems for the Protection and Repair of Concrete Structures — Definitions, Requirements, Quality Control and Evaluation of Conformity, Parts 1 to 10*, Brussels, European Committee for Standardization, 2004–17.
- GAUDETTE, Paul E., & SLATON, Deborah, *Preservation of Historic Concrete. Preservation Briefs 15*, Washington, DC, National Park Service, Heritage Preservation Services, 2007, accessed on June 29, 2021, <https://www.nps.gov/tps/how-to-preserve/preservedocs/preservation-briefs/15Preserve-Brief-Concrete.pdf>.
- International Council on Monuments and Sites, *ICOMOS Charter: Principles for the Analysis, Conservation and Structural Restoration of Architectural Heritage*, Paris, ICOMOS, 2003, accessed on June 29, 2021, https://www.icomos.org/charters/structures_e.pdf.
- ICOMOS International Scientific Committee on Twentieth-Century Heritage, *Approaches to the Conservation of Twentieth-Century Cultural Heritage — Madrid-New Delhi Document*, ICOMOS International Committee on Twentieth-Century Heritage, 2017, accessed on June 29, 2021, <http://www.icomos-isc20c.org/pdf/madrid-new-delhi-document-2017.pdf>.
- International Organization for Standardization, *ISO 16311: Maintenance and Repair of Concrete Structures — Parts 1–4*, Geneva, International Organization for Standardization, 2014.
- MACDONALD, Susan, & ARATO GONÇALVES, Ana Paula, *Conservation Principles for Concrete of Cultural Significance. Principles*, Los Angeles, Getty Conservation Institute, 2020, accessed on June 29, 2021, https://www.getty.edu/conservation/publications_resources/pdf_publications/pdf/Conservation_Principles_For_Concrete.pdf.

NOTES

- 1 Susan Macdonald, “Conserving Concrete Heritage: An Experts Meeting to Identify Research Needs to Advance the Field,” Custance-Baker & Macdonald, *Conserving Concrete Heritage Experts Meeting*, 36.
- 2 Macdonald, “Conserving Concrete Heritage,” 39–40.
- 3 Custance-Baker & Macdonald, *Conserving Concrete Heritage Experts Meeting*, 4–5.
- 4 Macdonald & Arato Gonçalves, *Conservation Principles for Concrete*, 8.
- 5 Macdonald & Arato Gonçalves, *Conservation Principles for Concrete*, 14–15.

- 6 Australia ICOMOS, *Burra Charter*, 3.
- 7 ICOMOS-ISC20C, *Madrid-New Delhi Document*, 6.
- 8 ICOMOS, *Charter: Structural Restoration*, 1.
- 9 Macdonald and Arato Gonçalves, *Conservation Principles for Concrete*, 16–19.
- 10 ICOMOS, *Charter: Structural Restoration*, 1.
- 11 Gaudette & Slaton, *Preservation Briefs* 15, 8.
- 12 ICOMOS-ISC20C, *Madrid-New Delhi Document*, 3.
- 13 American Concrete Institute, “ACI 364.1R-07 Guide for Evaluation of Concrete Structures before Rehabilitation, Reported by ACI Committee 364,” ACI and ICRI, *Concrete Repair Manual*, Vol. 1, 124.
- 14 European Committee for Standardization, *EN 1504-Part 9*, 7–8.
- 15 European Committee for Standardization, *EN 16096*, 7.
- 16 International Organization for Standardization, *ISO 16311-Part 1*, 7.
- 17 Macdonald & Arato Gonçalves, *Conservation Principles for Concrete*, 20.
- 18 Gaudette & Slaton, *Preservation Briefs* 15, 8.
- 19 ICOMOS, *Charter: Structural Restoration*, 3.
- 20 ACI, “ACI 364.1R-07,” 135.
- 21 European Committee for Standardization, *EN 1504-Part 9*, 9.
- 22 International Organization for Standardization, *ISO 16311-Part 1*, 10.
- 23 International Organization for Standardization, *ISO 16311-Part 1*, 10.
- 24 ACI, “ACI 364.1R-07,” 134–135.
- 25 American Concrete Institute, “ACI 546R-04 Concrete Repair Guide, Reported by ACI Committee 546,” ACI and ICRI, *Concrete Repair Manual*, Vol. 1, 665–666.
- 26 European Committee for Standardization, *EN 1504-Part 9*, 9–10.
- 27 ICOMOS, *Charter: Structural Restoration*, 2–4.
- 28 ICOMOS-ISC20C, *Madrid-New Delhi Document*, 8–9.
- 29 Gaudette & Slaton, *Preservation Briefs* 15, 11.
- 30 ACI, “ACI 546R-04,” 692.
- 31 ACI, “ACI 546R-04,” 666.
- 32 Gaudette & Slaton, *Preservation Briefs* 15, 12.
- 33 ACI, “ACI 546R-04,” 667.
- 34 European Committee for Standardization, *EN 1504-Part 10*, 31.
- 35 ICOMOS, *Charter: Structural Restoration*, 4.
- 36 International Organization for Standardization, *ISO 16311-Part 1*, 13.
- 37 Macdonald & Arato Gonçalves, *Conservation Principles for Concrete*, 23.
- 38 Macdonald & Arato Gonçalves, *Conservation Principles for Concrete*, 24.
- 39 International Organization for Standardization, *ISO 16311-Part 1*, 5–6.
- 40 ACI, “ACI 546R-04,” 667.
- 41 European Committee for Standardization, *EN 1504-Part 9*, 13.
- 42 ICOMOS, *Charter: Structural Restoration*, 2.
- 43 ICOMOS-ISC20C, *Madrid-New Delhi Document*, 6.

ÁLVARO SIZA'S TECTONIC SHIFT IN LEÇA DA PALMEIRA: FROM DESIGN TO CONSERVATION

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ABSTRACT.

From 1958 to 1966, Álvaro Siza Vieira (Portuguese Architect, Pritzker Prize-winner in 1992) designed two paradigmatic works along the seafront in Leça da Palmeira, near Porto, in the north of Portugal: the Boa Nova Tea House (1958–1963) and the Ocean Swimming Pools (1959–1966). Although these projects were built on the same coastal road and were designed almost simultaneously, their tectonic principles are quite different: in the Tea House, Siza uses traditional materials mixed with modern ones, attempting to combine vernacular constructive elements with the use of modern technologies; on the contrary, in the Swimming Pool, the architect adopts a modern technology and an abstract neoplastic language. This tectonic shift can be explained by the evolution of the Portuguese architectural debate during the 1960s.

Both buildings are now listed as National Monuments (2011) and have been included in the Portuguese Tentative List for World Heritage (2017). Furthermore, they have been subjected to recent interventions by Álvaro Siza himself (Tea House, 2013–2014; Swimming Pools, 2019–2020). Focusing on the technological and material legacies, this paper seeks to analyse the life cycle of these buildings, from their original design to their ageing process and transformations, including recent conservation work. Moreover, this paper also reflects on two different approaches to one of the most challenging issues in the conservation of modern architecture: concrete repair and its maintenance over time.

1. INTRODUCTION

Context

From the late 1930s onwards, Portuguese architecture was dominated by a set of stylistic rules imposed by the *Estado Novo* (the dictatorial regime of António Salazar), which sought to impose a fictional concept of Portuguese architecture (associating alleged vernacular values with a monumentality inspired by Nazi Germany and Fascist Italy) that implied a representation of the oppressive power of the state.¹

The 1948 Congress of Portuguese Architects² was a historic moment, marked by the affirmation of two groups of young architects who demanded a modernisation of processes and languages: the members of ICAT (Technique and Art, Cultural Initiatives, formed in Lisbon in 1964) and ODAM (Organisation of Modern Architects, founded in Porto in 1947). Subsequently, modern architecture was again admitted in Portugal, at least in private buildings.³

In 1955, the *Estado Novo* made one final attempt to promote a 'Portuguese character' in architecture, through the *Surveys on Portuguese Vernacular Architecture*, organised by the Union of Portuguese Architects;⁴ however, the *Surveys* clearly demonstrated that there was not one single 'Portuguese architecture', but instead various regional expressions that were recognisable throughout the territory. The success of the book *Popular Architecture in Portugal*⁵ (1961) led to the reuse and reinterpretation of traditional construction systems, which demonstrated the compatibility between the vernacular legacy and the modernist values

of pragmatism, functionality and truthful tectonics.⁶

Therefore, during the 1960s, most Portuguese architecture followed a regionalist trend; however, it was becoming clear for a few architects that the formal aspects of this vernacular influence were crystallising "a reality that was, in fact, rapidly disappearing and could not translate the contemporary times".⁷

This context explains the tectonic shift in Siza's work, and, in this particular case, from the Boa Nova Tea House to the Ocean Swimming Pools, which was also related to the assimilation of different international references.⁸

Since very little has been published on the technological and material features of these works, the methodology of this paper is based both on archive research (conducted at the Matosinhos Municipal Council), combined with the direct observation and analysis of the architect's built works, and on interviews with Álvaro Siza, involved engineers, collaborators, and contractors.

2. ORIGINAL DESIGN

2.1. Boa Nova Tea House (1958–1963)

Constructed on rocky terrain by the seaside in Leça da Palmeira, the Tea House is a good example of the above-mentioned vernacular influence, which is displayed in both a conceptual and formal way (Fig. 1).

Initially designed at the studio of Fernando Távora (1923–2005) for a public contest (won in 1956), the subsequent commission and its corresponding authorship were later en-



Fig. 1. Views of the Tea House and Ocean Swimming Pools.
© Eduardo Fernandes.

trusted by the master to Álvaro Siza (a collaborator in his office, between 1955 and 1958).⁹ Siza's project was built between 1960 and 1963 and was "immediately recognised as a masterpiece".¹⁰

The composition of the building is based on three main principles, conceptually related with Portuguese vernacular architecture: an almost mimetic reinterpretation of the site topography, a respectful attitude in terms of the relationship with the pre-existing chapel and a constant correlation with the landscape, achieved through the intentional design of a promenade built in Portuguese limestone.

Hence, Siza proposes the use of a mixture of traditional tectonics (timber and ceramic tiles) and modern tectonics (reinforced concrete), seeking to combine vernacular constructive elements with the use of modern technologies (pitched concrete slabs with tiled roofs and timber joinery). Most of the wooden elements are built in afzelia wood, which is used in the ceilings, in the interior flooring and in all the frames, including a set of sliding windows. Apart from the building's foundations and pillars, all of the walls are plastered and painted white. The roof's gutters and flashings are made of copper.

2.2. Ocean Swimming Pools (1959–1973)

In November 1959, the Matosinhos Municipal Council

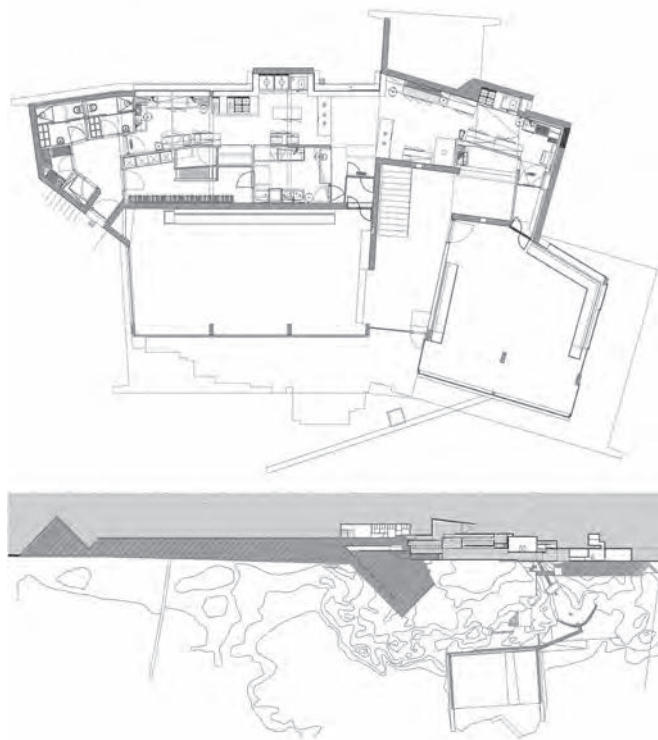


Fig. 2. Demolitions (yellow) and alterations (red) to the Tea House (2012–2014) and Swimming Pools (design proposal, 2019). © Câmara Municipal de Matosinhos and Frederico Barbosa.

commissioned the construction of a bathing tank on the cliffs of the Leça da Palmeira seafront (located about one kilometre south of the Tea House), designed to allow the seawater to be naturally renewed at high tide. In accordance with this brief, the engineer Bernardo Ferrão (Fernando Távora's brother) began the study of a 20 x 33-metre tank. However, given the delicacy of the landscape, he recommended Álvaro Siza to design the pool and annex buildings (Fig. 2).

In the first phase of the project (March 1960), Siza proposed a tank with three walls, using the pre-existing rocks as a boundary on the west side. This proposal was actually built, but it soon became clear that, for reasons of public hygiene, the water would have to be filtered and mechanically changed, which precluded the use of a simple container.¹¹ The design was presented in October 1962 and the construction took place over the next two years, with the pool being opened to the public in the summer of 1965. After September 1965, Siza designed an expansion of the bar and the technical areas, which was submitted to successive revisions until 1973. It was the construction of this new design that gave the building its contemporary image, with the 45° wall that protects the bar from the north wind.¹²

The tectonics of the building are dominated by concrete walls composed with very little cement and reinforcement,

but with tremendous binding over time, making it a very high-quality concrete. The roofs are covered with copper sheets, supported by a structure made out of Baltic pine-wood and treated with burned machine oil, giving it a very dark, almost black, colour.

2.3. The Tectonic Shift

In contrast to the formal vernacular influence visible in the Tea House, the Swimming Pools building displays an abstract language, being composed of a succession of walls in reinforced concrete, running parallel to the shoreline and covered with a low-slope copper roof. In the interior, the dark timber structure is scarcely illuminated by the few rays of light that manage to penetrate through small openings between the walls and the ceiling.

Despite these tectonic differences, the conceptual principles are similar, as in both cases we find a reinterpretation of the topography. However, in the Swimming Pools, this intention led to a different design because the conditions of the site are also diverse. Siza aimed to reduce the impact of the construction as much as possible to the “three parallel lines” that dominated the site: “the meeting of the sea and the sky, the meeting of the beach and the sea, and the long support wall of the seafront”. Thus, the building is “anchored, like a boat, to the marginal wall”.¹³

Thus, the building's perfect physical integration into its setting, a characteristic feature of Siza's work (and clearly evident in the case of the Tea House) is taken to an extreme in the Swimming Pools: building and setting merge, as the architect's intervention becomes a metaphor for the surroundings, incorporating and reinterpreting the pre-existing seaside wall. In both cases, Siza's architecture is meant to be felt, and not only seen.

The Tea House is a building that was conceived as a window, a device created with the main purpose of showing the landscape: Siza hides it momentarily at the entrance, to accentuate the surprise given by the grand opening in the lower rooms. Then, in the dining-room, the dominance of the landscape is reinforced by the mechanism of the window, which can disappear underground (as in Mies van der Rohe's Tugendhat house), leaving no barrier between inside and outside.

Otherwise, the Swimming Pools' changing rooms act as a wall, hiding the exterior view: it is a dark and dense space, between two concrete walls.¹⁴ The interior is dominated by the black Baltic pinewood partitions and roof beams (darkened with burned oil), creating a disturbing atmosphere, evocative of Tanizaki's discourse on the value of shadows.¹⁵

As we exit the changing rooms, heading towards the pool with our eyes adapted to this darkness, we feel completely dazzled by the strong light of the sun, reflected in the concrete walls and pavement slabs.

In both cases, Siza's architecture is meant to be felt, and not only seen.

3. CONSERVATION WORKS

3.1. Boa Nova Tea House

The conservation of the Boa Nova Tea House in 1992 was Siza's first intervention on an earlier work and, in his words, an important experience for his following works on pre-existing buildings.¹⁶ After first declaring his intention to make changes to the original design (the work of his much younger self), Siza was able to recognise the building's value and coherence as a whole. He thus resisted the temptation to correct his own work, and decided to maintain the original design, arguing that “in a rehabilitation there is a mandatory requirement, which is (...) absolute integrity.”¹⁷

In 2012, Siza was called upon to perform a second intervention for a new concessionaire, after the building had been abandoned and vandalised (theft of all the copper guttering and some pieces of furniture, as well as broken windows and damage to the roof's ceramic tiles), which further aggravated the increasing signs of decay. Apart from some damage to the technical installations and some missing furniture, the building's interior was actually in a reasonable state of conservation. As far as the decay of the concrete was concerned, there were only a few localised anomalies, such as spalling, cracking or erosion, possibly caused by the corrosion of the reinforced steel due to its exposure to chlorides, as well as to a process of carbonisation.

To solve these problems, recent interventions comprised the following works: replacement of all the roof's ceramic tiles with a new model similar to the original one, since the initial manufacturer no longer existed; replacement of the copper coverings and gutter in keeping with the original specifications; waterproofing of the kitchen's exterior walls; redesign of the basement's ceiling slab in order to insert a new staircase; reorganisation of the kitchen area and equipment; replacement of the bathroom tiles with marble, as well as of the sanitary appliances; conservation of the decaying window frames; conversion of the sliding window's mechanical opening system to a mechanism operated by electric motors; conservation and treatment of all the afzelia wood elements; reproduction of replica furniture, including the conversion of the lamps' power supply to battery. Additionally, the introduction of air conditioning was also requested, which, according to the author,¹⁸ was unnecessary in such a maritime position.

The localised repair of the concrete consisted in the prior removal of the detached concrete, as well as the elimination of the oxidation and the cleaning of the steel reinforcements. Later, various other actions were performed: anti-corrosion treatment of the steel reinforcements (“emaco nanocrete AP”), repair of the mortar filling voids and cracks (“emaco nanocrete R4”) and a smooth final coating (“emaco R205”), using wooden boards as formwork in order to provide a texture similar to the original one.¹⁹ Samples were tested (with the cement production company Secil) in order to guarantee that the final solution was technically

and aesthetically compatible with the original.²⁰

In 2014, the building reopened to the public, unfortunately solely as a restaurant, without the tea house area (one of the most prominent features of its original concept, use and atmosphere), which is now used as another dining-room.

3.2. Ocean Swimming Pools

The pools and buildings are mainly constructed in good-quality concrete, with a very small amount of reinforced steel: the building walls have depths of 30cm and a welded steel mesh of 5mm, with a grid of 15 x 15cm. In contrast, the slabs have wider reinforced steel bars.

The maritime exposure of the building was already causing several problems in the concrete structures in the 1980s, when the engineer Ferrão proposed the application of a 4cm concrete coating to some of the external walls. Over the years, this coating revealed problems of compatibility with the original structures and started to detach or crack (pattern cracking²¹). Furthermore, the absence of expansion joints in the longitudinal walls led to the formation of vertical cracks. The subsequent patch repairs of cracks with incompatible cement mortars created problems such as delamination and cracking.

In 1993, the building had an intervention performed by Siza, covering the “roofs with patinated copper, as already specified in the original plan”, but this did not significantly alter the existing building.²² Recently (2019), Álvaro Siza developed a new conservation project, which mainly focused on the pools’ technical installations and the equipment of the pool tanks, as most of its pipes had been destroyed by salt or were clogged with sand. Moreover, this same intervention envisaged the reconstruction of the north side of the swimming pools in order to improve the bar’s services and facilities.

Despite their quality, most of the concrete structures, such as the walls in the north side and the small bridge that leads to the swimming pools, were already in an advanced state of decay, with all of their reinforcements corroded. In addition to the spalling related with steel corrosion, the main signs of decay are the above-mentioned ‘pattern cracking’, erosion of the surfaces of the concrete elements and patches caused by incorrect interventions (Fig. 3). The wooden elements in the interior do not reveal much damage, but incorrect interventions had given it a very oily texture and all the metal elements showed signs of oxidation.

The intervention that is currently in progress comprises the following works: the replacement of the old pipes with new ones (made of copper) and the insertion of a new technical gallery for future maintenance; repair and repainting of the inner side of the adults’ and children’s swimming pool; demolition and reconstruction of the pavement of the bar and terrace, and the renovation of the toilets and sanitary appliances; treatment of all metal and wooden elements in the interior; demolition and reconstruction of the

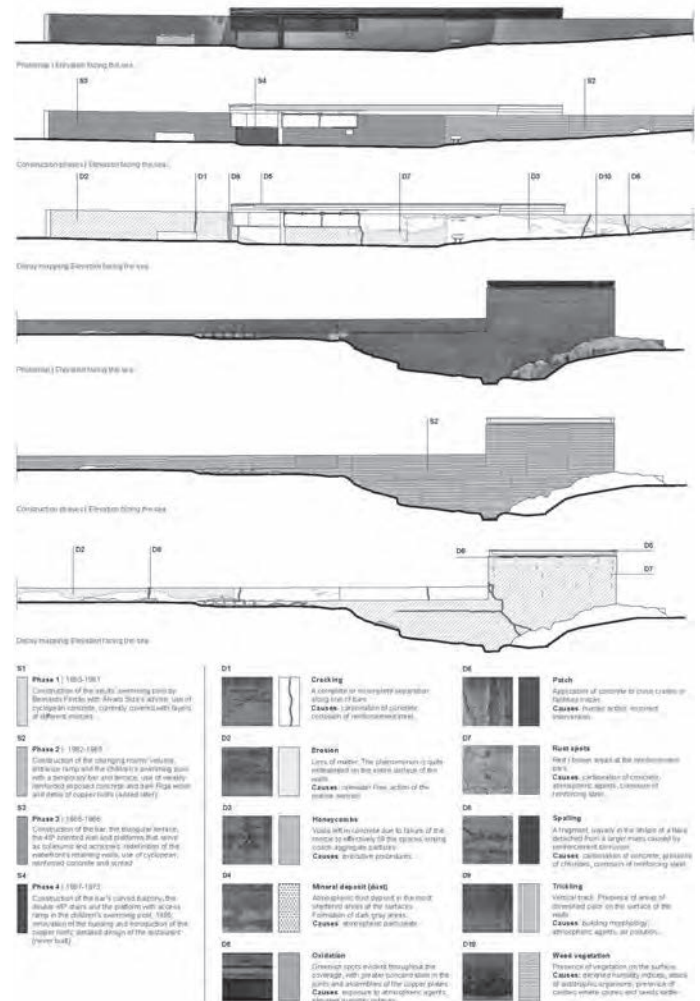


Fig. 3. Elevations of the Swimming Pools (Photomap, Phases and Decay Mapping). © Frederico Barbosa, Eleonora Fantini, Teresa Cunha Ferreira.

northern area of the building, under a new design.²³

Unfortunately, the limited budget available for the works did not allow for the inspection, diagnosis and testing of the condition of the concrete. Also, in view of the visible patches of the remedial interventions conducted over time — which affect the building's authenticity and integrity as a whole — as well as the inevitable visibility of new repairs over existing cracks, Siza decided to perform a 'minimal intervention' involving the protective treatment and minor coating of the corroded reinforced steel elements, leaving the cracks uncovered as a memory of the history of the building.

However, this minimal intervention will require an accurate conservation management plan involving specific research on concrete, with annual monitoring and maintenance, possibly through the brush cleaning and protective painting of the uncovered cracks, as well as the treatment of



Fig. 4. Concrete repair solution in the Tea House (2019) and Swimming Pools (2019, proposal). © Frederico Barbosa.

the timber and the regular inspection of the roofs.

3.3. Preserving the Signs of Time

These buildings are defined by the high quality of their construction and the building materials that were used (concrete, wood, copper), which have allowed for its conservation over the years. However, both buildings are in a vulnerable position because of their coastal location and the nearby oil refinery, which greatly aggravates the decay of concrete structures, by triggering the corrosion of the steel reinforcements. While the carbon dioxide from the refinery accelerates the occurrence of carbonisation, the chlorides of the salt water also penetrate the concrete and cause local corrosion and spalling. Furthermore, these buildings have suffered from the lack of preventive or planned conservation, which has also led to some reactive and incorrect repairs over time.

Hence, both works present the problem of concrete repair in a maritime environment, which, according to Siza, is one of the most challenging issues in the conservation of modern architecture, since localised repairs (which, in his opinion, are preferable to the complete replacement of existing concrete) are necessarily visible. He thus prefers to perform “minimum intervention, because it’s not desirable (and it wouldn’t be possible) to hide what is determined by the passage of time.”²⁴

However, the previous condition of the concrete of these two works (before intervention) was quite different: while, in the Tea House, only very local spalling or cracking of the concrete was detected, the Swimming Pools had a

very high prominence of numerous anomalies in the concrete walls (Fig. 3). These diverse conditions led to different solutions for concrete repair: very localised intervention with a compatible cement coating in the Tea House (Fig. 4a), while, in the Swimming Pools, the architect decided to keep the signs of decay in order to avoid a visible ‘patchwork’ of concrete repairs in the walls (Fig. 4b). In the latter case, acknowledging the impossibility of dissimulating concrete repairs (due to the impracticality of reproducing the original conditions, as well as the binding and ageing processes) Siza thus preserved the ‘signs of time’ as part of the material history of the building.

4. FINAL NOTE

This paper focuses on the challenging subject of the architect preserving his own work. Unlike other authors, who were either quite open or totally opposed to the intervention on their early works,²⁵ Alvaro Siza acknowledges the distance required from the original design and thus (albeit admitting the emotional conflicts) resists the temptation to perform corrections, upholding the importance of respecting the integrity and authenticity of the works.

Being heavily committed to intervention in the built heritage in recent years (including several of his own works²⁶), Siza maintains that in “conservation there is a mandatory requirement, which is (...) absolute integrity. No changes should be performed unless (...) in special or exceptional cases”,²⁷ avoiding the tendency to leave the ‘signature’ of the architect on the intervention.²⁸

Hence, in his recent interventions on the Tea House and Swimming Pools, Siza has respected the original project while he updated technical installations and service areas such as the toilets, kitchen, and bar. However, the tectonic differences between the buildings (combined traditional-modern constructive features in the Tea House versus modern constructive technologies in the Swimming Pools) led to different stages of deterioration (e.g., to the concrete, which was much more severe in the Pools) and, subsequently, to different approaches in the conservation intervention.

Moreover, both these buildings suffered from a lack of maintenance over a long period, which, according to Siza, is a decisive feature in the conservation of architectural works. In particular, modern buildings apply new industrialised technologies and materials — which are normally more vulnerable or age faster than pre-industrial constructions — so they require the implementation of accurate maintenance plans after intervention.

Although Siza recognises the “antique value”²⁹ in modern buildings: — “The passage of time in buildings is part of their quality; it increases the density of the buildings” —, he calls for continued maintenance “when there is a lowering, for economic reasons, of either the quality of the materials or the execution, or a lack of maintenance.”³⁰ Siza thus maintains that “the work of rehabilitation should be converted into maintenance. Otherwise, you repair and afterwards it decays again. Carrying out regular maintenance is a matter of economics.”³¹

In conclusion, these works by Siza provide us with important lessons, not only through their original design, but also through the recent conservation works based on respecting the building's integrity, together with a high-quality architectural design.

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NOTES

- 1 Eduardo Fernandes, & Rui Pereira, *A dicotomia nacional/estrangeiro na arquitetura portuguesa da primeira metade do século XX: o papel da Exposição do Mundo Português, O Estranho e o Estrangeiro no Teatro. Strangeness and the Stranger in Drama*, Porto, Centro de Estudos Teatrais da Universidade do Porto, 2016, 173–198.
- 2 Sindicato Nacional dos Arquitectos, *1º Congresso Nacional de Arquitectura, Maio/Junho de 1948. Relatório da comissão executiva. Teses. Conclusões e Votos do Congresso*, Lisbon, Sindicato Nacional dos Arquitectos, 1948.
- 3 Eduardo Fernandes, “Os CODA da EBAP nos anos 40: das linguagens do Estado Novo à emergência de uma consciência moderna”, Fátima Ferreira, Francisco Mendes & Natália Pereira (eds.), *A Conquista Social do Território. Arquitectura e*

- Corporativismo no Estado Novo Português*, Coimbra, Tenacitas, 2016, 39–56.
- 4 These Surveys were carried out between 1955 and 1956, and resulted from the work of six groups of architects headed by Keil do Amaral (main promotor) and by Fernando Távora, Lixa Filgueiras, Nuno Teófilo Pereira, Frederico George and Artur Pires Martins.
- 5 Francisco Keil do Amaral (ed.), *Arquitectura Popular em Portugal*, Lisbon, SNA, 1961.
- 6 Eduardo Fernandes, “The construction of the Porto School”, Paulo Cruz (ed.), *Structures and Architecture*, London, CRC Press/Bakema, 2019, 293–294.
- 7 Eduardo Fernandes, “From Seia to Guimarães. Fernando Távora's tectonic shift in the Sacor fuel stations”, Paulo Cruz (ed.), *Structures and Architecture. Beyond Their Limits*, London, CRC Press/Bakema, 2016, 403–404.
- 8 In previous years, Siza had bought a few editions of *Architecture d'Aujourd'hui*, including an issue on Alvar Aalto's work. Looking at the Ocean Swimming Pool, one can see the influence of other designs, ranging from the parallel galleries from Frank Lloyd Wright's Taliesin West to Mies van der Rohe's architecture and, looking at the children's swimming pool, one can find echoes of a reinterpretation of Le Corbusier's free plan curves.
- 9 “Fernando Távora, Álvaro Siza, Eduardo Souto de Moura”, Antonio Esposito, Giovanni Leoni, *Eduardo Souto Moura*, Barcelona, GG, 9.
- 10 Eduardo Fernandes, “Reform Follows Function? Reflections on the Reuse of Modern Buildings”, Ana Tostões & Zara Ferreira, (eds.), *DO.CO.MO.MO 14th International Conference. Adaptive Reuse. The Modern Movement towards the Future*, Lisbon, docomomo International / Casa da Arquitectura, 2016, 920–927.
- 11 Christian Ganshirt, *Piscina na praia de Leça da Palmeira*, Lisbon, Blau, 2004, 10–20.
- 12 Eduardo Fernandes, “A luz como material de construção: a Piscina das Marés em Leça da Palmeira (Álvaro Siza Vieira, 1961–66)”, *International Conference on Communication and Light*, Braga, Instituto de Ciências Sociais da Universidade do Minho, 2015, 185.
- 13 Álvaro Siza, “Piscina de Leça da Palmeira”, C. C. Morais (ed.), *01 textos: Álvaro Siza*, Porto, Civilização, 1980, 23.
- 14 Eduardo Fernandes, “A luz como material de construção: a Piscina das Marés em Leça da Palmeira (Álvaro Siza Vieira, 1961–66)”, *International Conference on Communication and Light*, Braga, Instituto de Ciências Sociais da Universidade do Minho, 2015, 187–188.
- 15 Junichiro Tanizaki, *In Praise of Shadows* (In'ei Raisen), New York, Random House 1933.
- 16 Álvaro Siza, ‘Conferencia para el CAH2’, *Intervention Approaches for the 20th-Century Architectural Heritage — International Conference CAH20th Madrid*, 2011, 186.
- 17 *Ibid.*, 186–188.
- 18 Álvaro Siza, Interview with Teresa Cunha Ferreira, 14 January 2018, un.
- 19 The new concrete is a XS1 class, with 380 kg/m³ of CEM I-32,5N cement and 50 kg/m³ of fly ash in an A/L=0.34 proportion. Information by GOP Engineering (J. Silva and R. Dias).
- 20 Álvaro Siza, Interview with Teresa Cunha Ferreira, *Construção Magazine* 83, 2018, 7.
- 21 This paper adopts the terminology used in Carolina Di Biase (a cura di), *Il degrado del calcestruzzo nell'architettura del Novecento*, Santarcangelo di Romagna, Maggiori, 2009.
- 22 Christian Ganshirt, *Piscina na praia de Leça da Palmeira*, Lisbon, Blau, 2004, 33–34.
- 23 In the case of the new walls to the north of the building, samples will be taken and tested on site, with the aim of drawing as close as possible to the original materiality, including the board marks of the formwork, in order to keep its texture similar to the original.
- 24 Álvaro Siza, Interview with Teresa Cunha Ferreira, 14 January 2018, un.
- 25 For example, while Le Corbusier admitted the transformation of his early works, Aldo van Eyck was largely opposed to any interventions on his works. See Fondation Le Corbusier, “Le Corbusier: L'oeuvre à l'épreuve de sa restauration”, Paris, La Villette Eds, 2017; Wessel de Jonge, “Myth and metamorphosis: Aldo van Eyck's orphanage (1960) in Amsterdam restored”, N. Koselj & A. Tostões (eds.), *Proceedings of the 15th International Docomomo Conference: Metamorphosis: The Continuity of Change*, Lisboa, Ljubljana, docomomo international, docomomo Slovenia, 2018, 587–593.
- 26 Teresa Cunha Ferreira, “Conservation of 20th-century architecture in Portugal. The lesson of Álvaro Siza”, N. Koselj & A. Tostões (eds.), *Proceedings of the 15th International Docomomo Conference — Metamorphosis: The Continuity of Change*, IDC 2018, Lisboa, Ljubljana, docomomo international, docomomo Slovenia, 2018, 338–344.
- 27 Álvaro Siza, “Conferencia para el CAH2”, *Intervention Approaches for the 20th-Century Architectural Heritage*, International Conference CAH20th, Madrid, 2011, 188.
- 28 Álvaro Siza, “Recuperação e Manutenção”, *A intervenção no património. Práticas de conservação e reabilitação*, Porto, FEUP, 2005, 21.
- 29 Alois Riegl, *The modern cult of monuments: its character and its origin*, Cambridge and London, MIT Press, 1982 (1903).
- 30 Álvaro Siza, Interview with Teresa Cunha Ferreira, *Saber manter os edifícios: pensar, desenhar, construir. Faculdade de Arquitectura da Universidade do Porto, Faculdade de Engenharia da Universidade do Porto*, Teresa Cunha Ferreira and Patrícia Rocha (eds.), Porto, Afrontamento/CEAU-FAUP/CEES-FEUP, 2017, 151.
- 31 *Ibid.*, 141.

THE EVANS-FINTUBE BUILDING: ARCHITECTURE OF THE OKLAHOMA OIL INDUSTRY

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ABSTRACT.

This paper investigates the cultural legacy and future possibilities for early twentieth century industrial architecture linked to oil production in Oklahoma. As a case study, the paper considers the Evans-Fintube facility, an industrial structure northeast of the Tulsa Central Business District. The facility (also known as Oklahoma Iron Works/Bethlehem Supply Company Building), is the only trace left from a larger plant that manufactured oil field equipment in Tulsa. As one of the most well-preserved examples of industrial archaeology in Oklahoma, the case study is relevant for several reasons. Its historical importance stems from its role as the largest manufacturing plant in the “Oil Capital of the World.” Documentary values of the site are also deeply intertwined with architectural features. What is still visible today, even if in a state of ruin, is the result of a series of additions that followed the evolution of the facility during the early twentieth century.

As a chronologically ordered collection of different building phases, the Evans-Fintube building shows the evolution of industrial architecture in Oklahoma, its relationship with the history of Tulsa’s community, broader national construction history as well as international trends in manufacturing.

Lastly, another significant factor of interest in the case-study lays in the possible reuse of the site, strongly connected to the future of the city. The facility, currently owned by the Municipality, is at the centre of an approved project for the construction of the USA BMX official headquarters, with an annexed Olympic-quality track imagined for a nationwide audience.

1. INTRO: OKLAHOMA AND PETROLEUM

The Evans-Fintube plant in Tulsa (originally known as the Oklahoma Iron Works plant), is one of the oldest and most remarkable examples of industrial archaeology and early modern architecture in the state of Oklahoma. Located in the South-central region of the United States, Oklahoma has traditionally been a major producer of petroleum and natural gas. In particular, the city of Tulsa, located in northeast Oklahoma, had been one of the most important centres for oil production nationally. The flourishing of oil plants and annexed “boomtowns” in northeast Oklahoma caused a significant economic and industrial growth in the region. In less than 20 years, Tulsa grew dramatically in population linked to the establishment of oil company headquarters, refineries and annexed productive facilities. By the end of the 1920s Tulsa was internationally known as “The Oil Capital of the World” because of the economic wealth that had transformed it into a thriving business centre.¹ The Tulsa region dramatic process of industrialization played a leading role in the development of Oklahoma. During the first part of the twentieth century Oklahoma’s industrial architecture was developed through a significant number of facilities dedicated to the production of steel for oil plants. Among them, the Evans-Fintube facility is one of the few that still survives in the region.

2. THE PAST: TULSA AND THE EVANS-FINTUBE

The story of the Evans-Fintube building began in 1911, with the construction of the Oklahoma Iron Works plant.

The Oklahoma Iron Works had a massive impact on the Tulsa’s community and regional economy. Considered a “Tulsa institution” and “one of the largest plants west of the Mississippi river,”² the company was created to primarily produce oil well supplies in grey iron (Fig. 1). The original core of the Iron Works was located in one of the oldest manufacturing centres of the city, bordered on the south by the historic Archer Street.³ In the early twentieth century the street was the heart of Greenwood District, the segregated African American neighbourhood in the city, theatre of the infamous events that went down in history as the Tulsa Race Massacre.⁴

The original plant, designed by engineer and architect Daniel J. Moran,⁵ consisted of a main workspace — a foundry — and a series of smaller separate shops for different subdivisions of the work. As shown in a historic aerial view of Tulsa,⁶ the plant was strategically connected both to the St. Louis and San Francisco Railroad (Frisco) and Santa Fe Railways. Its role in the modernization of the steel industry in the Central States was evidenced by the fact that in 1917 the facility transitioned from cupola furnaces to electric arc ones.⁷ This improvement allowed the company to manufacture a fine grade of steel, and to start the transition in the production of oil equipment from iron to steel. During the following decade, while Tulsa had achieved the status of the “Pittsburgh of the West”,⁸ the Iron Works plant was continually expanded with more and more modern workspaces. Between 1918 and 1921, the construction of a new modern machine shop and department store, immediately attached to the foundry, reflected the rapid growth of the company.

In 1938, following the death of founder James Sloan, the



Fig. 1. Forging O. K. Swivel Socket. Oklahoma Iron Works, 1920. © Courtesy of Tulsa Historical Society & Museum, catalogue No. 1975.037.005.

Bethlehem Supply Company, the second leading steel producer in the USA, bought the plant. Bethlehem's association with the building "signalled the commitment of the country's second largest steel manufacturer to the oil well supply business".⁹ The Bethlehem strongly invested in the Tulsa facility to expand its market to national scale (Fig. 2).¹⁰ Over the 1940s and 1950s, the work life at the Bethlehem plant in Tulsa reflected the dramatic events of the nation and the fights between unions and steel corporations.¹¹ In 1961, as the Oklahoma oil field became increasingly less productive and labour costs more expensive, the Bethlehem sold the plant.¹² The new company dismantled the equipment, selling it across the country. Similarly, during the 1960s, many productive facilities in Tulsa connected to the oil industry closed, progressively leaving brownfields in the city.

Over the following 40 years, the former Iron Works facility changed ownership multiple times. In the 1980s the site was divided into two parcels. The original core of the Iron

Works, including the 1911 foundry, was acquired by the Evans, a local electrical equipment company. The northern portion of the plant, comprised of ancillary shops and warehouses, was purchased by the Fintube Technologies. Throughout the second part of the last century, the facility was subject to indiscriminate alterations, like the partial demolition of the foundry. Acquired by the City of Tulsa in 2005, the site, commonly called Evans-Fintube plant, had remained vacant and in a state of abandonment until today. Natural deterioration, due to vandalism and the obsolescence of the building envelope, generated a significant decline in the surviving structures.

In 2010 an environmental site assessment conducted by the City revealed the potential presence of contaminants like asbestos, lead, arsenic, and petroleum hydrocarbons.¹³ This critical condition led the United States Environmental Protection Agency (EPA) to select the Evans-Fintube site for a brownfield clean-up grant.¹⁴ In 2015, a portion of the plant,



Fig. 2. Exterior of the Bethlehem Steel facility, 1954. © Courtesy of Tulsa Historical Society & Museum.

the Evans building, was included in the National Register of the Historic places, the official list of the nation's historic monuments and sites worthy of preservation for their historical significance. According to the documentation provided, the Evans was listed because of its association with events that have made a significant contribution to the American history.¹⁵ Northern shops previously belonging to the Fintube, some of them built contemporaneously to the Evans' machine shop, were not included in the request. This nomination qualifies the Evans building for tax incentives, potentially derived from the total value of expenses incurred in preservation projects. However, it does not protect it in any strict sense from demolition or radical alterations.

3. THE PRESENT: THE ABANDONED RUIN

The 89,000m² site where the Evans building stands is just northeast of downtown Tulsa, less than 1 mile as the crow flies, and adjacent to Greenwood and the Campus of Oklahoma State University-Tulsa. However, today the facility is totally separated from the surrounding context. Massive vehicular and rail infrastructure surrounds it. The extant industrial building is roughly 11,000m² and has a composite massing resulting from its heterogeneous and

unplanned expansion. The surviving building is oriented primary north-south and has a T shape in plan. It is the result of 6 main building units from different construction phases, from 1911 to 1961 (Fig. 3). The facility today is completely empty.

Each one of the surviving building units is characterized by an identifiable spatial layout, which corresponds to a specific phase of the factory's life. Indeed, the whole facility can be considered as a visual handbook of the development of steel architecture in Oklahoma. Although the structural scheme is consistent throughout the different components, joining typologies for structural members differ. Riveted connections characterize the foundry and machine shop, while later warehouses and assembly shops show pieces connected through bolts and welding.

The surviving structure of the original foundry encapsulates the main features of American industrial buildings in the first decade of the twentieth century. At that moment of the history of modern factories, the structural skeleton was starting to be preferred to load bearing walls in masonry. This innovation resulted from the affordable production and standardization of building components in steel. The extant foundry is approximately 30m wide and 25m long, with a maximum height of 14m. The interior space is divided



Fig. 3. Aerial view of the Bethlehem Supply Company Tulsa Plant buildings, 1949. © Courtesy of Tulsa Historical Society & Museum, catalogue No. 2006.098.010.

into a central 18m wide bay and two 6m wide side bays. It presents a steel skeleton with trusses supported by I-beam columns, clad with brick veneer walls in the lower portion and, above them, sheets of galvanized tin. Operable steel-framed sash windows allow light and cool air to enter. The roof structure is characterized by the presence of a central Fink truss with knee braces — a typical solution for still mills of that time¹⁶ — and a monitor for extra lighting and fume extraction. Today only approximately 1/3 of the original foundry stands. The north and east façades of the unit have been removed, by leaving the structure exposed to the weather.

Among the other units built later, the machine shop is the largest space of the plant (Fig. 4). Planned as expansion of the foundry, it is roughly 30m wide and 120m long. The structural section of the unit is similar to the foundry. Brick walls and large expanses of sash windows in wire glass characterize the exterior facades. There is no other building in the State like the machine shop. Its modern, north-south basilica layout, reflected the need to capture daylight, favour stack ventilation, and sequentially organize the manufacturing processes. Additionally, the architecture of the machine shop manifested the radical implementation of both principles of modern industrial architecture — steel and

glass, lightness and light — and needs of modern workflow.

4. THE FUTURE: QUESTIONS OF PRESERVATION

In early 2017 clean-up of asbestos and lead-based paint at the site was completed.¹⁷ In the same year the site, already at the centre of a series of redevelopment proposals, was selected by the City and BMX USA to be the location for the company's headquarters. Also, the BMX project will include offices, an indoor arena for competitions and an exhibition space showcasing the BMX story. With a \$15 million investment, "the city is expected to see more than 100,000 visitors attending more than 100 local, state, and national events in the first five years".¹⁸ The BMX headquarters will be located on the northern side of the plant and take the place of the existing Fintube complex. According to the City officers' public statements, the Evans will be converted into a receptive space for both the Greenwood community and BMX users. At the beginning of 2020, however, detailed projects for the Evans-Fintube site have not yet to be publicized. In particular, the future of the Evans building is uncertain. In fact, although the facility is listed in the National Register, its preservation is not guaranteed by law. The owners of the property retain the right to radically transform it or, in the



Fig. 4. Evans building, view of the machine shop, 2019. © Brian Bourn.

worst case, demolish it.

With its coming reuse, the Evans building will deal with complex transformations that risk to compromise its unique urban, architectural and historical characters. The development of the Evans could provide a major opportunity for Tulsa and Greenwood only if it would be associated to a sustainable, research-based project, capable of documenting and preserving those characters.

The Evans sits in a barycentric and raised area among Downtown, Greenwood, the OSU-Tulsa Campus, and a series of underused infrastructural and green corridors. The latter may be easily converted into pedestrian and bike paths to improve site accessibility and connectivity among surrounding districts. Also, the abandoned outdoor spaces around the facility may strongly benefit from a careful environmental remediation project to provide greenspaces to the underserved local community. The remediation of the outdoor spaces surrounding the Evans may be inspired by recent successful brownfield redevelopments in the USA. Among them, the Steel Yard in Providence, Rhode Island, is worth to mention. A former steel plant was converted into a community space for arts and fabrication thanks to an interdisciplinary design strategy based on landscape, environ-

mental engineering, and creative restoration works.¹⁹

Preservation hypotheses are more critical when it comes to the building scale. In particular, the restoration of the building envelope is among the most pivotal topics for the overall success of the intervention. Because of decades of total vacancy, numerous glass panels of the exterior facades were damaged, replaced by fiberglass sheets or, as in the case of the foundry, removed. Similarly, most of the exterior metal sheets for the roof and facades are rusty and deformed, detached from the structure or completely missing. However, despite the poor conditions of the building skin, the main steel structure of the facility is still intact. The spaces covered by the extant skeleton are flexible and large enough to adapt a wide range of hospitality and leisure services. The original 6 building units can be easily partitioned and programmatically differentiated for establishing a proper balance among market demands, functional requirements, and preservation needs.²⁰

One possible strategy to preserve part of the original building is to transform some interior spaces of the factory in public open areas, less demanding in terms of wind, light and temperature control. Particularly as regards the machine shop, the most reasonable and less impactful strategy

seems to be the conversion of its central nave into a *passage*, a meeting space flanked by smaller and auto-climatized shops along the side aisles. Similar solutions may offer the opportunity for implementing flexible strategies of preservation for the building skin, which implement both restoration and replacement practices.

All these transformation opportunities need to be assessed by always respecting the building's original innovative characters and their cultural significance for Tulsa and the state of Oklahoma. The story of the site's construction, abandonment and projected reuse as an entertainment venue mirrors a larger history of industrial growth, decline and transformation in the American heartland. The fact that the facility may become a site for mass entertainment highlights the shift towards service industries conducted by Tulsa and the region in the last decades. The critical transformation of the facility represents a unique opportunity for updating the city's identity, suspended between the "petroleum age" and the "information age,"²¹ and proposing a model of sustainable development for the region, both sensitive to cultural reasons and market needs.

REFERENCES

- DE JONGE, Wessel, "Continuity and Change: Approaches to Conserving Modern Architecture Internationally," video, filmed in November 15, 2012, uploaded by Getty Conservation Institute, accessed on June 13, 2020, https://www.youtube.com/watch?v=b-fihvWYnPC&feature=emb_title.
- HOLLANDER, Justin, KIRKWOOD, Niall, & GOLD, Julia, *Principles of Brownfield Regeneration: Cleanup, Design, and Reuse of Derelict Land*, Washington, Island Press, 2010.
- KEMM, James O., *Tulsa: Oil Capital of the World*, Charleston, Arcadia, 2004.
- KETCHUM, Milo S., *The Design of Steel Mill Buildings and the Calculation of Stresses in Framed Structures*, New York, The Engineering News Publishing Co., 1903.
- KLINE, Susan Allen, "Oklahoma Iron Works/Bethlehem Supply Company Building, National Park Service / National Register of Historic Places Registration Form," accessed on March 7, 2020, <http://nr2-shpo.okstate.edu/pdfs/15000067.pdf>.

NOTES

- 1 James O. Kemm, *Tulsa: Oil Capital of the World*, Charleston, Arcadia, 2004.
- 2 "Oklahoma Iron Works. Great Tulsa Industry," *Tulsa Daily World*, August 31, 1913, 40.
- 3 Susan Allen Kline, "Oklahoma Iron Works/Bethlehem Supply Company Building, National Park Service / National Register of Historic Places Registration Form," 16, accessed on March 7, 2020, <http://nr2-shpo.okstate.edu/pdfs/15000067.pdf>.
- 4 On May 31, 1921, the Greenwood District, one of the most prosperous African American communities in the United States, was attacked by a white mob. The attack, triggered by rumours that a young black man had attempted to rape a white girl, destroyed the neighbourhood and killed perhaps as many as 300 people. The event remains one of the worst and least known episodes of racial violence in the American history. Randy Krehbiel, *Tulsa, 1921. Reporting a Massacre*, Norman, University of Oklahoma Press, 2019.
- 5 "Foundry and Machine Plants," *Industrial Development and Manufacturers' Record*, February 18, 1909, 62.
- 6 Fowler & Kelly, *Aero view of Tulsa, Oklahoma*, Pasaic (sic), N. J., Fowler & Kelly, 1918, map, accessed on March 7, 2020, <https://www.loc.gov/item/87692752/>.
- 7 A 1 ton, 300 kva Rennerfelt electric furnace by Hamilton & Hansell Inc. is reported in the plant. "Types and Uses of Electrical Furnaces," *Electrical Record*, Vol. 23, March 1918, 54.
- 8 Kline, "Oklahoma Iron Works," 18.
- 9 Ibid., 24.
- 10 In 1944 the Bethlehem Supply Company produced finished products valued in excess of \$100,000, of which more than 60% was shipped by it into interstate commerce. *Decisions and Orders of the National Labor Relations Board*, Vol. 63, Washington, DC, United States Government Printing Office, 1946, 938.

- 11 In 1952, to reply to the menaces of a national steel strike during the events of the Korean War, the facility was included in the list of strategic plants by President Harry Truman's Executive order 10340, as "interests of national defense." National Archives and Records Administration, *Federal Register: 17 Fed. Reg. 3139*, April 10, 1952, Periodical, accessed on May 27, 2021, <https://www.loc.gov/item/fr017071/>.
- 12 Kline, "Oklahoma Iron Works," 22.
- 13 The City of Tulsa, Oklahoma, *Quality Assurance Project Plan (Qapp)*, 5, accessed on March 7, 2020, https://www.cityoftulsa.org/media/3207/qualityassuranceproject-plan_jan2016.pdf.
- 14 Ibid.
- 15 Kline, "Oklahoma Iron Works," 11.
- 16 Milo S. Ketchum, *The Design of Steel Mill Buildings and the Calculation of Stresses in Framed Structures*, New York, The Engineering News Publishing Co, 1903, 147-148.
- 17 The City of Tulsa, *Planning, Cleanup and Redevelopment*, accessed on March 7, 2020, <https://www.cityoftulsa.org/economic-development/opportunities-and-incentives/brownfields/planning-cleanup-and-redevelopment/>.
- 18 Ibid.
- 19 Justin Hollander, Niall Kirkwood, Julia Gold, *Principles of Brownfield Regeneration: Cleanup, Design, and Reuse of Derelict Land*, Washington: Island Press, 2010, 68.
- 20 A successful implementation of this strategy is the adaptive reuse of the Bethlehem Shipbuilding, within the historic Pier 70 in San Francisco, California. The former plant, recently turned in the Uber ATG R&D Center, was carefully converted in order to preserve the legibility of the historical and spatial individuality of each building unit, constructed at different times with different structural layouts and materials. The project, completed in 2018, was designed by Marcy Wong Donn Logan Architects. *Uber Advanced Technologies Group R&D Center*, accessed on June 13, 2020, <https://wonglogan.com/#/uber-advanced-technology-rdcenter/>.
- 21 On the challenges headed by post-industrial cities and modern architecture icons in the "information age", see: Wessel de Jonge, "Continuity and Change: Approaches to Conserving Modern Architecture Internationally," video, filmed in November 15, 2012, uploaded by Getty Conservation Institute, accessed on June 13, 2020, https://www.youtube.com/watch?v=b-fihvWYnPC&feature=emb_title.

Session 4-b

MASSIVE MATERIAL CULTURES

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Massive Materials outlines the importance of natural stone, brick and concrete as the most relevant massive materials used in buildings and ensembles of Modern Movement. While natural stone as main structural material has first been increasingly replaced by brick during the 19th century, concrete has become the dominant construction material during the 20th century and in particular after WWII. Natural stone and brick were mostly the result and expression of locally available materials, techniques and construction cultures. Thus materials and building elements differed in expression and details. Concrete constructions in contrast seemed to be the expression of a globalized industry that expanded rapidly at the beginning of 20th century. Still, many buildings of that early period witness experimental design and handling of the new material before guidelines and standards were not established until the middle of the century. Often individual and rarely documented material formulations were used, which require special analyses and knowledge during rehabilitation. The authors in this session highlight different aspects of these material cultures in Japan, Switzerland and Taiwan.

In the first lecture Naoki Hirai explores expression, details and construction process of the fair-faced concrete at the National Museum of Western Art, Tokyo, designed by Le Corbusier and completed in 1959. The authors want to emphasize "the difference in results brought about through the process from preliminary design to construction."

Akio Yasumori and Motosumi Kobayashi, investigate the use of Japanese local stone in different modernist buildings of Frank Lloyd Wright, Arata Endo, Junzo Sakakura and Yoshiro Taniguchi which were built between 1923 to 1977. In their paper they compare their construction methods, details and usage to identify typologies — as examples of Modernism and Vernacularism. All of them were made of Oya-Stone, a tuff, which is made from volcanic ash and

characterized by a soft texture.

Patrick Fleming's paper deals with the historical foundations the Zurich Kongresshaus in Switzerland built by Haefeli Moser Steiger Architects (HMS) from 1937–39. The project was involving four different engineering offices, among them the Swiss engineer Robert Maillart. Fleming highlights the importance of archival research to understand the evolution and execution of the original construction of the foundations. Those were indeed composed of both modern and traditional construction techniques and materials, in this case of concrete and timber piles.

Finally Nan-wei Wu demonstrates in her paper how the use and meaning of brick in Taiwan have changed at least four times from before 1895 to 1980s which she describes as a "resilient materiality of brick". In her work Wu describes how brick was deployed according to European construction principles for defences, but also according Chinese principles as used by the Han people for domestic buildings.

All contributions exemplify how modern materials and constructions were interwoven with traditional ones and that they were often shaped and modified by regional influences in the planning and building process.



THE NATIONAL MUSEUM OF WESTERN ART, TOKYO: USING FAIR-FACED CONCRETE

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ABSTRACT.

The National Museum of Western Art, Tokyo, which was completed in 1959, was constructed by a Japanese general contractor based on Le Corbusier's preliminary design and a detailed design by Japanese architects. This paper examines the relationship between the museum's fair-faced concrete and its architectural expression; addressing the approach and the background of its construction manager and the details of its on-site construction processes.

Fair-faced concrete offers a vivid reflection of the underlying form. It can take on a different finish depending on the layout and materials of the forms, metal, plastic, wood, and so on. With wooden forms, it depends also on the choice of wood, the processing of the board and the presence of knots. The museum drawings did not indicate the details of the forms of the fair-faced concrete, so during construction it was realised using existing Japanese building technology and experience.

The resulting fair-faced concrete is something different from that of the Sanskar Kendra Museum in India which derived from the same "Museum of Unlimited Growth" prototype. It is uncertain what Le Corbusier had in mind in the design stage; he left the actual work to the Japanese architects and the general contractor. However, it can be said that the full expression of the building's characteristics arose from a combination of the preliminary design, detailed design, and construction management.

1. INTRODUCTION

This paper focuses on the construction of the main building of the National Museum of Western Art, Tokyo, which was completed in 1959, addressing the approach and the background of its construction manager and how the actual construction work was carried out. It also examines the relationship between the museum's fair-faced concrete and its architectural expression. To capture and respect the values of modern architecture from a different perspective, taking a look at the individuality expressed in the construction work is just as important as understanding the intention of its designers.

The building's expression is based on the finish of the exposed concrete established by the close relationship between its design and construction. The frame of the reinforced concrete, such as the columns and beams, is basically fair-faced concrete, and the outer wall panel and front garden is also finished in the way of exposed aggregate concrete (Fig. 1). Based on the preliminary design by Le Corbusier, the Japanese architects Kunio Maekawa, Junzo Sakakura, Takamasa Yoshizaka and Fugaku Yokoyama and their office staff worked on the detailed design, and Shimizu Corporation, a Japanese construction company, carried out the construction work.

The papers and books written on this building are mainly focused on its design and have not given much consideration to its construction. Most of them take up the architectural work of Le Corbusier and some of them also refer to the Japanese architects who took charge of the detailed design. Regarding the construction, there has been an article

evaluating a construction manager as "an unknown master of concrete placing work",¹ an exhibition catalogue introducing photographs and documents about the construction² and a book dealing with the building as one example of Le Corbusier's works using exposed concrete.³

This paper focuses not only on the designer's intentions and the constructor's skilfulness, but also on the process of construction from an examination of the construction plan to execution, and the individuality of the architectural expression of the fair-faced concrete.

2. CONSTRUCTION METHODS OF FAIR-FACED CONCRETE IN JAPAN

The architectural expression of exposed concrete represented by fair-faced concrete is one of the characteristics of Japanese modern architecture. In Japan, exposed concrete as an architectural expression is said to have been successful for the first time in the Reinanzaka House completed in 1924. After WWII, it was utilised early in Okinawa, which was under the control of the U.S., and, since the 1950s, it has been widely used in various parts of Japan.

In the latter half of the 1950s, various options were being employed on the forms of fair-faced concrete. In addition to the thick boards and standard-size wooden panels used before WWII, metal forms, plywood panels, paper tubes for round columns and other options appeared after 1945. These attracted attention for their economic efficiency, accuracy and speed of installation. In the construction of wooden forms, fastening technology using plastic cones and separators became popular from the 1950s. Thick boards of pine



Fig. 1. Le Corbusier, National Museum of Western Art, Tokyo, Japan, 1959, Columns and beams in the main hall. © Naoki Hirai, 2016.

and cedar were used from around 1900 until the beginning of the 1960s. The thick boards were originally abutted and bonded, but, later on, they were usually constructed with straight scarf joints (both ends cut to half of the thickness and then joined together). Moreover, in the case of fair-faced concrete, they were generally constructed with tongue-and-groove joints (one of the boards converted into a convex shape and the other board into a concave shape before being connected). Repeatedly usable wooden standard-size panels (1,800mm x 600mm) were devised in 1917 and then used until the 1960s. Metal forms began to be manufactured by Japanese companies around 1950, but those for round columns were not so popular at that time. Plywood panels began to be used from around 1950 and became popular in

the 1960s. Paper tubes for round columns were commercialised in 1955 in Japan.⁴

The surface of fair-faced concrete changes depending on the type of its form and its layout. If it is made of wood, it varies depending on the type of wood, wood conversion, and whether or not it has knots. If using wooden standard-scale panels, the traces of the frames also appear on the surface. Using metal forms, smooth and homogeneous surfaces peculiar to metals are obtained, and the finish dimension will also be accurate. Smooth surfaces can be obtained even when plywood is used. When using standard-scale panels, if they are made of wood or steel, one surface cannot be evenly divided unless designed according to the respective dimension system. If using a paper tube for round columns, a spi-

ral pattern appears on the surface.

3. EXPERIENCE AND CONCEPT OF THE CONSTRUCTION MANAGER

Shiro Morioka (1906–1992), who served as the construction manager of this museum, had experience working in Auguste Perret's atelier in Paris from March 1928 to May 1930. Without receiving any architectural education in Japan, he went to France and studied basic architectural design and theory. He learned the ideal way of modern architecture based on actual buildings from Perret, who designed buildings with exposed concrete in pursuit of details and finishes.

Morioka's true specialty was not merely skills limited to placing concrete. After returning to Japan in June 1930, he soon began working in the design department of Shimizu Corporation, and later moved to the construction management department. After joining Shimizu Corporation, his job was not limited to the construction of reinforced concrete structures, but was extended to the design of wooden houses, the design and construction of brick offices and factories, and the construction of steel structures.⁵

His philosophy for modern architecture was influenced by Perret. He explained the correctness of exposed concrete by stating "the structure of carefully constructed concrete is too excellent for decorative use finishing". The "beauty of Greek and Tuscan columns and Gothic churches in France in the 14th and 15th centuries are just only beauty of used materials and structures", he said, and regarded the beauty of exposed concrete in relation to the beauty of materials and structures in traditional architecture. In addition, he regarded the relationship between a designer and a constructor as similar to that of the relationship between a composer and a performer. He thought that "the constructor must have the same new knowledge and aesthetics as the designer in order to carry out the construction work which fully reflects the new design using many new materials".⁶

The construction plan of this building reflects his thoughts. He imagined "a country chateau in Europe in the crude and wild Middle Ages" from its design. However, he was concerned that the finished building would convey the impression of paucity and that it would look highly contrived if Japanese incredible craftsmanship was applied. Therefore, he approached the construction with the thought that "I could, at least, add a touch of nobility to this museum, which was like an unassuming woman wearing a simple cotton kimono, with meticulous attentiveness to her personal appearance".⁷

4. CONSTRUCTION OF FAIR-FACED CONCRETE

Though the construction of the museum did not have a completely new technical problem, careful consideration was required in the details and finishes. In the case of fair-faced concrete, it was necessary to manufacture the forms according to the Modulor Rule, and the finishes were also

important for this building because of its simple design. In this construction, various working drawings taking into consideration the architectural expression were prepared in the construction site based on the detailed design drawing. Then the construction work was carried out with the approval of the architects and supervisors.

In the specifications of the building, the fair-faced concrete had a smooth surface not a rough surface of brutalist architecture. Regarding the round columns, the following instructions were given: "No finishing should be done with the fair-faced concrete"; "Special consideration should be given to the forms. They should be made of steel plate semi-cylindrical shape with a height of 1.40m so that a smooth concrete surface can be obtained." In the typical cross section (FLC24625) by Le Corbusier, he envisaged allocating the forms so that the longitudinal joints are shifted by 90 degrees. In addition, regarding the general structure, it was stated "it must be exposed concrete", while it was not specified whether the type of forms to be made should be wood or steel plates.⁸

Concerning the forms of fair-faced concrete, first, forms for round columns with a total length of about 1,200mm were produced using materials such as paper pipes, steel plates, cypress and Japanese white pine, and concrete was placed to the forms for comparison (Fig. 2). As a result, Japanese white pine with a dense and uniform surface was selected "to leave the exact impression in the concrete", and the straight-grained and knot-free boards which hardly get out of order were mainly used. Then, to not mar the surface pattern in the fair-faced concrete, it was decided to leave it just as it was when the framework was removed, without wiping it down or performing any other detail work.

During the actual construction, a factory specializing in woodworking manufactured the forms of round columns, and they were like wooden tubs of exquisite workmanship. The forms were manufactured with small-width boards (about 40mm in width x 48 sheets) with the length of one floor with spline joints. Moreover, rather than approximating the cylinder by the regular polygonal cylinder, inside of each small-width board was finished to a curved surface. This resulted in a smooth cylinder without vertical seams. In addition, since the width of the board becomes a seam as it is and appears on the surface of the fair-faced concrete, narrowing the width leads to a delicate impression.

To prevent the surface of the forms from being damaged by the reinforcing bars when the round columns were constructed, the forms were installed after the metal cylinders were placed. The procedure was as follows: (1) a circular groove for placing a form on the foot was created, (2) bars and spacers were arranged, (3) a metal cylinder whose diameter was one size smaller than the form was installed, (4) the form was installed (application of a peeling agent on the surface) outside the metal cylinder, (5) the metal cylinder was removed, (6) ready-mixed concrete was placed and (7) the form was removed (Fig. 3).



Fig. 2. Le Corbusier, National Museum of Western Art, Tokyo, Japan, 1959, test construction for round columns. © Shimizu Corporation, 1958.

When constructing the general structures, different construction methods were selected for the visible and invisible parts. For the invisible parts such as the outer walls of the basement floors, steel forms, which were easy to remove and could be used many times, were used. Meanwhile, for the visible parts, the forms made of Japanese white pine boards were used, and these were used only one time. The forms such as the columns and beams were constructed with small-width boards (standard width: 100mm) with tongue-and-groove joints, and were fastened with cones, separators, and form ties. In so doing, the seams of the small-width boards divided one surface evenly, where straight and slight wood grains and cone marks remained. In other words, it can be said that for the general structures as well, consideration was given to the differences in architectural expressions due to forms, and for the visible parts, a classical time-consuming work was daringly chosen.⁹

5. CONCLUSION

This paper, concerning the main building of the National Museum of Western Art, Tokyo, clarified the construction plan of the construction manager and its background, and how the actual construction work was carried out focusing

especially on the fair-faced concrete.

The construction manager of this building took account of not only technical aspects but also aesthetic aspects to leave the exact impression in the fair-faced concrete. Proposals were made from the construction manager, and the material for forms of round columns was changed from steel plate to wood by obtaining the permission of Le Corbusier. He decided the forms by considering the difference of the skin of the concrete due to the difference of the forms and the trace of the seam and wood grain appearing on the surface. In other words, based on the accumulation of technology and experience in Japan at that time, it was the result of considering the expression of fair-faced concrete used in this building, which was not described in the drawings.

This museum is one of three museums derived from the "Museum of Unlimited Growth" prototype by Le Corbusier, but it has a different texture than the fair-faced concrete of the other two museums (the Sanskar Kendra Museum in Ahmedabad, and the Government Museum and Art Gallery in Chandigarh). In the museum in Tokyo, straight and slight wood grains appear on the fair-faced concrete. This leaves an elegant and gentle impression. In contrast, the fair-faced concrete of the two museums in India using steel forms gives a smooth, homogeneous and hard impression.



Fig. 3. Le Corbusier, National Museum of Western Art, Tokyo, Japan, under construction of round columns. © Fumio Takano, 1958.

What is important is not whether the construction in Japan or India is superior. In *Le Corbusier's complete works*, the finish of the museum in Tokyo was accepted with the impression of Japanese wooden architecture and praised as follows: "The forms for the reinforced concrete were made of wood with a quality which only the Japanese possess, with impeccable craftsmanship, with a most admirable professional consciousness."¹⁰ The museum in Ahmedabad was also evaluated as "the joints appear clean in the formwork; the concrete, being left visible, thus benefits from a decidedly modern 'opus' introduced into the 'plastic architectural issue'".¹¹

What I would like to emphasise in this paper is the difference in results brought about through the process from preliminary design to construction. It can be said that the expression particular to each building was established as

the sum of the search of all stages from the preliminary design to the detailed design and the construction. Although the museum in Tokyo is a special case in which the preliminary design of a global architect was realised in a distant Japan, the individuality of the exposed concrete as an architectural expression could be an important aspect in considering the value and preservation of modern architecture in general.

This paper is based on an earlier study which appeared in Naoki Hirai, "Research on Fair-Faced Concrete Finishes of Post-War Modern Architecture in Japan — The National Museum of Western Art — (in Japanese)", *Technical research report Institute of Technology, Shimizu Corporation* No. 94, Tokyo, Institute of Technology, Shimizu Corporation, 2017, 8–16.

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REFERENCES

- FORTY, Adrian, *Media toshite no Konkurito tsuchi seiji kioku rōdō shashin*, SAKAUSHI, Taku, et al. (trans.), Tokyo, Kajima shuppankai, 2016.
- FUJIKI, Tadayoshi, *Ru Korubyujie no Kokuritsu seiyo bijutsukan*, Tokyo, Kajima shuppankai, 2011.
- KONDO, Yoshimi, "Konkurito no katawaku kōji" [Concrete form construction], *Kenchiku gijutsu* No. 75, 1957.
- MATSUKUMA, Hiroshi, "Ru Korubyujie ga nihon ni tsutaeyoutoshita mono: Kokuritsu seiyo bijutsukan no sekai isan touroku wo mae ni" (What Le Corbusier tried to tell Japan: before World Heritage Registration of the National Museum of Western Art), *Kikan bunkyō shisetsu* No. 63, Tokyo, Bunkyo shisetsu kyōkai, 2016, 35–38.
- Nihon Kenchiku Gakkai Kokuritsu Seiyo Bijutsukan Rekishi Chōsa WG (Architectural Institute of Japan for Historical Research on National Museum of Western Art Working Group, Tokyo), *Kokuritsu seiyo bijutsukan honkan rekishi chōsa hōkokusho*, Tokyo, Kokuritsu seiyo bijutsukan, 2007.
- SENDAI, Shoichiro, *Ru Korubyujie zumen senshu — bijutsukan hen —*, Tokyo, Chuō kōron bijutsu shuppan, 2016.
- TAKASHINA, Shuji, SUZUKI, Hiroyuki, MIYAKE, Riichi, & OTA, Yasuto, *Ru Korubyujie to Nihon*, Kajima shuppankai, 1999.
- URAE, Masato, "Purasutikkukōn shiki katawaku kinketsu kanamono no kai-hatsu to fukyū" (Development and dissemination of form fixing tools using plastic), *Uchida sho kensho jiseki shu: Nihon wo kaeta yattsu no kouhou*, Uchida sho iinkai jimukyoku, 2002.
- WILSON, J. Gilchrist, *Konkurito no arawashi shiage*, NAGAI, Hisao (trans.), Kajima shuppankai, 1969.

NOTES

- 1 Hiroshi Sasaki, "Kakureta konkurito uchi no meijin: Ōgyusuto Pere no deshī no Morioka Shiro [an unknown master of concrete placing work: a disciple of Auguste Perret, Shiro Morioka]", *Nikkan kensetsu kōgyō shinbun*, Tokyo, Nikkan kensetsu kōgyō shinbun sha, 2001.
- 2 Yoko Terashima, *Kaikan 50 shūnen kinen Ru Korubyujie to Kokuritsu seiyo bijutsukan*, 2009.
- 3 Roberto Gargiani & Anna Rosellini, *Le Corbusier Beton Brut and Ineffable Space, 1940-1-65*, Lausanne, EPFL Press, 2011.
- 4 Hideki Daigo & Masato Urae, "Uchihanashi katawaku no hensenshi [A History of concrete forms]", *Kendhiku gijutsu zōkan* (12), 1993, 99–100.
- 5 According to the records remaining at Shimizu Corporation, his career was as follows. Born on 4 January 1906 in Toyama, Japan. In 1924, he journeyed to France and entered École nationale supérieure des beaux-arts de Lyon. In 1925, he entered Académie Julian in Paris. From March 1928 to May 1930, he was working in Auguste Perret's atelier. After returning in 1930, he started working in a design department of Shimizu Corporation. In 1939, he transferred to Tianjin office in North China branch. He engaged in design and construction management. In 1942, he moved to Zhangjiakou office and became a chief construction manager of the office. In 1944, He returned to Japan. After WWII, he served as the construction manager of Nippon Sogo Bank (1952) and gained the trust of the designer Kunio Maekawa. He engaged in the construction of some branches of the same bank as well as Tokyo Metropolitan Festival Hall (1961).
- 6 Shiro Morioka, "Kenchikukai chūmoku no tatemono rakusei ni atatte" [On the completion of a building that attracts attention from the building industry], *Shimizu kensetsu* No. 182, Tokyo, Shimizu Corporation, 1952, 10–13.
- 7 Shiro Morioka, "Sobokuna naka ni hin'i: sekō wo tantōshite" [Dignity in simplicity: in charge of the construction], *Nikkan kensetsu kōgyō shinbun* No. 3424, Tokyo, Nikkan kensetsu kōgyō shinbun sha, 1959, 3.
- 8 Yoko Terashima, *op. cit.*, 110–111.
- 9 Fumio Takano, "Kokuritsu seiyo bijutsukan oboegaki (2)" [A Memorandum about the National Museum of Western Art], *Shisetsu geppō* No. 35, Tokyo, Monbushō, 1959; *Zadankai Seiyo bijutsukan kensetsu no koro wo kataru*, Tokyo, Bunkyo shisetsu kyōkai, 1996.
- 10 W. Boesiger, *Le Corbusier 1957–65*, Zurich, Artemis, 1965, 184.
- 11 W. Boesiger, *Le Corbusier 1952–57*, Zurich, Artemis, 1957, 158.

MODERNISM AND REGIONALISM IN JAPANESE LOCAL STONE BUILDINGS

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ABSTRACT.

In modern architecture, stone has been used as an important material along with iron, glass, and concrete. We can see the locality in the buildings built with local stones. Since Japan is a volcanic country, tuff, which is made from volcanic ash and has soft texture, is produced all over the country. In this paper, the characteristics of buildings using stone, especially Oya-stone, which is a tuff produced in Utsunomiya city in Kanto area, are clarified through the propagation of Modernism and Regionalism. In Japanese modern architecture, Frank Lloyd Wright used Oya-stone in the former Imperial Hotel in 1923 and in the former Yamamura Residence in 1924. His disciple Arata Endo also used Nikka-stone, which is a tuff produced in Hokuriku area, in the former Koshien Hotel in 1930. In 1951 after WWII, Junzo Sakakura, Le Corbusier's disciple, also used Oya-stone in the pilotis in the Kanagawa Museum of Modern Art. Moreover, Yoshiro Taniguchi used it for the Eiji Yoshikawa Memorial in 1977. Those modern architects' stone works are examined. Moreover, stone buildings such as storehouses or barns were also constructed by unknown masons in Japan. Stone were used for these vernacular buildings near the producing sites and formed their townscape. Their typologies are examined through the construction methods, the details, the usages, and so on. Furthermore, the Folk Art Movement called "Mingei" also discussed Oya-stone focusing on its anonymous design. Finally, the characteristics of Japanese stone buildings are clarified through the comparative study of the modern architects' works and vernacular buildings.

1. INTRODUCTION

1.1. Background and Purpose

The Japanese architecture culture is centered on wooden architecture, but stones are produced in various areas. Stone materials from the regions have been used as architecture materials since the early modern period and in combination with materials like iron, glass, and concrete also for modern architecture. Particularly in Japan, a volcanic country, tuff made of solidified volcanic ash is produced in various areas, and the tuff is characterized for its ease of processing due to the light specific gravity and softness. Oya-stone, a kind of tuff produced in Utsunomiya City, Tochigi Prefecture, approximately 100 km north of Tokyo, has been utilized for a lot of buildings and modernization in urban areas mainly in Kanto District. The purpose of this paper is to clarify the characteristics of the modernism and the regionalism in Japanese architecture from the perspective of stone materials by analysing the architecture for which Japanese tuff represented by Oya-stone is used.

1.2. Previous Studies

The authors have conducted field surveys of anonymous Oya-stone buildings made by masons and the townscape where they have aggregated, and clarified the typological characteristics in agricultural village and urban areas near quarries in Utsunomiya City.^{1,2,3} Furthermore, a bibliographic survey was conducted on modern architecture works for which Oya-stone was used and the design expressions and design theories of architects were reported.^{4,5} This paper compares architectures for which tuff represented by

Oya-stone, both in anonymous buildings and works by prestigious architects. With regard to modern architecture works mentioned in this study, the design process of former Imperial Hotel designed by Frank Lloyd Wright is reported by Tanigawa⁶ (1975), the stone material preservation of former Koshien Hotel designed by Endo Arata, the apprentice, is reported by Uno et al.⁷ (2017), and the geometry of design process of Kanagawa Prefectural Museum of Modern Art designed by Junzo Sakakura is reported by Wada⁸ (2006). But no previous studies have focused on the tuff represented by Oya-stone, compared modern architecture works with regional ones, and clarified the characteristics from the perspectives of construction and design like this study.

1.3. Study Outline

In this study, Section 2 describes the history and outline of Japanese stone materials and Oya-stone. Then, Section 3 discusses the characteristics of architecture works of four modern architects which used tuff represented by Oya-stone. Furthermore, Section 4 discusses the characteristics of anonymous buildings like stone warehouses built by masons in Utsunomiya City where Oya-stone is produced. Finally, Section 5 integrates the above and clarifies the Modernism and Regionalism of architectures that used stone materials in Japan.

2. OUTLINES OF JAPANESE STONES AND OYA-STONE

2.1. Japanese Stones and Production Areas

A green tuff belt with solidified volcanic ash in form of tuff can be found in Japan, a volcanic country. The tuff is

represented by Oya-stone produced in Utsunomiya City, Tochigi Prefecture, which was used for modernization of buildings and cities in Kanto District. Nikka-stone is produced in Hokuriku District, which was transported also to Kansai District and used as building materials. Tuff is a light soft stone, but heavy hard stone like granite is also produced mainly along Seto Inland Sea and the Pacific Ocean.

2.2. Outline of Oya-Stone and Quarries

Oya-stone is characterized for the porosity and brown dots called “miso” (Fig. 1). Quarries are mainly two types; an old style “open mining” where stone exposed on the ground is mined and “pit mining” under the ground. Mining equipment was developed in the 1960s and the production of Oya-stone increased significantly. Today, seven quarries are in operation (open mining in one quarry and pit mining in six quarries).

3. JAPANESE MODERN ARCHITECTURE USING OYA-STONE OR TUFF

3.1. Former Imperial Hotel and Yamamura Residence Designed by F. L. Wright

Oya-stone was used for Japanese modern architecture for the first time in former Imperial Hotel designed by Frank Lloyd Wright that was built in Tokyo in 1923 (Fig. 2a). At that time, the Building Department of the Ministry of Finance had samples of stone materials from various areas in Japan for the purpose of examining stone materials used for national architecture including the Diet Building. Wright chose a porous stone from them and Oya-stone easily available in Kanto District was adopted. The operating company of Imperial Hotel purchased a mountain of a quarry in Oya Town to build the hotel, and a large amount of stone was transported from there. Wright used Oya-stone with scratch tiles and terracotta manufactured in Tokoname City, Aichi Prefecture, both of which are characterized for the uneven texture (Fig. 2b). He also used Oya-stone for the parts to emphasize horizontal lines, which effectively created the continuity between horizontal spaces that is the feature of architecture of Wright. Wright was also requested to design a

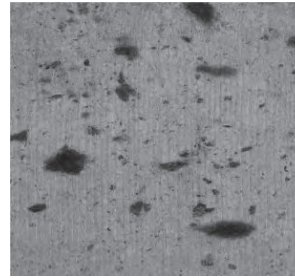


Fig. 1. Oya-Stone © Akio Yasumori, 2019.

residence near Kobe City, Hyogo Prefecture, during construction of Imperial Hotel, and Yamamura residence was completed in 1924. Oya-stone was transported to be used also for the residence on the rise in Ashiya City (Fig. 2c).

3.2. Former Koshien Hotel Designed by Arata Endo

Arata Endo, a disciple of Wright, is an architect who was engaged in the site supervision of Imperial Hotel. He designed Koshien Hotel near Yamamura Residence, which was completed in 1930 (Fig. 3a). Nikka-stone produced in Komatsu City, Ishikawa Prefecture in Hokuriku District was used for the building. Nikka-stone is characterized by bright yellow and makes a more gorgeous impression than Oya-stone does. The stone was used with unglazed tiles from Osaka for the building.

3.3. Former Kanagawa Prefectural Museum of Modern Art Designed by Junzo Sakakura

In the reconstruction period after the WWII, the Kanagawa Prefectural Museum of Modern Art (Fig. 3b) — the first museum of modern art in Japan — was designed by Junzo Sakakura, an architect who studied under Le Corbusier; it was completed in 1951. The cloistered museum with a patio combined pilotis on the 1st floor and the white volume covered with aluminum panel on the 2nd floor, which was a typical composition of modern architecture. Oya-stone was used for the pilotis and combined with glass blocks to form walls to take light from the patio into the cloister. Oya-stone is used in the fixed scale of 1 shaku x 3 shaku (303mm x



Fig. 2. Images of F.L. Wright's Works: a. Interior of Former Imperial Hotel; b. Combination of materials; c. Former Yamamura Residence. © Akio Yasumori, 2019.



Fig. 3. Images of Arata Endo, Junzo Sakakura and Yoshiro Taniguchi's Works: a. Former Koshien Hotel; b. Former Kanagawa Prefectural Museum of Modern Art; c. Yoshikawa Eiji Museum© Akio Yasumori, 2019.

910mm) in many cases, but it was designed to be 205mm x 895mm that was smaller than ordinary ones to match the size of glass blocks, which makes a slender impression. Oya-stone creates the contrast with the white volume on the 2nd floor as well as provides the continuity with the ground, so it contributes to the ambiguous expression of autonomy and grounding property.

3.4. Yoshikawa Eiji Museum Designed by Yoshiro Taniguchi

Yoshiro Taniguchi, another important modern architect, designed the museum of Eiji Yoshikawa, the novelist in Ome City, Tokyo, which was completed in 1977 (Fig. 3c). Taniguchi went to Europe in the late 1930s and was first influenced by Schinkel, the neoclassical architect in Germany, and later tried to blend Modernism and Japanese tradition. The museum is a one-story gabled building built in a wide property of the private residence of Eiji Yoshikawa, and Oya-stone is used for the wall of the entrance hall. Oya-stone whose size is 270mm x 860mm and slenderer than the fixed scale is piled geometrically with the longer side and shorter side alternately. The floor is covered with Teppei-stone at irregular scales, and the materials of stones are creating harmony. Furthermore, Taniguchi was the first manager of Museum Meiji Mura and made efforts to transfer and preserve the above-mentioned former Imperial Hotel designed by Wright.

4. ANONYMOUS BUILDINGS IN UTSUNOMIYA CITY, THE PRODUCTION AREA OF OYA-STONE

4.1. Townscape of Oya-Stone

In Utsunomiya City, the production area of Oya-stone, a lot of stone buildings like stone warehouses are still seen today. Particularly in the farming settlement in the north of the city, a townscape was formed with the continuity of Oya-stone buildings and stone walls because warehouses and barns were used for agricultural purposes. In the old days, a lot of residents were engaged in stonework and quarrying, and fires occurred frequently, so stone buildings which were highly fire-proof became popular and the stone

townscape was formed.

4.2. Typology of Oya-Stone Buildings

Characteristics of Oya-stone buildings are described here (Table 1). First, construction methods of the buildings are categorized into "stone-cladded" and "stone-piled". Old stone warehouses from the late Edo era (the end of 19th century) to the early Taisho era (the early 20th century) are "stone-cladded", that means, stones are cladded on a wooden framework. In Japan, there have been simple wooden warehouses since the old days, and in the late Edo era, warehouses coated with soil and mortar in order to improve the fire-proof performance appear. Warehouses cladded with fire-proof Oya-stone are the origin of stone warehouses around Utsunomiya City. Thin plates ranging from 60mm to 90mm are fixed with iron nails normally, and some roofs are pitched with stone tiles. On the other hand, the "stone-piled" method is seen mainly in the Taisho era (early 20th century) when brick and stone buildings were imported from the Western world and the transportation developed after the modernisation in the Meiji era. The fixed scale is 1 shaku height x 3 shaku length (approx. 303mm x 910mm) and the thickness ranges from 5 sun (15mm) to 1 shaku (303mm) depending on the part where it is used.

Soft Oya-stone is characterized for the shaped-mining with the size in quarries. Moreover, the numbers of stories of buildings are mainly "one-storey" and "two-storey". Furthermore, the uses of buildings are mainly "warehouse" to store the property and "barn" for agriculture and equipment storage, and some are "residence" and "annex". Types of Oya-stone buildings can be found as the common points of the characteristics.

4.3. Folk Art Movement and Oya-Stone Buildings

Anonymous stone buildings attracted attention also in the modern design movements. In the Mingei Movement, the Folk Art Movement in Japan, philosopher and aesthetician Muneyoshi Yanagi discussed Oya-stone extensively. The movement of life culture proposed in 1926 while industrialisation developed and mass production was popularised in

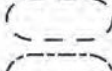
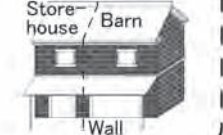
Construction Stories	Cladding stone (Wooden•Soil)		Piling stone			
	Whole wall	Part of wall	Wooden frame piling stone	Masonry		RC girder•frame piling stone
Single story			Single story foundation barn  Single story foundation stone house 	Agricultural village Single story piling stone barn  Single story piling stone shed  Single story piling stone storehouse 		 Agricultural village  City center
Two stories	Agricultural village 2 stories cladding stone storehouse 	2 stories part of cladding stone storehouse  2 stories part of cladding stone Machiya 	City center 2 stories wooden frame piling stone storehouse  2 stories piling stone house 	2 stories piling stone storehouse  2 stories piling stone barn 	[Composite type] 2 stories piling stone annex + barn  2 stories piling stone storehouse + barn 	City center 2 stories RC piling stone storehouse  2 stories RC piling stone house  2 stories RC piling stone factory  2 stories RC piling stone sign shop 

Table 1. Typology of Oya-stone buildings.

Japan, named daily life tools manufactured by anonymous craftsmen as “Min-gei”, which means folk-art, and asserted that life tools rooted in daily culture have a beauty equivalent to the one of art works. He purchased the Nagaya-mon Gate with a stone roof and a stone spandrel wall in Utsunomiya from a wealthy farmer and transferred it to his own residence in Komaba Town, Tokyo (Fig. 4). He refurbished the rooms on the left and right of the gate and built a main building he designed for himself at the back, where he lived to the last years. Moreover, the Japan Folk Crafts Museum built across the street from the property is also clad with Oya-stone. It is assumed that Yanagi found the same quality based on the regionality and anonymity in the life tools manufactured by craftsmen and the buildings built by masons.

5. MODERNISM AND REGIONALISM OF OYA-STONE BUILDINGS

Modern buildings designed by architects and anonymous buildings built by masons have actually been produced in the same period in the 20th century. However, they had been regarded as different things and not been discussed from the same perspective. They are compared from the perspectives of construction method and handling of materials here.



Fig. 4. Image of Nagaya-mon gate at the Japan Folk Crafts Museum © Akio Yasumori, 2019.

5.1. Structure Types and Construction Methods

First, regarding the structures and stone construction methods of buildings, regional anonymous buildings are wooden framework clad with stones and the pure masonry construction. The former is a Japanese traditional

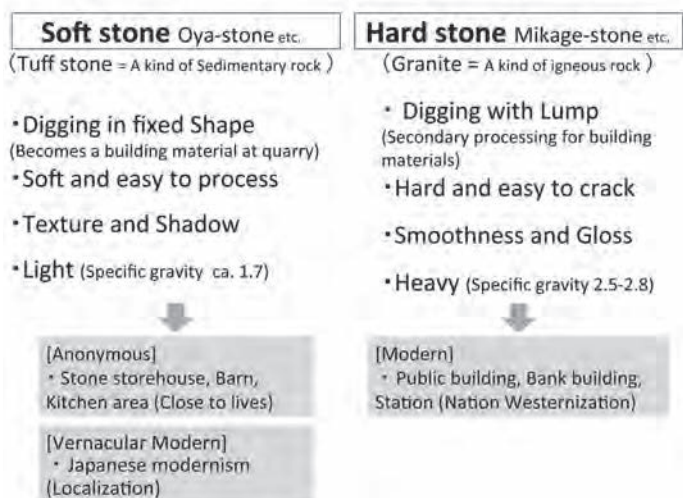


Fig. 5. Characteristics of Soft Stone and Hard Stone.

building clad with stones and the latter is stone-piled one as the simplest masonry method. In contrast, regarding the structure of modern buildings, Imperial Hotel with reinforced concrete designed by Wright used the brick framework clad with Oya-stone, and the construction method was inherited to Yamamura residence and former Koshien Hotel designed by Endo. On the other hand, in Kanagawa Prefectural Museum of Modern Art with steel structure designed by Sakakura, Oya-stone was piled to hide the braces between columns of steel frames of the pilotis. In Yoshikawa Eiji Museum designed by Taniguchi, the method of cladding Oya-stone on concrete walls was adopted like the one adopted today.

5.2. Stone Size and Joint

The size of Oya-stone becomes the product of fixed scale (1 shaku x 3 shaku, approx. 303mm x 910mm) in a quarry as mentioned above. The weight of the stone ranges from approx. 70kg to 90kg and the size is suitable for a mason to shoulder and convey. Many anonymous stone warehouses in a region adopted the masonry construction of piling the stones of the size alternately by a break joint method, which is assumed to be the most effective way of using stones. Moreover, the fixed scale was sliced and used also for old wooden stone-clad walls and roofs with stone tiles. In contrast, in the works by modern architects like Taniguchi, slender stones are used preferably and they are designed geometrically with straight joints. Moreover, in the case of Sakakura, the stone heights are adjusted to the industrial product of 200mm square glass block.

5.3. Combination of Materials

Regarding the combination of materials, Wright used Oya-stone with scratch tiles and terracotta, and combined

them with shaded texture. An organic architecture of Wright can be found there. The concept was inherited to his disciple, Endo, who combined more gorgeously-colored Nikka-stone and tiles. An orientation toward industrial materials can be found in the combination of glass block and aluminium panels by Sakakura, and an orientation toward Japanese materials can be found in the combination of Oya-stone walls and Teppei-stone floor by Taniguchi.

5.4. Soft Stone and Hard Stone

Finally, from the perspective of the stone material, tuff is a light "soft stone" whose specific gravity is 1.7, while in contrast, granite represented by Mikage-stone is a typical "hard stone" (Fig. 5). White Inada-stone in Ibaraki Prefecture that represents granite in Kanto District was used for national buildings like Diet Building (1936) and the Supreme Court (1974) in modern times. It can be assumed that soft stone represented by tuff was used for the buildings close to life like stone warehouses and barns, in other words, buildings of citizens because it was soft and easy to process, and heavy and smooth hard stone represented by granite was used for national buildings through the processes of westernisation and modernisation. Furthermore, an orientation of the "Vernacular Modern" that is a fusion of the modernism and regionalism can be found in modern buildings for which tuff represented by Oya-stone mentioned in this study was used.

6. CONCLUSION

This paper, focusing on Oya-stone, the representative tuff produced in Japan, presents a comparative study of the construction methods and designs of modern architecture as well as anonymous works that applied it. As a result, "Vernacular Modernity" was found in the works of modern architects of tuff, expressing a particular sensibility for the materials used. A circuit to connect the work characteristics of architects as modern thought and practicability of citizens as constructive behaviours can be found there.

NOTES

- 1 Akio Yasumori, "Typological study on Oya-stone Building and Townscape — Case study of Nishine district, Tokujirou town, Utsunomiya city", *Journal of Architecture and Planning (Transactions of AIJ)*, Vol. 82, No. 740, 2017. 10, 2733–2740.
- 2 Motosumi Kobayashi & Akio Yasumori, "Typology of Oya-stone Building and Fragmentary Townscape in the Central Area of Utsunomiya city", *Journal of Architecture and Planning (Transactions of AIJ)*, Vol. 84, No. 756, 2019. 2, 489–498.
- 3 Motosumi Kobayashi & Akio Yasumori, "Townscape Evaluation of Oya-stone Buildings in the Central Area of Utsunomiya City, Tochigi Prefecture", *Proceedings of the 12th ISAIA (International Symposium on Architectural Interchanges in Asia)*, Pyeongchang, Korea, 2018. 10, 1516–1521.
- 4 Takuya Tsukamoto, Akio Yasumori, & Kento Nihei, "Study on Design of Contemporary Japanese Architecture with Oya-stone —Study on Building of Oya-stone in Utsunomiya City 11—", *Summaries of technical papers of annual meeting (AIJ)*, 2017. 8, 517–518.
- 5 Koya Takahashi, Akio Yasumori, & Akinori Otake, "Study on Design Theory of Contemporary Japanese Architecture with Oya-stone — Study on Building of Oya-stone in Utsunomiya City 12 —", *Summaries of technical papers of annual meeting (AIJ)*, 2017. 8, 473–474.
- 6 Masami Tanigawa, "Memo on Oya-stone of Imperial Hotel — Study on Frank Lloyd Wright 20 —", *Summaries of technical papers of annual meeting*, 1975. 10, 1423–1424.
- 7 Tomoko Uno, et. al., "Study on Deterioration of Stones Used in Koshien Hotel — Part I Current condition of stones —", *Summaries of technical papers of annual meeting (AIJ)*, 2017. 8, 239–240.
- 8 Nahoko Wada, "Analysis on the Geometry of Special Composition and Visual Structure based on the Design Process: A consideration on the proportion of "Museum of Modern Art, Kamakura" designed by Junzo Sakakura (Part 2)", *Journal of Architecture and Planning (Transactions of AIJ)*, Vol. 84, No. 606, 2006. 8, 207–214.

THE CONCRETE, STEEL AND TIMBER FOUNDATIONS OF THE ZURICH KONGRESSHAUS (1937–39)

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ABSTRACT.

This article brings to light historical records from the Robert Maillart Archive at ETH Zurich, which documented the construction and detailed testing of various foundations and piles for the Zurich Kongresshaus by Haefeli Moser Steiger Architects (HMS). As one of the three project engineers from Conzett Bronzini Partner AG who was involved in the Kongresshaus' current restoration and extension, the author's first-hand experiences and site photographs further supplement these historical records. The author's own accounts arise from observing the construction of new piles, and also from working with and repurposing the building's historical foundations. This article therefore aims to form an archaeological catalogue and review of the Kongresshaus' foundations. In doing so, different materials and techniques are addressed, reflecting a range of both traditional practices and modern technology in the Kongresshaus' construction. This work further offers valuable insights and examples for future projects and interventions within existing heritage buildings, including those located further afield with similarly challenging sites.

1. INTRODUCTION

Foundations are a rarely seen and often unappreciated part of architecture, yet their structural role is paramount. They directly connect a building with the topology and geological conditions of its site. In the case of existing structures, the absolute capacity of foundations can further play an important role in determining how a building can be re-developed, extended, or conserved. Furthermore, when complications and problems like settling or deterioration arise in an existing building's foundations, such issues can create additional problems throughout a structure and affect its long-term use and lifespan.

Underneath the Zurich Kongresshaus (1937–39), designed by Haefeli Moser Steiger Architects (HMS), the building's foundations are especially critical elements due to several factors. The building is located on a central site near the shores of Lake Zurich (Fig. 1), in an area of historically reclaimed land from the late 19th century. Underneath an upper layer of fill material from the historical reclamation process, there are relatively deep geological layers of soft clay and sandy deposits. Such ground material offers little resistance to either shallow foundations or deep piles, working either in friction or bearing against the surrounding ground material. A relatively high groundwater level due to the Kongresshaus' close proximity to the lake further complicates any construction efforts, including those during the building's original construction and in later alteration projects. Only after reaching a depth of approximately 25m below grade (Fig. 1), one finds a relatively hard geological layer of silt formed by the historical lakebed. Like an old tree with an extensive network of hidden roots underground, the Kongresshaus' deep pile foundations are in many instances as tall as the building itself.

2. DESIGN, REUSE, EXPERIMENTS, AND TESTING

Writing in 1980 and reflecting back on the 1930s construction process, Rudolf Steiger described the Kongresshaus' foundations as the problem child (*Sorgenkind*) of the original construction project.¹ In light of the challenging geology of the site, the foundations were indeed a major concern of both the project's architects and engineers. For example, the foundation work alone accounted for around six months of the total eighteen-month construction schedule. The overall construction schedule for such a large project was also strictly limited, as the opening of the Kongresshaus was expected to coincide with that of the Swiss National Exhibition in May, 1939. Extensions and delays were not an option. In the face of such pressure to complete construction in a timely manner, HMS most likely designed and adjusted the Kongresshaus' structural axes and spans early on to coincide with several existing foundations leftover from the partially demolished Tonhalle (1895). The older Tonhalle, designed by Fellner & Helmer, featured a large circular entrance area known as Zurich's Trocadero, which stood on the site immediately before the Kongresshaus construction began. Archival architecture plans explicitly show how HMS, wherever possible, reused and repaired several existing timber pile foundations, locating their new columns and axis lines over the Tonhalle's existing foundations in an effort to save construction time and manage costs.

Yet the Kongresshaus' foundations in the 1930s were still more problematic for the project's four separate structural engineering offices, including that of the well-known Swiss engineer Robert Maillart. For instance, by taking a somewhat unconventional approach to the project's foundations and emphasising buoyancy effects from the surrounding ground water, Maillart supposedly clashed directly with several leading engineering professors from the Swiss Federal

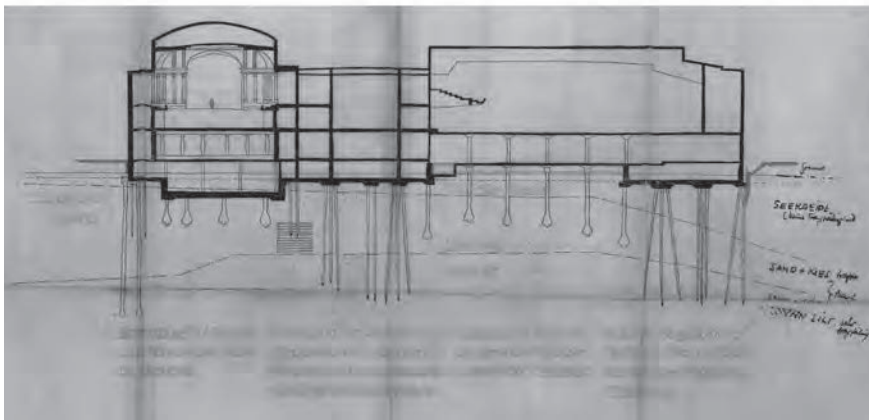
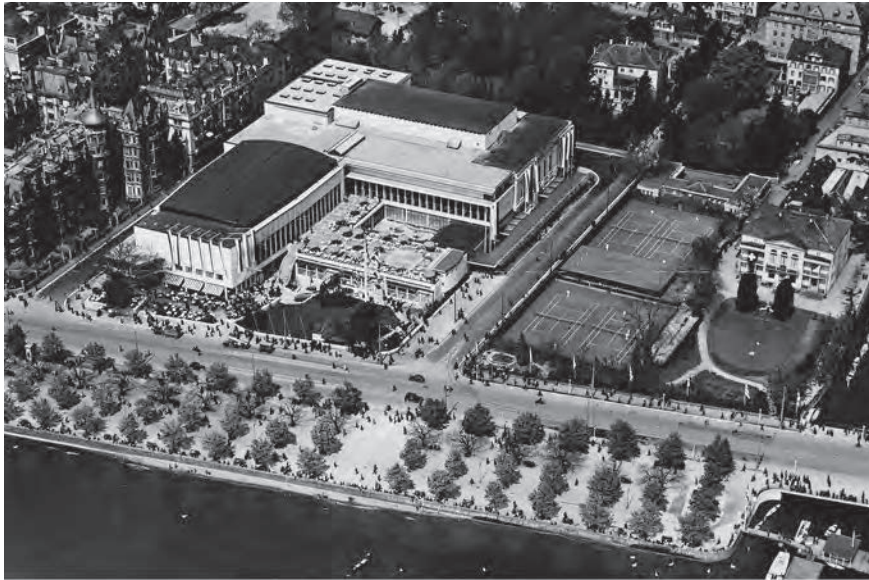


Fig. 1. Haefeli Moser Steiger Architects, Kongresshaus, Zurich, 1937–39, an aerial view of the completed building, and an early typical section showing the geology of the site and depth of the piles and foundations. © gta Archives / ETH Zurich, Haefeli Moser Steiger.

Institute of Technology (ETH Zurich).² Compared to Maillart's current acclaim and acknowledged position in the tradition of Swiss engineering, Steiger specifically recalled how the practising engineer was long considered as a kind of outsider (*Aussenseiter*) by his academic contemporaries at that time.³ In any case, numerous records and elaborate test results from the Robert Maillart Archive at ETH Zurich highlight how the company Losinger & Cie AG executed a small series of different experimental pilings on the Kongresshaus site in late 1937, just before construction began. Like many of Maillart's structures, full-scale testing played a crucial role here. Various types of piles were constructed in-situ at the Kongresshaus site, tested to their maximum capacity, and established certainty and confidence for planning and the definitive construction work.

Based on initial full-scale experiments and testing, a variety of different piles and foundations were used in the Kongresshaus' original construction. The various types of

piles ranged from relatively sophisticated reinforced concrete piles that were cast in-situ, but also much more simple and primitive rammed timber poles of fir or pine. Later on in the 1980s, concrete piles either with conventional reinforcement or steel I-beam profiles were also used in a major alteration to the Kongresshaus. And more recently, during the building's current on-going restoration and extension project (2012–2021), contemporary drilled, reinforced concrete piles and relatively small-diameter micro piles were constructed in 2017 and 2018. Several of these micro piles were up to 27m in length and situated within the challenging context of the existing building. In the context of the present Docomomo conference and its theme, *Inheritable Resilience: Sharing Values of Global Modernities*, this article offers a review and discussion of the Kongresshaus' foundations; how they were built and tested in response to the particular ground conditions encountered on a challenging site, and also later reused in subsequent renovation work. Such les-

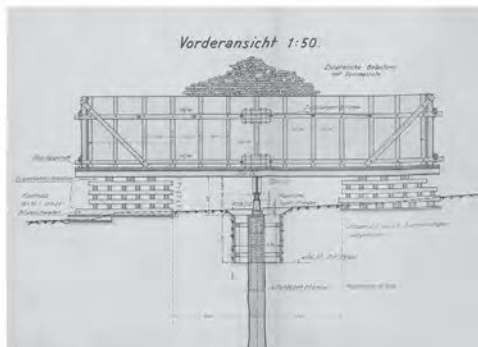
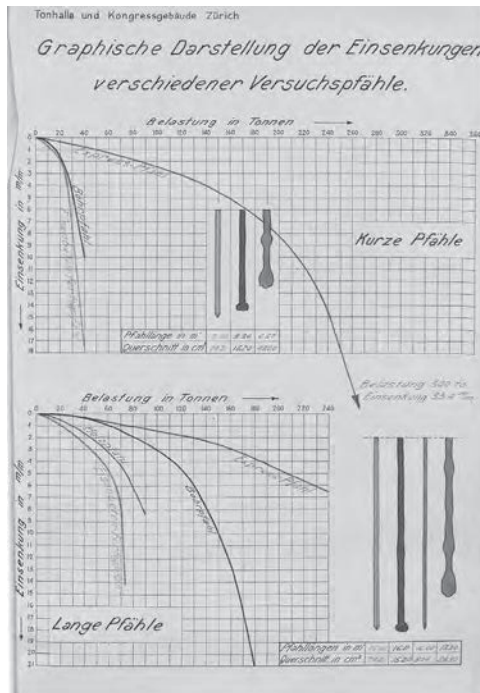


Fig. 2. Robert Maillart, Tonhalle and Kongresshaus, Zurich, 1937–39, *Expresspfahl* construction and full-scale experimental testing in 1937. © ETH-Bibliothek, Hochschularchiv ETHZ, Hs 1085:1936/38-1.

sons can serve as useful examples for future renovation and extension projects, especially those dealing with similar site conditions in regards to geology and groundwater.

3. FOUNDATIONS AND PILES

3.1. Concrete

In preliminary trials and testing for the Kongresshaus' foundations, three types of concrete piles were examined: a basic rammed concrete pile, a drilled and cast in-situ type (*Bohrpfahl*), and a special proprietary 'Express' pile, known in German simply as an *Expresspfahl*. These three types are shown in test results (Fig. 2) in green, blue, and red colours, respectively. While Ed. Züblin AG realized the first rammed reinforced concrete in Germany in 1900,⁴ and drilled concrete piles were developed somewhat later, the *Expresspfahl* system by Ottokar Stern was a much later development and

patented only in the early 1930s.⁵ The system involved a pointed steel base connected to steel piping, which together, were driven into the ground with a conventional pile-driving machine (Fig. 2). As cement mixtures were then poured into the steel pipe, the pipe would be slightly raised while simultaneously pounding the mixture inside the pipe, like a piston in a cylinder. Due to the relatively soft ground material, this process produced piles with uneven, large-diameter sections along their lengths, and bulging protrusions, especially at the foot of the pile. Such protrusions and uneven surfaces along the pile lead to greater overall load capacities from enhanced contact and friction between the pile and surrounding ground material. The arduous 240 tonne load testing from full-scale experiments conducted on the Kongresshaus site confirmed that the *Expresspfahl* system offered significantly higher load capacities compared to conventional alternatives in either concrete or timber (Fig. 2).



Fig. 3. ARGE Boesch Architekten GmbH / Diener + Diener Architekten / Offermann Architektur & Projekte, reconstruction and renovation Tonhalle/Kongresshaus, Zurich, 2012–2021, temporary horizontal steel supports and vertical steel piles during construction in 2018. © Patrick Fleming, Conzett Bronzini Partner AG.

Here was a definitive example of a relatively recent, modern technology and construction technique outperforming conventional and more traditional alternatives in response to the specific site conditions of the Zurich Kongresshaus.

3.2. Steel

Compared to concrete, early types of rammed cast-iron and steel piles were used in construction since around the mid and late 19th century, respectively.⁶ For the original Kongresshaus construction, steel pile foundations were likely not used due to concerns regarding corrosion from the relatively high groundwater level, and the high price of steel during the period immediately preceding the World War II. Yet a peculiar foundation with standard steel profiles set in its piles, however, was built much later in the Kongresshaus' major 1980s alteration project. Other foundations and piles during the 1980s alteration were rather conventional rammed and injected types (*Mörtelverpressung* or *MV Pfahl*), not unlike the older *Expresspfahl* system already discussed. But archival plans still show that a single 1980s foundation included two piles, each having a standard HEA 140 steel profile. Such a basic configuration of inserting a standard steel profile in a pile in lieu of conventional reinforcement may not be particularly innovative or noteworthy, and may have been done here simply for economic reasons at that time. In the context of the Kongresshaus' current on-going renovation and extension (2012–2021), this configuration was indeed suggested for such reasons, but only in the case of temporary or provisional piles. For temporary piles that were needed to support horizontal steel bracing for sheet piling (Fig. 3), having basic foundations and piles with standard steel profiles was a practical option. Such piles were not only simple to construct, but also resulted in straightforward welded connections to the horizontal steel bracing structure above.

3.3. Timber

The fourth type of pile tested in the preliminary trials for the original Kongresshaus construction was a basic timber type, shown in brown in the test results from Maillart's archive at ETH Zurich (Fig. 2). Although timber piles are often associated with decay and susceptibilities to insects, they were still rammed into the ground and soft clay around Lake Zurich since prehistoric times.⁷ In the case of the Kongresshaus' 1930s construction process, a majority of the foundations were built with groups or bundles of four, five, or six inclined timber piles over a ca. 2x2m foundation area (Fig. 4). The timber piles were fir or pine, circa 25m in length or the height of an entire tree. With the foundation construction and excavation work executed by Ed. Züblin AG, the piles were always driven in the ground so that the very top of the driven pile would reach a depth below the lowest recorded possible groundwater level. The timber piles were therefore completely submerged in groundwater constantly and indefinitely, thereby avoiding any decay over time. At the beginning of the current Kongresshaus renovation project starting in 2012, one of the first aspects of the existing structure that was checked was the condition of a typical timber pile from the 1930s. A careful and tedious excavation near the edge of the existing building and sampling of one the timber piles confirmed their well-preserved condition. This well-preserved condition was further seen later on in 2018, when a number of the original timber piles were uncovered during the renovation and extension project's major excavation work (Fig. 4). Just like in the 1930s, wherever possible, existing timber piles on the site were therefore reused, and adapted to work with a new basement structure by simply cutting a short length off the top of each pile.

4. DISCUSSION

In contrast to the Kongresshaus' innovative and mod-



Fig. 4. Haefeli Moser Steiger Architects, Kongresshaus, Zurich, 1937–39, an archival photograph showing the timber piles being driven into the ground in 1937, and a contemporary photograph of five timber piles uncovered during excavation work in 2018. © gta Archives / ETH Zurich, Haefeli Moser Steiger, and Patrick Fleming, Conzett Bronzini Partner AG, respectively.

ern concrete piles, the project's timber pile foundations represent a distinctly traditional, more primitive construction technique. The various types of historical piles and foundations built underneath the Kongresshaus therefore illustrate how the project was realized with both modern construction and traditional techniques and materials together. Similar observations have also been made throughout the Kongresshaus' reinforced concrete floor and deck construction, which involved the extensive use of reed and cane (*Rohrzellen*) formwork.⁸ In the face of considerable time pressure to complete a construction project and overcome technical challenges, it is commonplace today for architects and engineers to seek out new solutions offered by recent technologies or modern innovations, not unlike Haefeli Moser Steiger or Maillart during the time of the original Kongresshaus construction in the late 1930s. It is still also equally valid, however, to rely on well-established and trustworthy construction techniques and principles, no matter how primitive or traditional they may be. The historical construction and legacy of the Zurich Kongresshaus shows how these two approaches are not exclusive. Contrary to the general and still widely held understanding of modern architecture being based upon, if not characterised by modern technology and materials, the Kongresshaus offers an example of an architecture seamlessly realized through both traditional and modern construction.

5. CONCLUSION

The foundations and piles of the Zurich Kongresshaus are unseen, yet important elements of the original project and later alterations and renovations. They influenced the basic architectural layout of the original plan, the construction schedule, and building process. Early experiments and full-scale testing on the construction site in the 1930s included a variety of different piles, ranging from traditional timber piles to more modern reinforced concrete piles with rel-

atively sophisticated construction techniques. A review and discussion of the Zurich Kongresshaus' historical foundations and pile construction illustrates the dual-influence of traditional and innovative construction techniques and materials in an important example of modern architecture. On similar construction sites with challenging geological and groundwater conditions, in either new projects or especially renovation work, such an approach and consideration of both conventional techniques together with modern developments and technology is still valid for architects and engineers today, and an intrinsic part of the Kongresshaus' long-term material legacy.

REFERENCES

- BLEICHER, Niels, & HARB, Christian, "Settlement and Social Organisation in the Late Fourth Millennium BC in Central Europe: the Waterlogged Site of Zurich-Parkhaus Opéra," *Antiquity* 92, No. 365, 2018, 1210–1230.
- FLEMING, Patrick H., "The Application of Wayss' Rohrzellendecke System in the Kongresshaus Zurich (1937–1939)," *6th Annual Conference on Construction History*, Cambridge, Construction History Society, 2019, 625–634, doi:10.3929/ethz-b-000400961.
- GEISER, Reto & STIERLI, Martino, "Architecture Officielle Maudite," *Future Anterior*, IV (1), 2007, 1–12.
- HAHN, Volker, *Bauen mit Armiertem Beton — Eduard Züblin — Leben und Wirken eines Ingenieurs in der Entwicklungszeit des Stahlbetons zu Beginn des 20. Jahrhunderts*, Düsseldorf, VDI-Gesellschaft Bautechnik, 1984.
- HILDEBRAND, Sonja, MAURER, Bruno, & OECHSLIN, Werner (eds.), *Haefeli Moser Steiger: die Architekten der Schweizer Moderne*, Zurich, gta Verlag, 2007.
- Kongresshaus Zürich 1937 bis 1980*, Zurich, Kongresshaus-Stiftung Zürich, 1980.
- MEYER, Peter, "Das Kongresshaus in Zürich als Beispiel moderner Architektur," *Schweizerische Bauzeitung*, 121 (26), 1943, 310–313, <http://doi.org/10.5169/seals-53117>.
- RÜEGG, Arthur & GADOLA, Reto (eds.), *Kongresshaus Zürich 1937–1939: Moderne Raumkultur*, Zurich, gta Verlag, 2007.
- SEITZ, Jörn M., & SCHMIDT, Heinz-Günter, *Bohrpfähle*, Berlin, Ernst & Sohn, 2000.
- STERN, Ottokar, "Apparatus for forming columns in situ," Patent 1978332, Stern-Gesellschaft für modern Grundbautechnik GmbH (ed.), U.S. Patent and Trademark Office, issued October 1934.

NOTES

- 1 *Kongresshaus Zürich 1937 Bis 1980*, Zurich, Kongresshaus-Stiftung Zürich, Zurich, 1980.
- 2 *ibid.*
- 3 *ibid.*
- 4 Volker Hahn, *Bauen mit Armiertem Beton — Eduard Züblin — Leben und Wirken eines Ingenieurs in der Entwicklungszeit des Stahlbetons zu Beginn des 20. Jahrhunderts*, Düsseldorf, VDI-Gesellschaft Bautechnik, 1984.
- 5 Ottokar Stern, "Apparatus for forming columns in situ", Patent 1978332, Stern-Gesellschaft für modern Grundbautechnik GmbH (ed.), U.S. Patent and Trademark Office, issued October 1934.
- 6 Jörn M. Seitz & Heinz-Günter Schmidt, *Bohrpfähle*, Berlin, Ernst & Sohn, 2000.
- 7 Niels Bleicher & Christian Harb, "Settlement and Social Organisation in the Late Fourth Millennium BC in Central Europe: the Waterlogged Site of Zurich-Parkhaus Opéra," *Antiquity* 92, No. 365 (2018): 1210–1230.
- 8 Patrick H. Fleming, "The Application of Wayss' Rohrzellendecke System in the Kongresshaus Zurich (1937–1939)," *6th Annual Conference on Construction History, Cambridge, Construction History Society*, 2019, 625–634, doi:10.3929/ethz-b-000400961.

THE RESILIENT MATERIALITY OF BRICK IN 20th CENTURY TAIWAN

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ABSTRACT.

The various uses and diverse meanings of red brick in Taiwan from the 19th century to the end of the 20th century demonstrate material resilience, although this phenomenon should not be limited to Taiwan but should be considered as a global development responding to modernity and modernisation. The uses and meanings of red brick in Taiwan have changed from a load-bearing material to an ideological symbol of colonial modernisation, to a symbol of seismic danger after the 1923 earthquake to one of the components of architectural surfaces after WWII, and eventually to the traditional, regional and cultural characteristics which serve as contemporary architectural designs.

In some approaches, the modernity of brick might imply the presentation of its rational characteristics, but if the materiality of the material could present cultural responses, its properties should not be the only consideration of material deployment. Social, cultural, political and geographical backgrounds all affect the resilient materiality of the material deployment more than its intrinsic properties. Brick in Taiwan can show its resilient materiality in a variety of cultural responses for spectators to understand the material and the history of the regions in which it is deployed.

1. INTRODUCTION

The deployment and implications of brick have been various: for thousands of years, it has been regarded as a load-bearing material for supporting buildings; it has also been given implications and meanings based on its long-term deployment as a building material even though it has sometimes been used for ornamental purposes. These double deployments and meanings represent a kind of resilient materiality, in terms of both historical points of view and regional diversity.

Social, political and geographical backgrounds have affected material deployment. Architectural materials can be regarded not only as the physical components of buildings but also the representation of a general consideration of a social atmosphere. In this paper, empirical works in Taiwan, mainly of the 20th century, will be discussed in detail to reveal different implications beyond the simple material use of brick against changing social and political backgrounds. Although many kinds of material could exemplify this phenomenon of material deployment, brick, which has had a long-term development in the construction history and has been used in both the eastern and the western worlds, will be the specific material to be examined and discussed here.

2. LITERATURE REVIEW: MODERNITY AND MATERIALITY

Modernity has been considered from various perspectives, including political, sociological, cultural, philosophical and scientific. Taking into account cultural and philosophical approaches, at the end of the 19th century, Otto Wagner wrote *Modern Architecture* to signify the new developing aspects of architecture from the classical approaches.¹ Although Wagner's practical projects cannot be considered strictly as models of the Modernist, his views led architects

to consider material use and architectural forms differently. The development of Modernism in architecture gradually revealed particular approaches to the use of construction materials and formed preferences in social backgrounds and concepts, but there should be no doubt that modernity in material and construction could be referred to as the rationality of material and of construction.

Although during the 1920s some modern architecture had a stereotypical white-washed uniform appearance², it was nevertheless focused essentially on the characteristics and properties of different materials. Louis Kahn's well-known conversation with brick embodied this consideration,³ and the concrete appearance of brutalism also echoed this kind of presentation of the materials themselves.

In fact, materiality has been widely discussed since the last century. As Modernism became widespread, different arguments about its stereotype and misunderstanding quickly developed. For instance, when Reyner Banham discussed the New Brutalism, he sought to demonstrate the use of construction materials instead of the white-washed or patent surface of the concrete or steel construction typical of international modernism.⁴ In other words, the different properties of materials could be revealed. Sandra Karina Löschke drew attention to Banham's opinion that the problems of the materiality of architecture in Western societies might be the lack of "spatial experiences" and "cultural responses".⁵

This concern with materiality could enrich and broaden the variety of the cultural background and consideration of materials. The materiality of a single material in different period of time in one region could generate changing stories because of the shifting social atmosphere in response to changing cultural surroundings. For instance, in the changing social background in 20th century Taiwan, brick can show some transitions in its meanings and its implications, and these will be discussed next.



Fig. 1. Juro kondou, the older wing of the National Taiwan University Hospital, Taipei, Taiwan, 1912: a hospital building in brick construction with western-style ornamentation. © Nan-Wei Wu, 2004.

3. EMPIRICAL WORKS: BRICK USE IN TAIWAN

In this section, the roles of brick in different eras in Taiwan will be examined. Moreover, as the social and political background of each period influenced people's understanding of materials, I shall briefly clarify how this reveals people's thinking and the ideology ascribed to brick.

3.1. The Tradition before the Japanese Colonial Period: Brick before 1895

Before 1895, Taiwan had been ruled and influenced by various European colonists and Han settlers immigrating from China. Although Taiwan was referred to in some archival texts in early Chinese histories, the written history of Taiwan can be dated back to the 17th century records of the Dutch East India Company (*Vereenigde Oostindische Compagnie*; VOC), which occupied southern Taiwan from 1624 to 1662. In the same period, the Spanish Empire also settled in northern Taiwan from 1626 to 1642. In 1662, however, Cheng-gong Zheng, a supporter of the Ming dynasty which was losing control in mainland China, drove out the Dutch and ruled Taiwan until 1683, when his family surrendered to the Qing dynasty.⁶ After that, Taiwan was a territory of the Qing dynasty but received little attention from the governing authority until the end of the 19th century. Nonetheless, the Han settlers from south-eastern China significantly affected the development and traditions of Taiwan for centuries.⁷

Because of this complex historical background, brick was deployed not only by the European occupants for the construction of defences, but also by the Han people for domestic buildings. On the one hand, the Dutch and Spanish used brick and stone to build their fortress. For instance, the ruins of Fort Zeelandia which can be dated back to 1634 clearly show red-brick construction.⁸ On the other, the traditional Han houses in the *Min-nan* region in south-eastern China were usually built of brick, adobe, timber or bamboo. The Han people in Taiwan had ancestors from the *Min-nan* region and their building style in Taiwan can be clearly linked to their ancestors' building styles in the *Min-nan* region. For example, the Fan-Chiang private residence built in 1855 was constructed with a mixture of red brick, grey blocks and stone.⁹ Both of the cultural backgrounds shared the same material, brick, to build even though the construction methods or the sizes of the material were different.

3.2. A Symbol of Modernisation and Colonialism: Brick from 1895 to 1923

Part of the Treaty of *Shimonoseki* which ended the First Sino-Japanese War was the ceding of Taiwan as the first colony of Japan from 1895. In the first half of the Japanese colonial period, the Japanese imported their experiences of westernization, referred to as the Meiji Restoration, in Japan to introduce modernization in Taiwan.¹⁰ The government not only introduced infrastructural systems and urban



Fig. 2. Kaoru Ide, Taipei Public Hall, Taipei, Taiwan, 1936: surface tiles with an olive colour. © Nan-Wei Wu, 2004.

planning to Taiwan, but also imported the 'modern' architectural style to represent colonial modernization.

In this atmosphere, brick construction became the symbol of modernization (or more accurately Colonialism). This could refer to the *Ginza renga* street brick building programme in Tokyo which was completed in 1872 and symbolized the success of Meiji Restoration, or more specifically simply westernization.¹¹ Many public buildings in colonial Taiwan, such as modern hospitals and administrative offices, were built in brick with simplified western ornamentations in order to signify beneficial development and also modernization.¹² The older wing of the National Taiwan University Hospital completed in 1912 can be considered as an example of brick deployment with the 'modern' architectural style (Fig. 1).

3.3. The Implication of the Seismic Threat:

Brick from 1923 to 1945

Despite these developments, the overwhelming westernization of Japan was severely challenged by seismic hazards and their consequences. The first challenge was the 1891 earthquake, but this did not completely change the enthusiasm for westernization, although some doubts about western building techniques gradually began to develop. The 1923 earthquake then provoked strong objections to some of the symbols of westernization: for instance, red brick construction was regarded as a symbol of danger after the earth-

quake, rather than a symbol of westernization and modernization.¹³ This was signified by the demolition of the symbol of modernization in Tokyo, the *Ginza Renga* street brick buildings, which had been damaged by the earthquake.

In any colonial territory, the colony is usually subject to strong influences from the mother country, and Taiwan as the Japanese colony was no exception. After the destruction of the western symbol represented by the *Ginza Renga* buildings, the appearance of brick, especially the colour of brick, became a symbol of danger in both Japan and colonial Taiwan. The pattern of laid bricks, however, could not be so easily abandoned. The red-brick appearance and brick construction had become unpopular after 1923, but reinforced concrete construction was by then widely accepted. This relatively new construction system had been practised for more than twenty years. Moreover, the undamaged Imperial Hotel in Tokyo designed by Frank Lloyd Wright demonstrated to architects and spectators a safe and earthquake-proof impression after the seismic hazard. The structural system and surface materials of the Imperial Hotel, which comprised reinforced concrete and thick, brown scratched tiles, then became popular and reliable choices for construction materials. Even though the thick brown scratched tiles of the Imperial Hotel were the same size as stretcher courses of brick and their attachment was just like the stretcher bonds of brick layering, people seemed to ignore the iconic origins taken from brick construction. This



Fig. 3. Da-hong WANG, Wang Da Hong's House, Taipei, Taiwan, 1953: brick with a red surface and load-bearing use representing modernism. © Nan-Wei Wu, 2018.

can be evidenced in many projects, such as the *Katakurakan* in Japan after 1923,¹⁴ and also in Taiwan, such as the Chia-Yi Station and the Taipei Public Hall (Fig. 2). Those buildings were constructed in reinforced concrete with a variety of elevation surface colours such as brown, ivory or olive, but none of them used red again.

3.4. The Balance between Modernism and Tradition: Brick from 1945 to 1980

After the WWII, the Japanese colonial period in Taiwan ended and Taiwan has become part of the Republic of China, which had been established in 1912 in mainland China. Although the territory had been reduced after 1949 because of the second phase of the Chinese civil war between the Kuomintang-led government and the Communist Party of China, Taiwan was still physically governed by the Republic of China. In other words, the territory of the Republic of China from 1912 to 1945 was mainly in mainland China, but from 1945 to 1949 it comprised Taiwan and mainland China. Since 1949, Taiwan has become self-governing territory of the Republic of China, whereas mainland China has been governed by the People's Republic of China. Nevertheless, the Republic of China has been generally named Taiwan in order to distinguish from the People Republic of China, usually named China.

In Taiwan after 1949, politicians on the one hand wanted to preserve the authentic role of China on the world stage but on the other hand hoped to maintain their memories of their home in mainland China, so they practised specific strategies in a variety of contexts. For instance, from 1966 to

1976, the Cultural Revolution in China evoked a Chinese Cultural Renaissance in Taiwan in order to preserve cultural traditions. To be more specific, the so-called Chinese Cultural Renaissance, in terms of architectural approaches, referred to orthodox and official palaces in northern China disregarding the cultural diversity in the country's extensive territories.

Against this political background, the numbers of immigrants from China to Taiwan between 1946 and 1949 were significant and certainly included politicians, scholars and architects. Some of these architects had been taught in China with the new western professional education and some understanding of traditional Chinese architecture simultaneously, whereas others had been taught overseas and had absorbed the concepts of Modernism.¹⁵ After 1949, they did not go back to their original home in mainland China but moved instead to Taiwan in order to be reunited with their immigrant families from mainland China. Therefore, architects with specific Chinese origins or connections might have had in their minds western Modernism and Chinese traditions simultaneously.

Due to this mixture of modern and traditional backgrounds, architects deployed brick in their projects in a range of techniques: some with imitations of traditional buildings and others with ideas of Modernism but still showing the properties of brick. Furthermore, some architects used brick as a surface ornamentation on reinforced concrete construction in ways which meant that particular properties of brick, such as its load-bearing ability, were irrelevant.



Fig. 4. Po-teh HAN, Municipal Cultural Centre, Changhua, Taiwan, 1983: brick-laying patterns showing the *Min-nan* style. © Nan-Wei Wu, 2012.

For instance, Da-hong Wang was born in mainland China but studied at the University of Cambridge and Harvard University for his bachelor's and master's degree respectively. After his studies, he established an architectural firm in Shanghai, moved it to Hongkong and then settled in Taipei. He therefore had experience of traditional spatial arrangements and material use in mainland China and had also learned modern architecture in a western atmosphere.¹⁶ His design of his own first residence shows his consideration of brick use in its conventional understanding as a load-bearing material (Fig. 3).

Moreover, the master plan of Tunghai University and some buildings established in the early period of this development were planned and designed by I.M. Pei, Chi-kwan Chen and Chao-kang Chang in 1953. It embodied influences of the architectural Modernism in Taiwan.¹⁷ One of the buildings named Oberlin Hall represents their consideration of brick as the material for surface ornamental panels which protrude and cantilever out from a frame of reinforced concrete.

3.5. Recalling Regionalism: Brick after 1980

Taiwan experienced a different social atmosphere after the lifting of martial law in Taiwan, which was in place from May 1949 until July 1987. This resulted from widespread objections from the beginning of the 1980s, and the death of Kai-shek Chiang in 1975 also signified the decline of the autocracy. Political consideration of Chinese traditions, such as the orthodoxy and officialdom of mainland China, therefore faded away and were replaced by local and regional

consideration of the social background which became more and more influential.

Among professional architects, concerns about local Taiwanese traditions, such as the imported *Min-nan* style, were emphasised. The projects of Pao-teh Han, who had gained a master's degree from Harvard University in 1965, showed a greater awareness of Modernism in the 1970s and their surfaces were usually covered with white stucco. Nevertheless, Han's projects in the 1980s showed a more regional approach, with brick deployment.¹⁸ For example, he employed brick-like tiles as the major wall material for the Municipal Cultural Centre of Changhua (Fig. 4) and the tile arrangement was in the pattern of the *Min-nan* style. Load-bearing patterns can be seen even though the structural system is still a frame of reinforced concrete.

4. DISCUSSION

It is not difficult to see that brick has been given a variety of symbolic attributes over the last hundred years; the implications of brick have changed at least four times.

Before the colonial period, brick was used both according to its European origins and by the *Min-nan* people who had Han origins from south-eastern China. Although their construction methods were different, the same brick material was deployed, and both used brick in their traditional constructions showing different constructive patterns. The additional meanings of brick were not so obvious or easy to classify before the colonial period as people had used it in their own traditional understandings of the material.

Japanese Colonialism then brought a new consideration for the material, one of westernisation for Japan but of modernisation for colonial Taiwan. The background of this westernisation and Colonialism generated multiple understandings of the material. However, an additional implication emerged in the colonial period as a consequence of the natural seismic event in 1923. As explained above, this was not the first serious earthquake after the Meiji Restoration, but the earlier 1891 earthquake had only led to the Japanese having some doubts but not feeling the need for an overwhelming review.¹⁹ In 1923, as Gregory Clancey has suggested, the Japanese had considerable confidence in their ability to face earthquake threats, as the western powers also had. At the same time, a specific earthquake-proven example, the Imperial Hotel in Tokyo, also provided them with a clear demonstration of a reliable structure. So, the abandonment of red-brick construction and surfaces seemed inevitable in Japan and colonial Taiwan. Both before and after 1923, brick was not just a construction material: on the contrary, its materiality represented both a symbolic understanding of western and advanced techniques and a warning of seismic danger.

Brick deployment then changed again after the end of the WWII in Taiwan. The government changed from Japanese to Chinese and the political atmosphere in the context of the failure of the conflict between the Kuomintang-led government and the Communist Party of China was conservative. This resulted in the fact the government in Taiwan was determined to emphasize Chinese orthodoxy in Taiwan.²⁰ Architects who had a background of upbringing in mainland China and educational experience under Modernism employed brick in their projects with some modern concepts of materials combined with their understanding of nostalgia for orthodox Chinese practices. Nonetheless, the relatively simple consideration of brick led to the deployment of the material as ornamentation, which moved it away from the basic properties of brick. At this stage, brick on the one hand represented a form of nostalgia in people's minds and on the other it played the role of surface composition without its own characteristics.

When the social atmosphere changed again, the use of brick changed too. Brick and brick-like tiles started to be used for surface images displaying regional considerations, but because of the scale of modern buildings and their structural system, brick no longer had to be merely a functional load-bearing material.

5. CONCLUSION

Brick has a long history of use with diverse understandings of its meaning. The properties of the material and the cultural responses which it evokes meant that it could not usually be presented simply and purely. The resilient materiality of brick has to be unravelled in order to understand the use of the material. In some approaches, the modernity of

brick might imply the presentation of its rational characteristics; however, if the materiality of the material can generate cultural responses, its properties should not be the only consideration for its deployment. The social, cultural, political and geographical background can affect the resilient materiality of the deployment of brick more than its properties. The phenomenon of brick as a construction material in Taiwan should not be only an isolated empirical one, and the examination of materials in different regions might be able to bring spectators some complex understandings of resilient materiality of construction materials.

REFERENCES

- BANHAM, Reyner, *Architecture of the Well-Tempered Environment*, Chicago, University of Chicago Press, 1984.
- CLANCEY, Gregory, *Earthquake Nation: the Cultural Politics of Japanese Seismicity, 1868–1930*, Berkeley & Los Angeles, California, University of California Press, 2006.
- FU, Chao-Ching, *A History of Modern Architecture in Taiwan*, Taipei, Architectural Institute of Taiwan, 2013.
- FU, Chao-Ching, *Preservation and Conservation of Cultural Heritage in Taiwan: History and Practices*, Tainan, Foundation of Historic City Conservation and Regeneration, 2016.
- LÖSCHKE, Sandra Karina, "Materiality and architecture: Introductory Remarks," *Materiality and Architecture*, Oxford, Routledge, 2016, 1–9.
- MILLER, Daniel (ed.), *Materiality*, Durham & London, Duke University Press, 2005.
- STEWART, David B., *The Making of A Modern Japanese Architecture: From the Founders to Shinohara and Isozaki*, Tokyo, New York, London, Kodansha International, 2002.
- WU, Nan-Wei, *Architectonics of Seismicity: Building and Colonial Culture in Japan and Taiwan from the Meiji Period to the Second World War*, Unpublished PhD thesis at the University of Edinburgh, 2012.

NOTES

- 1 Otto Wagner, *Modern Architecture*, Santa Monica, Getty Center for the History of Art and the Humanities, 1988, 92–95.
- 2 Mark Wigley, *White Wall, Designer Dresses: the Fashioning of Modern Architecture*, Cambridge, Mass., MIT Press, 1995, 1–5.
- 3 Louis I. Kahn, "1973: Brooklyn, New York", *Perspecta*, MIT Press, 1982, 89–100.
- 4 Reyner Banham, *Architecture of the Well-Tempered Environment*, Chicago, The University of Chicago Press, 1984.
- 5 Sandra Karina Löschke, "Materiality and architecture: Introductory Remarks," *Materiality and Architecture*, Oxford, Routledge, 2016, 1–9.
- 6 John E. Wills Jr., "The Seventeenth-Century Transformation: Taiwan under the Dutch and the Cheng Regime," *Taiwan: A New History*, London, M. E. Sharpe, 1999, 91.
- 7 W. G. Goddard, *Formosa: A Study in Chinese History*, Michigan State University Press, 1966, 49.
- 8 Chao-Ching Fu, *Preservation and Conservation of Cultural Heritage in Taiwan: History and Practices*, Tainan, Foundation of Historic City Conservation and Regeneration, 2016, 49.
- 9 Chao-Ching Fu, *A History of Modern Architecture in Taiwan*, Taipei, Architectural Institute of Taiwan, 2013, 13.
- 10 Fu, *A History of Modern Architecture in Taiwan*, 26.
- 11 David B. Stewart, *The Making of A Modern Japanese Architecture: From the Founders to Shinohara and Isozaki*, Tokyo, New York, London, Kodansha International, 2002, 22.
- 12 Fu, *A History of Modern Architecture in Taiwan*, 47.
- 13 Gregory Clancey, *Earthquake Nation: the Cultural Politics of Japanese Seismicity, 1868–1930*, Berkeley & Los Angeles, California, University of California Press, 2006, 113, 212.
- 14 Nan-Wei Wu, *Architectonics of Seismicity: Building and Colonial Culture in Japan and Taiwan from the Meiji Period to the Second World War*, Unpublished PhD thesis at the University of Edinburgh, 2012, 218.
- 15 Fu, *A History of Modern Architecture in Taiwan*, 120.
- 16 Ibid., 152–154.
- 17 Ibid., 140–142.
- 18 Ibid., 254–255.
- 19 Clancey, *Earthquake Nation*, 214.
- 20 Fu, *A History of Modern Architecture in Taiwan*, 184.

Session 4-c

TECHNOLOGIES FOR CLIMATE CONTROL

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Modern Movement buildings are generally considered of being poorly equipped to tackle the current challenges of climate change and energy efficiency. Because they are often experimental in the use of materials and technologies, some buildings can be considered prototypes that have not always proven to be fully adequate in terms of climate and comfort requirements. Despite this fact, there are many other examples where modern architecture has used and integrated vernacular and passive design principles and translated them into modern forms and expression. Also new and innovative technologies were successfully integrated, further developed and became state of the art. The authors in this session describe the impact of vernacular, passive and innovative technologies for climate control in different climatic regions, in particular in Switzerland, Iraq, Italy and Malaysia.

Under the title "A warm tint that ensures coolness" Giulia Marino discusses the relevance of tinted glazing as essential part of modern curtain walls. These coatings with "metal oxides — silver, copper, nickel, etc. — served to effectively offset solar radiation" and to prevent glare and overheating. Developed and brought to market at the same time as double glazing this glazed material lacks heritage recognition and reflections on its preservation. The authors raise the question if and how "we (Should) restore coated glazing" and illustrates this with the case-study of the WIPO's Sapphire Tower built in 1979 in Geneva in Switzerland.

Nawar and Saba Sami Al-Ali investigate the use of cement brick curtains in Iraqi Modern Architecture of the 1940s and 50s which referred to traditional patterns and aesthetic to protect the interior from heat and glare. While these applications got lost during the postmodern period in the 1980s the authors want to revive this cement brick curtains by employing CNC and Robotic Technologies for their design and fabrication.

Caterina Mele and Caterina Franchini re-evaluate "the bioclimatic legacy of the MoMo" by analyzing modern heritage in Italy with regard to "climate-mediating strategies". In their research they could identify many of those bioclimatic and sustainable concepts and principles in different building typologies. Most of them are part of the building envelope and apply passive design strategies aiming for solar shading, cross-ventilation or insulation. The authors demonstrate that those features need careful assessment to be understood and maintained as part of the environmental, cultural and economic rehabilitation to act as "proto-sustainable heritage".

Yusra Binti Zulkifli elicits the history of air vents and ventilation block as part of traditional and modern tropical architecture in Malaysia. Often applied between 1950s and 70s the modern ventilation blocks less applied after the introduction of air-conditioning. In her paper Zulkifli investigates the potential of new digital technologies to mass-produce and mass-customize new affordable ornamentations as expression of local culture and as passive design strategy.

All contributions showcase how innovative technologies and principles were embedded into Modern Movement buildings. On one side vernacular principles were adapted to modern expressions and materials. On the other side new technologies transformed the appearance and aimed to replace the traditional components.



“A WARM COLOUR THAT ENSURES COOLNESS!”: CURTAIN WALLS AND COATED GLAZING

Giulia Marino

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ABSTRACT.

While in North America the curtain wall was often designed as a simple barrier to air and water — air conditioning took care of the rest! — in Europe, we were more concerned with the physical interaction between the glass envelopes and climate control, including the concept of the economy of operation of technical installations. In this respect, coated glass was an aesthetic and effective answer, capable of reducing solar irradiation and, subsequently, phenomena of glare and overheating. The European glass industry was thus gearing up to develop solar-control coating techniques. Together with the perfecting of Thermopane-type double glazing, this new component was introduced on the market, so matching aesthetic qualities with enhanced comfort. Today, fifty years later, we can see the limits of the experiments with coating glass techniques. Failure of the seals has led to significant forms of deterioration that affect both their aesthetic aspects and performance. How to deal with these buildings whose treatment of the glazed surfaces was, in itself, a fundamental architectural choice?

1. INTRODUCTION

Among the countless constructional types introduced in the 20th century, the curtain wall is certainly the one that best identifies a certain “mannerism” of the International Style. A smooth, taut skin placed in front of the load-bearing structure, cadenced by a regular, sparkling geometry of metal and glass: the curtain wall emerged in the post-war period as the perfect expression of administrative building, a language that Bruno Zevi did not hesitate to call the “Esperanto” of international architecture.¹

In this production with relentless mechanics, between resistance and flexibility, the question of colour has a fundamental part, in the same way as the definition of the grid, the articulation of the envelopes or the rhythm of the apertures. After 1945, architects took advantage of advances in a particularly dynamic industry. In terms of metallurgy, it was the perfecting of all kinds of surface treatments by the electrolysis of lightweight alloys used in the structural grid, firstly anodisation, which not only protects aluminium from corrosion, but also produces multiple shades of colour with a matte or glossy finish according to preference. At the same time, architects were engaged in the development of glass products, where physical characteristics such as mechanical resistance or thermal performance could not in any case disregard aesthetic criteria. The imperatives of increased thermal and acoustic insulation remained of course unavoidable, with rapid progress in the design of insulating double glazing, especially in terms of the sealing of glasses by means of a metal interlayer. But the development of a panoply of new materials and processes also sought to control the surface finish of glazing, its perfect flatness and degree of reflection, while also making a broad palette of hues available to architects.

2. AESTHETICS AND COMFORT

The result of this skilful combination of polychrome industrial products was astonishing. The chapter devoted to office buildings in Konrad Gatz's work *Colour in Architecture: A Guide to Exterior Design*, published in 1961, clearly shows the proliferation of colour in lightweight facades of the second post-war period. Opaque glass coloured by being treated with silicate enamels and used in double thicknesses at the level of the sills was a widely used solution, on the model of Lever House in New York (Gordon Bunshaft for SOM, 1952), whose bands in shades of vivid green, alternating with transparent glass, would provide an essential frame of reference. Besides the massive use of these opaque panels based on glass tempered and with a polished surface, which contrasted with the style of the structural elements in natural aluminium, transparent coloured glass also gained a significant share of the market.

2.1. From Tinted Glass...

With the Seagram building in 1958, Mies van der Rohe paved the way for “colour”, with simple glazing tinted in the mass by the addition of bronze dust, the same material as the grid of the facade. In the wake of this highly publicised achievement — in which the production of the glass raised many problems and proved to be extremely expensive! — architects were seduced by the expressive possibilities of tinted transparent components. Around the world, an impressive series of variations on the theme then appeared. The model, constantly reproduced, was that of the slender prismatic volume, sheathed in a lightweight envelope, finely articulated by a network of tinted metallic components (in painted steel or anodised aluminium) that matched the shade of the glass coloured in the mass. Examples are Pall Mall Court in Man-

chester (Brett & Pollen, 1969), José Antonio Coderch's Trade Towers in Barcelona (1966) or the splendid Stock Exchange Tower in Montreal by Luigi Moretti and Pier Luigi Nervi (1966), a model of the genre in shades of dark brown.

In this context, the architect Pietro Belluschi, who trained at the University of Rome before pursuing a career in the United States, did pioneering work with his Equitable Building in Portland (1949). The use of double insulating glazing, the exterior volume of which is slightly tinted green, was chosen not just for aesthetic reasons, but also to mitigate the thermal effects of insulation, which meant optimising the technical utilities in this building, held to be one of the first to have an integral air conditioning system. Beyond its obvious architectural qualities, the Portland building is emblematic in terms of comfort management. There remains a relatively isolated case in a cultural context, that of construction in the United States, which relegated the total control of the interior environment to the technical systems. Indeed, while in North America, the curtain wall was often designed as a simple barrier to air and moisture — as shown clearly by the simple glazing of the Seagram or Montreal buildings, with air conditioning doing everything else to ensure comfort! — in Europe, builders were more concerned with the interaction between the glass envelopes and the technical utilities, including a concern for the economical functioning of such systems. The light facade was then designed as a true “thermal device”, with a very strong overlap between active devices — air conditioning or climate control equipment — and passive devices — firstly by the qualities and efficiency of the glazing. There was no question of neglecting the physical characteristics of the envelopes; on the contrary, they participated fully in the operation of the technical utilities, appropriately adjusted for this purpose. The definition of materiality was therefore an unavoidable issue. It was part of a comprehensive strategy that put comfort, operating economy and, of course, aesthetics on the same plane. At a time when the association of lightweight facades and air conditioning was becoming widespread in administrative architecture, the European glass industry was mobilising to meet the new requirements of designers.

2.2. ... to Coated Glass

Parallel with the improvement of Thermopane type double glazing — a North American patent distributed under license in Europe, including the Triver version — a new product was launched on the market “with a great future ahead of it.”² This was reflective double glazing, or thin-film sunscreen glazing. The objective was twofold and clearly stated. On the one hand, the principle of insulating double glazing — two volumes of glass separated by a mattress of dehydrated air — avoids the effects of interior condensation and, with it, the uncontrolled increase in humidity, harmful to user well-being. On the other hand, the treatment of the inner face of the volume of exterior glass by the deposition of metal oxides — silver, copper, nickel, etc. — to effectively

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Fig. 1. Stopray glass by Belgian Company Glaverbel, advertising. © Bauen+Wohnen, 1966.

offset solar radiation, meaning phenomena of glare and overheating, so reducing the work of the air conditioning plant. At the same time, a high coefficient of light transmission also had to be ensured to make the interiors sufficiently bright, with an atmosphere close to that of daylight, hence comfortable. Finally, of course, the question of aesthetics, through tinted and gleaming surfaces, was advanced as a fundamental feature, allowing multiple combinations and a particularly striking finish of the facades.

The stakes were high and European industry was engaged in research and development of this completely new glass product, which would be marketed extensively. Hence without abandoning the production of tinted glass (think of Saint-Gobain Athermis glazing, which was widely distributed), there was a search for new, economical and reliable production methods. This concerned both the techniques for treating the interior face of the double glazing — by processes of chemical reduction in most cases — as well as the sealing devices for the two glass panes, a crucial point, hence the sealing of the interlayer, recognised as the true guarantee of efficiency and durability.

Thus, from the beginning of the 1960s, it was first of all



Fig. 2. Jean-Marc Lamunière architect, Imprimeries réunies Tower (today Edipresse Tower), Lausanne, Switzerland, 1959–1963, before 1998's refurbishment. © TSAM.

the Belgian company Glaverbel which developed its flagship product Stopray (Fig. 1), a patent based on the principle of chemical reduction, then perfected down to the 1970s by the association of this coating process for metal films based on chemical reduction, and the “in-line spray-coating process” (which would give rise to Infrastop glazing, developed with its German partner Flachglas). In parallel, from 1965, the German company Schott und Genossen³ developed the principle of spraying metal oxide solutions onto large glass surfaces heated in a tunnel, a process later called “off-line coating” and which would be developed by the Pittsburgh Plate Glass Company (PPG, known from the 1930s for its heat absorbing Solex tinted glass). In 1972 PPG launched its Solarcool model, massively distributed in its bronze colour version. Saint-Gobain also, in France, used this process for its Parsol glazing and its Parello and Antelio glazing, as well

as for its cutting-edge model Elioterm, available in several colour variants, from golden to bluish, which would prove successful with architects, seduced by the aesthetic possibilities of glazing and its great versatility.

2.3. A Vast and Diversified Production

“A warm colour that ensures coolness!” we read in the advertising published in the most important architectural magazines. Stopray, Infrastop, Parello, Elioterm... A broad array of products was appearing on the market, against a backdrop of fierce competition, unfolding with the help of patents. Loved or hated, “mirror glass” quickly spread, becoming one of the components that most clearly embodied the character of international architecture in the post-war period. In addition to its undeniable efficiency, due to the successful association of the principle of insulating double



Fig. 3. René Stapels and Pierre Dufau architects, Royale Belge Building (today Axa Building), Bruxelles, Belgium, 1963–1966. © CC BY 4.0.

glazing and the thin layer inside the external glass, coated glazing would indeed be a particularly appreciated component among designers until it became a veritable leitmotif, a sign of distinction internationally in the architecture of the 1960s and 1970s. Long before the mirror envelopes designed by César Pelli or Ieoh Ming Pei became a model for international architecture, European experiences multiplied in the 1960s: the Imprimeries Réunies Tower by Jean-Marc Lamunière in Lausanne (1959, Fig. 2), the Totem Tower by Andrault and Parat in Paris (1978), the astonishing La Tulipe building in Geneva (J. V. Bertoli, 1975), or the Palast der Republik in Berlin (H. Graffunder, 1976), not to mention a particularly remarkable output in Brussels that numbered, among others, the CRB building by Constantin Brodzki (1969) and the Royale Belge headquarters by René Stapels and Pierre Dufau (1966, Fig. 3), both equipped with orange Stopray by the Bel-

gian Glaverbel company. The list of these office buildings would be long. It was an immense and highly diversified output, which took advantage of the formal potential of thin-layer glazing, available in multiple infill panes, which could be slipped into equally expressive metal or concrete structures.

The search for reflections has always seduced the creator; but before — and up to Chandigarh — the reflecting surface was placed in front of the building, so that it could be seen there (Taj-Mahal). Now the building is the mirror. What to think of this fashion?

asked the editor of the review *Ingénieurs et architectes suisses* in an article with the explicit title “Mirror, tell me: who is the most beautiful of all?”⁴ dedicated to the trend for re-



Fig. 4. Pierre Brillard architect, World Intellectual Property Organization Headquarters, Geneva, Switzerland, 1974–1979. © Claudio Merlini.

flecting curtain facades. In this wave of brilliant achievements all over Europe, we can recognise the expressive freedom that characterised the 1960s and 1970s, a period of technical and formal experimentation, the two aspects being inseparable. The case of polychrome envelopes shows this clearly.

3. SHOULD WE RESTORE COATED GLAZING?

Since the 1990s, there have been numerous specialist studies devoted to some pioneering achievements in the inter-war period, then to the massive production of curtain

walls after 1945 — the Docomomo network has been notably active in this field. This very rich scientific literature nevertheless seems to neglect, and this despite its importance, the crucial question of the colouring of lightweight envelopes. This appears all the more striking at a time when reflections on the restoration of the quantitatively important and often remarkable heritage of curtain walls began in the 1960s and 1970s. In this context, in the absence of established heritage recognition, envelopes using tinted and mirror glass in particular have been the target of heavy-handed and irreversible renovation, which most often fails to take into account the highly emblematic image of the original facades.

Admittedly, today, fifty years later, we note some limits of highly technical coating glass experiments. In some cases, the loss of the water-tightness of the window frame has led to forms of decay affecting both aesthetic factors — change of colour, non-uniform colour, crystallisation, etc. — and efficiency, now reduced to that of traditional insulating double glazing. But, independently of the pathologies which might affect coated glazing, interventions on mirror-glass envelopes are carried out with little attention to the subtleties of their installation and appearance. Worse, in most cases, there is a tendency to intervene on the principle of updating the image under the pretext of improving the energy balance, due to a veritable conditioned reflex. As a result, coated glazing is disappearing and being replaced by new contemporary glassmaking techniques known as “low emissivity” (or Low-E), which are certainly more efficient, but incapable of restoring the original architectural qualities.

And yet, other approaches are possible, for example by favouring the optimisation of technical air conditioning installations over replacement. The timely relevance of the spectacular curtain wall at the headquarters of the World Intellectual Property Organisation in Geneva (WIPO, 1979) is a demonstration of this.

The WIPO's Sapphire Tower, an Exemplary Case Study

The WIPO building (Fig. 4) is all facade. The “arc” plan designed by the architect Pierre Brillard actually corresponds to a very simple volumetry, that of a thin and slender parallelepiped, where the profiles of the two curved facades — concave to the southeast and convex to the northwest — offer changing perspectives and reduce the mass effect of its 12-storey volume. Despite its elementary geometry, the WIPO tower benefits from a particularly successful aesthetic as regards the expression of its envelopes. The architect sought “a living architecture, changing and light, in keeping with the changes of light from morning to night or from day to day. [...] An architecture which participates in the life of the sky, the clouds, and plays with them.”⁵

Hence the grid of the curtain wall in anodised aluminium with a natural colour is designed to avoid any protruding components, which would mean shadows cast by the joint plates. The infill panels, meanwhile, are carefully selected from the wide range of glass products on the market since the 1970s. Aware of the strategic aspect of the choice of glass components — in terms of image, but also the physical qualities of the building — the architect then called in Professor Rolf Schaal, a leading engineer at the ETH Zurich, regarded as one of the greatest specialists in light facades in Switzerland and elsewhere — his book *Vorhangwände-Curtain Walls* of 1961 was long a reference text. After a meticulous multi-criteria analysis, the choice fell on Elioterm's Sapphire tinted glass, produced by Saint-Gobain and later by its German partner Vegla.

Certainly thanks to an extremely flexible design of the curtain wall — Schaal's expertise is acknowledged — the en-

velopes of the WIPO tower are today in good condition, apart from a few specific pathologies. If for the few degraded glass panes — of the order of 5%, violet in colour and having lost their transparency — one can simply envisage localized replacement, the question of the energy balance arises, all the more in the case of a United Nations organisation wishing to be exemplary in terms of sustainable development.

Recent in-depth studies⁶ have shown, however, that the complete replacement of the infill glazing with new contemporary high-performance glazing, initially envisaged, would only constitute a minor improvement compared to the potential for optimising the original air conditioning installations, logically obsolete and very energy-consuming, fifty years after their commissioning. No degradation of the oxide layer is visible on the glazing, which means that the frame has not lost its seal and it is just as efficient as it was originally (with a U-Coefficient of 1.4 W/m² · °K), which was excellent at the time and is still remarkable. On the other hand, replacing the air-conditioning system with ejector-convectors, powered by an older generation thermal power plant, as well as optimising the zoning, would allow very significant, or even substantial, energy savings, even during summer cooling. Backed by calculation data, we can reasonably conclude that the option of restoring the curtain wall is undoubtedly preferable to that of its replacement, which would lead to a loss of the aesthetic of the envelopes, among the most emblematic from the second half of the 20th century. In the implementation of this pragmatic and respectful strategy, the WIPO tower is certainly not an isolated case — quite the contrary. It is simply a question of taking advantage of the conception of the 1970s, namely a perfect synergy between the materiality of the envelopes and the utilities, between regenerative techniques and conservative techniques, as Reyner Banham says, by extending it into the preservation project.

NOTES

- 1 Bruno Zevi, “Le sette meraviglie dell'architettura americana”, *L'Architettura, Cronache e Storia*, 40, 1955, 657.
- 2 “Glaverbel in the world”, *L'Habitation*, 9, 1968, 53–54.
- 3 The Schott company in Mainz would then become the leader in the “sol-gel coating” immersion processes, with the application of a film of titanium dioxide, used from the mid-1960s (Irmir, Mirogard and Amiran). A triple oxide layer version would be marketed under the Irox and Calorex models.
- 4 François Neyroud, “Miroir, dis-moi : qui est la plus belle ?”, *IAS*, 5, 1987, 45–46.
- 5 Pierre Brillard, *La tour bleu de l'OMPI sur la place des Nations*, booklet published for the official opening of the building in 1978, WIPO archives, Geneva.
- 6 Franz Graf & Giulia Marino, EPFL-TSAM, with Effinart, *Les enveloppes de l'OMPI, études préalables à la restauration*, 2017–2020.

POTENTIALS OF CEMENT BRICK IN IRAQI MODERN ARCHITECTURE

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ABSTRACT.

Traditional Iraqi Architecture has a legacy for structuring several methods to address sunlight's heat and glare. These treatments had their functional purpose and aesthetic impact. With the advent of Modern technologies of cement production in Iraq during the forties and fifties of the last century, this legacy was rediscovered. While the western methods of louvers were familiar, some Iraqi architects embraced sunlight by using the newly produced cement brick screens of variant motifs, suggesting a local trend within the Modern Iraqi Architecture. This trend did not survive the Iraqi Postmodernism of the 1980s.

This paper is an invitation to re-consider this Traditional Modern trend, regarding the possibility of employing the CNC (computer numerical control) machines and Robotic Technologies, in the revival of the Modern Iraqi trend of sunlight cement brick curtains. This notion creates a sense of an inheritable resilience, embedded into specific Modern techniques, in the age of Digital Technology.

The study includes a survey to categorize the modern design methods that were used in implementing the cement bricks for sunlight treatment, versus the traditional ancient ones, to unravel their potentials. The paper will investigate the possible ways to revive those methods and compare them with the methods and the strategies that are based on the abilities of the CNC machines' involvement in the design of buildings, to determine the possible means to restore the treatment of sunlight in Iraqi Architecture, in the twenty first century.

1. INTRODUCTION

Iraq is a country with long days of sunshine accompanied by a high average of heat temperature, especially in summer. Hence, Glare and Heat are of the most problematic climate aspects that Iraqis had to deal with since ancient times of Mesopotamia. While constructing their built environment, Iraqis managed to develop in the long run several construction techniques and devices that hold their comprehension of the natural environment of the country. Clay and vegetal resources remained for centuries the primary materials used in the building industry until the advent of cement concrete industry around the mid of the twentieth century, and the production of cement-based bricks appeared in the market in several shapes, therein many modernist architects embraced this material and relied on it in executing treatments of sunlight and heat suggesting different potentials that are inspired by old traditional practice.

The paper focuses on the aspects of using cement bricks by Iraqi modernist architects as an inherited / inheritable tradition that can inspire new future approaches that take advantage of recent technologies of CNC machines (Fig. 1).

2. TRADITION OF SUNLIGHT TREATMENT IN IRAQI ARCHITECTURE

For centuries lasting from ancient Mesopotamian times until early twentieth century, thick walls of clay bricks, and narrow openings, with domes and vaults roofing systems, were authentic means of construction in the Iraqi environment. As the heat gain diminished through the thermal capacity of the clay bricks, such a tradition came along with a compact urban fabric of court-yarded buildings permeated

by relatively narrow alleys, creating a highly integrated system of the city structure.¹

Besides their environmental function, wall treatment with rhythmic repetition of recesses in Mesopotamian architecture reflected an awareness of the aesthetics of light effects of shades and shadows. This aesthetic sensibility was manifested with a different vocabulary in the remaining Abbasid architectural heritage, such as the repetition of Arcades around the courtyards, recessed openings, as well as decorative relief clay panels.

The main devices that emerged for the treatment of sunlight and glare and heat are sunscreens or sun-breakers. Fragments of backed clay panels perforated with ornamenting patterns made to fit in window openings appeared in archaeological Mesopotamian sites.² Despite the lack of material evidence, this device most probably continued to be used in local construction traditions. It finally appeared, in a much more elaborate form, centuries later in traditional houses of the Ottoman era, especially those of the nineteenth century in different Iraqi cities. It can be seen in projected wooden constructs of windows on the first floor, overlooking the narrow alleys, locally called *Shanashil*. These components had panels of timber sun-screens, hence fulfilling several objectives. First, an environmental objective, through protection from direct sunlight. Second, aesthetically, as they added a pleasant effect with their intricate wooden work, and third, they performed a social role as they provided privacy for inhabitants from being viewed from outside.

3. MODERN OF SUNLIGHT TREATMENT IN IRAQI ARCHITECTURE

Cement, and eventually concrete, was among the im-

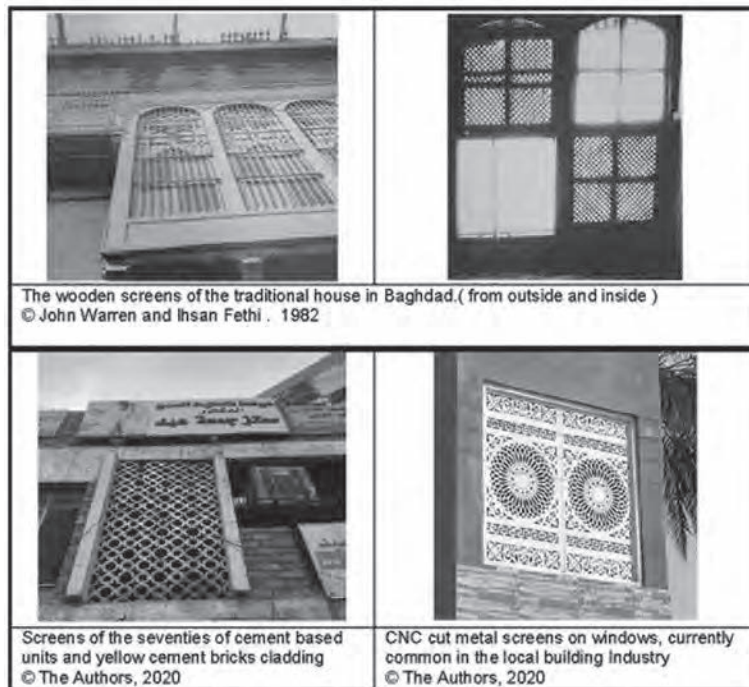


Fig. 1. Compression of screens in the Baghdadi houses in three phases of history.

ported materials to Iraq until the thirties of the twentieth century, along with iron and steel. By the end of the forties, the material became locally produced,³ and gained favour for Modernist architects. The Modern cement-based techniques included plastering and cladding, which came along with the multi-storey building type constructed in the concrete skeleton structural method.

Cement industry eventually expanded to include the production of cement bricks in different shapes, which were used by architects for the implementation of screens, of different shapes and materials.⁴

Many of cement screens were composed of repetitive louvers, and such approach was mutual among the architects during the fifties, sixties, and seventies, while others were of single units as will be illustrated later. These screens held the same potentials identified above in the wooden screens of the *Shanashil* found in the traditional houses.

The advantage was to create screens that can diminish the glare of the sunlight for the outdoor spaces without depriving them of the light itself. They had two important aspects that attracted some Iraqi Architects. The first was the freedom to create any desired pattern out of the repeated units, and the second was the partial blocking of sunlight that was necessary in their multi-floored buildings as part of the common screening trend. The tendency toward experiencing the aesthetics of shade and shadows was recognized again. Iraqi architects played with large and narrow cantilevers to shed walkways and paved areas in their buildings by using playful modern motifs and screens of differ-

ent types of units, replacing conventional arcades. The design of façades for any modern Iraqi building reveals the careful attention to the effects of shade and shadows of the sunlight through the use of horizontal and vertical louvers.

4. SCREENS OF CEMENT BASED BRICKS AND UNITS

Two types of cement bricks were salient in Iraqi Modernist architecture: the first were standard-sized filled bricks and the second unique hollowed units. While the latter appeared in several buildings during the fifties, sixties, and even seventies; the former started to appear during the sixties, and appeared in three colours of the different sizes: a (25 X 10.5 X 7.5cm³) in dark yellow, used mostly in façades; a (35.5 X 21 X 5.5cm³) in grey, used mostly in interiors; and a (35.5 X 20 X 3.5cm³) in dark red, used mostly in private gardens.

The yellow cement-based bricks were among the materials that dressed the façades of the buildings, as well as residential and public projects like Khammo's designs.⁵ They also have certain limited usage to cover interior walls, chimneys, but among all these uses, there has been the effort of creating patterned screens, though in limited examples like the institute of fine arts. Cement hollowed units appeared in several housing projects that were designed by foreign architects during the sixties.

The practice of implementing the screens of cement blocks faced several issues that might have made architects abandoning it. Among those issues was the blockage of the

No.	Type of material	Type of treatment	Architect	project	Building Type	Date
1	Precast Cement based units	Windows screen	Werner March – German- & Jaffar Alawi	Iraqi Museum & the expansion	Cultural facility	1953 & 1965
	Gray Cement bricks	Interior – fairface				
	Yellow Cement bricks	Façade cladding				
2	Precast Cement based units	large screen of cylindrical elements	Abdullah Ihsan Kamel & Rifat chadinji	Edfish abood building	Multi-story private building	1955
3	Precast Cement based units	screens of cylindrical & rectangles elements	Rifat chadinji	Beiber Dawood building	Multi-story private building	1955
4	Precast Cement based units	Screen on façade of rectangular units	Jose Luis sert	United States Embassy	Embassy	1955
5	Precast Cement based units	screen on façade of cylindrical elements	Kahtan awni	Salman Faiq hospital	Health care facility	1956
6	Precast Cement based units	Outdoor fence screen of rectangular elements	Jaffer Allawi	Row houses	Housing	1956
7	Precast cement based units	Screen on side façade	Midhat ali Madhloom	Al-Hayden private Hospital	Health care facility	1956
8	Precast cement based units	Screen on façade of rectangular units	Rifat chadinji	Residence of Kithkuda family	Private residence	1957
9	Precast cement based units	screen with hexagonal elements of hexagonal concrete formation	Abdullah Ihsan Kamel	Waqf Ihsan al-pasha building	Multi story private building	1957
10	Precast cement based units	Screens on Balconies of rectangular units	Doxiadis Associates	Housing of west Baghdad / Aldour Alsoud	Housing	1958
	Precast cement based units	Screen on façade of rectangular units	Saeed Ali Madloom	Hospital of People – Atomic Medicine	Health care facility	1960
11	Precast cement based units	Screens on front & rear façade of circular and linear shapes	Abdullah Ihsan Kamel & Jorge Sotth Mayor D'almeida – Portuguese -	Museum of Modern Art	Art Gallery	1962
12	Yellow Cement bricks	Façade cladding	Saeed Ali Madloom	Expansion of Red Crescent hospital	Health care facility	1964
13	Cement bricks	Fair-face – façade	Ellen & Nizar Jawdet, Al-Ayoubi	American secondary school	Education facility	1965
	Cement bricks	Fair-face – façade with motifs				
14	Yellow Cement bricks	Large wall screen	Rifat chadinji	The Federation of Industries	Public building	1966
15	Yellow Cement bricks	Large vertical cylindrical screens	Saeed Ali Madloom	Institute of fine arts	Education building	1968
		Interior façade cladding				
		Exterior façade cladding				
16	Yellow Cement bricks	Façade cladding	Mohammed Makiya & Mahmood Al-Ali	Water Liquefaction	Public building	1970
17	Cement bricks	Façade cladding	Mohammed Makiya	Rafidain bank – Basrah branch	Public building	1974
18	Yellow Cement bricks Glazed bricks	Façade cladding	Hussain al-hassani	First Iraqi National Council	Public building	Early Seventies
19	Yellow Cement bricks	Façade cladding	Gabriel Khammo Peter Khammo	Civil Engineer architect	five different family houses	Private residence 1965 -1975
20	Yellow Cement bricks	Façade cladding Fence façade	Gabriel Khammo	Civil Engineer	Eight different family houses	Private residence
	Gray Cement bricks				Three different multi – storey buildings	Private multi-storey buildings
	Precast cement based units					1960 -1980

Table 1. Results concerning cement based bricks and units, extracted from the general survey for screens in Iraqi Modern Architecture. 2019–2020. © Nawar Sami Al Ali & Saba Sami Al Ali.

glare of Sunlight, but they did not successfully decrease the heat, due to the low thermal capacity of cement.

In table 1, the researchers selected the projects that used cement-based bricks and units from a survey around the modern methods of sunlight treatment in Modern Iraqi Architecture. The table presents a variety of uses of the material in question (Table 1, Fig. 2).

The survey revealed two aspects concerning sunlight screens adoption; the first was a change in material, as the old method was using wood. The second was the change in scale; after being limited to windows, screens started to cover wider areas from the façade, such as balconies. This treatment was suitable with the type of modern approach, as buildings exceeded the height of two levels, and the exposure to the sun became inevitable; specially with the wide streets of modern planning of the city.

5. REVIVING THE CEMENT BRICKS

A recent tendency within the industry of construction

in Iraq has emerged toward the adoption of the CNC machines and technologies in search for new possibilities of environmental control. The local entrepreneurs have already integrated certain CNC machines in manufacturing steel, and aluminium, doors, and windows, decorated with predesigned motifs. This technique developed to include screening with perforated plates for balconies and windows at different scales; hence, recapturing the modernist practice of sunlight treatments and privacy control, which was lost several decades ago, to be carried out now with contemporary technology (Fig. 3). However, the material available for use, namely steel and aluminium plates or even wood or MDF (medium density fibreboards), is still unconvincing for outdoor usage due to their fragility to different environmental factors, like heat, humidity, or wind. Therefore, this new practice could be steered towards more durable and resistant materials.

Professionals recognized that clay bricks have the upper hand in heat capacity.⁶ Contemporary research enhanced the specifications of cement-based, and clay-based materi-

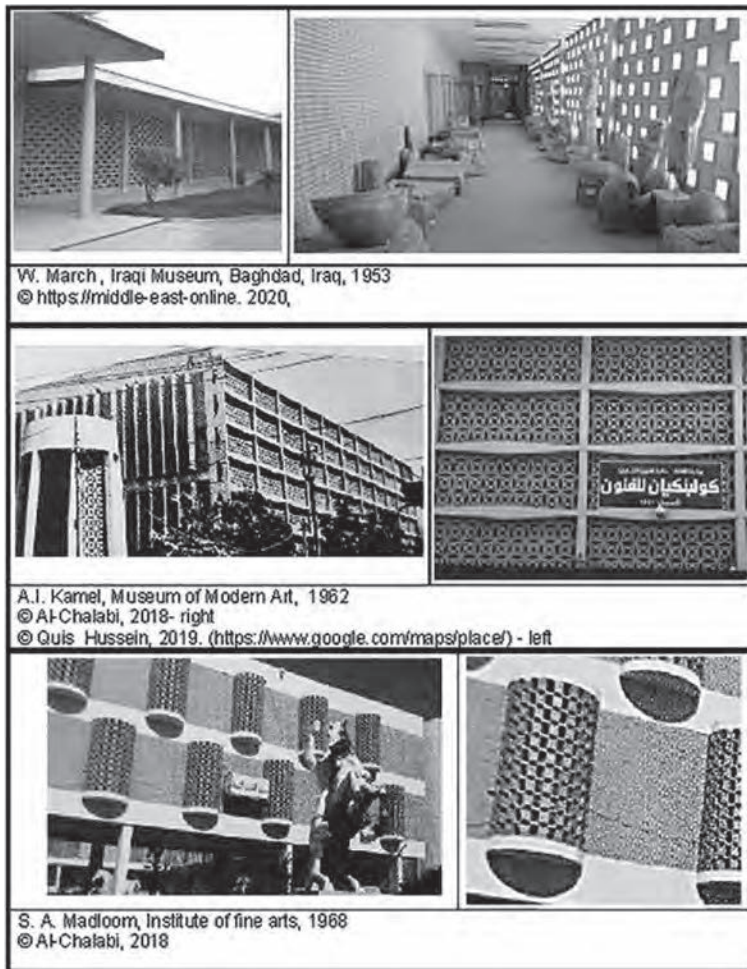


Fig. 2. Comparative examples of the Modern screen types, in form, material, and scale.



Fig. 3. Laser Jet CNC in a local workshop, Iraq, 2018–2019.

als, and presented the chemical brick.⁷ Yet, the current Iraqi method of construction holds on to clay bricks for partitioning, while using cement plastering on the outside façades, among other imported materials, without respect to the heat capacity. However, regarding the screening methods of

Modern Iraqi architects, contemporary brickworks screens are possible to realise by combining the available and common technologies and materials in the local industry, either by assembling the units in the site to create the component or by pre-assembling them in a factory and transporting

them to field, within a (bottom-up) strategy. These two methods already exist in the advanced methods of constructing ordinary brick walls, and panelled brickwork, to accomplish innovative work.⁸

6. ADVANCED EXPERIMENTS ON BRICKS AND UNITS

Several researchers and labs have tested different methods in highly ranked universities, and they presented flexible methods for digital architectural design to venture in the traditional restricted brickwork. Among the examples for such endeavours are the pioneering efforts at the ETH Zurich labs, which paid careful attention to keeping the standard methods of brick construction.⁹ In their work, they created a curved linear continuous screened wall of 200m with a standard brick unit for the Swiss Biennale pavilion in Venice in 2008, using an additive procedure, with a method of robotic-aided assembly of individual bricks. The team had already tried panelled brickwork screens for the 400m² façades of the winery of Guntenbein in Fiosch, Switzerland.¹⁰

Researchers at Harvard University used CNC wire cutting method “in the established clay extrusion process, commonly used for the production of bricks and many other ceramic building elements”.¹¹ Their objective was to achieve strategic design improvements of brick construction by introducing mass-customisation of the units so that bricks could be shaped individually and continuously.¹² The technology was suggested to be integrated into the industry-standard production processes without necessitating any but the minor changes for downstream post-processing and handling activities.¹³

On the other hand, there have been other innovative approaches with more limited applications and a potentiality for development. A research of Kent State University employed a method to combined 3D printing fabrication techniques to create bricks from the material of ceramic. Using a desktop inexpensive 3D printer and based on an FDM (Fused deposition modelling) technique of printing, and a configuration for the printer to print ceramic, the bricks were printed with continuous extrusion derived from a slip cast recipe of earthenware ceramics, commonly used casting moulds. It resulted in a variety of prototyped ceramic brick shapes and assemblies.¹⁴ The researchers mentioned their intention to carry out further research to test traditional materials like ceramic and concrete.¹⁵ It might be possible to consider the employment of large-scale 3D printing to create prototyped panelled screen units,¹⁶ with a thought of the radical development in the industry of ceramic's materials and production.¹⁷

Nonetheless, apart from the material, these contemporary experiments did not surpass the traditional methods of intervention in brick construction, namely: the shape and size of the unit, and the method and size of unit's assembly.

Research from Harvard University was trying to devel-

op a framework for deploying digital design techniques to the production of bricks under vernacular technology as a medium for achieving geometrical variations and functional complexity in domestic-scale projects.¹⁸ The study was trying to create a feasible, innovative system, intended to a country where digital fabrication is not an economically viable option, and engaging a design that can easily suit current hand-labour.¹⁹ The research suggested that the formal complexity accomplished through the presented design procedure remains feasible to fabricate under low-tech conditions, with minor modifications in the manufacturing method of soft mud.²⁰

7. CONCLUSION: THE LEGACY OF CEMENT UNITS SCREENS

The treatment of sunlight's heat and glare has always been manifested constantly through a batch of methods and devices that lasted for centuries.

This paper is an invitation to re-consider this historical method, rooted in the practice of building in Iraq. It was adopted and developed by modern Iraqi architects through the employment of cement bricks and units, in diverse shapes and scales. The paper embraces the engagement of the current local trend with the employment of CNC machines, used to provide metal screens, following the market needs. It recognises the modern innovative approach of screening as an initiative to employ the availability of the new technology in carrying the legacy of traditional screening to future generations. The approach reveals a resilient, inheritable aspect in the Iraqi Modern Movement.

REFERENCES

- AL SULTANY, Khaled, *The Architecture of Modernity in Baghdad: years of foundation*, Amman, Adib Books, 2014, 159, 184–185.
- AL CHALABI, Mohammed Ridha, *Encyclopedia of Iraqi Architecture: A documentation for Architecture and Architects*, Vol. 2, Iraqi Architects' Works, The fore founders and the Pioneers, Baghdad, Dar Al-Kafeel, 2018, 165, 200, 215–216.
- BRWONELL, Blaine, *Material Strategies: Innovative Applications in Architecture*, New York, Princeton Architectural Press, 2012, 20–22, 30–31.
- GRAMAZIO, Fabio, KOHLER, Matthias, & LANGENBERG, Silke (eds.), *Fabricate*, London, UCLPress, 2014, 115–117, 185.
- MOOREY, Peter R. S., *Ancient Mesopotamian Materials and Industries*, Eisenbrauns, Indiana, 1999.
- HAUSCHILD, Moritz & KARZEL, Rüdiger, *Digital processes: Planning, Design, Production*, Detail Practice series, Munich, Institut für Internationale, 2011, 50–51, 52–53.
- MULLA HIWAISH, Akeel N., *Modern Architecture in Iraq: a Comparative Analysis Study in Planning and architecture*, Baghdad, Dar Al-Shouaoun Al-Thaqafi Al-Ammah, 1988.
- PIERI, Caecilia, *Baghdad: La construction d'une capitale moderne (1914–1960)*, Beyrouth, Presses de l'ifpo, 2015, 298.
- WARREN, John, & FETHI, Ihsan, *Traditional Houses in Baghdad*, Horsham, Coach publishing house limited, 1982. 144, 151, 194.
- STONE, Elizabeth C., “The Spatial Organization of Mesopotamian cities”, *Aula Orientalis* 9, Sabadell, Barcelona, AUSA, 1991, 235–242.

NOTES

- 1 Elizabeth C. Stone, "The Spatial Organization of Mesopotamian cities", Sabadell, Barcelona, AUSA, *Aula Orientalis* 9, 1991, 235–242.
- 2 Peter R. S. Moorey, *Ancient Mesopotamian Materials and Industries*, Eisenbrauns, Indiana, 1999.
- 3 The Guiding record to the Public Companies of the Iraqi Ministry of Industry and Minerals, 2006.
- 4 Khaled AL Sultany, *The Architecture of Modernity in Baghdad: years of foundation*, Amman, Adib Books, 2014, 159.
- 5 See Projects of Gabriel Khammo in: Mohammed Ridha AL Chalabi, *Encyclopedia of Iraqi Architecture: A documentation for Architecture and Architects*, Vol. 2, Baghdad, Dar Al-Kafeel, 2018, 152–183.
- 6 Blaine Brownell, *Material Strategies: Innovative Applications in Architecture*, New York, Princeton Architectural Press, 2012, 21.
- 7 Ibid., 22.
- 8 Referring to Shop Architects' project, the: 290 Mulberry, located in: Notalia, New York: "In Progress: 290 Mulberry / SHoP Architects", accessed on January 28, 2020, <https://www.archdaily.com/9028/in-progress-290-mulberry-shop-architects>.
- 9 Moritz Hauschild & Rudiger Karzel, *Digital processes: Planning, Design, Production*, Detail Practice series, Munich, Institut für Internationale, 2011, 50–51. Also, see: Research, in their website: *Gramazio-Kohler Research*, accessed on January 27, 2020, <https://gramaziokohler.arch.ethz.ch/web/e/forschung/372.html>.
- 10 Ibid., 51; Brownell, 30–31.
- 11 Stephano Andreani & Martin Bechthold, "[R]evolving Brick: Geometry and Performance Innovation in Ceramic Building Systems through Design Robotics", London, *Fabricate*, 2014, 185.
- 12 Ibid.
- 13 Ibid.
- 14 Brian Peters, "Building Bytes: 3D — Printed Bricks", London, *Fabricate*, 2014, 115–117.
- 15 Ibid.
- 16 As mentioned in: Hauschild & Karzel, op. cit., 52–53.
- 17 Brownell, op. cit., 20–21.
- 18 Mateias Imbern, "Re-thinking the Brick Digital Tectonic", *Rethinking Comprehensive Design: Speculative Counterculture*, Hong Kong, 2014, 211.
- 19 Ibid.
- 20 Ibid., 217.

REVALUING THE BIOCLIMATIC IN THE MODERN MOVEMENT: ARTÉ AND TEKNE

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ABSTRACT.

It is still a widely held opinion that the cultural legacy and material heritage of the Modern Movement (MoMo) are antithetical to environmental sustainability. Recently, the challenge of energy sustainability has become pressing, and concern for passive thermal control in the preservation and restoration of the 20th-century architecture is getting momentum. Within this epochal turning point, it is relevant to acknowledge that bioclimatic architecture reached its first systematic formulation along the path of the MoMo in 1963, with the book *Design with Climate: A Bioclimatic Approach to Architectural Regionalism* by Victor Olgyay. Well before its release, the concern for thermal control has featured the face of the global modernities through an impressive variety of external solar shading systems and other climate-mediating strategies.

The designed solutions demonstrate both the climatic adaptability of the building elements and the adaptation of the International Style to the different climatic regions, including tropical and subtropical areas.

In the period surrounding the Second World War, several forward-thinking Italian architects combined *arté* and *teknê* to achieve proto-bioclimatic solutions by designing solar shading devices and new building envelopes, experimenting autarkic bio-based materials or reinterpreting the use of traditional elements. In an international comparative perspective, looking at the modern heritage in Italy through the lens of energy sustainability, our study focuses on the identification and analysis of combined solutions and devices for passive thermal control, thus revaluing the bioclimatic legacy of the MoMo. The assessment processes leading to protection and restoration choices have to encompass this legacy.

1. TECHNOLOGICAL AND CULTURAL RESILIENCE IN THE MOMO¹

Among the legacies of the Modern Movement (MoMo), the bioclimatic lesson is the least obvious to identify since it seems to contradict Philip Johnson and Henry-Russell Hitchcock's interpretation of the "International Style" (MoMA Exhibition, New York, 1932) as a universal architectural style alien to places and regional specificities.

We use the term bioclimatic to refer technological solutions acting to facilitate ventilation and natural lighting or improving the building thermo-hygrometric comfort through passive devices, such as solar shading systems (fixed or operable) or others integrated into the building envelope.

We consider the identification of the bioclimatic heritage of paramount interest as regards one of the main challenges of our time, that of sustainability, which implies a radical rethinking of buildings and towns.

The needful refurbishment of the vast 20th-century building stock involves, first and foremost, the acknowledgement of its specificity in terms of materials, techniques and how they took form. This acknowledgement is desirable not only for protection purposes but also to convey to present the quality of solutions featured by adaptability, flexibility and maintainability of their components or entire building envelope. These qualities belong to resilience as they

allow buildings to stand the test of time.

In physics, the term resilience refers to the ability of a material to withstand the dynamic forces by absorbing energy by elastic or plastic deformations. While, regarding a living organism, we generally mean by resilience, its ability to adapt to changing external conditions; by analogy, a 'building organism' can be more or less resilient too.

As a result of our research on international and Italian architecture between the 1920s and 1960s, designed by authors belonging to the MoMo, we have identified 'resilient' components recurring in technical and formal solutions.

From a purely technological and performance point of view, together with 'native elements' from regional traditions, the solutions of the MoMo for solar radiation control or the improvement of thermo-hygrometric comfort anticipated those of the current bioclimatic and sustainable architecture.

Although in the late 1950s, early 1960s, the Olgyay brothers developed the scientific application of bioclimatic principles in architecture, some of the MoMo masters had addressed the issues of passive climatic of buildings since the late 1920s. Among them, Le Corbusier engaged in climate and helio-thermal explorations, not always reaching suitable results. For a project in Algiers — published in his *Oeuvre complete: 1929–1934* — he designed a 'box-like' solar shading in protruding reinforced concrete he named *brise-soleil*.

As for "The five points for a new architecture" (*Vers une*

Architecture, 1923), sensitivity to climatic and environmental aspects is evident in the way some of its fundamental elements act. Le Corbusier conceived several solutions for the control of climate aspects such as the “neutralising wall” — thermally active façade in opaque or glazed walls to avoid air and heat flowing from inside to outside and vice-versa — or the *pan de verre* for the Cité de Refuge (Paris, 1933).

After the Second World War, he continued developing diagrams to define the shape of the *brise-soleil* according to solar radiation control, and by the study of the “climatic grid”. He perfected his care for climatic and solar factors in the Chandigarh and Ahmedabad projects (*Oeuvre complète* 1951–59).

2. THE PROTO-BIOCLIMATIC LESSON AS INHERITABLE RESILIENCE: THE ITALIAN CASE²

Before *Design with Climate* (1963), several masters of global modernities developed proto-bioclimatic solutions by incorporating climate mediating strategies into their projects. Although some scholars have already revealed the “green approach” of the MoMo, the Italian case has remained unexplored.³ In the attempt of covering this gap, we have identified the ‘cultural resilience’ of the MoMo. This resilience is the extent to which the MoMo has been able to absorb a broad spectrum of changes (political, economic, technological, social) and be able to still exist in its shared set of values that have materialised in the buildings we have inherited.

By designing with the agencies of nature, leading Italian architects have coped historic difficult contingencies and unpredictable events that occurred in the period surrounding the Second World War in their works.

Before the war, tuberculosis ravaged Europe and Italy; the Duce’s imperialist ambitions relaunched the colonisation of Africa, and the sanctions of the Society of Nations occasioned autarky due to the invasion of Ethiopia (1935). In the post-war, public policies induced the fast and low-cost construction of thousand housing estates, and the industrial rebirth engaged architecture new challenges. Assuming the climate-mediating strategies as ‘markers’ of the cultural resilience, we present some emblematic cases related to the historical contingencies just mentioned.

2.1. Passive Thermal Control for Health: Operable Glass Façade and Dynamic Solar Shading as an in One System

When in the early decades of the 20th century Europe was ravaged by tuberculosis and other diseases, Functionalism and Rationalism embraced the hygienist view. The sunlight, ventilation and outdoor exposure became significant factors in the design of schools, children’s camps and health-care facilities. Leading architects of the MoMo reacted by designing building envelopes with large operable windows to provide vast amounts of natural light and ventilation to indoors and direct transitions into outdoor living spaces. To maximize the ‘healthy’ thermal comfort, the architects care-

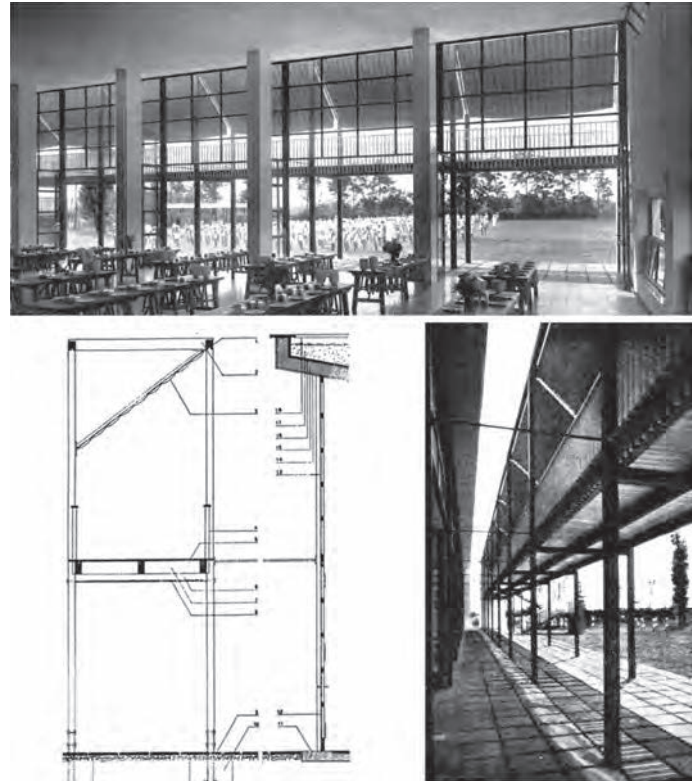


Fig. 1. BBPR, Health Centre for Children, Legnano (Milan), 1937–38 © Irenio Diotallevi, Francesco Marescotti, “Particolari costruttivi di architettura”, *Casabella-Costruzioni*, No. 186, 1943, pl. XLIX.

fully conceived building’s volumes and elements according to the site’s microclimate; they considered the thermal-impact of prevailing winds and the most efficient solar orientation for each body or front of the building.

In Europe, iconic works of the MoMo heritage such as the Zonnestraal Sanatorium (Hilversum, 1926–30) and the Open-Air School (Amsterdam-South, 1927–30) or the Paimio Sanatorium (1929–33) embodied to a different extent the proto-bioclimatic approach. The elements celebrated as formal traits of these architectures, namely the Zonnestraal flat-roofing overhangs, the angular ‘void’ south of the School classrooms-terraces, and the balconies of Paimio open-air ward, disclosed a new meaning of Functionalism when re-examined under the climatic lens. Similarly, Italian masterpieces such as the Nursery School Sant’Elia (Como, 1935–37) by Giuseppe Terragni and the Health Center of the Legnano Children’s Summer Camp (Milan, 1937–38) by BBPR (G.L. Banfi, L. Barbiano di Belgiojoso, E. Peressutti, E. N. Rogers) can stand out as brilliant works of the proto-bioclimatic lesson.

Acclaimed icon of the Rationalism, the Nursery School manifests Terragni’s consistency in realising what he wrote in 1936. The architect proclaimed that rationalist architecture is functioning with the sun as life is. He designed the glassed building fronts pursuing his principle of the “right



Fig. 2. Stefania Filo, Hunting and Fishing pavilion, Naples, Italy, 1940. © *Architettura*, No.1–2, 1941, 66, 67.

graduation" that means according to the "calorific intensity, the brightness of the sun's rays in the gradual seasonal variation of its trajectories."⁴

In addition to the traditional indoor curtains of the many glass walls, Terragni masterfully conceived a system of dynamic external solar shading for the south-southwest front opened onto the school garden. The system consists of awnings supported on one side by a thin reinforced concrete structure running in parallel to the operable glass façade; it is multifunctional in that it acts to shade the building envelope and also defines and protects the renowned outdoor classrooms. This solution makes it possible the heating in winter and cooling in summer required in the temperate climate zone.

Another sort of 'double façade' features the glassed south front of the Health Centre in Legnano.⁵ The BBPR built a vertical self-bearing wooden platform that is multi-functional, as it serves as porch-solarium, and multi-performance, as it provides for shading and allows ventilation of the double-height interior space of the dining hall behind it (Fig. 1).

2.2. A Quest of Adaptation to Climate: Rationalism for the African Colonies

The adaptation of the rationalist architecture to the environment of the Italian African colonies has aroused an extraordinary quest for technical innovations of passive thermal control which included both building materials and solar shading solutions. From this quest, structures and partitions acquired new qualities of hydro-thermal insulation due to the use of pumice-based products made by Italpomice. Modern concrete mixed with pumice was promoted for various applications in colonial buildings; for structures in cast reinforced concrete, in the form of blocks for external or internal walls and — due to its resistance to humidity — as sub-floor for insulation floorings.

The pumice-based materials contributed to the proto-bi-climatic design which in the same building included other aspects related to the dimension and position of the openings letting the flow of fresh air in from shaded outside-spac-

es (such as patios, porches, sheds, loggias), and of which the Colonial house (1932–33) at the 5th Triennial of Milan (1933)⁶ is an epitome. For the horizontal window of this model house, rationalist architect Luigi Piccinato also conceived an external device consisting of operable solar and ventilation louvers. The same year, Le Corbusier proposed a dynamic system for a housing building in Barcelona. The drawings of this not-built project show the loggias shielded by horizontal operable fins incorporated into the 'box-like' *brise-soleil*.

Other solar shading systems marked the façades of several pavilions of the first permanent Exhibition of the Italian Overseas Colonies (Naples, 1940), demonstrating the 'technical' sensitivity to passive thermal-control.

For the glass façade of the Hunting and Fishing pavilion, Stefania Filo Speziale (among the first female architects in Italy) built a surprising self-bearing solar shading. She masterfully showed the desire to merge *arté* and *teknê* in carrying forward the concept of rationalism to comprise climate issues. The parabolic arcade in reinforced concrete standing on a basin that acted as an evaporative cooling pond was a beautiful and efficient system for passive thermal control as well as a meaningful symbol of modernist building design technique (Fig. 2).

The Colonial Exhibitions played an essential role in the official recognition of a great variety of insulating autarkic materials, among which the Masonite and Populit stood out. Together with their technical performances (endurance to humidity, termites or fire) the easy availability, the simplicity and speed of installation and, in some cases, the lightness and low-cost, the new bio-based materials favoured the Italian experimentation in performing thermal-hygrometric building envelopes, since the 1930s.⁷

2.3. Autarkic Multi-layered Building Envelope as a Component of the Proto-bi-climatic Approach

Some early masterpieces of Modern Italian architecture reveal that multi-layered thermal-insulating infill walls were part of a systemic-climatic design that included the positioning and size of the glassed openings according to

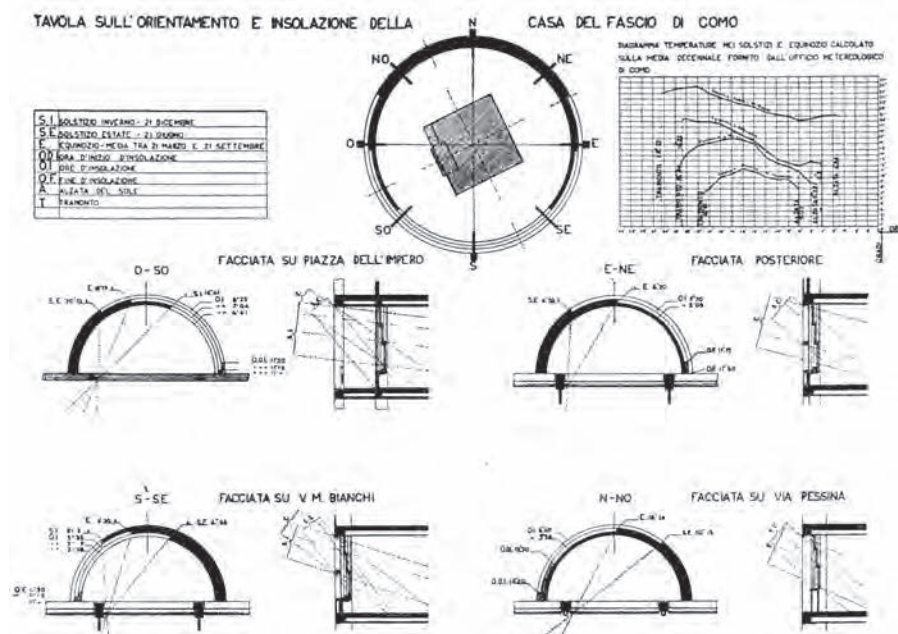


Fig. 3. Giuseppe Terragni, Casa del Fascio di Como, Como, Italy, 1932–37. Schemes for the best sun-exposure based on Ernst Neufert method. © Quadrante, No. 35–36, 1936, 43.

the sun-orientation as well as solutions for solar shading.

For the Casa del Fascio of Como (1928–32, 1935–37) Terragni not only used Eraclit panels for the inner side of the concrete infill walls and pumice blocks behind the local limestone Botticino slabs of the external cladding (chosen considering the climate of Como)⁸, but he also composed each building front according to the exposure to the sun (Fig. 3). He reassured the sceptics by writing “do not worry about the glass walls facing south or south-west as long as they are set back from the building line and protected by balconies or loggias or tall trees.”⁹

As regarding the main façade, the iconic system of loggias is a performing multi-functional solar shading. The exhibition of the slender structural grid is a functional consequence of the setback of the building envelope exposed to solar radiation (south-east), rather than a purely formal choice to exalt the modern reinforced concrete construction. In the same years, a passive-thermal solution based on the retreat of the infill walls from the structural skeleton was also used by Le Corbusier for Villa Baizeau in Carthage (1929, Tunisia).

Recycled industrial wastes such as of coal slags, wood and cork shavings served as insulation materials. By these materials, rationalist architect of second-generation Cesare Cattaneo realised diversified multi-layered infill walls according to the performances needed for each heliothermal exposure side of his masterpiece, the Rental House in Cernobbio (1938–39). This experimentation hidden into the walls (Fig. 4) combined with a while well visible bioclimatic solution on the main façade.

The reinforced concrete frame that protrudes from the attic floor as a remarkable element of the south-west façade, conceived initially as a glassed veranda, became a ‘green wall’ in the final project.

Cattaneo’s ‘green wall’ seems to be a unique solution to its kind, while the adaptiveness of plants combined with ceramic latticed partitions spread as solar shadings system of the global modernities.

2.4. Robustness and Adaptiveness:

Latticed Solar-shadings Inspired by Tradition

Lattices screens in ceramic material or concrete were the most utilised in housing estates of the INA-Casa and other public plans of the post-war. They derive from an interpretation of the building tradition and in Italy from the recovery of the building components of rural architecture. By merely spacing the bricks, Ignazio Gardella was the first to introduce this solution for the terrace-solarium of his celebrated Tuberculosis Dispensary in Alessandria (1934–38).

In Italy as in tropical modernisms — suffice it to remind the tremendous works of Jane Drew in Africa — besides the material robustness another reason that favoured the spread of lattices is their extreme flexibility to satisfy various applications to offer privacy and subdivide indoor or outdoor spaces. Concerning the qualities of resilience just highlighted, in addition to robustness, durability over time almost maintenance-free and the flexibility of uses, the adaptiveness manifests when lattices are covered by climbing plants. Studying the technical drawings of the Type A duplex housing building of the Dessié-Harar in Milan (1951–

bility demonstrated by the building, considered beyond the thermal point of view, is the plant designed by Marco Zanuso at Merlo in Argentina for Olivetti (1958–60) as it has remained almost in its original state despite the transformations due to changing production needs.

The plant (31,200 square meters) locates in a flat area of a park (123,000 square meters) intended to host future extensions. The building sets on a modular scheme is based on 12 by 18 meters spans; the structural and architectural layout consists of hollow beams in prestressed reinforced concrete. The large hollow beams are 42 meters long, have an internal round section of 90 centimetres and an external polygonal one, with two cantilever wings of 1.20 meter each side. They stand on three points, with two roof shelters of three meters cantilever, which with their overhang act as external horizontal sunscreens to control the intense solar radiation passively. The beams still house the hydraulic, electrical, and ventilation pipes. They are therefore a structural element of the building and generating elements of space, within a unitary concept that integrates structure, architectural form and technical systems.

The design process integrates structure and systems into a harmonious and unitary conception, which anticipates later solutions such as those by Renzo Piano for the Beaubourg in Paris. From an urban and territorial point of view, the Olivetti plant in Merlo is a demonstration of how a factory can be the central element for the productive, social and architectural organisation of a territorial community, according to Adriano Olivetti's vision, in current full consistency with the sustainability goals of the Agenda 2030.¹¹

Despite the reconversion in a manufacture of cigarettes, which occurred after the cessation of Olivetti's production the mid-1970s, the persistence of the original conformation of the factory demonstrates the resilience of the architectural and plant engineering solutions (a synthesis of *arté* and *teknê*) of the Zanuso's project.¹²

Revaluating the bioclimatic and proto-sustainable heritage of some aspects of the MoMo production is strategic for their conservation but also for the suited energy retrofitting and environmental upgrading actions that our time needs.

REFERENCES

- BARBER, Daniel A., "Le Corbusier, The Brise-Soleil, and the Socio-Climatic Project of Modern Architecture, 1929–1963", *Thresholds*, No. 40, 2012, 21–32.
- BONE, Kevin (ed.), *Lessons from Modernism: Environmental Design Strategies in Architecture 1925–1970*, New York, The Monacelli Press, 2014.
- CASCIATO, Maristella (ed.), *Diotallevi e Marescotti: Il Problema sociale costruttivo ed economico dell'abitazione. Con Particolari costruttivi di architettura*, Roma, Officina Edizioni, 1984.
- CUPELLONI, Luciano (ed.), *Materiali del Moderno*, Roma, Gangemi, 2017.
- OLGYAY, Aladar, & OLGAY, Victor, *Solar Control and Shading Devices*, Princeton, Princeton University Press, 1957.
- OLGYAY, Victor, *Design with Climate: Bioclimatic Approach to Architectural Regionalism*, Princeton, Princeton University Press, 1963.
- PORTEOUS, Colin, *The New Eco-architecture: Alternatives from the Modern Movement*, London-New York, Taylor & Francis — Spon Press, 2002.
- STEIN, Carl, *Greening Modernism: Preservation, Sustainability, and the Modern Movement*, New York-London, W.W. Norton & Company, 2010.

NOTES

- 1 The author of parts 1 and 3 is Caterina Mele, Responsible of the Research programme.
- 2 The author is Caterina Franchini.
- 3 Groundbreaking studies including those by Porteous (2002), Stain (2010), Barber (2012), or Bone (2014) inspired our research.
- 4 Giuseppe Terragni, "L'impiego del vetro", Milan, *Quadrante*, No. 35–36, 1936, 48.
- 5 Already identified by Diotallevi and Marescotti as an excellent solution in 1943, the Olgyays included this case in their 1957 book about solar control.
- 6 Gian Carlo Palanti, "La Casa coloniale", Milan, *L'Edilizia Moderna*, No. 10–11 August–December 1933, 20–23.
- 7 About insulation materials see: Paola Ascione, "Isolanti", *Materiali del Moderno*, Roma, Gangemi, 2017, pp. 330–343.
- 8 See: Giuseppe Terragni, "I marmi", Milan, *Quadrante*, No. 35–36, 1936, 51.
- 9 Giuseppe Terragni, "L'impiego del vetro", Milan, *Quadrante*, No. 35–36, 1936, 48.
- 10 See: Lúcio Costa, "Flats at Rio the Janeiro", London, *The Architectural Review*, No. 644, 1950, pp. 88–94.
- 11 Lo stabilimento della 'Olivetti Argentina', *Notizie Olivetti*, No. 77, Ivrea, 1963, 53.
- 12 See: Caterina Mele, Paolo Plantanida, Edgardo Daniel Vedoya, "Functional continuity and industrial discontinuity. The case of the Massalin Particulares S.R.L. in Merlo (Argentina)", *Patrimonio Industrial. Entendiendo el Pasado, Haciendo el Futuro Sostenible*, Santiago del Chile, Central University of Chile, 2018, 641–644.

VENTILATION BLOCK: THE MODERN TROPICAL BUILDING ELEMENT

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ABSTRACT.

The use of ventilation blocks was part of the modern tropical architecture movement in Malaysia. It was a prevalent design feature in Malaysia from mid 20th century and was used in mass housing placed as bands above windows and as wall features along corridors and staircases. Vernacular architecture in Malaysia also had air vents that were designed for the tropical climate by having perforated skin reflecting the local culture. The ventilation blocks are the modern interpretation of the traditional air vents in Malaysian vernacular architecture. These blocks were mass-produced to a variety of simple modular forms made of concrete. These modularity allows the flexibility of achieving simple or complex façade patterns through different arrangements of the blocks, creating a modern ornamental façade. However, it does not reflect the cultural identity as compared to the traditional dwellings air vents. With the introduction of air-conditioning units in 1970s, there was a decline in the application of ventilation blocks. In recent years, increase in awareness of global warming has made local architects challenging themselves in designing buildings that address this issue passively. This paper discusses the usage of prefabricated modular ventilation blocks in contemporary buildings designed for the tropical climate. With the advancement of new technologies, new designs are explored and have made ornamentation economically viable. It not only can be mass-produced but can be mass-customised which may lead to a new reading of ornamentation that reflects the local culture. This may lead to an abundance of new conceptual and aesthetic possibilities.

1. INTRODUCTION

Ventilation vents are common features in the traditional to modern dwellings in the tropical climate region. It is an ingenious building element that has evolved from traditional Malay dwellings using timber as main material, that has been meticulously carved to facilitate ventilation and filtration of daylight, to modern contemporary ventilation blocks that are made of concrete and use simple extrusion machines to create modular forms, that when arranged together create a highly ornamental facade. The evolution of the ventilation vents went through different influences such as the migration of Chinese from southern mainland China and the colonization of Dutch, Portuguese and the British. All these influences have created a rich catalogue of ventilation vents with motifs that gave different meaning to different culture at a given period of time. This paper identifies and discusses the historical use of the ventilation vents in the traditional and migrant communities in Malaysia and the historical applications of the ventilation blocks in modern Malaysian Architecture. A further discussion is also made on the innovative reinterpretation of ventilation blocks in contemporary architecture.

2. HISTORICAL APPLICATIONS OF VENTILATION VENTS IN TRADITIONAL AND MIGRANT COMMUNITIES IN MALAYSIA

Most primitive houses are well designed responding to the local climatic and regional materials. Building construction, the use of materials and application of styles were usually indigenous towards its region. Malaysia sits in a hot and

humid tropical climate with abundance of natural materials available. Over the generations, the design has been constantly improvised and modified to suit their current social needs and their natural surroundings. However, the Malay lands were also influenced by the west during the colonisation of the Dutch and British which also brought in migrants from southern China mainland. This paper discusses two types of historical buildings using ventilation vents in both the traditional and migrant communities which are the traditional Malay house and the Peranakan shophouses.

2.1. Malay Traditional Houses

The traditional Malay house has evolved through generations after generations and developed a sophisticated system that reflects the needs and wants of the Malays (Fig. 1). Over the generations, the Malays have constantly improvised and modified their houses to suit their changing way of life and integrating with their surroundings. One of the key features is having a carved decorative timber screen that acts as a ventilation vent and sunlight shading or filtration device. This carved decorative timber screen represents the innovation and sophistication of the arts and crafts of the Malays which also manifests in creating visually ornate and comfortable internal spaces. The traditional Malay house responds very well to the tropical climate and is designed to be part of the natural environment.

2.1.1. PERFORATED SCREEN

Decorative timber screen carvings are perforated screens that have been incorporated in the Malay traditional houses as part of the design of the openings. The perforated screens are usually placed above the windows and doors, roof ends,



Fig. 1. Architect unknown, Tunjang Bakawali, Besut, Terengganu, Malaysia, early 20th century, School of Architecture & Built Environment (SABE) students visit to Tunjang Bakawali. © Yusra binti Zulkifli, 2020.

and on certain walls. The placements of these perforated screens perform their environmental function by facilitating ventilation and penetration of daylight into the interior spaces. The perforated screen filters the undesirable effect and discomfort of outside sunlight such as heat and glare that may cause visual discomfort to many people living under the hot tropical climate. The placements of the perforated screens are above eye levels to function as visual barriers and providing privacy to its occupants. The design and placements of the perforated screens perform both aesthetically and climatically to create a tranquil and peaceful environment.

2.1.2. PERFORATED SCREEN MOTIFS

The traditional Malay arts and crafts are reflected in the splendour and beauty of timber carving ornamentations used in the traditional Malay house. The carvings have more than aesthetical values and have deep philosophical meanings. In general, the shapes and designs of Malay wood carvings are interpretations of the carvers inspired from the surrounding environment. The surrounding environment includes living things, cosmic forms, geometry, calligraphy, clouds, and plant life. The most favoured motifs are inspired by plants found from immediate surroundings such as patterns of leaves, branches of local trees and by native flowers found nearby.

The representation of human or animal form are never included in conformity with most Islamic art form everywhere. The limitation imposed by this unwritten prohibition did not however result in monotony of design. Malay wood carver were keen observers of nature and although they only sought inspiration in the nature of the plant life in the vicinity of their villages, they took great care to introduce variation of motifs in their works. In many instances, abstract geometrical and delicate Arabic calligraphies are introduced into traditional carvings.¹

The motifs differ from different region because of their geographical location and culture. Perforated screen motifs are carved with less intricacy and are normally repeated to create a screen-like element. The rich show off their wealth with carved embellishment serves as visual indicators of the social rank and status of the occupants and owners of the dwellings. The ornamental timber carvings on traditional Malay houses have become synonymous with the identity of the Malay culture.

2.2. Peranakan Shophouses

A Peranakan shophouse is a two or three-storey terrace building with combined residential and commercial areas with covered walkway by the street. Peranakan shophouse is



Fig. 2. Architect unknown, Peranakan shophouses, Katong, Singapore, early 20th century, Peranakan colourful shophouses in Katong. © Instagram, Lee Mandy, @ladyandpups, 2018.

one of the popular building types in Southeast Asia (Fig. 2). In the 18th century, Chinese tribes like Hokkien, Cantonese, Teochew and Hakkan were brought to Southeast Asia by British rulers as labourers in the tin mining industry and resulted in various Chinese settlements in the region. The earliest form of Peranakan shophouses was introduced in Melaka, Penang and Singapore during the colonial period. The earliest Peranakan shophouses were predominantly wooden structures influenced by the traditional Malay house style which were designed responding to the local climatic and regional materials. Later, the styles had western influences adopting materials such as bricks and tiles due to fire incidences. This resulted in the development and evolution of the history of shophouses in terms of styles and building constructions. However, these early structures were more functional and less ornamented but with the western influences such as Dutch, Portuguese and British colonizations in the region, more colourful decoration and elaborate ornamentation could be observed.

2.2.1. PERANAKAN SHOPHOUSE AIR VENT

There are a number of architectural opening elements

introduced during the different periods of Peranakan shophouses such as circular punched holes, slit punched holes, fan-shaped vents, glass paneled shutter, horizontal bar and wooden louvred shutters. These openings help the natural ventilation and cooling of the Peranakan shophouses which increases the energy efficiency and contribute to comfortable indoor spaces. It is a passive design for internal ventilation and these features respond well to the hot and humid tropical climate of Southeast Asia.

2.2.2. SHOPHOUSE AIR VENT MOTIF

The Baba Nyonya Residential shop houses and dwelling houses are a form all their own, celebrated throughout Penang and the region. Whether business or residential, each shop house shares a few common characteristics: Each includes an intricately decorated air vent, commonly featuring the image of a peony (symbolizing wealth) and the bat (symbolizing good fortune).²

This decorated air vent which is symmetrical, is always located at the top of ground floor windows together with iron grills. However, in some Peranakan shophouses, the air

vent is made from ceramic blocks with carved openings.

There are different meanings and origins of animal figures of ornamentation in Chinese culture. Most of the fruits and mythical animal figures are influenced by the ancient Chinese architecture, while the insertion of flowers, leaves and geometrical shapes are inspired by European and Malay architecture.³

The rich show off their wealth with carved embellishment serves as visual indicators of the social rank and status of the occupants and owners of the dwellings. The Peranakan shophouse ornamental symbolism plays an important part in the conveyance of status in society and meaning in architecture.

3. HISTORICAL APPLICATIONS OF VENTILATION BLOCK IN MODERN MALAYSIAN ARCHITECTURE

The Ventilation block is a building element that is commonly used in tropical countries. It is a classic feature of modern tropical architecture, became common in Southeast Asian countries since the turn of the 20th century. As an important building element in the tropics, it responds adequately to the hot and humid climatic conditions in the tropical countries. There are major issues caused by improper ventilation in the tropical region such as mouldy facade due to rain and hot internal spaces. It also serves as good reminders of certain fundamental considerations for building designers who will continue to deal with this issue of designing buildings in the geography and climate of the region. The purpose of this building element is to facilitate good air flow within the building, allow daylight and at the same time prevent rainfall seeping in but also as a design feature giving added aesthetic values to the building. The ventilation block has created a strong identity in the tropical countries.

The application of the ventilation blocks as design feature walls are commonplaces in Malaysia applied at mass housing, school buildings, office buildings, and institutional buildings. The feature walls are often full-length exterior ventilation walls which are typically used on staircase facade, corridors, transition spaces or acting as internal wall screens covering private or semi-private spaces. It can also be placed as bands above windows and doors, in spaces that requires privacy such as wash areas and bathrooms. Other wet or damp areas such as kitchens and yards are among the other spaces' ventilation blocks are used to facilitate natural air ventilation.

3.1. Ventilation Block Wall

The ventilation block wall filters excessive daylight that gives much relief to the people living under the hot tropical climate by reducing the undesirable effect and discomfort of outside sunlight such as heat and glare that causes visual discomfort to the occupants. Besides filtering daylight, it



Fig. 3. Kevin Mark Low, Petaling Jaya Trade Centre, Petaling Jaya, Malaysia, 2010, High rise ventilation block facade. © Yusra binti Zulkifli, 2020.

casts shadows that creates an aesthetic impact to the internal spaces. The interplay of light and shadow changes in appearances during different times of the day and brings aesthetically delightful lighting effects to the interiors. The porous walls also facilitate natural ventilation that flows to the interior spaces reducing internal humidity due to rainfalls. Ventilation is an important aspect in indoor environment and one of the basic elements that have always been considered in building design. The application of this passive cooling strategy addresses the energy efficiency of a building and makes living more comfortable in the hot and humid tropical climate regions.

3.2. Modular Ventilation Block

The ventilation blocks are also known as perforated bricks and breeze blocks. These perforated bricks are made of concrete that are permeable, modular and relatively sim-



Fig. 4. Students Year 02 of Architectural Construction, Department of Architecture, National University of Singapore, Singapore. *Casting Architecture: Ventilation Blocks* by Florian Schatz, 2014, 30–31, 72–73.

ple to produce that can be stacked to construct porous ventilated wall in buildings. The ventilation blocks are mass-produced to a variety of simple pre-cast concrete modular blocks. The modularity of the blocks allows endless various configurations to the imagination of the designers.

*A ventilation block would be at least 3 inches thick to ensure internal structural integrity and for ease of construction. The most common module is an extruded square or rectangle with a perimeter of concrete forming its shape, of about six-inches to a foot in overall size for each side. The internal space of this frame is articulated with lines or geometric shapes of concrete depending on design, but which leave out areas for ventilation purposes.*⁴

The modular forms of the ventilation block give the flexibility of achieving simple and complex facade or wall patterns through different arrangements of the single module. The key factor in the design and arrangements of the modular blocks is to consider facilitating sufficient daylighting, shadow casting, privacy, cross ventilation, and protection from rain. These arrangements are important considerations in creating a modern ornamental facade that is functional and is porous with filigree appearances. These blocks create a patterned facade that gives an overall aesthetic outcome of a unique visual rhythm which is enticing and delightful to the eye. This simple ventilation modular block has the ability to create a strong visual impact from afar and creates a new language of its own when arranged together. The creativity of the block designers as well as building designers are displayed on how they use the ventilation block that creates both visually ornate screen wall and comfortable internal spaces.

3.3. The Decline and Rise of Ventilation Blocks Applications

There was a decline in the application of ventilation

blocks with the arrival of the International style and modern technology that enables the usage of glass or steel curtain walls (Fig. 3). This was also equipped with the introduction of air-conditioning units that makes living comfortable behind these glass walls in hot and humid tropical climate. Ventilation blocks were considered irrelevant, and glass or steel curtain walls were in favour as a sign of being a modern and progressive nation. In recent years, with the increase of awareness of global warming, local architects have challenged themselves in designing spaces that can address this issue passively. More contemporary buildings are using ventilation blocks at a different scale which were becoming a new trend in both interior and exterior features. There are far more available modular ventilation block designs for building designers to choose from now which makes it more plausible for more new ornamental ventilation wall designs to happen.

4. INNOVATIVE REINTERPRETATIONS OF VENTILATION BLOCKS IN CONTEMPORARY ARCHITECTURE

Innovation of ventilation blocks recapture the essence of traditional forms of buildings. By merging traditional principles with modern building technologies, it reinterprets the traditional ventilation blocks. The Interplay of light and shadow gives a phenomenal effect to the space. This encourages a new wave of designers in constructing modular ventilation blocks made from available materials such as concrete or newly available materials that pushes the limits beyond the conventional building methodologies.

With the advancement of new technologies, new designs can be achieved with its boundaries redefined such as exploration with different materials and technologies (Fig. 4). New construction and manufacturing processes have made the return of ornamentation economically viable which enables new types of ventilation blocks to be conceived. Digital soft-

ware have enabled new form finding method that can simulate the images and performances of these blocks and made reinvention of ventilation block possible. New machines can not only mass-produce these blocks but can be geared towards mass-customisation, which may lead to a new reading of ornamentation. New systems of production have opened up possibilities and may lead to an abundance of new conceptual and aesthetic possibilities.

REFERENCES

- CHEAH, Khai Kid & MOHD RASDI, Mohd Tajuddin, *Western Ornaments and Malaysian Architecture*, Kuala Lumpur, Dewan Bahasa dan Pustaka, 2015.
- MOHD RASDI, Mohd Tajuddin, *The Architectural Heritage of the Malay World: The Traditional Houses*, Johor Bahru, Penerbit UTM, 2005.
- LIM, Jee Yuan, *The Malay House: Rediscovering Malaysia's Indigenous Shelter System*, Kuala Lumpur, Institut Masyarakat, 1991.
- SCHATZ, Florian, *Casting Architecture: Ventilation Blocks*, Singapore, Centre for Advanced Studies (CASA) at Department of Architecture National University of Singapore, 2014.
- NORDIN, Norhaslin, ISMAIL, Muhammad Azzam, & MOHD ARIFFIN, Ati Rosemary, "Ventilation Blocks: Design Feature in Malaysia Public Schools", *Journal of Design and Built Environment*, Kuala Lumpur, 2019.
- DENAN, Zuraina ABDUL MAJID, Noor Hanita, & ARIFIN, Norazah, "Ingenious Malay Wood Carving as Daylight Filtering Devices", *Procedia Social and Behavioral Sciences*, Kuala Lumpur, 2015.
- ZWAIN, Akram & BAHAUDDIN, Azizi, "The Sustainable Architectural Values of Eclectic Style Shophouses Case Study: Sun Yat Sen Museum Penang, Malaysia", *Panggun*, Kuala Lumpur, 2017.
- ZWAIN, Akram & BAHAUDDIN, Azizi, "The Traditional Courtyard Architectural Components of Eclectic Style Shophouses, George Town, Penang", *International Transaction Journal of Engineering, Management, & Applied Sciences & Technologies*, Penang, 2017.
- "The Influence of a Multicultural Society on Penang's Architecture", accessed on June 25, 2013, <https://www.expatgo.com/my/2013/06/25/the-influence-of-a-multicultural-society-on-penangs-architecture/>.

NOTES

- 1 Mohd Tajuddin Mohd Rasdi, "Detailing and Craftsmanship", *From the The Architectural Heritage of the Malay World: The Traditional Houses*, Johor Bahru, Penerbit UTM, 2005, 51–54.
- 2 "The Influence of a Multicultural Society on Penang's Architecture", accessed on June 25, 2013, <https://www.expatgo.com/my/2013/06/25/the-influence-of-a-multicultural-society-on-penangs-architecture/>.
- 3 Akram Zwain, "The Traditional Courtyard Architectural Components of Eclectic Style Shophouses, George Town, Penang", Penang, *International Transaction Journal of Engineering, Management, & Applied Sciences & Technologies*, 2017, 74.
- 4 Chee Kien Lai, "Ventilation Blocks and Their Use in Southeast Asia", *From Casting Architecture: Ventilation Blocks*, Singapore, 2013, 25.

Session 4-d

BRIDGING THE GAP: LARGE-SPAN CONSTRUCTION AS A PHENOMENON OF INTERNATIONAL EXCHANGE

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This session is a celebration of the development of the large-span structure in the post-war Modern Movement. DOCOMOMO veteran Hugo Segawa and Juliana Suzuki, both from Brazil, explore the particularities of the diffusion of European ideas on modernity, in contrast to Latin American concepts of modernization in regards of the socio-economic growth of the post-World War II years. They illustrate how Latin American architects and engineers proposed an alternative building system for large spans that helped Brazilian expansion in the 1970-80s. The fabulous works of Eladio Dieste and Eugenio Montañez are a case in point.

Saikaku Toyokawa and Mariko Fujioka focus on the seminal role of the German theoretic Curt Siegel in the conception of the 1964 Olympic Yoyogi Stadium in Tokyo, designed in close cooperation between the architect Kenzo Tange and structural engineers Yoshikatsu Tsuboi and Mamoru Kawaguchi. This is even more fascinating in view of the fact that the Yoyogi stadiums are now again used for the 2020+1 Olympics, underlining the sustainable character of the present Olympic Games.

Chijeng Kuo explores the intriguing search for the right and feasible construction for the double conoid shell roofs of the Luce Chapel in Taiwan. From traditional timber construction, through a steel skeleton concept brought in by the local shipbuilding industry, to the reinforced concrete shell construction finally chosen as suggested by American engineers. It shows how the final appearance of architecture is not always determined by the architect's lofty thoughts, but just as much by everyday concerns about getting things done – in this case, even in an international context.

Monica Aguiar and Marcos Favero conclude by addressing the works of Oscar Niemeyer, resulting in the smooth and 'boneless' architectural forms as displayed in the Nitcróy Arts Museum.

The analyses of these projects present evidence of the struggle to find the proper choice of material and construction that would express the modernity of a large-span structure while being affordable and available under the local condition, often relying on foreign consultancies. Such conditions were sometimes far from self-evident after the Second World War and the persistence of the pioneers-of-the-large-span must therefore be appreciated even more. And what great and wonderful structures they have brought us!



BEYOND TECHNICAL RESTRICTIONS: A DOCUMENTARY REVIEW ABOUT THE STRUCTURAL FORMATION OF LUCE MEMORIAL CHAPEL'S CONOID SHELLS

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ABSTRACT.

Luce Memorial Chapel (1963), designed by Pritzker-winner I. M. Pei — a notable early work in his career — and completed by architect and artist C. K. Chen in 1963, had designated on the list of Taiwan's National Monument on 2019. Having been noted for its special Conoid-like reinforced concrete Shells about the 1950–60s, however, it was scarcely aware that the Chapel had a series of structural trial between timber structures, steel bones, and reinforced concretes. When the preliminary design with some drawings published at “Architectural Record” and “Architectural Forum” at 1956, the four shells were still supposed to construct by timber meshes with indigenous Taiwan's superior wood Hi-no-ki. Then international structural consultant Roberts and Schaffer at New York was appointed to initiate studies about steels bones. Nevertheless, finally the Chapel was approved by Luce Foundation and the United Board of Christian Higher Education at Asia to be constructed by reinforced concrete which is developed by C. K. Chen under the assistance of a genius structural engineer H. S. Fong at Taiwan.

Reviewing with archives of personal letters, drafts, and drawings, this paper tried to restore this iconic building back to the historical context of American-Aid period of Post-War Taiwan to figure out why and how reinforced concrete should be chosen and verified to be the most rational solution to Luce Chapel. In terms of cultural significance for modern building conservation and transplanting of modernism, the paper would also like to go beyond the technical and material restrictions to re-identify Luce Memorial Chapel's milestone status to Taiwan.

1. PREFACE AND PROBLEMATIC

Luce Memorial Chapel, noted for its special Conoid-like reinforced concrete Shells, is the newest modern heritage listed as Taiwan's National Monument as of 2019. However, before finishing by reinforced concrete, it was scarcely aware that the Chapel had went through series of structural trial. When I. M. Pei (abbreviated ‘Pei’ later) was appointed by the Luce Foundation to design the Chapel, the international structural engineering consultant Roberts and Schaffer at New York (abbreviated ‘RS’ later) was also invited to approve the timber structure and initiated studies of steel bones. Reviewing the preliminary drawings published on *Architectural Record* and *Architectural Forum*, they recommended the chapel to be built of wood. However, the Chapel was approved by Luce Foundation and the United Board of Christian Higher Education at Asia (abbreviated ‘UB’ later) to be constructed by reinforced concrete, which is developed by Chi-Kwan Chen (following the form of address in the letters, abbreviated ‘Chen’ later) under the assistance of structural engineer Ho-Shang Fong (abbreviated ‘Fong’ later) at Taiwan.

Through reviewing the archives of personal letters, drafts, and drawings and tracing the historical context of American-Aid period of Post-War Taiwan during the 1950–60s, the paper tried to figure out ‘why and how reinforced concrete should be verified the most rational solution to Luce Chapel?’, and re-identify the cultural significance for modern building conservation through documentation.

2. STRUCTURAL FORMATION OF LUCE CHAPEL

2.1. The First Trial for Wood

The design of Luce Chapel was initiated at 1956 by I. M. Pei, Chen, and Chang-Kang Chang (abbreviated ‘Chang’ later) through a model which looked like an inverted wooden boat made of sticks done by Chen. Therefore, the chapel was supposed to be a wood structure at the beginning, which Chen and Chang were both requested to develop. Several months later, a rhombus plan with four Conoid shell walls stands on the four edges of a diamond-shaped plan had been decided with preliminary drawings of plans, sections, elevations and figures in perspective finished. Attempting to take the lead in Conoid shell design, Pei, the appointed architect by UB, soon urged Chen to publish at both *Architectural Forum* (1957/03) and *Architectural Record* (1957/08). However, among the other unpublished drawings and drafts, there were only two drawings dealing with the structural system and construction details of wood.

The details of the structural drawing showed four Conoid shells each of which was composed of timber frames, which crossed in oblique stance to form a wooden grid. Every oblique grids had its own specific shapes made for jointing to other grids and fit for curvature of the Conoid shell. The shapes were secured by wood slabs nailed diagonally on two sides of each grid which intersected in 90 degrees. On the interior and exterior surfaces of these diagonal wood slabs, layers of horizontal Hinoki¹ boards were paved for covering (Fig. 1).

Without any values of degrees shown on these drawing,

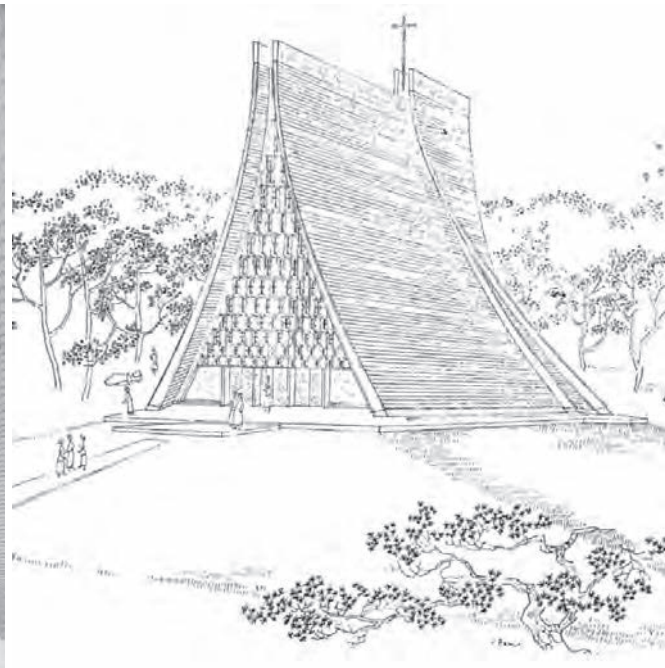
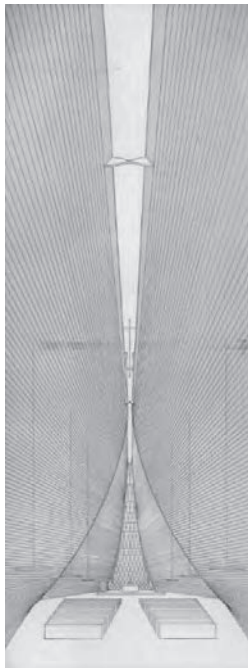


Fig. 1. Images published at Architectural Forum (1957/03) & Architectural Record (1957/08). ©Fumei Lin.

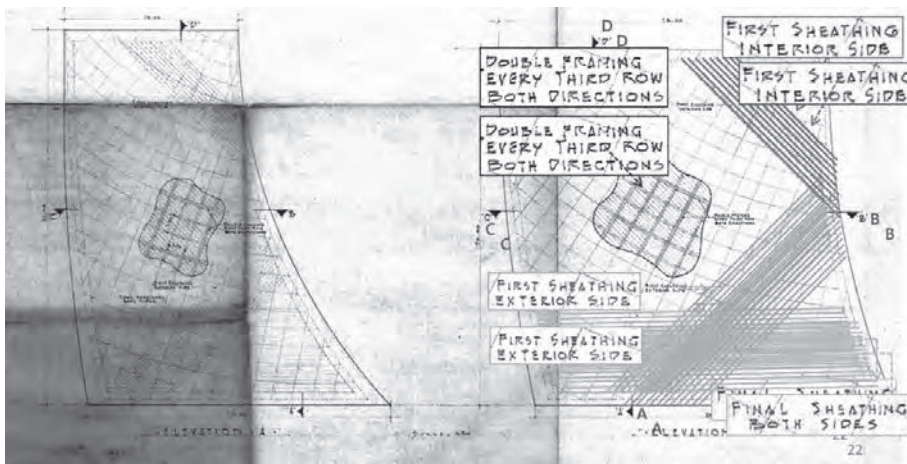


Fig. 2. illustrations for wood frame (source: *The Campus Buildings' Archives* stored at the General Affairs Office, Tunghai University). © Tung-hai University.

the scheme seemed to be just an immature grope which tried to have the Conoid shell take its shape, not to say the correspondence between the grid pattern and geometrical principals made for composing the Conoid shell; neither did it speculate to transfer the stress and moment caused by wind, earthquake, and the weight itself. Accordingly, the drawings could provide nothing re-calculable and verifiable but a set of amazing scale of wood section, 100x60cm/85x-60cm for the curved vertical edges and 65x52cm/75x62cm for straight horizontal edges, set for strengthening the shells' rigidity. However, with height over 18 meters, the eight vertical-curved edges could only be composed by several straight Hinoki columns jointing with tenons. To confirming its

strength and rigidity, Chen and Chang envisaged to have curved steel H-columns replacing the wooden edges, or to have the eight assembled curved wood edges each reinforced by clipping with a curved steel H-column. That compelled Chen to ask for consultancy to his schoolmate, Dahwai Wu, who worked as chief-manager at a national dockyard and got the answer which recommending to have each H-column delivered to the construction site in its whole length to avoid deformation. Nevertheless, H-columns over 18 meters in length could not be delivered by train because there were series of tunnels between Keelung and Taichung which long curved steel bars could not pass through (Fig. 2).

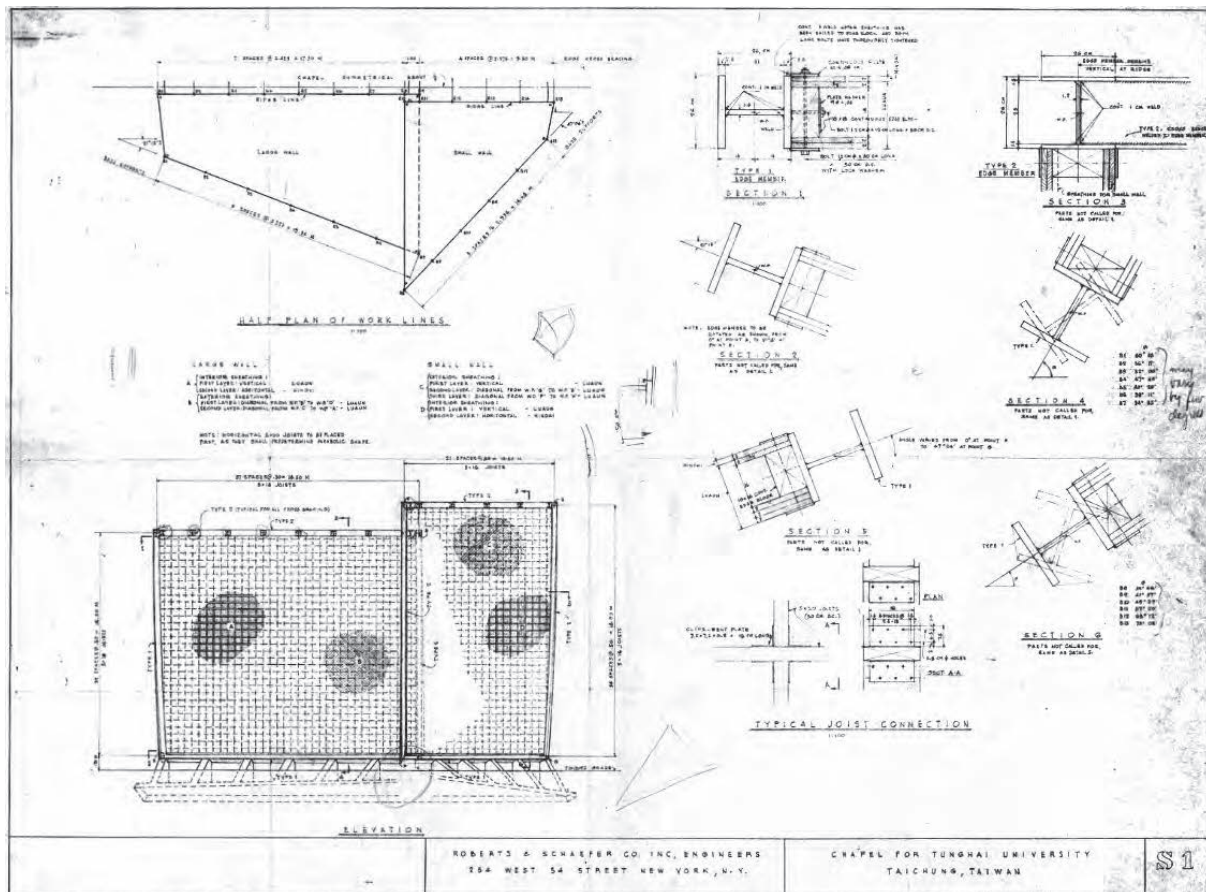


Fig. 3. Drawings for steel frame (source: *The Campus Buildings' Archives* stored at the General Affairs Office, Tunghai University). © Tunghai University.

What Wu reminded was a crucial concern for Taiwan to construct such kind of Conoid Shells around the 1950–60s. Actually, post WWII Taiwan was capable of “bending” steel bars for keels making in shipbuilding. That’s why there were two quotations made by two Taiwanese shipyards, 13,888 USD by the Ingalls² and 23,222 USD by the Taiwan Machinery Factory, in Luce Chapel’s archives dated November 1958. However, both quotations exceeded the pre-estimated amount of 50,000 USD totally suggested to UB when the drawings of wooden structure just finished. Assuming reinforcement with steel was the necessity and leading to over-budget, Luce Foundation gave up the wood trial on January 1959 but with another trial for utilizing steel at New York still proceeding.

2.2. The Simultaneous Trial for Steel Structure

There are five sheets of drawings for steel frame by RS in the archives as the only evidence that steel frame had ever been tried, however, no clues within letters between Pei, Priest,³ Fenn,⁴ Ferguson,⁵ and Luce Foundation could clarify when and why Pei initiated another trial for steel separately

at NY by RS. But according to the letter from Ferguson to Priest which inferred ‘estimate of costs 1. with steel frame, and 1. with wood frame.’ at January 1958, and another letter from Priest to Chen ‘to use the steel frame as original proposed’ at the next January, the two trial assumed to co-exist for one year at least. Comparing to the drawings for wood structure, the most apparent difference for steel trial is the details shown for describing how the H-columns could be twisted along with theirs bending. It meant the geometric orders had been taken into account by RS for structural calculation and verification.

Geometrically, Luce Chapel got its iconic feature by the four Conoid shells, which was composed by a set of simple but clear orders:

- The two vertical-curved edges of each shell had its own parabola formula.
- To connect with a straight horizontal line at any height on both parabola curve, from bottom to top integrally, could form the proposing Conoid Shell.
- To Pair the four Conoid shells with hierarchy, the higher but shorter pair defines the platform with trapezoid

shape; another larger trapezoid space under the lower but longer pair is where the audience sits.

- D. Standing on the paired edges of the chapel's rhombus plan, pairs of straight horizontal lines ended on top by two parallel lines opened for skylight.
- E. The east and west side of the rhombus plan was cut to have openings for daylight and entrance.

Different from extrusion for Aluminium, iron bars were made-to-order by welding three or four iron slabs together. Along the parabola line the iron bars must weld iron slabs section by section to fit the curvature. For curvature-fitting, the iron members of the shells' curved edges should be twisted along with bending simultaneously, which made for connecting with horizontal straight lines directly; any straight horizontal section iron bars have to be twisted with angular variation either. Subsequently, welding or soldering techniques played crucially to the steel trial (Fig. 3).

To Pei, key concerns emerged:

- A. Was Taiwan capable of made-to-order section iron bars with conformity to sharp drawings RS provided? Or the steel frames should be made at qualified iron works at USA or Japan and ship to Taiwan
- B. How could the curved frames transport to the construction site with its whole body? Or alternatively, should be dismembered and welded right at the construction site with conformity?
- C. No matter Taiwan, USA or Japan, estimated cost was the crucial concern.

However, Pei's decision-making process is hard to trace. One could just assume that when Chen was informed the wood trial had been stopped on Jan 31 1959, the steel trial was still proceeding and informed to stop on March 26 1959. Accordingly, it could be inferred that Pei appointed Chen and Chang to cooperate at Taiwan for the wood trial, but its structural assessment and verification was appointed to RS at New York. Even RS had never rejected the wood scheme in written format, but the extra cost of reinforced steel for wood trial meant RS had less confidence in wood structure and would rather to initiate a new structural trial in steel only. That's why both trial were in progress separately at Taichung and New York from 1958 simultaneously.

Wu's reminding to Chen in 1958 which only cautioned train delivering meant, to Wu, such techniques for made-to-order steel-processing is available at Keelung. Furthermore, the shipbuilding histories of Taiwan also demonstrated that from the colonized period Taiwan was capable of steel shipbuilding at Keelung, including bending for keels. During WWII, increasing demands for ammunition pushed USA to output key techniques in welding/soldering to private enterprise and greatly cost down these techniques. The military alliance between ROC and USA during war times favoured ROC with opportunities to send qualified technical staff to USA to learn these new techniques and import back to mainland China, then to Taiwan after 1949. But even though crucial techniques for steel frames were available at Taiwan,

it seemed to be ignored within the critical year from 1958–9. When frequent communication between Fenn, Tsai, Pei and Chen, over-budget emerged as the crucial concern for Luce Foundation and UB until they decided to suspend the whole project. Pei definitely had confidence in RS and had guaranteed to Tsai that RS had sufficient experience to construct Conoid shells at USA.⁶ Moreover, the wood and steel schemes both had to cover the structure with wood skin interiorly and exteriorly. It not only increased the construction cost which led to project suspending,⁷ but also opposed the tendency of modern architecture which inclined to expose the tectonic authenticities of the revolutionary material, structure system, or construction methods which had been pioneeringly explored in this building.

Chen concluded the failure of the steel trial: "First, the engineers of RS were unfamiliar with construction situation at Taiwan and lacked the necessary confidence to local capability to build the chapel, including using the reinforced concrete. Second, RS would rather to ignore the possibilities for reinforced concrete because the drastic change in construction should compelled them to re-calculate the construction cost; However, the commission fee for RS is so high that RS assumed another trial for reinforced concrete is unaffordable to the original commission fee. It is impossible to activate the third trial for reinforced concrete".⁸ Chen knew if only reinforced concrete could take into account, or the chapel is unable to be built.

2.3. The Practice of Reinforced Concrete

Fortunately, Chen did not involve the steel trial. No sooner than he knew the steel H-columns added for reinforcement for wood trial would lead to over-budget, he had initiated another trial for reinforced concrete without Pei's approval in 1959. The key transition happened when a talented structural engineer Ho-sang Fong was introduced to Chen by Da-hong Wang, classmate of Pei and another Chinese student of Gropius. It's Fong's participation launched the third construction trial for reinforced concrete.

By July 1959, the reinforced concrete scheme had confirmed possible by Fong. Chen and Chang made a report to Pei and the lower cost seemed to be more than attractive to Pei.⁹ Without extra wooden skins made for covering the structure, a great amount of budget had been saved. Accordingly, Pei admired the "purification" of the reinforced concrete trial to be *'more "pure" than the composite use of wood and steel'*.¹⁰

Actually, When Fong involved, RS still under appointment for structural design and verification. Pei encountered work ethics problems of double appointment: there seemed to be two structural engineers appointed. However, the delay caused by the steel trial and over-budget had made Luce Foundation to query the possibilities to build this chapel in such a unique style. They hired the J.G. White Co. as the third sector to supervise all paper works from Pei and RS.¹¹ Accordingly, President Wu and Pei decided to delay the initi-

By scaffolding, the Reinforced Concrete scheme followed the geometric orders which composing the Conoid shells to locate all the critical points 'in the air'

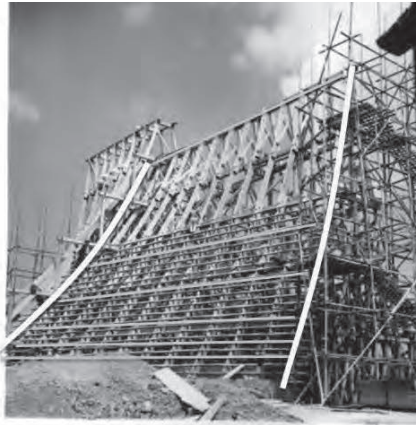


Fig. 4. The scaffolding of Luce Chapel. © Tunghai University.

ation of the reinforced concrete trial until October 1960.

Free from time pressure and the supervisions from RS, the time from late September 1959 to October 1960 was a very crucial period for Chen and Fong to go through a thorough fresh trial for reinforced concrete with the highest autonomy. Until the formal new re-initiation on October 14th, 1960, modified plans including the chaplain's offices at the basement was submitted and assumed to be a very positive strategy to convinced Luce Foundation that everything had been taken into account which was just waiting for re-activating. By spring 1961, a re-modified proposal with higher integrity but estimated under 100,000 USD got the final approval by Fenn, Wu and Chairman Tsai of the Board.¹² Luce Foundation soon decided to re-activate Luce Chapel project by reinforced concrete formally.

To any 'unusual' forms like the four Conoid shells for Luce Chapel, the most difficult but crucial challenge is to set out the critical points 'in the air' with accuracy to have the shells 'take its shape' physically. During the wood and steel trials, Chen, Pei, and RS all resorted to 'factory-made' to fit curvature with conformity of these shells. Nevertheless, made-to-order often meant budget-increased and raised extra issues like 'where to order?' and 'how could be transported?' Fong's formal participation did really make great progress in mastering the geometric orders of the four Conoid shells. Cooperating with Chen's practical working experience locally at Taiwan after the mid-1950s, they were more familiar with the capability and capacity of local construction companies and artisans than RS. Subsequently, the fundamental geometric orders for composing single Conoid shells were applied not only to the mark-up of the eight parabola edges of the shells,¹³ but also to the hierarchical scaffoldings made for having the Conoid shell taking their shape geometrically (Fig. 4).

In structural terms, Fong defined the four Conoid shells were not 'shell' itself. It was just 'shell-like' and would rather to be categorized as a curved 'gridwork girder' system, which transformed to be rhombus gridwork. As the lowest grid

was stronger and the higher slimmer, the structural rationale also intensified its visual effect to have the interior space looked more far-reaching and got the approximation of gothic churches' interior scenery with all the ribs of the rhombus gridworks exposed. Confronting the earthquake damage, pairs of Conoid shells jointed by several reinforced concrete hinges to retain the flexibilities, with four shells firmly jointed by a strongest beam which was 1.8 meters in depth to a short span of 1.2 meters. The fixed joint where the cross stand was also the focal point to have the four Conoid shells firm enough to against earthquake.

3. CONCLUSION

Through the documentary review which traced the unique structural decision-making process of Luce Chapel to the historical context of American-Aid period at Post-War Taiwan, the paper concluded: not only Luce Chapel, but also the whole Tunghai University campus buildings before the 1960s all witnessed what happened when the advanced West encountered the developing East. Not just by financial aid, institutional and technical assistance were another significant issues during the encountering. However, for modern architectural practice, even groups of well-disciplined professionals could be missioned, new instruments and techniques be imported and the defining artistic forms of the 20th century be implemented only when construction artisans, building materials and, most significantly, the intentions to conquer missions which seemed impossible at the beginning were available locally. Luce Chapel was definitely a great challenge to the local building societies of Taiwan during the 1950–60s. The cutting-edge building materials and structural systems that defined the modern movement were represented in its innovative forms by Pei's group. Being less familiar with local capacity, especially of the novel construction techniques to have the four Conoid shells take shape, Pei's team had ever resorted to pre-fabricating the crucial parts at ironworks and delivered to the

construction site for conformity. Nevertheless, the first two trials both exceeded the budget and compelled the project to be suspended, which drastically gave the local working group supervised by Chen and Fong to get sufficient time to explore the utmost capability and capacity of the locals to implement the innovative but experimental task. Luce Chapel not only demonstrated the artistic performance defining modern architecture of the 20th century in Taiwan, but also is a milestone to remind us: issues regarding transplanting the modern movements in architecture always deserve our further research towards documentation.

REFERENCES

- Editorial Board of School History, *Breeze of Tunghai-Special Issue of Tunghai University's 40th anniversary*, Taichung, Tunghai University Press, 1995.
 Editorial Board of School History, *School History of Tunghai University's 50th anniversary*, Taichung, Tunghai University Press, 2006.
 CHI-KWAN, Chen, *Brief Introduction about the Design and Construction of Luce Chapel-special issue for completion*, Taichung, Tunghai University.
 SHI-WEI, Lo, *Readers for 'Special Topics for Construction of Modern Architecture at Taiwan' Course*, Taichung, Tunghai University, 1997.
 Archives of the United Board for Christian Higher Education in Asia (Record for Tunghai University), New Haven, Yale Divinity Library.
 KIM Report online Library, "The Conservation Research Project of Luce Memorial Chapel", 2018, <http://blogs.getty.edu/iris/conservation-and-technical-reports-for-modern-buildings-now-freely-available-online/>.

NOTES

- 1 Precious Cupressaceae wood only exist at Taiwan.
- 2 Ingalls Taiwan Shipbuilding and Dockyard Company.
- 3 Elsie Priest, Chief Accountant and Dean of General Affairs of Tunghai University between 1955–61.
- 4 William P. Fenn, a former missionary educator who worked as general secretary of UB from 1946–70.
- 5 Mary Esther Ferguson, vice general secretary of UB from 1950–60.
- 6 1959/3/23 Pei to Tsai.
- 7 1959/3/31 Pei to Chen : Luce Foundation 'had decided against building the chapel'.
- 8 There is an manuscript unloaded date entitled "the story for the Building of Luce Memorial Chapel" written by Chen inside the UB archive.
- 9 Fong declared there should be 22,000 USD saved for reinforced concrete.
- 10 1959/09/03 Pei to Chen and Chang.
- 11 1959/09/16 President Wu The-yao to Ferguson and Fenn.
- 12 The domestic Board of Tunghai University.
- 13 Autumn 1996, interview with Mr. Wu (the boss of the construction company of Luce Chapel).

EFFORTS TO BUILD SPACE STRUCTURES BY TANGE AND TSUBOI

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ABSTRACT.

The proposition of “functional beauty” has been continuously argued since the birth of modern architecture. Curt Siegel, a German architect and engineer, believed that functional modern architecture becomes beautiful when its art and techniques are integrated. Siegel named the form created through such integration and modern construction technology “Strukturformen”. This kind of integration can be realized only by close coordination between architects and structural engineers.

This study first discusses how “Strukturformen” was realized in the 1950s in Japan by focusing on the coordination between the architect Kenzo Tange and structural engineer Yoshikatsu Tsuboi, and demonstrates how their relationship became the model for collaboration between architects and engineers in post-war Japan. Next the opinions with which Tsuboi agreed in *Strukturformen der Modernen Architektur* written by Siegel in 1960 is examined by comparing Siegel’s book and the basic design instructions of Yoyogi National Stadium completed in 1962 by Tsuboi and Mamoru Kawaguchi, who worked under Tsuboi. It is hypothesized that Tsuboi and Kawaguchi referred to Siegel’s book during the basic design of Yoyogi National Stadium, especially its roof structure. In addition, Kawaguchi’s article written after the completion of Yoyogi stadium is investigated. The article compares shell structures and suspension structures around the world and points out the distinctiveness of Yoyogi National Stadium from an international perspective.

1. OVERVIEW

The proposition of “functional beauty” has been continuously argued since the birth of modern architecture. Curt Siegel, a German architect and engineer, believed that functional modern architecture becomes beautiful when its art and techniques are integrated. Siegel named the form created through such integration and modern construction technology “Strukturformen”. This kind of integration can be realized only by close coordination between architects and structural engineers.

This study first discusses how Strukturformen were realized in the 1950s in Japan by focusing on the collaboration of Kenzo Tange, an architect, and Yoshikatsu Tsuboi, a structural engineer. It also examines opinions with which Tsuboi agreed in *Strukturformen der Modernen Architektur*, written by Siegel in 1960, by comparing Siegel’s book and the basic design of Yoyogi National Stadium (“Yoyogi”) completed by Tsuboi and Mamoru Kawaguchi, who worked under Tsuboi. After the completion of Yoyogi, Kawaguchi emphasized Yoyogi’s distinctiveness by evaluating shell structures and suspension structures in the world.

2. EFFORTS TO ACHIEVE LARGE INTERIOR SPACE BY TANGE AND TSUBOI

2.1. Hiroshima Children’s Library (Hiroshima, Japan, 1948) and Ehime Prefectural Hall (Matsuyama, Japan, 1953)

In 1948, three years after the atomic bombing in Hiroshima, Tange used a rib-reinforced shell structure in a competition proposal for the Hiroshima Memorial Cathedral for World Peace. He expressed in his proposal the view that shell structures unique to modern construction techniques which merge both rationality and economic efficiency also

resonate with one’s soul.

Tange’s expectations for shell structures were realized through collaboration with Tsuboi. In the 1950s, Tange was asked to design a children’s centre in the bank of Ota river in Hiroshima. The initial idea was a two-story library with a circular shape and conventional design. However, based on Tsuboi’s advice, he adopted a circular 20m-diameter shell structure. Its shape resembles a funnel or morning glory. Tsuboi interpreted this shape as a combination of three parts — a cone in the upper section, a cylinder in the middle, and a column at the bottom — and applied structural analysis using membrane theory. It was finally completed as Hiroshima Children’s Library in 1952.

In 1953, Tange together with Tsuboi completed Ehime Prefectural Hall, built for the National Athletic Meeting. It had a 50m-diameter shell structure, with a shape resembling a sphere-shaped structure with a part cut-off. Initially, Tange proposed various shapes for the roof, including a sea-shell shape, but Tsuboi advised that since no roof of such a large size had been realized in Japan, they must first concentrate on realizing a simple shape that could be expressed by a simple equation. Based on this advice, Tange decided to adopt a simple design.¹ The shell thickness is not uniform. The thickest part is 70cm, and the thinnest is 12cm. Tsuboi made a 1:20 scale mortar model, which demonstrated that the shell was more robust than expected.

2.2. Congress Hall in Shizuoka (Shizuoka, Japan, 1957)

In 1957, Tange and Tsuboi completed the Congress Hall in Shizuoka (Sunpu kaikan), which has a square shape. Its roof is an RC hyperbolic paraboloid (HP) shell, with a side length of 54m. At the initial design stage, Tange desired to achieve a large-scale roof with only two short columns and no walls. However, in the actual construction, long folded

walls were provided to support the edge beams at the roof ends. Their purpose was to limit vertical displacement of the edge beams to prevent excessive stress on the roof and to resist lateral vibration from earthquakes. Tange recalled later that the long folded walls and shell were not well integrated in this design.² Regarding the interior of the building, the many ribs provided for the ceiling generated a different impression than that of Ehime Prefectural Hall.

Following its completion, accidents occurred in which concrete pieces of the shell fell down. Several factors were pointed out: the construction period was too short, the pipes in the scaffolding for the shell formworks were deformed in the process of making the shell due to raw concrete being poured in bulk all at once, and insufficient casting of the shell concrete due to rain.³

2.3. Totsuka Country Club House (Totsuka, Japan, 1961)

Totsuka Country Club House is composed of the main building (3400m²), accommodating a lounge, dining hall, and locker room and a separate building (1400m²), accommodating a shower room and machinery room. At the initial design stage, in valuing the interior view, Tange considered a large roof with a triangular shape. To realize it, Tsuboi proposed two ideas. One was a plan to combine multiple HP shells, while another was to provide one large wall in the middle of the roof to achieve a simple and beautiful ceiling. The design process proceeded based on the latter idea, but functional considerations of the club house building led to the decision that a rectangular shaped roof using a reversed cylindrical shell was more appropriate.

At the time, although such a roof had already been seen in many other buildings, Tsuboi set upon himself three tasks in achieving it: how to minimize the number of columns, how to deal with risk of cracking due to the cylinder being reversed, and how to resist earthquakes.

As a result, the roof slab of the reversed cylindrical shell was supported by six columns. Its size was 30m wide and 77m long, with a thickness of 17cm on average where the thinnest part was 12cm.

The idea of combining multiple HP shells was later realized in the design of Tokyo Cathedral. For this building, Tange and Tsuboi combined eight HP shells, demonstrating a new possibilities for concrete shell structures by covering it with stainless steel.

3. UNDERSTANDING TECHNIQUES TO ACHIEVE LARGE INTERIOR SPACE

3.1. *Strukturformen in Modernen Architektur* by Curt Siegel

Strukturformen der modernen Architektur, written by Curt Siegel, was published in Germany in 1960, and its Japanese translation was published in 1967. In the foreword to the translated Japanese version, Siegel points out that historically, discussion of the relationship between building

form and structure had been limited to specific cultural areas and specific periods, but that structural techniques in the 20th century would not be subject to manual skills, geographical limitations on the use of materials, or cultural area.⁴ Tsuboi agreed with Siegel and insisted that architects who lacked wide knowledge of technology, scholars who took interest only in numerical formulas but not in their realization, and engineers who would not try to go beyond established structural theory would not be able to contribute to the development of “Strukturformen”.⁵

Siegel's book is composed of three chapters on skeleton construction, v-shaped supports, and space structures. Siegel selected the Seagram Building (New York, U.S.A., 1958, Ludwig Mies van der Rohe) as a representative example of skeleton construction and Unité d'Habitation (Marseille, France, 1952, Le Corbusier) as a representative example of v-shaped supports. Space structures were classified into four types: space frames, folded plates, shell structures, and suspended roof structures. Shell structures are further classified into the following five types with examples.

- Cylindrical shells: Shells arranged in a double fan to form an auditorium roof (location and year of completion: unknown, architect: W.Gropius; engineers: P. Weidlinger and M. Salvadori)
- Shells of revolution: Ehime Prefectural Hall, Ehime, Japan, 1953 (architect: K.Tange; engineer: Y.Tsuboi)
- Conoids: Canopy of the UNESCO Building, Paris, France, 1958 (architects: M. Breuer, B. Zehrfuss; engineer: P. Nelvi)
- HP shells: Congress Hall in Shizuoka, Shizuoka, Japan, 1957 (architect: K. Tange; engineer: Y. Tsuboi)
- Free forms: T.W.A. terminal building in Idlewild, New York, U.S.A., 1962 (architect: E. Saarinen; engineers: A.M. and Whitney)

Likewise, Siegel classified suspended roof structures into four types.

- Simple curved suspended roofs: Swimming pool in Wuppertal, Wuppertal, Germany, 1957 (H. Hetzelt)
- Cable systems curved in two mutually opposing directions: Raleigh Arena, North Carolina, U.S.A., 1953 (architect: M. Novicki; engineers: Severud, Elstad, and Krueger)
- Combination of cables and struts: American Pavilion at the 1958 Brussels World Exhibition, Brussels, Belgium, 1958 (E.D. Stone)
- Tents: Tent over a dance floor, Cologne, Germany, 1957 (F. Otto)

As an example of a building influenced by tent structures, he included the Yale University hockey arena (State of Connecticut, U.S.A., 1958, E. Saarinen).

3.2. Basic Design of Yoyogi

The translation of Siegel's book was started by Kawaguchi and his colleagues soon after its publication in 1960 but was suspended because of the construction of Yoyogi. Kenzo Tange, Yoshikatsu Tsuboi, and Uichi Inoue, who was an installation engineer, were appointed as designers of Yoyogi

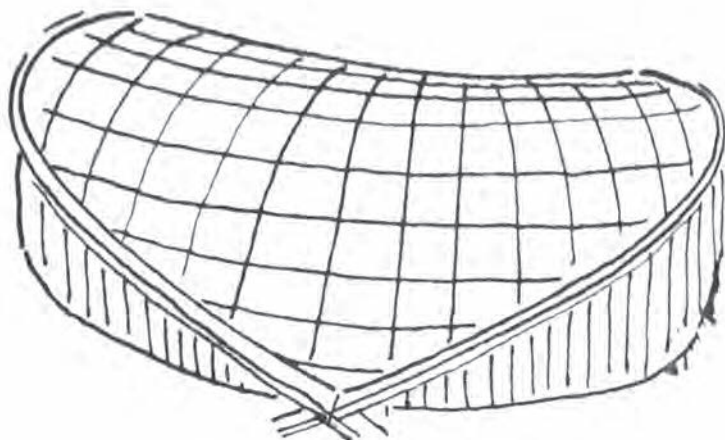


Fig. 1. Double curved suspension roof: Raleigh Arena (M. Novicki) (Source: Kokuritsu Sogokyogijyo Kihonsekkeitosho (Basic Design Instructions of National Gymnasium) written by Tsuboi, Yoshikatsu and Kawaguchi, Mamoru, National Archives of Japan).

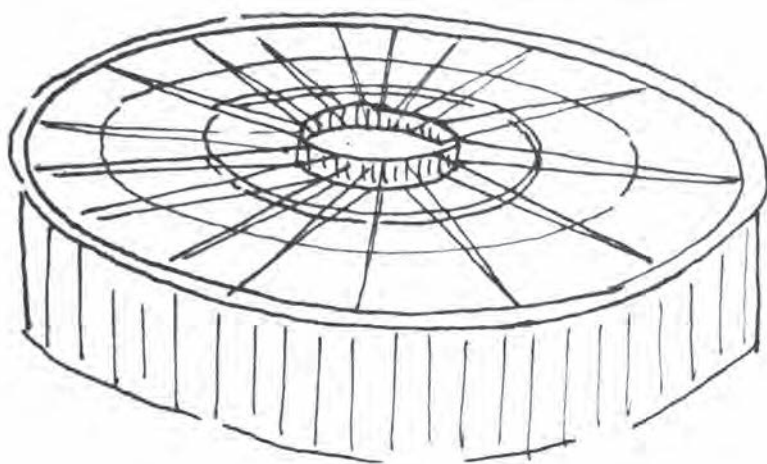


Fig. 2. Radiation pattern: The American Pavilion at the 1958 Brussels World Exhibition (E.D. Stone) (Source: Kokuritsu Sogokyogijyo Kihonsekkeitosho (Basic Design Instructions of National Gymnasium) written by Tsuboi, Yoshikatsu and Kawaguchi, Mamoru, National Archives of Japan).

in the autumn of 1961. The basic design of Yoyogi was completed in March 1962, the construction design was completed in autumn 1962, and the building was completed in August 1964. After its completion, Kawaguchi who had supported Tsuboi resumed the translation work.

Siegel's influence can be found in the basic design instructions of Yoyogi submitted to the Ministry of Education, Science and Culture on March 20th, 1962. In these instructions, Tsuboi and Kawaguchi classified suspended roof structures into seven types with their representative examples:

- 1) Simple curved suspended roof: Swimming pool in Wuppertal and Washington Dulles Airport, Washington, U.S.A., 1962 (E. Saarinen).
- 2) Double curved suspension roof: Raleigh Arena (M. Novicki / Fig. 1).

- 3) Radiation pattern: The American Pavilion at the 1958 Brussels World Exhibition (E.D. Stone / Fig. 2).
- 4) Arch-shaped roof: Yale University hockey arena (E. Saarinen / Fig. 3).
- 5) Pole-supported suspended mesh roof with main cable (not yet realized / Fig. 4).
- 6) Suspended roof: airplane shed in Frankfurt, Frankfurt, Germany, 1961 (E. Kirchner).
- 7) Others: Olympic Stadium in Melbourne, Melbourne, Australia, not completed (H. Seidler).

Types 1)–4) are covered in Siegel's book, and the drawings by Tsuboi and Kawaguchi are similar to Siegel's. On the other hand, 6) and 7) do not exist in Siegel's book, and their information sources are assumed to be overseas architectural journals and information obtained when Tsuboi travelled abroad. It appears that Tsuboi and Kawaguchi gathered in-

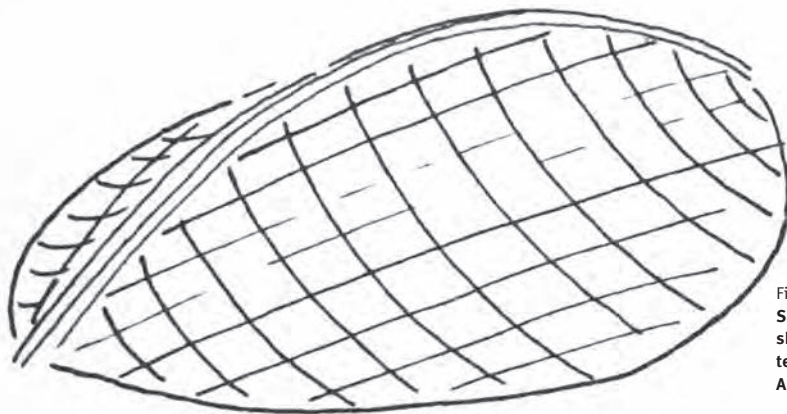


Fig. 3. Arch-shaped roof: Yale University hockey arena (E. Saarinen) (Source: Kokuritsu Sogokyogijyo Kihonsekkeito-sho (Basic Design Instructions of National Gymnasium) written by Tsuboi, Yoshikatsu and Kawaguchi, Mamoru, National Archives of Japan.

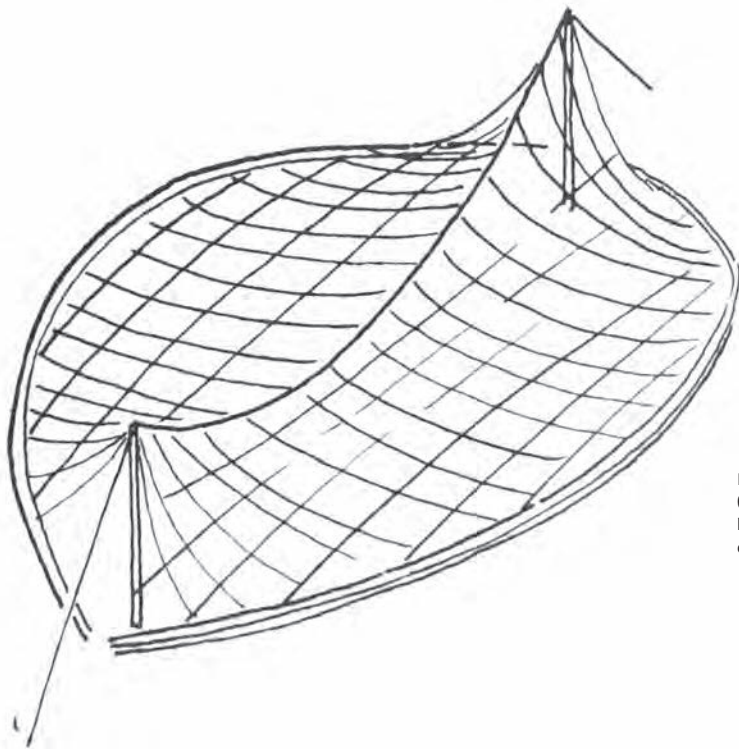


Fig. 4. Pole-supported suspended mesh roof with main cable (not yet realized) (Source: Kokuritsu sogokyogijyo kihonsekkeito-sho (Basic design of national gymnasium), National Archives of Japan.

formation on suspended roof structures in the world from Siegel's book and architectural journals to propose the roof structure of Yoyogi. The study led to the decision to adopt a roof that had not been realized in the world at that time, which was type 5).

Furthermore, they described the design policy for three types of suspended roofs in the instructions: the simple curved suspended roof, the leaf shaped suspended roof, and the pole-supported suspended roof. The pole-supported suspended roof involved a plan employing two poles, a main cable on the ridge between the two poles like a suspension bridge, and a mesh roof stretching from the ridge to the perimeter of the stands to create the roof surface. In contrast to a shell structure, the form of the curved surface of a suspended roof is dynamically created, depending on the physical boundary conditions, applied loads, and applied mesh

pretension. In general, it is impossible to create an arbitrary curved surface due to these physical limitations. Tsuboi stated that with the pole-supported suspended roof, by employing a mechanically feasible curved surface, a structure close to the designer's image for Yoyogi with internal forces within design thresholds could be realized.

3.3. Kawaguchi's Views on Shell Structures and Suspension Structures

After Kawaguchi resumed work on the translation of Siegel's book, he also published an article on prospects of suspension structures in a Japanese architectural journal named *Kokusaikenchiku* in 1966. The first part of the article describes the history and spread of suspension structures. It is pointed out that suspension structures were introduced 40 years later than shell structures, and the 1958 Brussels

World Exhibition provided an opportunity for their promotion.

The latter part provides a comparison between shell structure and suspension structure characteristics. It suggests three aspects for examining the development process of shell structures: changes in physical boundary conditions, combinations of curved surfaces, and liberalization and sophistication of the form of curved surfaces. In the beginning, a shell structure roof was just a simple geometrical shape such as a sphere, and the problem was how to change the boundary condition by cutting off a portion. As an example that combines several basic shaped surfaces, the shell structure roof by F. Candela is given. As an example of a curved surface itself becoming more sophisticated or complex, the Sydney Opera House proposal (Sydney, Australia, 1955, Jorn Utzon) is selected.

In the article, Kawaguchi further explains the historical development of suspension structures in the same manner as that of shell structures through the three aspects. Regarding changes in physical boundary conditions of suspension structures, he classifies structures into simply curved suspension roofs and doubly curved suspension roofs. As representative examples of the former, the swimming pool in Wuppertal and Washington Dulles Airport building are cited, and as representative examples of the latter, Raleigh Arena, North Carolina and the Yale University hockey arena are cited. Next, as an example of combining suspension structures, the French Pavilion at the 1958 Brussels World Exhibition (Brussels, Belgium, 1958, Guillaume Gillet, René Sarger and Jean Prouvé) is given. Yoyogi has been referred to as an example of a suspension structure which has become the most liberalized. In the design of Yoyogi, managing and overcoming the mechanical restrictions on the curved surface was the main issue. Finally, by using suspended steel as sub-cables stretching perpendicularly from the main cable, enough flexural rigidity of the roof structure was attained to obtain the desired curved surface.

Instead of trying to comprehensively treat shell structures and suspended roof structures like Siegel, Kawaguchi compared the differences in shell structures and suspended roof structures by focusing on three aspects (change in boundary condition, combination of curved surfaces, liberalization and sophistication of curved surfaces) in order to highlight the innovative features of Yoyogi.

4. CONCLUSION

Siegel emphasized the collaboration of architects and engineers as a requirement to realize "Strukturformen". The collaboration of Tange and Tsuboi was the role model for "Strukturformen" in post-war Japan. Tange and Tsuboi began to examine the applicability of shell structures by adopting the circle as the basic form for the Ehime Prefectural Hall, the square for the Congress Hall in Shizuoka, and the triangle for the Totsuka country club. In building the

Tokyo Cathedral, they demonstrated the potential of shell structures by using eight HP shell panels and covering the concrete structure with stainless steel.

It was shown that there is a high possibility that Tsuboi and Kawaguchi referred to the book published by Siegel in 1960 when they classified suspended roof structures around the world while writing the basic design instructions for Yoyogi.

Further, based on his own experience of the structural design of Yoyogi, Kawaguchi, in an article, gives an overview of shell structures and suspension structures from a global viewpoint expanding and deepening Siegel's opinions. Having summarized the development process of both structures, he selects the Sydney Opera House proposal by Jorn Utzon as a representative example of a liberalized shell structure curved surface and Yoyogi by Tange and Tsuboi as a practical example of a liberalized suspension structure curved surface.

NOTES

- 1 Kenzo Tange & Yoshikatsu Tsuboi, "Zadankai 'Furui Kozo wo Ryuko ni Shitateru (Roundtable Talk "Making the Conventional Structure 'Fashionable'")", *Kokusai-kenchiku*, July 1957, 22–25.
- 2 Kenzo Tange, "Mugen no Kanousei — Tetsu to Concrete (Infinite Possibilities — Iron and Concrete-)", *Kenchikubunka*, February 1958.
- 3 Saikaku Toyokawa, "Yoshioka Miki Interview (Interview with Miki Yoshioka)", *Tange Kenzo to KENZO TANGE*, Tokyo, Ohmsha, 2003: 282–83.
- 4 Curt Siegel, "Nihonban heno Jyo (Foreword to the Japanese Translation Version)", *Gendaikenchiku no Kozo to Hyogen* (Structure and Expression of Modern Architecture), Mamoru Kawaguchi, et al. (trans.), Tokyo, Shokokusha, 1967, 3.
- 5 Yoshikatsu Tsuboi, "STRUKTURFORMEN no Hoyaku ni Yosete (Message for Publishing the Japanese Translation of Strukturformen)", Curt Siegel, *Gendaikenchiku no Kozo to Hyogen* (Structure and Expression of Modern Architecture), Mamoru Kawaguchi, et al. (trans.), Tokyo, Shokokusha, 1967, 4.

BONELESS ARCHITECTURE: NIEMEYER, CONCRETE, STRUCTURAL ENGINEERING

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ABSTRACT.

As far back as the 1940s, Niemeyer's design expressed a profound understanding of the plastic possibilities of reinforced concrete; this was an insight that few modern architects had achieved by then. The focus here is in an architecture that has been built beyond the parameters established by the concept of independent structure, iconically represented by Le Corbusier's *Dom-ino* system which, by association with the idea of a skeleton, has substantiated modern architecture by liberating form from its constituent structure. The independent structure — its intelligibility and its ability to conduct forces to support points — has been incorporated as a tenet to modern architecture discourse. Throughout his career, Niemeyer was able to rely on the collaboration of structural engineers, such as Joaquim Cardozo, José Carlos Sussekund and Bruno Contarini, in partnerships that promoted the development of reinforced concrete in Brazil, in the fields of structural design and the technological control of concrete. Niemeyer's pre-computer-age choice of complex curves in form development constituted an enormous challenge to then-current paradigms in structural engineering, material technology, and construction. The apex of this trajectory is the Niterói Contemporary Art Museum (1996) which Niemeyer designed alongside Bruno Contarini. This is the project that will be analyzed here, regarding its architectural and structural characteristics as well as its construction process. From the "central support," according to the architect, there emerged a building that consecrates an architecture characterized by a specific formal research that pushes the technical boundaries of knowledge in both reinforced concrete and structural engineering: boneless architecture.

1. INTRODUCTION

In 1936, Oscar Niemeyer was part of the team that designed the Education and Health Ministry building in Rio de Janeiro, with Le Corbusier as a consultant. By then, Emílio Baumgart, a structural engineer who was also in the team, had already designed the structure of "A Noite," a building of Joseph Gire's and Elisário Bahiana's architectural design that was considered to be possibly the tallest reinforced concrete building in the world at that time.¹

By the first quarter of the twentieth century, Brazilian architecture and structural engineering had committed to parameters from modernity, and not long after that, Niemeyer's architecture would become a particular expression of that modernity.

As far back as the 1940s, Niemeyer's "lines" displayed an understanding of the aesthetic, technical and constructive possibilities of reinforced concrete that not many of his peers could match.

Niemeyer explored the material's plasticity in an architecture unrestrained by the guidelines put forth by the modern concept of an independent load-bearing structure, iconically represented by Le Corbusier's *Dom-ino* system which, in association with the idea of a skeleton, proposed to liberate form from its constituent structure. The rationality of the independent structure was incorporated as a tenet of modern architecture discourse, one which Niemeyer in a way subverted, in some of his projects, by merging form and

structure into one single essence.

2. THE SUBVERSION OF THE STRUCTURAL SKELETON

By the early twentieth century, both steel and reinforced concrete were applied in structural systems of unprecedented slenderness and weightlessness. However, it would be a while before the physical-mechanical properties of reinforced concrete would be comprehended. The constructive potential of the material was developed gradually and empirically, mostly in France.

Knowledge of the material's structural properties came about primarily through research by engineers from Germanic cultures. Through prolific experimentation, they found that "the design of concrete structures demanded a thorough understanding of the theoretical basis of structural analysis — much better than what was being learned by young engineers in any other countries."²

By 1904, the Swiss engineer Robert Maillart was exploring the properties of reinforced concrete in buildings whose load-bearing capacity stemmed from material and form, a known principle regarding other materials, but as yet underexplored when it came to reinforced concrete. The material's shaping process and plasticity allowed its use in curved structures such as the shell designed by the Wayss & Freitag Company in Dresden, 1911. It is important to emphasize that circa 1912, this German company was already in business in Brazil, by way of Companhia Construtora em Cimento Ar-

mado. The company was registered in 1924 as Companhia Construtora Nacional.³ This means that German reinforced concrete technology arrived in Brazil early on.

Running counter to Le Corbusier's research, Maillart's experiments with reinforced concrete shells ushered in a new perspective for formal creation in modern architecture, since in this kind of building form and structure are a single essence. In this case, the independent structure — the "skeleton" which liberates form — ceases to exist, hence arising a "boneless architecture."

3. NIEMEYER AND BONELESS ARCHITECTURE

Despite the influence of Corbusian ideas on the development of Brazilian modern architecture, Niemeyer did not subscribe exclusively to those principles, demonstrating a "unique style" since his earliest projects instead.

In designing the Saint Francis of Assisi Church in Pampulha, 1945 by using shells to create a parabolic vault, Niemeyer freed up his design from the independent structure. According to the architect, "we owe to Pampulha the beginning of our architecture, looking forward to a free and creative form."⁴ The design was developed in close collaboration with engineer Joaquim Cardozo, a partnership that would continue through to the construction of Brasília.

In his quest for "free form," Niemeyer bound his architecture to reinforced concrete, which he explored to the limit of its technical and constructive possibilities. Unyielding to architectural functionalism, he would argue that he "couldn't understand how, at a time when reinforced concrete offered everything, contemporary architecture could choose to remain committed to such cold, repetitive vocabulary."⁵

Niemeyer's work in tandem with structural engineers allowed reinforced concrete technology to simultaneously materialize into architectural form. Not only did each new project of his incorporate then-current technology, but it also sparked the structural intuition and intellectual abilities of engineers in a quest for ever-more sophisticated solutions.

Niemeyer's architecture reached its evolutionary peak in the design of the Niterói Contemporary Art Museum (MAC), alongside engineer Bruno Contarini, with construction completed in 1996.

4. THE NITERÓI CONTEMPORARY ART MUSEUM

According to João Masao Kamita, the MAC "is a perfect symbiosis of built form and landscape."⁶ The impact of form seems to overshadow any other functional aspects of the designed space, regardless of its adequacy. However, discussions regarding adequate spaces for art are as dynamic as art itself, as Lina Bo Bardi probably knew by 1957, when she designed MASP, where artworks sat on stands in the middle of the grand hall; as did Frank Lloyd Wright in 1956, upon designing the Solomon R. Guggenheim Museum, which saw

him propose movement and different points of visibility as part of the exhibition and art appreciation experiences. Functional adequacy aside, what is perceivable in the MAC is that the symbolic configuration of the building, achieved by an iconic image whose force was intended to put Niterói on the international art scene, seems to be the most prominent feature of the design.⁷

The MAC's architectural design doesn't reveal a formal revolution so much as the natural evolution of the free form which Niemeyer had been researching and implementing since the 1940s. Ever since his 1956 design of the Museum of Modern Art in Caracas, Niemeyer had been developing a kind of solution that ultimately materialized in his Niterói design.

The Caracas building features a kind of inverted pyramidal trunk, its tip buried atop an elevation, whereas the shape of the MAC evolves into an inverted trunk-conical slice, also sitting atop an elevation, and pinned to the ground by a central support (Fig. 2).

Both designs boast great structural complexity due to the tilt in their façades, and in the particular case of the MAC, for its elevated volume underpinned by a single support. Niemeyer's formal proposal involves a solution that cannot accommodate an independent load-bearing structure. It is therefore an instance of structure-form.

4.1. Structure-Form

The proposal of a structure-form shaped the project's work methodology. In an interview with the authors on October 20, 2016, Contarini recalled that Niemeyer invited him for a conversation about his then-fledgling MAC design. The engineer described the problems he had to solve in that meeting, chief among them the precondition of there being a cantilevered structure supported on a single central hollow pillar for the passage of the elevator, a core element to Niemeyer's concept.

It is worth noting that many of Niemeyer's designs are characterized by an imposition of form as a determinant of the entire development, particularly when it comes to structural solutions. Ever since the Pampulha design, a had been fact recognized by Cardozo, who considered this kind of imposition to be a natural condition of this process. In his essay *Forma Estática-Forma Estética*, Cardozo argues that "the form designed by the architect is a form established *a priori*, one that is merely *conditioned* to a matter of stability, but never resultant thereof *a posteriori*,"⁸ and this gives primacy to form within architectural design. From this follows that it is up to structural engineering to seek matching solutions in terms of creativity and innovation. Niemeyer in a way established with the few engineers that he worked with a particular Niemeyerian concept of structure. And this means that each structural solution was the only one possible. If on the one hand, this characteristic would place severe limitations upon the proposal of tried-and-true structural solutions, on the other hand, it would spark the creativity and

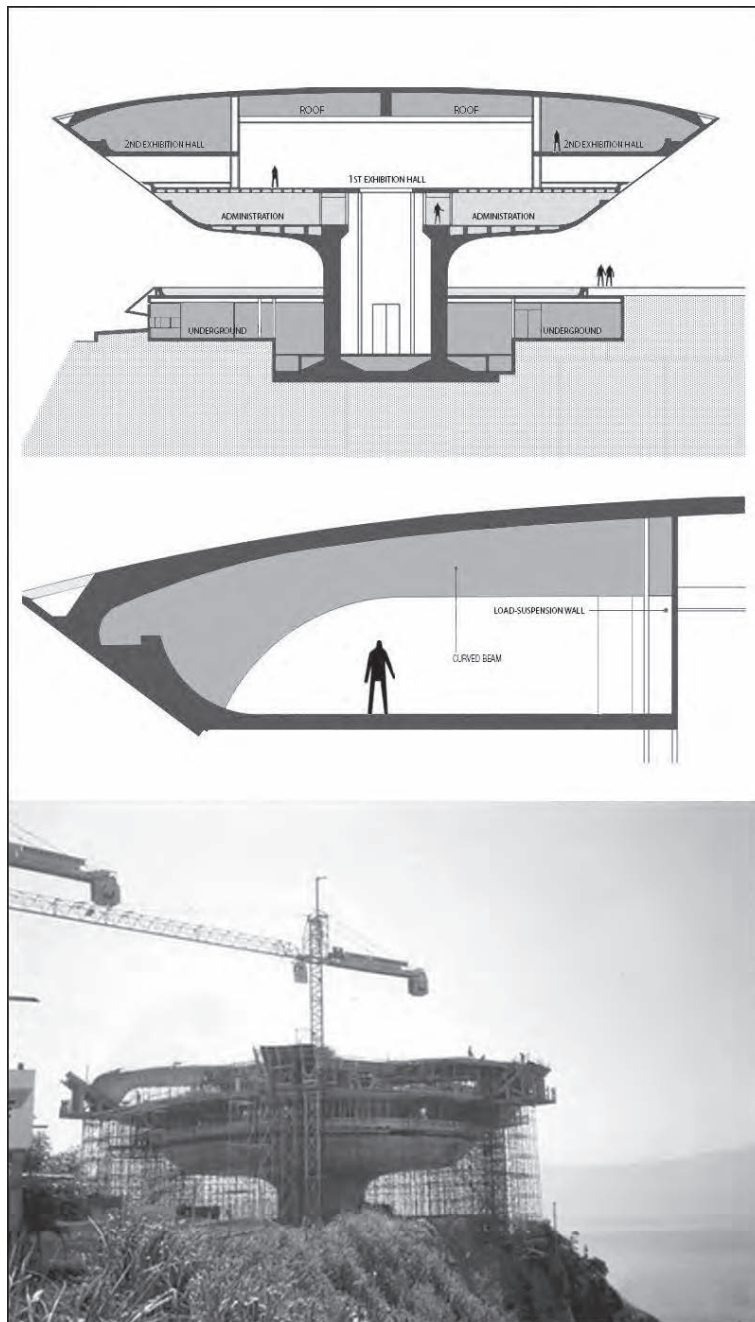


Fig. 1. Niemeyer and Contarini, MAC, Niterói, Brazil, architectural plans: cross-sectioned view and detail of roof, construction: broad view. Drawings: cross-section redrawn by the authors as of image retrieved from <http://culturanniteroi.com.br/blog/?id=2035&equ=macniteroi>. Photograph: © Haroldo da Costa Santos, retrieved from <https://hcsarquitetura.wixsite.com/hcsarquitetura/mac-niteri?lightbox=imigelca>.

intellectual abilities of the structural engineers involved. This dynamic wrought something of a myth among Brazilian structural engineers since Niemeyer's projects invariably implied a very high level of difficulty, therefore few were professional enough to handle them.

4.2. Architectural Design and Structural Design

The 16m-high building is composed of an Underground

Floor, a Ground Floor, an Administration Floor, two Exhibition Halls, and a Roof with a diameter of 50m. The higher the floor the bigger the square footage, and the building's façade is angled at 40°. The central pillar has a diameter of 9m and a hollow cross-section with a diameter of 6m to allow the elevator shaft.

In the MAC, Niemeyer explores the monolithism of concrete as tectonic expression, directly applying white paint

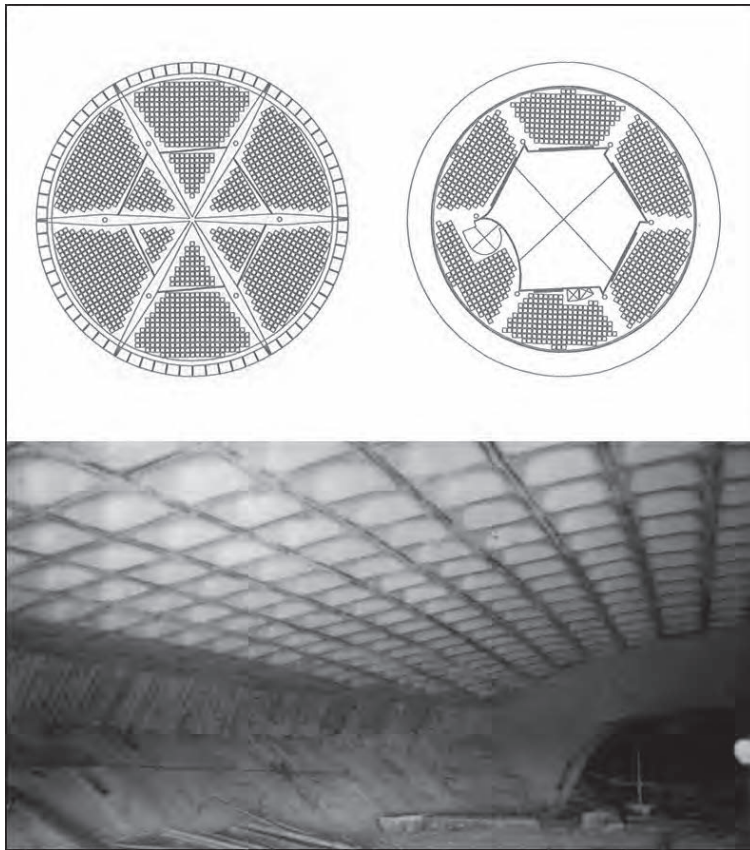


Fig. 2. Niemeyer and Contarini, MAC, Niterói, Brazil, structural plans: Roof and 2nd Exhibition Hall formwork design, construction: ribbed slab and curved post-tensioned beam of the roof. Drawings: © Bruno Contarini, BC Engenharia. Photograph: © Haroldo da Costa Santos, retrieved from <https://hcsarquitetura.wixsite.com/hcsarquitetura/mac-niteri?lightbox+imagem4u>.

onto the building's irregular surface, which bears formwork marks from the onsite pouring of concrete. This implied a craftsmanship-heavy process, especially as regards formwork.

The proposal of formal unity is also expressed in the system of the structural design. Contarini approaches the building globally since it cannot be broken down into separate floor plans. The unit is composed of 3 interacting subsystems: Roof + 2nd Exhibition Hall, 1st Exhibition Hall + Administration Floor, and Underground Floor + Foundation. The external access ramp connecting the Ground Floor to the Exhibition Halls is detached from the main building and will not be dealt with here. The entire building sits on one single footing (Fig. 1).

4.2.1. ROOF + 2nd EXHIBITION HALL

The Roof structure is composed of six ribbed slabs, six post-tensioned radial beams with 11m cantilever and six pillars of 50cm in diameter forming frames incorporated into the shape of the building. The floor of the 2nd Exhibition Hall has a central hollow and consists of a continuous ribbed slab supported by the curved roof beam on its outer end, and by load-suspension walls for the roof on its inner end (Fig. 2).

The Roof + 2nd Exhibition Hall assembly can be better comprehended in the cross-section in detail, where one can observe the curved roof beam and the load-suspension wall, as shown in Fig. 1.

The structural analysis of the roof pillars and beams reveals the conceptual ingenuity involved, since the bending moment at the centre of the span is zero, minimizing deformation at the central point of the cap.

4.2.2. 1st EXHIBITION HALL + ADMINISTRATION FLOOR

The 1st Exhibition Hall + Administration Floor is a transition level for loads from the six pillars that support the Roof + 2nd Exhibition Hall.

Elevator placement was perhaps the most complex problem in the project, since it interrupts slab continuity, preventing load transmission to the centre pillar.

The solution came in the form of six 10m radial post-tensioned cantilever beams from the centre pillar, connecting the 1st Exhibition Hall to the Administration Floor, with openings for door gaps connecting different inner areas. The pillars that support the two upper floors stand on these cantilever beams. Therefore, the loads from the upper two and lower two floors are transferred to the centre pillar. However, this meant that the post-tensioned cables, which should ide-

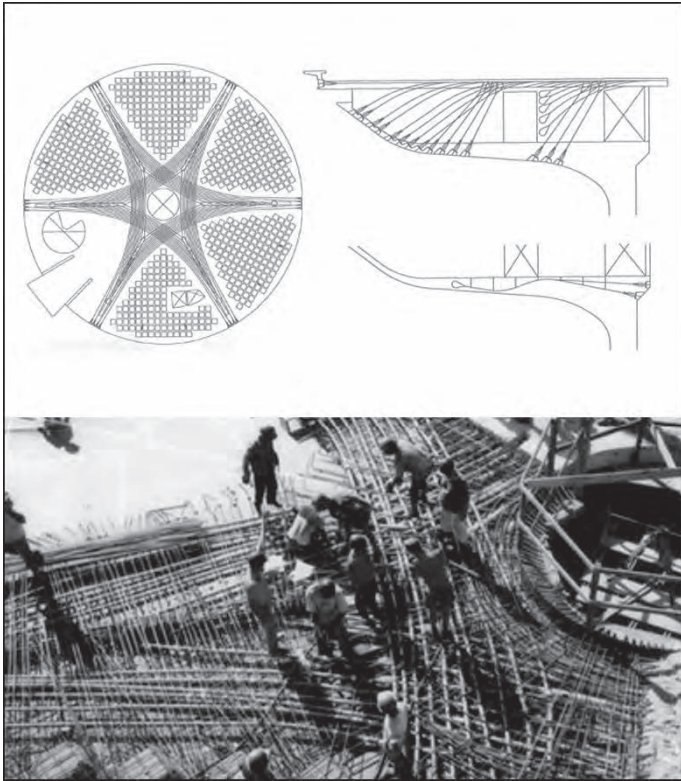


Fig. 3. Niemeyer and Contarini, MAC, Niterói, Brazil, structural plans: design of post-tensioned cables for 1st Exhibition Hall beams, cross-sectioned view of post-tensioned cables on 1st Exhibition Hall beams, construction: laying-down of post-tensioned cables for 1st Exhibition Hall. Drawings: © Bruno Contarini, BC Engenharia. Photograph: © Haroldo da Costa Santos, retrieved from <https://hcsarquitetura.wixsite.com/hcsarquitetura/mac-niteri?lightbox=image14>.

ally connect two diametrically opposed points of the slab, could not be so due to the centre hole. This was solved by laying out the cables around the elevator shaft hole (Fig. 3).

4.2.3. UNDERGROUND FLOOR AND FOUNDATION

The geological configuration of the building site was not amenable to a deep foundation, since the massif harbored a few caves, resulting in discontinuity and forcing the adoption of a shallow foundation instead.

It was determined that execution of the underground floor would require removing an amount of earth from the site whose mass would correspond to a load greater than that of the centre pillar. Therefore, the increase in load from construction would be offset by the weight of the earth removed. This was a sufficiently favorable condition for implementing the shallow foundation on the ground above the caves, which would ultimately be tantamount to preserving the original conditions of the soil. The building's foundation is, therefore, one single footing, with a diameter of 16m and a height of 2m at its tallest point, located just underneath the underground floor (Fig. 4).

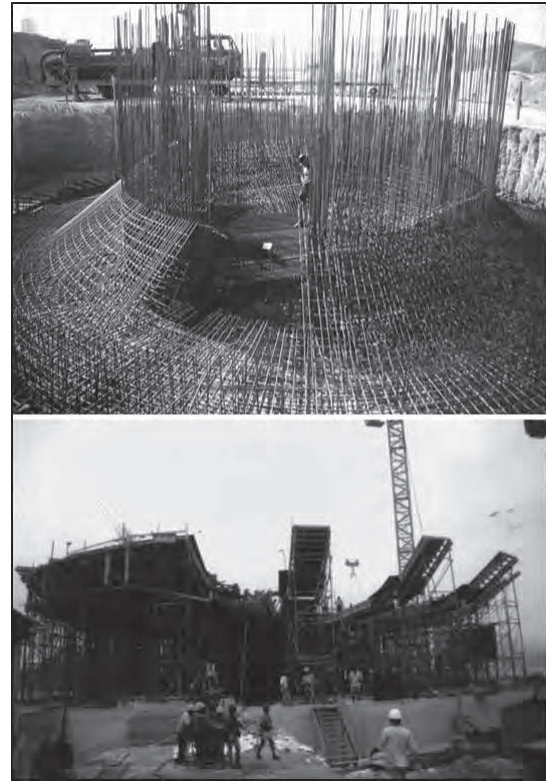


Fig. 4. Niemeyer and Contarini, MAC, Niterói, Brazil, construction: setting-up of foundation and execution of formwork for 1st Exhibition Hall + Administration Floor structural subsystem. Photographs: © Haroldo da Costa Santos, retrieved from <https://hcsarquitetura.wixsite.com/hcsarquitetura/mac-niteri?lightbox=imager9l>; and from <https://hcsarquitetura.wixsite.com/hcsarquitetura/mac-niteri?lightbox=imagekd4>.

5. FINAL REMARKS

The possibility of an architecture constituted as structure-form was a liberating tool for Niemeyer. In relinquishing the rationality of Corbusian-like independent structures and tapping into structural engineering for the technological support needed to bring his ideas to fruition, Niemeyer managed to explore new creative territories. Like few of his peers, the architect realized the constructive and formal potential of the material he chose to materialize his designs with.

Niemeyer's boneless architecture was and still is a landmark of modern architecture in Brazil, and in its constant overcoming of boundaries, it contributed as much to the development of reinforced concrete technology as to Structural Engineering itself.

REFERENCES

- ADDIS, Bill, *Building: 3000 Years of Design, Engineering and Construction*, London, Phaidon, 2007.
- MACEDO, Danilo Matoso & SOBREIRA, Fabiano José Arcadio (org.), *Forma Estática-Forma Estética*, ensaios de Joaquim Cardozo sobre arquitetura e engenharia, Brasília, Edições Câmara, 2009.
- NIEMEYER, Oscar, *A Forma na Arquitetura*, Rio de Janeiro, Avenir, 1978.
- VASCONCELOS, Augusto Carlos de, *O Concreto no Brasil: Recordes-Realizações-História*, São Paulo, Pini, 1992.

NOTES

- 1 Augusto Carlos de Vasconcelos, *O Concreto no Brasil: Recordes-Realizações-História*, São Paulo, Pini, 1992, 44.
- 2 Bill Addis, *Building: 3000 Years of Design, Engineering and Construction*, London, Phaidon, 2007, 428.
- 3 Augusto Carlos de Vasconcelos, *O Concreto no Brasil: Recordes-Realizações-História*, São Paulo, Pini, 1992, 17.
- 4 Oscar Niemeyer, *A Forma na Arquitetura*, Rio de Janeiro, 1978, 27.
- 5 Ibid., 20.
- 6 João Masao Kamita, "Oscar Niemeyer (1907–2012)", London, *Architectural Review*, 2019, accessed on 16 March 2020, <https://www.architectural-review.com/essays/reputations/oscar-niemeyer-1907-2012/10044728.article>.
- 7 Indeed, the image became international, whereas discussions regarding the project's functioning are ongoing, in keeping with the art world's own dynamic.
- 8 Joaquim Cardozo, "Forma Estática-Forma Estética", Danilo Matoso Macedo & Fabiano José Arcadio Sobreira (org.), *Forma Estática-Forma Estética*, ensaios de Joaquim Cardozo sobre arquitetura e engenharia, Brasília, Edições Câmara, 2009, 135–136.

ELADIO DIESTE, EUGENIO MONTAÑEZ AND MODERNITY IN SOUTH AMERICA

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ABSTRACT.

One way to understand 20th century modernity in South America is to examine its architecture from two perspectives: one referring to the reception of the ideas of Le Corbusier and the diffusion of a European modernism, and the other by examining its modernization through transformation of infrastructure that changed the territory and the cities. The work of the Uruguayan partnership of Dieste y Montañez can be seen from these two categories. Their buildings are considered cultural landmarks of Latin American architecture, expressions of the reinforced brick technology. Masterpieces such as the Church of Christ the Worker in Atlántida (1958–1960) and the Church of San Pedro in Durazno (1967–1971) must be understood within the context of the motivations and socioeconomic growth conditions found in Latin America in the post-World War II years. Dieste and Montañez proposed an alternative building system for large span structures. It was more technically and economically viable than the steel trusses or reinforced concrete being used in developed countries, impacting the Brazilian infrastructural expansion of the late 1970s and early 1980s. The buildings of these Uruguayan engineers characterize a specific modernity relevant to the Latin American condition, accompanying the process of social transformation and of the development of urban networks and infrastructure. This paper intends to establish the place of Dieste y Montañez among the world engineering and architectural innovators through the presentation and analysis of some of their works, within the context of modernization in Uruguay and Brazil.

1. INTRODUCTION

In 2017, Uruguay celebrated the centennial of the birth of the engineer Eladio Dieste (1917–2000). The highlight of the celebration was the application of the Cristo Obrero (Christ The Worker) Church to UNESCO as a World Heritage Site. Such an initiative would be supported by all of Latin American countries. Dieste's body of work is one of the great cultural achievements of the second half of the 20th century, characterizing a Latin American architectural and technological identity. Certainly, Dieste is an important figure equal to Oscar Niemeyer, Luís Barragán and Carlos Raúl Villanueva, other Latin Americans whose works make up part of the World Heritage.

Eladio Dieste Saint Martín graduated from the Faculty of Engineering of Montevideo in 1943, in the same class as Eugénio Rolando Montañez (1916–2001). In 1955, the two of them established the company of Dieste y Montañez in what would become a long, solid professional partnership. Although Eladio Dieste was the figurehead of the company, primarily responsible for creative and conceptual issues, his works owe to the more discreet and introverted Montañez a complicity in calculation, planning and execution, resulting in an extraordinary and complementary sum of talents.

2. REINFORCED CERAMICS

Eladio Dieste created a method of calculation and construction called *ceramica armada* (reinforced ceramics), a Uruguayan invention. The primary structures designed and patented by Dieste y Montañez were the free-standing walls

with curved surfaces, folded plates, free-standing, doubly-curved and gaussian vaults.

The development of Dieste's concepts derive from a variety of sources: European, Middle Eastern, and Catalan building systems. All techniques resulted from empirical methods. Not until the 19th century were vaults, arches and domes starting to be calculated. However, the development of calculation methods was aimed at applications in concrete structures rather than to ceramic elements.¹

The reinforced ceramic system consists of a ceramic brick surface, reinforced with overlapping and/or embedded steel bars or meshes with mortar joints or layers. The final slender appearance of cantilevered or large spanned structures becomes even more impressive when considering its proportions. The double-curved vaults are 13 centimeters thick, with three centimeters of top cover and 10 centimeters of solid or hollow bricks. The self-supporting vaults are nine centimeters — six centimeters of brick and three of sand-cement topping.

3. RELIGIOUS ARCHITECTURE

The Church of Christ The Worker and the Church of San Pedro are essential references in any Latin American architectural anthology.

In 1952, Dieste was asked to design and build a church alongside a highway about 40km from Montevideo, in the seaside town of Atlántida. This town housed a working-class community in its periphery in, according to Dieste, "one of those formless groupings of structures that never achieve village status. It shows, with the material clarity of architec-



Fig. 1. Church of Christ The Worker, Atlántida, Uruguay, 1960 (left). The Church of Christ the Worker combines two types of reinforced ceramics solutions: the roof in doubly-curved (gaussian) vaults, spanning approximately 16 meters and the undulating walls, seven meters high. The interior space is dominated by the undulations of the ceiling and walls, without, however, losing the sense of order and spatial clarity. Strategically arranged openings bring filtered light to the interior, sometimes colored by the stained-glass windows, sometimes by the onyx membranes in the choir. The altar walls, with different bricklayings, create a special background texture for the image of the crucified Christ. Church of San Pedro, Durazno, Uruguay, 1971 (right). They maintained the idea of a basilica floor plan with three naves, however as a constructive solution, flat slabs of reinforced ceramics were chosen for the walls and roofing. The ceramic slabs, with ingenious folds, articulate side walls and ceiling and, due to the angles, reinforce the perspective of the faithful from the entrance toward the contemplation of the altar. Opposite to it, above the entrance, another expressive element of the church rewards the faithful as they leave the enclosure: a brick rose window delicately supported by thin metal bars, imperceptible due to the contrast between light and shadow. © Hugo Segawa, 2018.

ture, the disorder and injustice of our societies.”²

The construction was carried out by local workers, under the supervision of Dieste y Montañez. The engagement of the workers was one of the fundamental points for Dieste, for he considered them “committed protagonists and full of human warmth”³ (Fig. 1).

Completed in July 1960, and restored in 2003 under the direction of Dieste’s son, Esteban Dieste, the church has been kept in good condition and continues to be well-frequented by the community, as well as receiving visitors from all over the world.

Durazno is a city in the interior of Uruguay with a characteristic main square surrounded by public and commercial buildings and dominated by the mother church of San Pedro, built in the first half of the 20th century. In 1967, a major fire left only its main facade and side walls standing. Dieste was responsible for the reconstruction of the church, which was completed in May 1971.

Given the importance of the building to the local popu-

lation, the parts that survived the flames, especially the facade, were preserved. Now, from the outside, nothing hints at the extraordinary interior intervention.

4. SOUTH AMERICAN DEVELOPMENTALISM

The churches of Atlántida and Durazno are notable. They are moments of exception among the large contracts that nourished Dieste y Montañez and made their engineering work stand out in the 1970s. They practiced much more in the field of typological serialization, in the massive repetition of a certain type of roof structure: free-standing double-curved vaults or Gaussian vaults. At a time of modernization of industrial infrastructure, production, and the circulation of products and commodities in Uruguay, Argentina and Brazil — a time known as Latin American developmentalism — reinforced ceramics proved to be a viable alternative to concrete and metal structures insofar as it was capable of overcoming large spans with low material con-

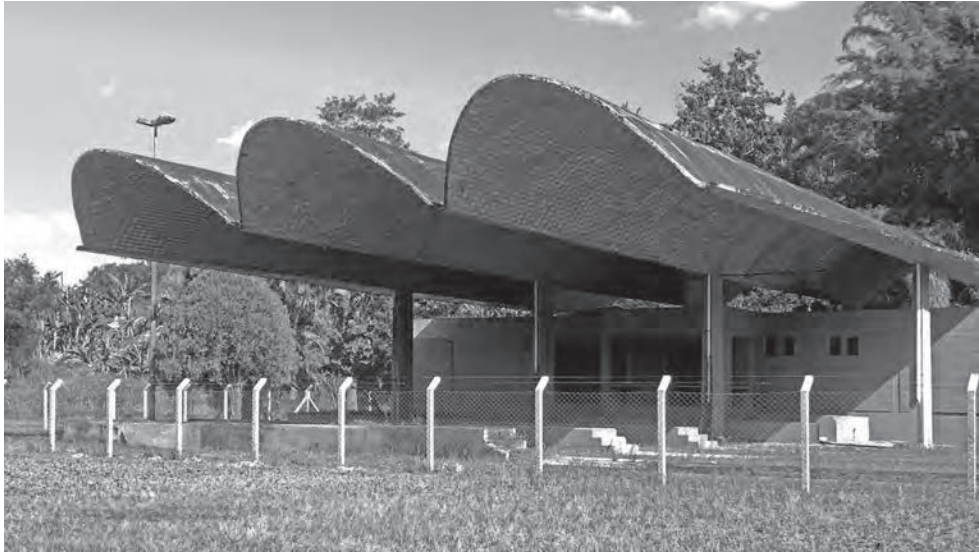


Fig. 2. Dieste y Montañez, Fiscal Control Post, Apiúna, Brazil, 1979–1980. The structure consists of three self-supporting vaults, approximately 8 x 33 meters in double cantilever, supported by four pillars aligned in the middle third of the construction. © Juliana Suzuki, 2018.



Fig. 3. Dieste y Montañez, Metropolitan Maintenance Plants for Metro Rio, Rio de Janeiro, Brazil, 1976–1978. Interior view. © Hugo Segawa, 2018.

sumption, reduced weight and more competitive costs and execution deadlines than other systems.

4.1. Transport Infrastructure

Among the countless possibilities for the application of reinforced ceramics, the technique became particularly successful in buildings related to transportation. Dieste & Montañez developed several projects for bus stations and maintenance workshops in Uruguay, Argentina, and Brazil.

The Salto, Uruguay bus station (1971–1977) is the most well-known project. Approximately 1,300m² are distributed in a rectangular plan, subdivided into seven free-standing vaults with double cantilevers of 13.50m on each side. The longitudinal ends of the vaults are finished in an oblique cut, which accentuates a feeling of dynamism.

Also in Salto, the Turlit bus terminal (1979–1980) employs the same system of free-standing vaults, covering an area of 900m², with five vaults of about 7m span and a double overhang of 13m.

The Barbieri and Leggire Service Station (1976) was a car

and truck maintenance site. The fuel pumps were covered with two semi-vaults supported by a single column. It was later transferred to the entrance to Salto and baptized as the Gate of Wisdom, dedicated to the memory of Eladio Dieste.

In Brazil, in the small southern town of Apiúna, there is a Fiscal Control Post (1979–1980), which serves as a weigh station for inspection of trucks and commercial vehicles. Despite its modest dimensions, around 800m², the 1750-meter longitudinal cantilever is the largest of all of the Dieste y Montañez works in Brazil (Fig. 2).

Although currently unused and ignored in the landscape, it is still in good condition, which proves the durability of the construction system.

In Brazil, the projects of Dieste & Montañez took on a different scale than those carried out in Uruguay, as will be discussed below.

In Rio de Janeiro, the Metropolitan Maintenance Plants (1976–1978) is a complex of workshops for the city's subway system. Its built area, over 50,000m², is made up of warehouses where the trains enter for inspection, repairs and

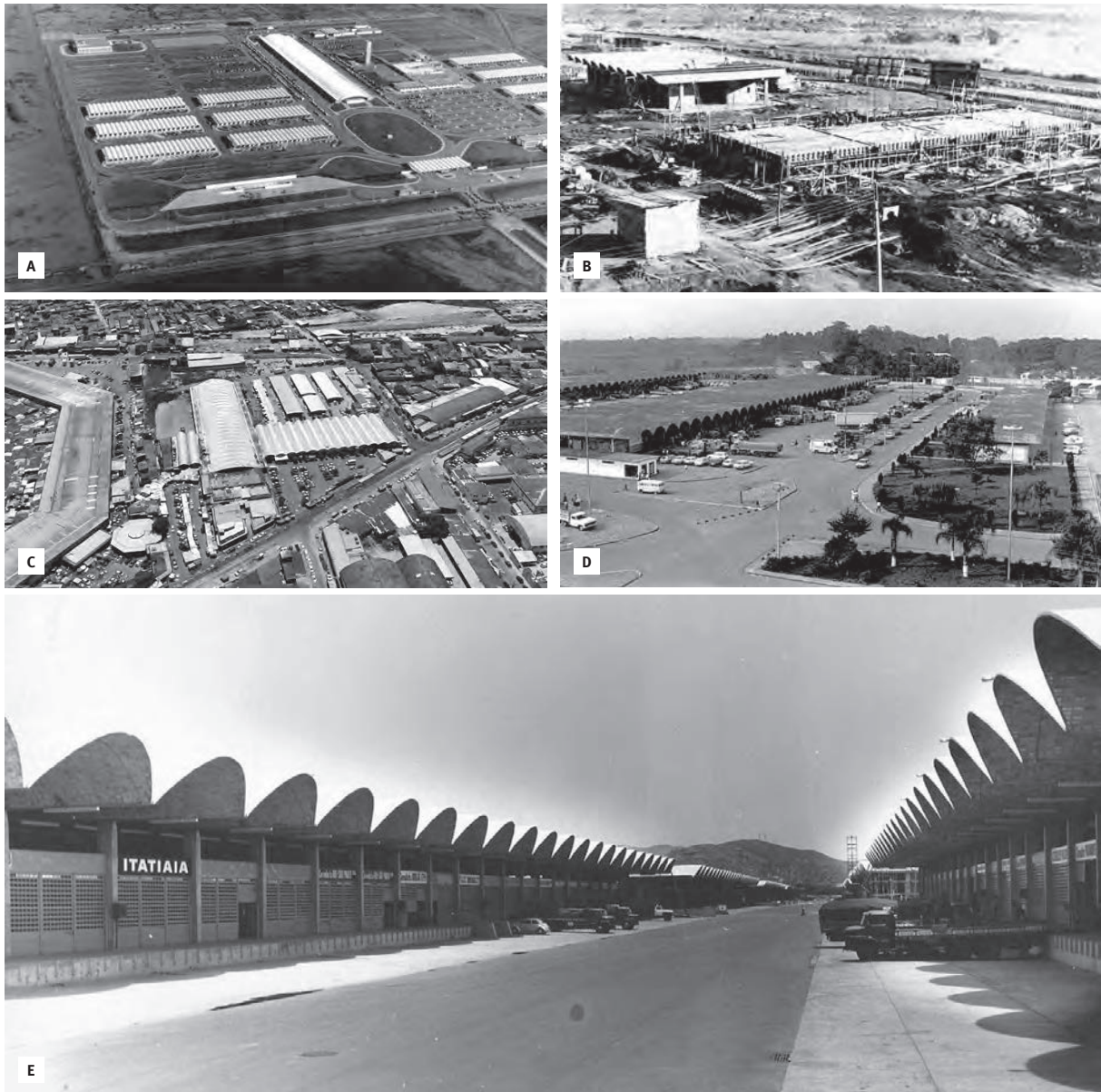


Fig. 4. [A] CEASA Porto Alegre, Porto Alegre, Brazil, 1972, view of the entrance to the main pavilion. © Dieste y Montañez archive. [B] CEASA Goiânia, Goiânia, Brazil, 1976, view of the construction of six pavilions with 16 free-standing vaults, totalling 21,000m² of built area. © CEASA Goiânia archive. [C] CEASA Maceió, Maceió, Brazil, 1972. This CEASA has similarities to the Porto Alegre project. It is a large pavilion with an area of approximately 7,500m², with 27m span gaussian vaults and two longitudinal lateral cantilevers measuring 4m. Added to one side of the pavilion is a block with two free-standing vaults and, on the other, a block with 13 free-standing vaults with 6m span each. Source: Google Earth, 2018. [D] CEASA Curitiba, Curitiba, Brazil, 1976, composed of three pavilions of approximately 160 x 38 meters, covered with 39 vaults with 4m of free span. The complex is completed with one 176 x 35m block, two smaller blocks and an entrance portico, all in free-standing vaults, totalling 29,000m² of built area. © CEASA Curitiba archive. [E] CEASA Rio de Janeiro, Rio de Janeiro, Brazil, 1974, general view of the pavilions in free-standing vaults. © CEASA Rio de Janeiro archive.

maintenance, with high ceilings for the installation of suspended rails through which the equipment necessary to carry out the work runs (Fig. 3).

The self-supporting vaults are seven meters wide by 23 meters long, offering adequate space for the parking and maintenance service of the trains. The shelters are over-

lapped in different heights, in order to guarantee natural ventilation and lighting, improved with skylights. The sand-cement topping over the vaults are white painted, as an efficient solution for the thermal comfort in the high temperatures characteristic of Rio de Janeiro, excepting the working areas from air conditioner devices.

The Maintenance Plant is currently in operation and, compared to other reinforced ceramics structures in Brazil, in good condition.

4.2. Horticulture and Food Supply Centers

The Metropolitan Maintenance Plants is a counterpoint between Dieste y Montañez's achievements in Uruguay and Brazil. It reveals the variation of the major undertakings by the Brazilian office.

It was in Brazil that the serial reproduction of reinforced ceramics designed and built by Dieste y Montañez found its most prolific application. In the 1970s, Brazil experienced a boom in infrastructure projects, driven by government investment and private industrial development. Such demand for work led them to open a branch of the office and Eugénio Montañez and collaborators Antônio Raúl Romero and Ariel Valmaggia moved from Montevideo to Rio de Janeiro.

Throughout the 1970s and for just over ten years, Dieste y Montañez built more than 750,000m² of reinforced ceramic structures for industrial warehouses, silos, workshops, laboratories and schools from the north to south of Brazil.

One of the big government programs of the time was the planning and management of the commercialization of fresh produce as a national supply system. The acronym CEASA refers to large complexes built in Brazilian metropolitan areas to streamline and regulate operations between producers, vendors, and consumers. In the 1970s, dozens of CEASA units were built across the country.³

Dieste y Montañez were responsible for the structures of five units of the system.⁴ Their first project was for the CEASA in Porto Alegre, inaugurated in 1972, an architectural and urban design by Carlos Maximiliano Fayet, Cláudio Luiz Araújo, Carlos Eduardo Dias Comas, and José Américo Gaudenzi. Located in the metropolitan area of the city, the complex lies on a plot measuring 650 x 1,300 meters, with a built area of around 60,000m² (Fig. 4).

The project was carefully monitored by Dieste and, later, Montañez came to Porto Alegre to personally direct the construction of the vaults. It is recognized as the best work of the company in Brazil. After Porto Alegre, Dieste & Montañez developed CEASA units in Maceió (1972), Goiânia (1976) and Curitiba (1976).

Of all the CEASA units built by Dieste y Montañez, the largest and most impressive was the one in Rio de Janeiro, completed in 1974. It comprises about 150,000m² of covered area, on a plot of approximately 440 x 1200 meters, the greatest achievement in reinforced ceramics, in terms of constructed area, in the career of these engineers.

Unlike the CEASA in Porto Alegre and Maceió, in Rio de Janeiro, pavilions with repetitious roofs were used in 25 free-standing vaults of 7m of free span each. The choice of free-standing vaults was certainly determined by the size of the project and the terms and conditions for its execution. Dieste y Montañez worked on the development of the roofing project and technical assistance, providing training in

the application of the technique to the construction company's workforce.

5. A COSMIC ECONOMY

One way to understand 20th century modernity in South America is to look at its architecture from two perspectives: one that refers to the reception of the ideas of Le Corbusier and the diffusion of a European modernity, and the other which examines modernization through the transformation of infrastructure that changed the territory and the cities. The work of the Uruguayan partnership Dieste y Montañez can be seen from these two points of view.

Their work in reinforced ceramics can be appreciated through several different features: the rational versatility of the structures in different building types in functionality and efficiency and constructive scale, the poignant mastery with which they manage the effects of light, shadows, textures and volumes, and the craftsmanship of bricklaying as a Latin American ethos.

The work of Dieste y Montañez transcends objective targets and points to an intangible dimension, which Dieste referred to as a Cosmic Economy. Different from what he calls financial economy, he meant "being in accordance with the profound order of the world,"⁵ linked to the ethical aspect, sensitive to the recognition of the socioeconomic needs of the Latin American people.

The concept of Cosmic Economy applied to the technological field of construction makes obvious the choice for simple, low-cost brick structures, carried out by local labour, in contrast to the waste that Dieste observed in the architecture of more developed countries. Reinforced ceramics was introduced as an alternative technology system in non-industrial environments, which were very present in Latin American countries during the period of the 1950s to 1970s.

The recognition of Dieste y Montañez's work has only recently been extended beyond the borders of Latin America and, increasingly, his legacy legitimizes the title by which he has been distinguished: that of *Señor de los Ladrillos* — the Master of Bricks.

REFERENCES

- ANDERSON, Stanford, *Eladio Dieste: Innovation in Structural Art*, New York, Princeton Architectural Press, 2004.
- BONTA, Juan Pablo, *Eladio Dieste*, Buenos Aires, Facultad de Arquitectura y Urbanismo, Instituto de Arte Americano e Investigaciones Estéticas, 1963.
- DIESTE, Eladio, *La Estructura Cerámica*, Bogotá, Escala, 1987.
- DIRECCIÓN General de Arquitectura y Vivienda, *Eladio Dieste 1943–1996*, Sevilla-Montevideo, Consejería de Obras Públicas y Transportes, 1996.
- GIOVANNARDI, Fausto, "Eladio Dieste Eugenio Rolando Montañez Opere in Brasile," accessed on June 25, 2017, https://issuu.com/fausto9312/docs/completo_681fe9743837fd.
- GROMPONE, Juan, "Eladio Dieste: el Maestro de la Ingeniería," accessed on October 17, 2018, http://www.grompone.org/ineditos/ciencia_y_tecnologia/Dieste.pdf.
- NUDELMAN, Jorge, "Eladio Dieste (1917–2000)," ARANA, Mariano, GARABELLI, Lorenzo, & LIVNI, José Luis, *Entrevistas Edición Especial*, Volume 2, Montevideo, Instituto de Historia de la Arquitectura, FADU-UDELAR, 2016, 186–223.
- PEDRESCHI, Remo, *The Engineer's Contribution to Contemporary Architecture: Eladio Dieste*, London, Thomas Telford, 2000.

QUANTRILL, Malcolm, *Latin American Architecture — Six Voices*, College Station, Texas A&M University Press, 2000.

NOTES

- ¹ Gilberto Pilecco Fagúndez, *Resgate da obra do Eng. Civil Eladio Dieste na Cidade de Artigas*, Santa Maria, Universidade Federal de Santa Maria, 2016, 45.
- ² Eladio Dieste, “Iglesia de Atlántida,” *Eladio Dieste 1943–1996: métodos de cálculo*, Sevilla-Montevideo, Consejería de Obras Públicas y Transportes, 1996, 150.
- ³ Hugo Segawa, *Arquiteturas no Brasil 1900–1990*, São Paulo, EDUSP, 1998, 172.
- ⁴ Juliana Suzuki, “Tijolo com tijolo num desenho lógico: as CEASA e os pavilhões de Dieste e Montañez no Brasil,” *Anais do 13º Seminário DOCOMOMO Brasil*, Salvador, accessed on June, 3, 2020, <https://docomomo.org.br/wp-content/uploads/2020/04/110841.pdf>.
- ⁵ Eladio Dieste, *Escritos sobre Arquitectura*, Montevideo, Irrupciones, 2011, 25.

Session 4-e

TECHNOLOGICAL/MATERIAL LEGACIES AND CONCRETE. CRITICAL AND ORIGINAL CONSIDERATIONS

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The session that I am pleased to introduce is dealing with “Technological/Material Legacies and Concrete”. The contributions will deal with reinforced concrete, which builders will say is the material of the 20th century par excellence and its heritage legacies.

The originality of the contributions on the reinforced concrete material is not that of deepening its “traditional” history as it has been made over the last 30 years, with its European beginnings and the multitude of patents — Cotancin, Monnier, Coignet, etc. — which competed with each other, its exemplary builders such as the Perret brothers or Pier Luigi Nervi, its dominant construction systems such as the Camus or Larsen-Nielsen panels, or its architectural trends such as the brutalism of Walter Förderer or the sculptural concrete of Marcel Breuer. The contributions presented in this session will come from a peripheral look at this history. Peripheral in geographical terms, proving that the use of the same material and its inherent techniques leads to diverse characters and languages depending on the material and immaterial cultures of the places where it is used. Thus the analysis of Khrushchevka housing blocks in the USSR, Panelak in Czechoslovakia or apartment blocks in Poland illustrate the mix between international style and national narratives, even though we are in neighbouring regions and bounded by the same socio-political system.

Some Mediterranean countries, such as Greece, are also reconsidering the use of concrete, a material that shaped their built environment in the 20th century. Far from the austere and pure lines used in Central Europe, a group of Greek architects, including Dimitris Pikionis and Aris Konstantinidis, will develop a sensual work on the materiality, colour and texture of concrete in relation to the local context, topography and climate, without abandoning their modern convictions. Not peripheral but at the antipodes of the country that will develop reinforced concrete, France,

Cambodia will make good use of it during its colonial period that will see modern architecture and its materials impose themselves. During decolonisation after WWII, Cambodian architects found themselves in difficulty, both forced to use the materials and techniques of the Western powers to erect modern structures but trying to escape them to achieve much-needed economic independence. The figure of architect Vann Molyvann, architect and senior official at the Ministry of Public Works, is exemplary in this regard: he uses local resources and adopts a construction method that local craftsmen can control, thus adapting to a limited budget and escaping the economic control of Western powers by favoring local building industries.

Finally, Peripherals also showcases the know-how of the Dutch precast concrete company Schokbeton, which industrially produces prefabricated artificial stone elements in a variety of colours, finishes and textures, but which are remarkably compact and therefore solid. Its contribution to the very definition of an international style in precast concrete in the 1950s could prove decisive, according to the study reported in the contribution devoted to it.

Whether from the point of view of the evolution of materials and their technology in the 20th century or from the point of view of the influence of technological innovation on architecture itself, the reflections proposed at this 16th International Docomomo Conference in Tokyo have moved away from overly traditional and narrow approaches and have proposed original and in-depth visions on a global scale.



THE CONCRETE HERITAGE OF LATE MODERNISM IN EAST AND CENTRAL EUROPE

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ABSTRACT.

The diverse character of late modernist architecture proves that even sharing the same material, technology and ideas can lead to the creation of various “languages of architecture”. The analysis of post-war modernist architectural heritage in the countries of the Eastern Bloc proves that even within one socio-political system (communism) and a limited area (Central and Eastern Europe) architecture was not a homogenous phenomenon.

The supra-local elements are: the socio-political context (centralized industry, five-year plans); the states modernization policy based on industrialization and the redefinition of local identities; the industrialization of architecture and the increase in importance of prefabricated technology (especially evident in the case of multi-family residential buildings). Local elements are the diversity in the production technology (the composition of concrete and the character of constructions varied quite significantly due to the climatic conditions); different traditions of construction works, the combining of international style with the national narrative; different interpretation of the same phenomenon which can be witnessed even in a closed set of multi-family residential buildings (*Khrushchevka* in USSR, *Panelak* in Czechoslovakia, *blocks* in Poland).

The architecture of post-war modernism in Eastern and Central Europe considered a homogenous collection of “socialist modernism architecture” is viewed as an element of communist unification.¹ Andrzej Basista dubbed the communist architecture in Poland “the concrete heritage”.² Meanwhile the image of “the cold war modernity” in the countries of the former Eastern Bloc is a much more nuanced one. The modern architecture was an expression of local aspirations, while reinforced concrete was seen as a material that “quintessentially catches the dialectics of these modernities”³ — a tool which allowed for different usage and interpretations.

This article is a short characteristic of late-modern architecture in Eastern and Central Europe, focusing on its local and supra-regional aspects. The showcased buildings are multi-family apartment blocks with a focus on those constructed using prefabricated elements.

1. (INTER) NATIONAL CONCRETE

Adrian Forty wrote that “talking about concrete means talking about modernity”.⁴ The material that had been known from antiquity became synonymous with modernity and the modernistic faith for a bright future. Both the symbolic and the actual meaning of concrete architecture, as well as its contemporary reception, have shifted within the last decades. For the countries of Central and Eastern Europe concrete was the material which enabled their rebuilding after WWII. Subsequently it was a tool used to create an image of a new, communist order. After the fall of communism, grey, concrete buildings became symbols of an unwanted past.

The common aspects of the countries of the Eastern Bloc: a political system determined by a leading role of a communist party, the dependence on the USSR and a cen-

tralized, nationalized economy⁵ didn't translate into a totally unified architecture. What is more, the differences in local incarnations of modernism appeared even despite the shared similarities in the creative conditions (national, multiple-branch design offices), the workmanship (national construction companies) and the technology (i.e. the prefabrication systems) of said states. This mirrored the global process occurring in the 1960s of a revision of modernist doctrines which led to the creation of the phrase “national concrete”. This saw architecture searching for individual characteristics rather than the common traits.⁶

The symbolic meaning of modern architecture, although less obvious than in the case of the eclectic forms of socialist realism architecture, was extremely important. Despite the fact that the Polish architect Jerzy Hryniewicz, wrote in 1965 to “avoid ideology and dogma”,⁷ architecture always remained a part of the state's politics. David Crowley named it the “banal socialism” which served ideology, however the buildings themselves made very little straightforward political statements.⁸ The confrontation with the West and the attempts made “to show, that we are gaining on the civilized world in terms of the technology”⁹ influenced the architects of the socialist countries, despite the fact that since 1956 they were fully participating in the global processes. “A highlight from this period was Expo '58 in Brussels when the Soviet, Czechoslovak, Hungarian, and Yugoslav pavilions showcased an unexpected, new communist style expressed in glass, concrete, and steel”.¹⁰ Such events — exhibitions and international competitions, were a possibility to present national capabilities and achievements in architecture. They weren't showing the full image of reality. Should one want to trace back the local and supra-regional aspects of late modern architecture in the countries of Central and Eastern Europe, it is important to take a look at the day to day of the construction sector — estates and prefabricated



Fig. 1. LPS building in Larsen-Nielsen system, Budapest-Újpest, Hungary. © Rovibroni (Barna Rovács), CC BY-SA 4.0.

multi-family housing.

2. THE SOCIALIST UNIFICATION

Stephan Kotkin pointed to the unification of construction within the entire Eastern Bloc. He wrote:

*The Soviet phenomenon created a deeply unified material culture. (...) apartment buildings (outside and inside), schools, indeed entire cities, even villages. Despite some folk ornamentation here and there (...) a traveller encounters identical designs and materials.*¹¹

The housing factories, starting from the late 1950s, have changed the landscape of cities and towns of almost the entire Eastern Bloc.¹² The prefabricated apartment buildings, despite having local names (*khrushchovka*¹³ in USSR, *panelak* in the Czechoslovakia, *bloki* in Poland, *panelház* in Hungary) and the discrepancies in their construction technology, have all been different manifestations of a singular phenomenon that was the post-war modernization of so-

cialist countries.

In 1958 the USSR bought the license and the factories for the Camus French heavy prefabrication system. This solution was then implemented in Czechoslovakia¹⁴ and Poland.¹⁵ Also introduced were technologies created in Finland (Larsen-Nielsen in Czechoslovakia and Hungary / Fig. 1) and Germany (Kesting in Poland). At the same time, domestic prefabrication systems were being developed — New Belgrade in Yugoslavia was raised using IMS and Jugomont systems, the Bielany quarter in Warsaw using the W-70 system. P1.11 system was utilized for Barrandov in Prague. The construction industry in all of the countries of the Eastern Bloc could boast about having a number of systems implemented simultaneously. Ironically, despite the elements of local tradition mentioned by Kotkin, the housing quarters made from prefabricates seem to be rather unified. Even when we aren't talking about simple apartment buildings created with reinforced concrete but structures with an intricately designed form and detail, it is difficult to discuss local characteristics of large panel system (LPS) apartment buildings. Obviously there are some dominant tendencies that can be



Fig. 2. Ernst Thälmann estate, Berlin, Germany. © Blazej Ciarkowski.

observed.

3. LOCAL NARRATIVES

In Czechoslovakia, after 1956, Western architecture was seen as individualistic and eccentric, while its Eastern counterpart as "humanized functionalism/modernism".¹⁶ This opinion was mirrored by Polish architectural press which dubbed the Western architecture as "philistine modernism".¹⁷ Whereas in Poland and Czechoslovakia architecture was closer to the Bauhaus productivism (in contrast to the poetic of constructivism), "individualism, rather than uniformity, was encouraged in Yugoslavian mass-housing projects".¹⁸

The forms of the Polish "blok" or the Czechoslovakian "panelak" derive from function and the used construction system. Their designers saw values in the spatial qualities of the entire urban context, not in the details of a singular building. In buildings utilizing LPS, the limited amount of elements, the imposed number of floors and the square space of the flats, together with the officially regulated eco-

nomics led to the fact that the buildings were practically identical. In that situation designers searched for others means to add originality to individual estates and apartment buildings. The limited options for creating architectural detail forced the search for alternative design features.

The surface of a prefabricated panel could be left just as raw concrete, but also covered with ceramic tiles or a mosaic. It could showcase aggregate (exposed aggregate concrete) or be covered with plaster and painted. Single developments (or even entire estates) were given a unified system of facade finishes. The apartment buildings in the Nowy Dwór estate in Wrocław were given colour accents, to break the monotony of architecture and to help the inhabitants identify with "their" space. Ceramic mosaic with a varied colour palette was used on the Ernst Thälmann estate in Berlin and in Bolesław Chrobry estate in Poznań (Fig. 2). In the 1970s, Hungarian architects made efforts to add "a more human face" to the monotonous estates by adding decorative elements. This wasn't a new phenomenon, as some time before the local "housing factories" introduced limited decorative detail. What is worth pointing out is the focus on locality expressed through the usage of ornaments inspired by Hungarian folklore.¹⁹ Such attempts at building a local identity were a rarity as most of the decorations were abstract. This unified them across all of the socialist states. "If one were transported into any residential area built since WWII in the socialist countries, it would be easier at first glance to tell when it was constructed than to determine in which country it was".²⁰

4. ECONOMY AND CREATIVITY

Concrete prefabricates in the USSR and countries of the Eastern Bloc had not only a strong ideological dimension but most importantly an economic one. Following the instructions outlined by Nikita Khrushchev in order to limit the usage of steel "everything that could be made out of concrete should be made out of concrete".²¹ Both the architects as well as politicians emphasized the advantages of prefabrication over construction in-situ.²² "Construction sites became assembly sites".²³ It came to a paradoxical situation in which the communist East adhered to economic reasoning whereas in the West the incentives of authorities to use precast concrete systems were purely based on ideology.²⁴

The rejection of the socialist realism doctrine, and the return to modernist architecture in the countries of Eastern and Central Europe coincided with the revision of CIAM principles. The architects, aware of the changes, made attempts to adapt them for the purposes of local conditions, seeing standardization and prefabrication as tools that could be used to reduce costs and improve the durability of their designs. They aimed to put into practice the words of Kisho Kurokawa — "flexibility and change hold the key to quality in mass-produced building".²⁵ Unfortunately, in most of the cases both the flexibility as well as quality end-

ed up just being a designer's dream.

Karel Honzik in his book "The Road to Socialist Architecture"²⁶ analysed the factors determining the compositions of architectural pieces using the method of dialectical materialism. He saw political-economic factors as paramount, and in his view standardization was a *conditio sine qua non* for a centrally planned economic system. Artistic freedom did not comply with economics and would be further hampered with imposed norms, that weren't modified too often. For example, in USSR the system for large panel constructions (KPD) had been regulated by the Construction Norm and Rules (SNiP) created in 1955 which up until the fall of the Soviet Union in 1991 were updated only 4 times.²⁷

5. BETWEEN TWO CENTRES

Architects from socialist countries designed in a space between the path outlined by the authorities of the USSR and the new ideas coming from the West. Contrary to popular belief the Iron Curtain was in reality a Nylon Curtain²⁸, and the architects from the Eastern Bloc had not only been inspired by the achievements of their counterparts in the West but also contributed to the creation of new trends. Polish architects: Oskar Hansen and Jerzy Sołtan were present at the CIAM congress in Dubrovnik in 1956 and during the creation of Team X. On the other hand the Czechoslovakian architects, although not directly working with the Team X, remained under the influence of the French late modernism (especially important for them was the Toulouse-Le Mirail estate).²⁹ Viktor Rudis didn't hide the fact that Georges Candilis and Jaap Bakema had great influence on his works, and while designing the Lesna estate in Brno (1962) he referenced Tapiola suburb near Helsinki.³⁰

The influence of two centres and the resultant value can be seen in the estate designs in the states of the former Soviet Union. In Vilnius the first LPS apartment buildings were created in the late 1950s using the soviet 1-464 system. Just a few years later the Lazdynai estate (arch. Vytautas Cekanauškas, Vytautas Bredikis et al.) was built utilizing the updated 1-464 LI system (the LI stood for Lithuanian, the prefabricated elements had been created in Vilnius). The design showcases western influences (Tapiola in Espoo, Stockholm — Vällingby, Le Mirail in Toulouse) as well as the Soviet concept of *microrayon* (micro district), and the well-known practice of diversifying the buildings through various materials and colours.

Similar solutions were used in Riga, in the Āgenskalns Pines estate, in which the designers N. Rendel and E. Jacobson adjusted the layout of the buildings in accordance with terrain.³¹ In the Ladinai estate in Vilnius, topography played a vital role as a factor responsible for the individualistic character for typical buildings.³² The *microrayon* concept was used in Väike-Õismäe (Tallinn / Fig. 3), although there the architect Mart Port decided on some modifications.³³ Oleg Zhemchugov who designed Lasnamäe used Scandina-



Fig. 3. LPS housing in Väike-Õismäe estate, Tallinn, Estonia. © Dmitry G, Public Domain.

vian models, yet "the cosiness characteristic of Scandinavian new towns (...) was lost due to the enormous scale of the housing estate."³⁴

The impact that peripheral narratives and local limitations had on supra-regional ideas yielded different variants of prefabricated mass-housing. According to Ljubo Karaman, the peripheries were not subordinated to one central hub, but rather were an area in which influence from various centres mixed. Instead of applying general models, the countries of Eastern and Central Europe created their own "particular modernisations".³⁵

6. THE RECEPTION OF "CONCRETE HERITAGE"

Prefabricated mass-housing is an important part of cultural heritage of Eastern and Central Europe in the second half of the 20th century. As a part of material heritage of late modernism it showcases both cultural and social changes. It is therefore necessary to consider the possibilities and the scale of its protection basing on the local reception and the supra-regional significance.



Fig. 4. Plan Grunwaldzki estate, Wrocław, Poland. © Blazej Ciarkowski.

Despite the passage of time, housing estates created in the LPS still raise heated debates. Their local reception is polarized — from the negation of “the unwanted heritage” of the communist era, through strict utilitarian views, to appreciating their cultural and touristic values. It is without a doubt that they remain a vital part of the 20th century heritage and their role as a document of times gone is indisputable. At the same time while they retain their function (in the countries of the former Eastern Bloc large number of people live in buildings created with prefabricates³⁶) they have to be subjected to modification. The high-rise buildings in the Grunwaldzki Square in Wrocław (designed by Jadwiga Grabowska-Hawrylak, 1968) were thermo-modernized (Fig. 4). At first alternative methods of improving the thermal isolation were considered, yet finally a traditional system was introduced and this resulted in the covering of the original texture of raw concrete prefabricates and clinker bricks.³⁷ Technical issues are not the only problem. Of similar importance is the establishing of a potential range of protection and the choice of representative examples. The dilemmas one faces with such a selection became apparent during the research undertaken as a part of an international research project InnovaConcrete.³⁸ One of the main goals of the project is to build social awareness of the value of 20th century

concrete heritage through, among other things, creating a list of a hundred important buildings.³⁹ These were chosen by experts⁴⁰ working on a preliminary list created by Docomomo Iberico. The list comprised not only the greatest pieces of global architecture but also the little known and researched buildings, as well as elements that, due to the strictly technical, infrastructural aspect, have often been disregarded by architecture historians. One should highlight that this selection contained only architectural heritage from the countries of the European Union. Telling is the fact that among the two hundred proposed structures, post-war apartment blocks built using prefabricated elements were represented only by five entries.⁴¹ Of those only one — the Ernst Thälmann estate in Berlin — was chosen from a country of the former Eastern Bloc. This showcases the supra-regional tendency of rejecting the LPS estates in Central and Eastern Europe, which only further emphasizes the need for establishing comprehensive measures of documentation and potential protection.

REFERENCES

BASISTA, Andrzej, *Betonowe dziedzictwo: architektura w Polsce czasów komunizmu*, Warsaw — Cracow, PWN, 2001.
 DREMAITE, Marija, "The Exceptional Design of Large Housing Estates in the Baltic Countries", *Housing Estates in the Baltic Countries. The Legacy of Central Planning in Estonia, Latvia and Lithuania*, Cham, Springer, 2019, 71–93.
 FORTY, Adrian, *Concrete and Culture: A Material History*, London, Reaktion Books, 2012, 14.
 HESS, Daniel Baldwin & METSPALU, Pille, "Architectural Transcendence in Soviet-Era Housing: Evidence from Socialist Residential Districts in Tallinn, Estonia", *Housing Estates in the Baltic Countries. The Legacy of Central Planning in Estonia, Latvia and Lithuania*, Cham, Springer, 2019, 239–259.
 KARAMAN, Ljubo *Problemi periferijske umjetnosti. O djelovanju domsc sredine u umjetnosti hrvatskih krajeva*, Zagreb, Društvo povjesničara umjetnosti, 2001.
 RIABUSZYN, Aleksander & SZYSZKINA, Iraida, *Architektura radziecka/ Sowiet-skaja architektura*, Warsaw, Arkady, 1987.
 ZARECOR, Kimberly E., *Manufacturing a socialist modernity: Housing In Czechoslovakia, 1945–1960*, Pittsburgh, University of Pittsburgh Press, 2011.

NOTES

- This publication is part of a project that has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement, No. 760858.
- Andrzej Basista, *Betonowe dziedzictwo: architektura w Polsce czasów komunizmu*, Warsaw — Cracow, PWN, 2001.
- Hilde Haynen, "The Most Modern Material Of Them All...", *Forty Ways to Think About Architecture*, Chichester, Wiley, 2014, 98–99.
- Adrian Forty, *Concrete and Culture: A Material History*, London, Reaktion Books, 2012, 14.
- In the economic aspects some variations can be observed. For example, the Hungarian Communist Party presented certain "willingness to experiment with hybrid economic forms, limited privatization, and a high tolerance for second-economy activities". Krisztina Fehérváry, *Politics in Color and Concrete: Socialist Materialities and the Middle Class in Hungary*, Bloomington, Indiana University Press, 2013, 80.
- A. Forty, op. cit., 103.
- David Crowley, "Nakierowani na przyszłość", *Autoportret*, No. 3, 2015, 77.
- D. Crowley, op. cit., 81.
- Stanisław Deńko, "Ambasada", *Autoportret*, No. 2, 2017, 80.
- Kimberly E. Zarecor, "Architecture in Eastern Europe, and the Former Soviet Union", *A Critical History of Contemporary Architecture, 1960–2010*, Farnham, Ashgate/ Gower, 2014, 259.
- Stephen Kotkin, "Mongol Commonwealth? Exchange and Governance across the Post-Mongol Space", *Kritika: Explorations in Russian and Eurasian History* No. 8/3, 2007, 520.
- The only exception was Hungary, where in the 1970s prefabricated constructions were only 30% of all the raised buildings (in the years 1970–1975 this number was 29). In comparison in the same period these numbers for other soviet states where the following: The Soviet Union — 75%, Czechoslovakia and DDR — 60%, Poland and Bulgaria — 40%. Virag Molnar, *Tulips and Prefabrication: Hungarian Architects in the Bind of State Socialist Modernization in the 1970s*, accessed on January 20, 2020, http://users.ox.ac.uk/~oaces/conference/papers/Virag_Molnar.pdf.
- Not all of *khreshchovkas* were LPS buildings.
- Kimberly E. Zarecor, *Manufacturing a socialist modernity: Housing In Czechoslovakia, 1945–1960*, Pittsburgh, University of Pittsburgh Press, 2011.
- Grzegorz Wojtkun, "Wielorodzinne budownictwo mieszkaniowe w Polsce. W cieniu wielkiej płyty", *Przestrzeń i Forma* No. 10, 2008, 183.
- Marcela Hanackova, "Team 10 and Czechoslovakia: secondary networks", *Team 10 East: Revisionist Architecture in Real Existing Modernism*, Warsaw, Museum of Modern Art, 2014, 79.
- Jacek Nowicki, "O kierunkach w architekturze współczesnej", *Architektura* No. 5, 1960, 169–170.
- Justin McGuirk, "The Unrepeatable Architectural Moment of Yugoslavia's Concrete Utopia", *New Yorker*, 2018.
- V. Molnar, op. cit., 2.
- Richard Antony French, Frederick Edwin Ian Hamilton, *The Socialist City: Spatial Structure and Urban Policy*, Chichester, Wiley, 1979, 15.
- A. Forty, op. cit., 151.
- Catherine Cooke, "Modernity and Realism, Architectural Relations in the Cold War", *Russian Art and the West. A Century of Dialogue in Painting, Architecture, and the Decorative Arts*, DeKalb, Northern Illinois University Press, 2007, 157.
- Aleksander Riabuzyn & Iraida Szyszkina, *Architektura radziecka/ Sowiet-skaja architektura*, Warsaw, Arkady, 1987.
- A. Forty, op. cit., 164.
- Kisho Kurokawa, *Metabolism in Architecture*, London, Studio Vista, 1977, 86.
- Karel Honzik, *Cestou k socialistické architektuře*, Prague, SNTL, 1960.
- In 1957, 1962, 1971, 1985. Marija Dremaite, "The Exceptional Design of Large

- Housing Estates in the Baltic Countries", *Housing Estates in the Baltic Countries. The Legacy of Central Planning in Estonia, Latvia and Lithuania*, Cham, Springer, 2019, 74.
- The name "Nylon curtain" was invented Hungarian historian Gyorgy Peteri. David Crowley, 77–78.
 - M. Hanackova, op. cit., 85.
 - Marijke Martin, Cor Wagenaar, "Building a New Community — A Comparison Between the Netherlands and Czechoslovakia", *Re-Humanizing Architecture: New Forms of Community 1950–1970*, Basel, Birkhauser, 2017, 165–166.
 - A. Riabuzyn & I. Szyszkina, op. cit., 43.
 - Eugeniusz Szpak, "Wywiad na ul. Architektów", *Architektura* No. 4, 1976, 33.
 - Mart Port, *Architecture in the Estonian SSR, Tallinn*, Periododika, 1983.
 - Daniel Baldwin Hess & Pille Metspalu, "Architectural Transcendence in Soviet-Era Housing: Evidence from Socialist Residential Districts in Tallinn, Estonia", *Housing Estates in the Baltic Countries. The Legacy of Central Planning in Estonia, Latvia and Lithuania*, Cham, Springer, 2019, 152.
 - Ljubo Karaman, *Problemi periferijske umjetnosti. O djelovanju domsc sredine u umjetnosti hrvatskih krajeva*, Zagreb, Društvo povjesničara umjetnosti, 2001.
 - In 2011 in Hungary 17.5% of the total population lived in LPS buildings, in Czech Republic — 26% (in 2015).
 - Jadwiga Grabowska-Hawrylak, "Zespół mieszkaniowo-usługowy przy pl. Grunwaldzkim we Wrocławiu", *Architektura*, No. 10, 1973, 377.
 - Innovative materials and techniques for the conservation of 20th century concrete-based cultural heritage, accessed on January 21, 2020, www.innovaconcrete.eu.
 - Accessed on January 21, 2020, www.100of20.innovaconcrete.eu.
 - Representatives of ICOMOS, Docomomo Iberico, Consejo Superior de Investigaciones Cientificas and the University of Lodz.
 - They are the E. Thälmann estate in Berlin, the Barbican Centre and the Brunswick Centre in London, Bijlmermeer in Amsterdam and Roskilde Amtsgaard in Roskilde.

MATERIALS OF VANN MOLYVANN: FROM POST-COLONIAL PERSPECTIVE

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ABSTRACT.

Through the examination of the works of Cambodian architect Vann Molyvann, this paper discusses the materials of modern architecture in non-western countries that became independent during the twentieth century. Modern architecture evolved based upon modern materials such as glass, steel, and concrete. However, only developed countries fully enjoyed the profit from them. In the colonial era, Southeast Asian countries had to import these materials mainly from their suzerain states. Cambodia, governed by France, was no exception. And even after the Second World War, when the colonies became independent, the “rule of materials” from developed countries continued. Architects in those countries were caught in a post-colonial dilemma. To build modern structures, they had to rely on foreign technologies and materials. However, as long as they continued to rely on imports from Western powers, the nation’s economic independence cannot be achieved. What an architect could do in such a situation was to utilize local resources and adopt a construction method that local craftsmen could construct. Vann Molyvann, an architect and senior official at the Ministry of Public Works, sought modern expression while using Cambodian local materials. His expression of exposed concrete is also a part of his strategy to maximize the use of local resources. Seemingly, his design approach is close to Brutalism. But it was not a mere expression, but a response to the reality in Cambodia; to adapt to the limited budget and to escape from economic control of Western powers through promoting local building industries.

1. INTRODUCTION

Through the examination of the works of Cambodian architect Vann Molyvann (1926–2017), this paper discusses the characteristics of material selection and expression of modern architecture in the non-western countries that became independent after the Second World War.

Modern architecture evolved based upon modern building materials such as glass, steel, and concrete. However, only developed countries fully enjoyed the profit from them. In the colonial era, Southeast Asian countries had to import these materials mainly from their suzerain states. And even after the Second World War, when the colonies became independent, the “rule of materials” from developed countries continued.

After independence, architects in those countries were caught in a post-colonial dilemma. To build modern structures, they had to rely on foreign technologies and materials. However, as long as they continued to rely on imports from Western powers, the nation’s economic independence cannot be achieved. Besides, imports were expensive and not suitable and applicable for the poor emerging country.

What an architect could do in such a situation was to utilize local resources as much as possible and adopt a construction method that local craftsmen could construct. Vann Molyvann, an architect and senior official at the Ministry of Public Works, sought modern architectural expression while using Cambodian local materials. In this paper, through three case studies of Vann’s projects in the 1950s–1960s, I examine how he tried to overcome this post-colonial dilemma.

2. RESEARCH METHODOLOGY

Materials of Vann Molyvann has been mentioned sporadically in the previous researches by Ros,¹ Ross and Collins,² and Matsubara.³ These previous studies, however, didn’t offer in-depth case studies. The originality of this paper, therefore, is to provide the discussion on Vann’s material selection through analyzing the primary sources discovered in Cambodia, Japan and Switzerland. Also, this paper uses field visits and interviews with Vann Molyvann and his collaborators.

3. CASE STUDIES

3.1. Debut with Timbers: Dojo in Cambodia, 1955

Vann Molyvann studied architecture at the École des Beaux-Arts in Paris from 1946 to 1955. For his diploma project at the school, he selected a wooden judo hall (dojo) on a site in Phnom Penh (Fig. 1). Vann learned judo, Japanese martial art, from a Japanese instructor when he was in Paris. This experience likely lead him to design the dojo. The influence of both Japanese and Cambodian traditional timber architecture is evident in the proposal. For example, dimensions use the Japanese measuring system, and wood joints use Cambodian techniques.⁴

In the 1950s, Japanese modern architecture had already an international reputation. Thus, there is a possibility that Japanese architects served as a role model for young Asian architects like Vann Molyvann. In a couple of interviews in the 2000s, Vann mentioned that he was influenced by Kunio Mayekawa and Kenzo Tange.⁵ There is a possibility that Vann knew the modern timber buildings designed by these two Japanese Masters.

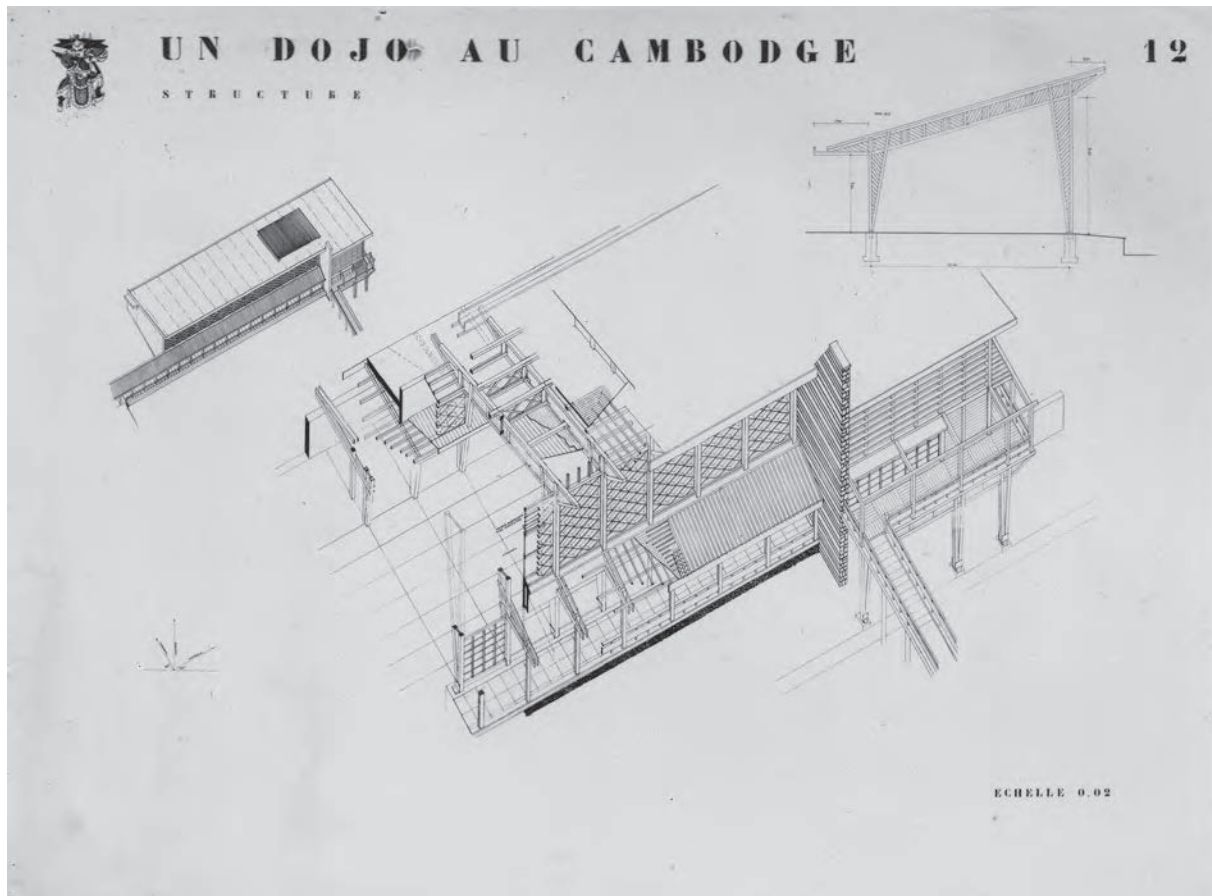


Fig. 1. Vann Molyvann, Dojo in Cambodia (Diploma Project at ENSBA), Phnom Penh, Cambodia, 1955, axonometric drawing. © Vann Molyvann.

From a material point of view, it is important that “the characteristic of local timber (Les Caractéristiques des bois locaux)” is explained in his proposal. Vann Molyvann compared the compressive strength, the densities, as well as the textures of various local timbers on his drawing. He had a keen interest in the technical properties of timbers and selected the right materials in the right places.

Vann Molyvann said that this diploma project led to his maiden work in Cambodia: Pavilions for the Celebration of Buddhist Era 2500 (1957). But after these pavilions, he designed only a few timber buildings. For durability, Vann relied more on concrete rather than timbers.⁶ Besides, the large-scale timber structure was not technically developed by the 1970s, therefore Vann had no reference to look at. In the 1960s, he applied timbers for temporary structures, sub-structures and interior decorations, but never utilized them for the main structure of his permanent projects.

3.2. Between Domestics and Imported: National Theatre, 1958–1967

The Preah Suramarit National Theatre was the home of

the Royal Ballet of Cambodia (Fig. 2). It was raised on pilotis and ended in a sharp edge like the prow of a ship floating on the Bassac River. The kite-shaped plan was laid out on a triangular grid with sharp angles. Its roof and pyramid-shaped fly tower were composed of steel structure.⁷

The basic design of National Theater was finished by 1958. The Japanese construction company Obayashi Corporation won a bid for the project along with a Cambodian partner, Chrun You Hak. The detailed design and structural design were developed by Obayashi around 1960.

Based on the specifications of the project⁸ and interviews with former Obayashi staff, construction materials were categorized into two groups; domestics and imported. Local materials selected for the project were: sand, soil, aggregate, and timber. Also, brick was specified to be “from the country (du pays hordée).”⁹ On the other hand, foreign-made materials were: cement, steel, waterproofing, and almost all interior materials such as tiles, glasses, fittings, hard wares, sanitary wares, and paints. According to the former Obayashi Staff, steel roof structures were produced in Chiba, Japan, and shipped to Cambodia.¹⁰



Fig. 2. Vann Molyvann, National Theatre, Phnom Penh, Cambodia, 1967, construction photo ca.1965. © Masao Ishihara.

In the 1950s, it was possible to procure tiles locally, but Vann Molyvann specified the tiles to be “French-made (*de fabrication française*)”. According to Khau Chuly, Cambodian contractor, “Vann Molyvann liked French materials since he studied in France”.¹¹ Other French-made products selected for the Theatre include: glasses (Saint-Gobain), paints (Silimat) and acoustic panels (Sonisorel). These products were frequently advertised on the French magazine *L'Architecture d'Aujourd'hui* around 1958. Vann most likely referred to the French magazine to find the materials for his project.

The construction of the Theatre was completed around 1967. As for the materials, there are two major differences between the primary design and the final design. Firstly, in the final design, the rear facade is completely covered by exposed brick walls, which is not apparent in the drawings of the first design. Secondly, the foyer is covered by a glass curtain wall in the first design, but this was cancelled. Instead, the foyer in the final design is covered by the precast concrete claustra like fish scales. For Vann, who served the state, the reduction of construction expenses to save the national treasury was a highly important objective. To lower the project budget, local materials had to be used to the greatest extent and imported materials were reduced; but at the same time, Vann had to express the modernity of the state

through the project. The need to meet these conflicting interests is likely the reason for his choice to combine reinforced concrete structures, concrete claustra, and exposed brick walls in the final design.

3.3. Steel Versus Concrete: National Sports Complex, 1962–1964

The National Sports Complex is Vann Molyvann's representative work, built in Phnom Penh in 1964 (Fig. 3). During the schematic design phase, two plans were developed for the main stadium of the Complex; an option using steel, and an option using reinforced concrete. The steel option was designed by a Japanese team led by Gyoji Banshoya, a United Nations officer at the Ministry of Public Works.¹² A French team, led by Vladimir Bodiansky, proposed the concrete and soil option, which was ultimately victorious. Vann said in 2008: “At first, the plan was launched in Japan, but they asked for too much money. We had to work everything out so as to use all the local material we could — the soil, the local workforce. After having settled the deal, we were able to hire a French company to carry it out. This was agreed on because of the experts' knowledge of concrete, local materials, and the actual Cambodian workforce's capacity to bring the sport complex to life.”¹³

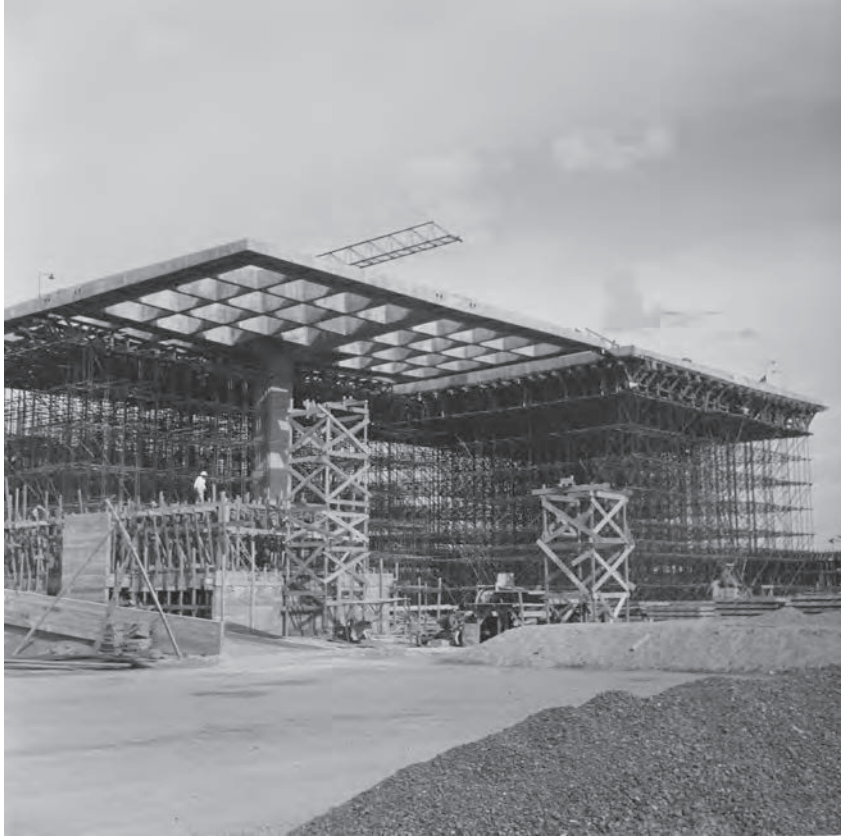


Fig. 3. Vann Molyvann, National Sports Complex, Phnom Penh, Cambodia, 1964, construction photo. © Vann Molyvann, Micheline Dullin (photograph).

In the interview by Matsubara and the author, Vann explained that Banshoya's plan needed to import the steel and invite more than 2000 skillful workers from Japan.¹⁴ The Japanese option, therefore, needed "too much money" for materials and labors. Besides, there was an accident in 1960. A steel bridge over the Mekong collapsed, and Vann felt that steel was not trustful.¹⁵

In the end, Vann Molyvann chose the cost-effective scheme of concrete and soil. And by using exposed concrete, Vann was able to represent "modernity." In accordance with the Brutalist style of the time, local materials and labor were exclusively used but expressed modernity. Besides, Vann deftly connected the expression of the exposed concrete to Angkorian tradition. He said in 1968: "The ancient Khmers were virtuosos in contrasting the reddish laterite of the foundation-mass with the noble blue of sandstone in the sanctuaries. Today, the best effects are obtained with rough beton."¹⁶

4. DISCUSSION

4.1. Timber, Steel to Concrete

The case studies explained three different structural systems applied by Vann Molyvann: timber structure (Dojo),

concrete and steel (Theatre), and concrete and soil (Stadium). Vann Molyvann, as a young Asian architect, started his career with timber structures. Timbers were reasonable since they were procured locally, as well as expressive, since they were related to the traditional architecture. However, the use of timber was technically limited to small-scale buildings at that time.

In the 1950s, for large-span buildings such as Chaktomuk Conference Hall (1957–1961) and National Theatre, Vann designed steel structures. As we have seen in the second case study, steel structures were imported from abroad and therefore expensive.

The stadium of the National Sports Complex was the turning point. Vann compared steel and concrete options and eventually chose the latter. Interestingly enough, after the completion of the National Sports Complex in 1964, Vann never used steel nor timber for the main structures of his projects. In the interview by the author, Vann said: "I think myself I am better at concrete than steel".¹⁷ After the successful completion of National Sports Complex, Vann became confident in his design of the concrete structure. In addition, the opening of the cement plants in Cambodia in 1965 likely encouraged him to design concrete structures. In the interview by Bill Greaves, Vann Molyvann mentioned

that “it favoured the creation of Khmer building firms and a national building industry — brickyards, cement plants, a timber industry.”¹⁸

4.2. Reflection on “Brutalism”

The preference of exposed concrete, or *béton brut*, is a common trend among architects in emerging nations. Leandro Locsin in the Philippines, Carlos Raúl Villanueva in Venezuela, Fernão Simões De Carvalho in Angola are such examples, not to mention Le Corbusier in Chandigarh, Louis Kahn in Dhaka or Oscar Niemeyer in Brazil. Today, the works of those architects are called “Brutalism”, and Vann Molyvann’s works are also considered as an example of this architectural trend.¹⁹

Brutalism (or New Brutalism) was theorized by Reyner Banham in 1955, to characterize the architectural tendency in Europe in the 1950s. Banham associated the trend with Le Corbusier’s “*béton brut*”, and summarized its quality as “formal legibility of plan”, “clear exhibition of structure”, and “valuation of materials for their inherent qualities ‘as found’.”²⁰ Vann never used the term “Brutalism” in his essays nor interviews, but he often talked about “*béton brut*”. When he was in Paris as a student, he visited Unité d’Habitation in Marseille,²¹ which is described as an exceptional precedent of New Brutalism in Banham’s essay. Young Vann Molyvann was likely influenced by this latest architectural trend in Europe.

However, Vann’s preference for concrete is not explained only by his empathy for Brutalism. As described in this paper, steel construction was an uneconomical method in Cambodia, since it relied on foreign materials, labors, and technology. Reinforced concrete, on the other hand, was relatively economical because it could make the maximum use of local materials and labor. Besides, in Cambodia at that time, not only metals and glasses but even paints had to be imported from foreign countries. Therefore, exposed concrete was almost the only finishing material that was able to express modernity on the surface but could also be locally procured. Further, Vann deftly associated the materiality of exposed concrete to the traditional architecture of Cambodia; Angkor. It appears that Vann preferred exposed concrete for this expressive, economical, and practical reason.

In the 1950s–1970s, other emerging nations were in a similar situation as Cambodia. After the Second World War, steel’s share in the world was oligopolies by the US, USSR, European countries, and Japan. Even in Brazil, where the steel industry started relatively early, steel construction was exceptional until the 1980s due to a lack of technology.²² In this situation, reinforced concrete is always more economical than steel construction. Thus, whether architects liked it or not, reinforced concrete was dominant at sites for economic and technical reasons. For another example, the Philippines’ national architect Leandro Locsin said that he selected concrete because it was reasonable.²³

The aesthetic expression of Brutalism is based on the

plasticity of exposed concrete, and it was applicable even in emerging countries where the materials and techniques available were limited. Brutalism, “the latest trend” from Europe, was likely the optimal solution in those countries, not only for its modern expression but also for economic and technological reasons. In other words, it appears that the economic and technical requirements, not the philosophy, were the critical reason why Brutalism spread in many emerging countries.

Besides, as a senior official of the government, Vann had a sense of mission to promote Cambodian building industry, to reduce the reliance on neo-colonial powers and eventually break up the monoculture economy. Material selection of Vann Molyvann was in the midst of the reality and the ideal of his country. Technology, materials, and budgets were limited in Cambodia. It was the reality and therefore he used concrete and local materials for his projects. On the other hand, the maximum use of local materials was the action to pursue the ideal of the newly independent country: the economic freedom from neo-colonial powers.

Regardless of the original designer’s intention, it is possible to label “isms” (Brutalism, Regionalism, or Critical Regionalism) to past works. However, such labeling and categorization are liable to be Eurocentric. Rather, by understanding the reality and the ideals of architects, the essence of the Modern Movement in emerging countries may reveal itself.

ACKNOWLEDGMENTS

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NOTES

- 1 Lisa Ros, *Architecture Moderne à Phnom Penh 1954–1970* (in French), Paris, Graduation thesis at Ecole d’Architecture de Paris-Belleville, 2000.
- 2 Helen Grant Ross & Darryl Leon Collins, *Building Cambodia: ‘New Khmer Architecture’ 1953–1970*, Bangkok, The Key Publisher, 2006.
- 3 Kosuke Matsubara, “International Cooperation by Japanese Specialists for Urban Planning in Cambodia in 1960’s”, *Journal of the City Planning Institute of Japan*, Vol. 50 No. 3, Tokyo, 2015.
- 4 Masaaki Iwamoto, “Dojo in Cambodia — Diploma Project”, *a+u*, No. 567, Tokyo, 2017, 19. The original drawings of Dojo belong to Vann Molyvann’s private archives in Siem Reap, Cambodia.
- 5 Bill Greaves, “Vann Molyvann The Agency Interview: The Litany of Power, The Legacy of Modernism”, *Perspecta*, 45, Cambridge, 2012.
- 6 Ly Daravuth & Ingrid Muan, *Cultures of Independence: An Introduction to Cambodian Arts and Culture in the 1950’s and 1960’s*, Phnom Penh, Reyum publishing, 2001, 15.
- 7 Masaaki Iwamoto, “National Theatre”, *a+u*, No. 567, Tokyo, 2017, 63.
- 8 The documents belong to Obayashi Corporation archives.
- 9 According to the specification in Obayashi Corporation Archives. Masaaki Iwamoto, “Research on the architectural documents of Vann Molyvann from the archives of Obayashi Corporation”, *AJ Journal of Technology and Design*, Vol. 22 No. 51, Tokyo, 801–806.
- 10 Interview with Masao Ishihara in Tokyo, 2. Sep. 2015.
- 11 Interview with Khau Chuly in Phnom Penh, 27. Feb. 2016.
- 12 Kosuke Matsubara, op. cit.
- 13 Micheline Dullin, *Une vie de photographie: Cambodge 1958–1964* (in French), Paris, Trans Photographic Press, 2012, 180.
- 14 Interview with Vann Molyvann in Siem Reap, 15. May. 2015.
- 15 Monivong Bridge, built in 1929 under the French rule, collapsed in 1960. Pictures of this accident are found in Vann Molyvann’s private archives in Finhaut, Switzerland.

- 16 Vann Molyvann, "Modern Khmer Architecture", *Nokor Khmer*, No. 1, 1969, 45.
- 17 Interview with Vann Molyvann in Siem Reap, 22. Feb. 2016.
- 18 Bill Greaves, op. cit., 91–93.
- 19 National Sports Complex was included in the exhibition "SOS BRUTALISM Save the Concrete Monsters!", held at German Architecture Museum in Frankfurt, 2017.
- 20 Reyner Banham, "The New Brutalism", *Architectural Review*, No. 118, London, 1955, 361.
- 21 Interview by Masaaki Iwamoto, 22. Feb. 2016.
- 22 Eduardo de Miranda Batista & Khosrow Ghavami, "Development of Brazilian steel construction", *Journal of Constructional Steel Research*, Vol. 61, No. 8, 2005.
- 23 Leandro Locsin, *The architecture of Leandro V. Locsin*, New York, Weatherhill, 1977.

FROM IMITATION TO ACCEPTANCE TO WORLDWIDE PRODUCTION OF SCHOKBETON

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ABSTRACT.

The Dutch precast concrete company Schokbeton started activities in the early 1930's, introducing well compacted concrete elements some of them plain, others mimicking the colour, details, and surface finishes of natural stone. Being a modern, industrially produced material with a traditional stone imitating look, Schokbeton served both traditional and modern architecture. This paper presents original research on the factories' concrete recipes and products (1930–1970) and concludes on the development of the material from an imitation to a 'real' material in its own right. The paper discusses the relation between the patented production technology, the architectural products used in Modernist buildings and the concrete technology (recipes). The recipes show experiments with crushed stone and many different sands. At first, the mixtures seemed to be random, but looking closer it becomes evident that the post-war architectural developments highly relate to the use of certain aggregates in the concrete and therefore with the aesthetics. It is argued that the relation of the concrete mixture and production technology with the design of the concrete element has often been underestimated. It is clear that by the end of the nineteen fifties an International Style in precast-concrete was born. Schokbeton clearly played a role in this development, but based on recently discovered archive material it is questionable how big this influence has been.

1. INTRODUCTION

In 2015, the Dutch part of the international precast concrete company Loveld went bankrupt. This company was the legal continuation of the Dutch company Schokbeton N. V. founded in 1932. This brought compacting concrete by means of the patented shocking technology after 83 years to an end in The Netherlands. Researchers of TU Delft were enabled to save documents, including historic concrete recipes, from the laboratory. Together with approx. 300 sample castings, these archival materials laid the basis for new research into the production of Schokbeton.

Several studies have been published by e.g. Van Zuijlen, Stenvert, De Jonge, Pyburn, Heinemann, and Quist.¹ Either focussing on a single case, the production technology or the development of the company, all studies and consequent publications address the historical-technological importance of the brand and associated technology of Schokbeton. As the patented shocking technology was licenced all over the world, Schokbeton seems — in retrospect — to have reached almost mythical status.

This paper aims at understanding the role of Schokbeton in the development of architectural precast concrete in The Netherlands and its international exposure in the period 1930–1970. Two essential aspects of the concrete will be dealt with: the use of aggregates to reach different colours and surface structures and the frame or window frame as an architectural component that played an important role in the production of Schokbeton. From this perspective, the paper discusses the international influence of the company and its patented technology.

2. SCHOKBETON

2.1. Technology

The Schokbeton technology was based on optimal compaction of precast reinforced concrete with a low water-cement factor by means of lifting and dropping the mould on a stiff base with a very high frequency (up to 400/minute) over a height of 0.8–2.5cm.² The patent only regards the shocking technology and doesn't refer directly to the concrete mixture. To achieve the high grades of compaction, very well graded aggregates, mainly sharp crushed stone instead of rounded river gravel are necessary, especially with regards to finely detailed elements. Drawings, recovered from the company archive, illustrate that the development of equipment was an in-house activity. The *schoktafels* (shocking tables) for the Kampen factory (opened 1947), were designed, engineered and built by company staff. Also, drawings regarding factories in Puerto Rico and Accra have been identified in the archive.³

2.2. Products

From the patent, it becomes clear that Schokbeton started as a concrete compacting technology, not as a product. Although only referred to as an example, the drawing in the patent shows the production of a foundation pile. This seems to have been one of the first products resulting from the compacting technology. Together with other components related to groundwork such as sheet piles and planks those were advertised mid nineteen thirties under the name of *Schokindustrie*.⁴ The overview of executed projects over the year 1938 shows a wide range of Schokbeton-components in buildings: industrial window frames, façade elements, structural components, small elements, etc.⁵ The

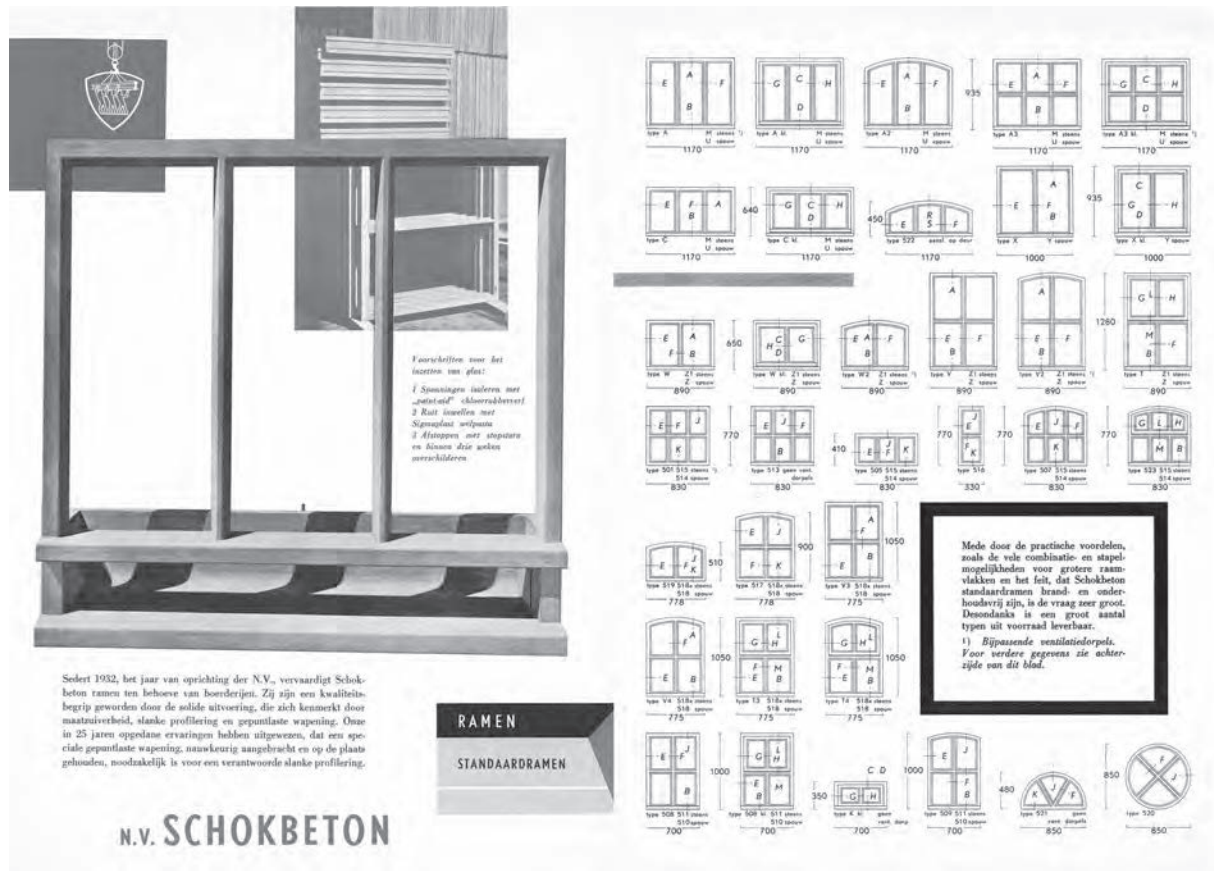


Fig. 1. Two pages from a Schokbeton brochure on standard window frames (approx. 1960). © Schokbeton Collection Heritage & Architecture.

term “Shockcrete” was used to brand components as artificial stone: e.g. *granite, syenite, sandstone, basalt* or *black Swedish*, referring to the (main) aggregate used.⁶ Shockcrete refers to the aesthetic outer layer of the precast concrete. In their advertisements, Schokbeton argues that it is not an added layer (like a render) but cast consecutively and interconnected with the inner body of the concrete during shocking (and therefor more durable).

3. WINDOW FRAMES

The company Schokbeton mentions window frames in several brochures, annual reports and advertisements as an important product category, both referring to the standard window frames and the special products, designed and engineered for a specific project. The design, engineering, and consequent production of ventilating stable windows for animal farms in the newly created *Wieringermeerpolder* in the period 1935–1938 established a strong commercial basis for Schokbeton. A brochure dating approx. 1960 shows standard windows in many variants, angular, arched or circular in different sizes (Fig. 1). Many Dutch buildings are

known with those off-the-shelf windows, ranging from farms to industrial building to churches. In retrospect it can be concluded that the window frame or any other façade element based on jambs, girders and fillings was the perfect product to be produced by the Schokbeton technology. The factory context allowed for an optimal alignment of the reinforcement and the shocking technology allowed for both a dense, hardly penetrable (by water and oxygen) surface and slender dimensions. Combined with a carefully designed concrete mixture with finishes exposing the coarse aggregates different aesthetics could be achieved.

A lot of successful and often referenced Dutch Schokbeton projects relate to the frame or window frame as the essential element. Even the barns built in the Flevopolder and the barracks for the US army built in Iceland and Greenland are essentially based on the principle of the frame: horizontal and vertical ribs with a thin slab in between shaped slender elements, creating a non-load-bearing wall.⁷ It was only in the early 1960s that the production of precast concrete elements for two international projects — Banque Lambert by SOM (G. Bunshaft) in Brussels and the American Embassy in Dublin by John M. Johansen — seemed to have broken



Fig. 2. Left: B. van Veen, Bank and apartment building, Rotterdam, 1939–1940, basalt-Shockcrete. Right: S. van Ravensteyn, Blijdorp Zoo, Rotterdam 1939–1941, brick-Shockcrete. © Wido Quist, 2020, 2019.

with the tradition of the frame-based façade elements. Both projects have a heavy loadbearing exoskeleton instead of slender frame-based infills. The concrete elements were still produced with the 1930s shocking technology but it is questionable whether the compacting technology made the difference in those elements.

4. ARCHITECTURAL PRECAST CONCRETE

Although non-fired, mostly non-reinforced artificial stone is already known from the mid-nineteenth century (i.e. Ransome stone was patented in the United Kingdom in 1844), it took until the 1930s that precast architectural concrete came to the Dutch market at a large scale.⁸ Experiments with concrete mixtures, stone imitating renders, finishing techniques, the production of structural precast concrete and the acceptance of concrete as a building material instead of only an engineering material paved the way for architectural precast concrete.⁹ During the yearly fair for building materials in 1937 in Utrecht, several companies presented precast concrete with different surface finishes, amongst them Schokbeton. From 1938 the first advertisements by Schokbeton — introducing 8 types of Shockcrete — targeted at architects are known.¹⁰

4.1. Shockcrete

Wattjes (1938) refers to Schokbeton with fine granite gravel used in the new Gymnasium of Leyden (architect J. Neisingh), without using the name Shockcrete. The first major use of Shockcrete, referred to as artificial granite or just artificial stone, seems to be the façade of Joseph Emberton's casino at Pleasure Beach, Blackpool, (1937–1939). The type of

Shockcrete used at the casino was nr. 7 — *witte steenslag* (white crushed stone), at the Gymnasium either nr. 1 — *Saksisch graniet* (Saxon granite) or nr. 5 — *Beiersch graniet* (Bavarian granite). In the case of Emberton's casino, it is mentioned that Medusa cement was used.¹¹ Medusa was an American Portland cement producing company, both ordinary grey and white PC.¹² When referred to it in the Dutch context it may be assumed that it is referred to as white Portland cement, because ordinary grey Portland cement was also available from many other (European) suppliers. This complies with remarks on recipe lists mentioning that all recipes contain ordinary grey Portland cement, unless otherwise noticed.

Shockcrete nr. 4 — *Basalt grijs* (grey basalt) was used in 1939–1940 in the façade of a former bank and apartment building (Goudsesingel, Rotterdam, architect B. van Veen; Fig. 2). In the same period, Blijdorp Zoo was designed by architect S. van Ravensteyn, using different elements of Schokbeton. At the *Rivierahal* (Fig. 2), the main building of the Zoo, Shockcrete nr. 18 — *paarse klinker* (purple brick) and nr. 19 — *gele klinker* (yellow brick) have been macroscopically identified.

The list of Shockcrete types expanded from the 8 known in 1938 to 52 in an undated list, presumably dating to the end of the nineteen fifties.

Although the company Schokbeton continues to use different aggregates for architectural concrete, the use of the term Shockcrete seems to not always have been used by the end of the nineteen fifties. With the Neherlab in Leidschendam (S. J. van Embden, 1955) it is used, but not in the context of three telephone exchanges in Amsterdam (municipal architects, 1959–1960).¹³ With the Banque Lambert in Brussels

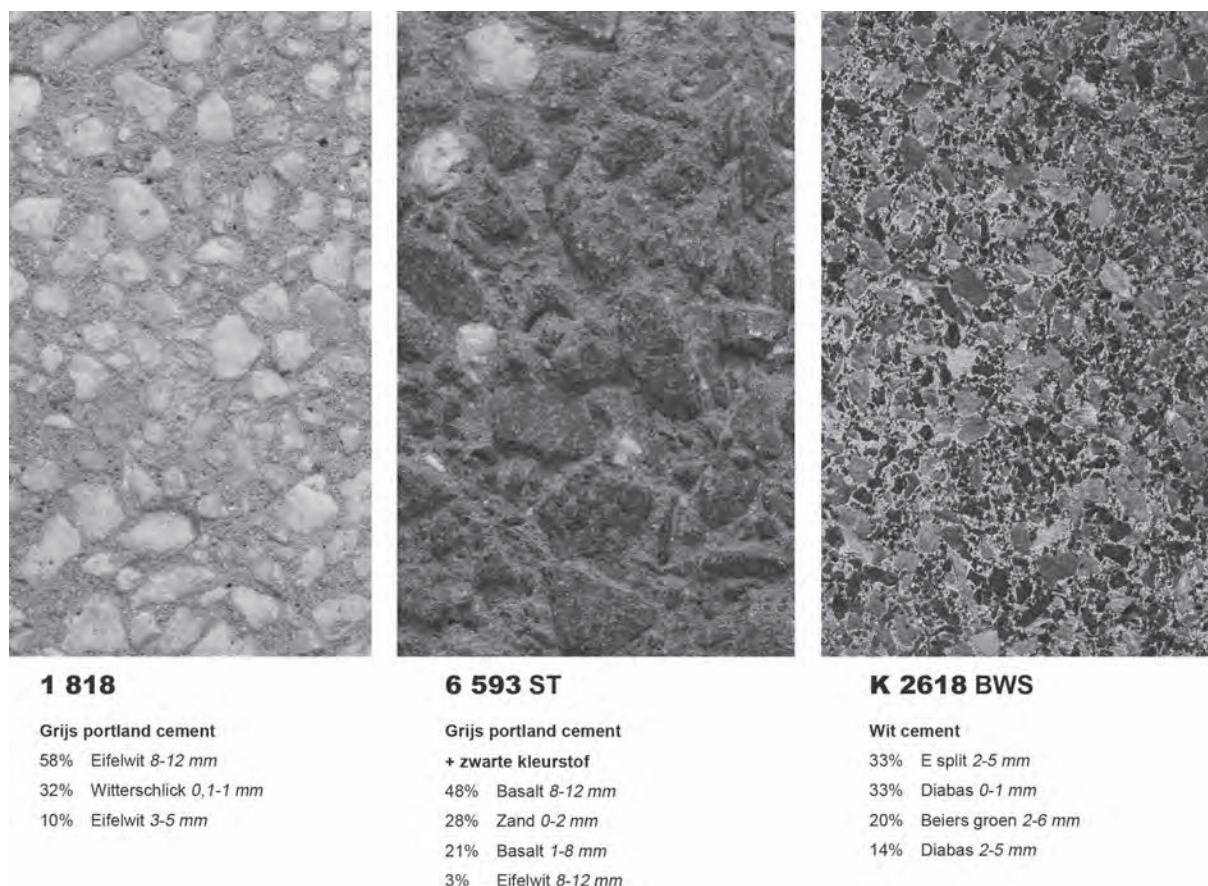


Fig. 3. Three sample pages from the Schokbeton reference fan. © Wido Quist and Jacqueline van Dam, 2019.

(1963), the term is back in use.¹⁴ There could be a relation between the application of an outer layer of aesthetical concrete and the term Shockcrete, although “shockcrete” is not mentioned. In the case of the Osdorp telephone exchange there is a minimum thickness of the outer aesthetical layer of the precast elements mentioned of 30mm.¹⁵ The term Shockcrete is not mentioned in the 1971 licensee manual.

4.2. Development of Recipes

About 1000 different recipes in all its variants have been identified in the recipe-books from Schokbeton's concrete laboratory. All the available information has been entered in a database for easy reference (Fig. 3). Due to the different ways of describing, numbering, listing and to the absence of dating information, it is — with this information — not yet possible to completely reconstruct the development of recipes, but some tendencies can be observed. Further research on the synonyms of different aggregates, the in-depth analysis of the technical information and the combination with other archival sources will eventually reveal even more information.

4.2.1. BLACK OR DARK GREEN CONCRETE

Among the first eight recipes, three of them are blackish-greenish: syenite, basalt and black Swedish, obviously referring to stones that were very popular during the 1920s and 1930s in The Netherlands, especially in the Amsterdam School — and related — architecture. The recipes with dark aggregates show a large variety in cement type and/or add mixtures. Using grey Portland cement in combination with black basalt — depending the grading of the aggregates — would result in a greyish concrete, where white Portland cement together with basalt would make the aggregate stand out more. The use of manganese black as a pigment together with grey Portland cement gave a darker cement paste.

4.2.2. WHITE CONCRETE

Next to the dark blackish-greenish coloured Schokbeton, light-coloured concrete elements seem to have been very popular, according to the number of recipes. The façade elements for Emberton's casino were probably the first ones as the elements for the Banque Lambert in Brussels proba-

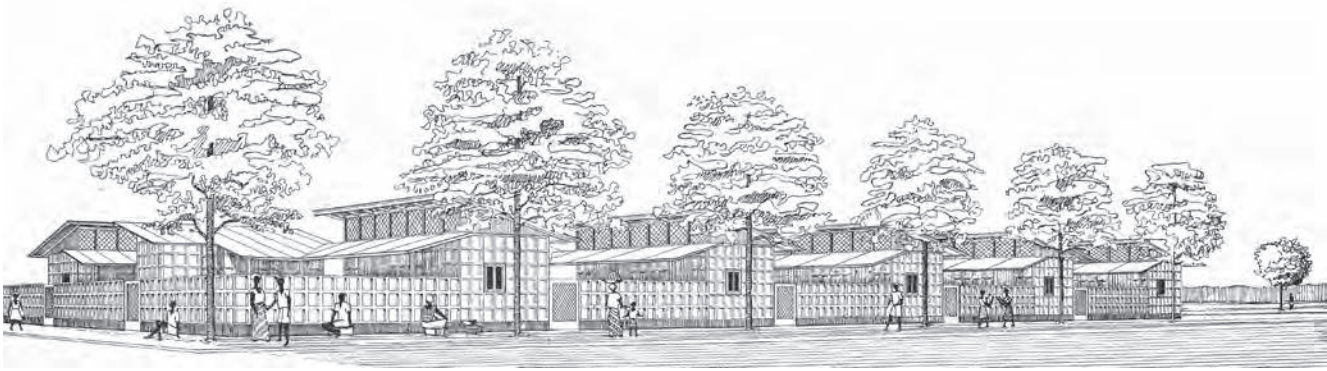


Fig. 4. One of the designs for housing in Accra by N. V. Raatbouw / N. V. Schokbeton. © N. V. Raatbouw 1952.

bly represent the ultimate whiteness. The use of white Portland cement — in later recipes accompanied by the pigment titanium dioxide — combined with silver sand is the obvious basis to create a white concrete. Coarse aggregates that can be observed in the white recipes are mainly Eiffel quartz together with the more yellowish Taunus gravel or Kaiser gravel or a multicolour river gravel, but also Cararra marble, different types of white limestone and the industrially produced grenette, luxovit and granusil can be found in the database. The 1971 licensee manual advises to polish the white concrete to expose as much as possible the white aggregates that were less vulnerable to soiling than the cement paste.¹⁶

4.2.3. SPECIALITIES

Crushed brick seems to appear in recipes in the late 1930s and 1940s, just like shells and silex. The use of finely crushed brick as aggregate is known from Blijdorp Zoo and precast concrete elements of several railway stations by architect Schelling show crushed ceramics as well. Also, silex is identified in the façade elements of Schelling's railway station of Zutphen. Although Schokbeton casted elements for this station, it is not clear which elements, as it is also known that Meteor — another precast concrete company — delivered elements for this building.¹⁷

5. DISCUSSION

The relation between the patented shocking technology, the wealth of recipes and the frame-based concrete elements has never been emphasized before. This perspective even strengthens the unique contribution of Schokbeton on Dutch Modernist architecture, but it directly questions the international importance. Although an exact chronological list of international companies using the patented shocking technology does not exist, it is clear that *Højgaard & Schultz* in Copenhagen from 1951 onwards was one of the first outside The Netherlands producing Schokbeton elements.¹⁸ The resemblance between their first buildings and

the Dutch frame-based façade architecture is remarkable. Not only the patent was exported, also the engineering. Whether this was successful on the longer term is not known.

In 1952 Raatbouw (a Schokbeton company) exported 134 housing units to Gold Coast and Dutch engineers and architects did an extensive research in the possibilities to start a Schokbeton factory in Accra with the aim to produce cheap houses, solving the local housing shortage.¹⁹ They even studied and tested the possible sources of local fine and course aggregates. Knowing the experiments with social housing on the Dutch Schokbeton factory site in 1947–1949, it is clear, looking at Fig. 4, that Schokbeton tried not only to export the patent but also the product (façade elements).²⁰ In the end, the houses turned out to be too expensive, but it is also imaginable that the Dutch based architecture did not appeal to the Africans.

When the Schokbeton license finally came to the USA in 1960, the 1940s–1950s slender concrete architecture was coming to an end and the load-bearing façade was becoming popular. Of course, those elements could also be made by using the shocking technology, but it is questionable if this technology was a prerequisite. Further research on the portfolios of the different Schokbeton licensees should shed a light on the real influence of Schokbeton on the International Style looking at the patented technology, frame-based elements, concrete recipes, and their relation.

ACKNOWLEDGEMENTS

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NOTES

- 1 L. van Zuijlen & R. Stenvert, "Schokbeton: Zwijsrecht / The Netherlands / International", Prudon & Normandin, *Concrete and Modernism: Technology and Conservation, ISC/T dossier 14*, 2015; J. Pyburn, "Schokbeton in the USA", Prudon & Normandin, *Concrete and Modernism: Technology and Conservation, ISC/T dossier 14*, 2015; H. A. Heinemann & W. J. Quist, *Het Schokbetonarchief — voorbeeld van het afstoffen van prefab beton erfgoed*, Delft, TNO — NVMz studiedag Historisch beton, 2017.
- 2 Dutch patent No. 36029: filed June 29, 1933, published September 15, 1934, granted July 4, 1935, British patent (427213): granted April 17, 1935.
- 3 Schoktafel drawings Puerto Rico & Gold Coast, Schokbeton Collection Heritage & Architecture.
- 4 Anonymous, *Catalogus voor de Bouwwereld*, 1937.
- 5 NV Schokbeton Zwijsrecht, *Een greep uit de door ons in 1938 uitgevoerde werken*.
- 6 H. Heinemann & W. Quist, "Stone and concrete: a review of the coevolution of the surface finishes of two building materials", I. Wouters, et al., *Building Knowledge, Constructing Histories: Proceedings of 6ICCH*, London, 2018, Vol. 1, 141–148.
- 7 Stenvert and Van Zuijlen 2018, Pyburn 2018.
- 8 T. G. Nijland & W. J. Quist, *Historische oppervlaktebehandelingen voor de conservering van steenachtige materialen (natuursteen, beton, metselwerk) in Europese context*, TNO rapport 060.12579, 2017.
- 9 H. Heinemann & W. Quist, 2018.
- 10 J. G. Wattjes, "Het nieuwe gymnasium te Leiden", *Het Bouwbedrijf*, 1938 (15), nr. 23, 225–233.
- 11 NV Schokbeton Zwijsrecht, *Een greep uit de door ons in 1938 uitgevoerde werken*.
- 12 H. A. Heinemann, "Historic Concrete: from Concrete repair to Concrete Conservation", PhD Thesis TU Delft, 2013, <https://doi.org/10.4233/uuid:987fafo-cd76-4230-beoe-be8843cae08e>.
- 13 See Schokbeton brochures, *Gevelstructuur — Dr. Neherlaboratorium, Leidschen-dam* and *Montagebouw — Telefooncentrales, Amsterdam*.
- 14 See Schokbeton brochure, *Gevelstructuur — Banque Lambert, Brussel*.
- 15 Building specifications, City Archive Amsterdam, inv. 39238, acc. 10057.
- 16 Schokbeton products corp. USA, Schokbeton Information, 1972.
- 17 T. G. Nijland, "Van Doornikse kalksteen tot beton 'als het definitieve materiaal', Het materiaalgebruik van spoorwegarchitect H.G.J. Schelling", Bulletin KNOB 108, 2009, 5–6, <https://doi.org/10.7480/knob.108.2009.5-6.167>.
- 18 Anonymous, *Personal communication of Jørgen Burchardt and Lars Gravesen, Chockbeton I Dansk Byggeri*, Ingeniøren 15-11-1952, 691–696.
- 19 A lot has been written in Dutch and British media about this deal. See the report Schokbeton NV. *Survey report on the development of the Schokbetonprocess in the Gold Coast*, Zeist, 1952.
- 20 N. V. Raatbouw, Proefwoning gebouwd in Kampen in het systeem Raatbouw van de N. V. Raatbouw te 's-Gravenhage in samenwerking met de N. V. Schokbeton te Kampen, Kampen, 1952.

THE 'ASSIMILATED' CONCRETE; A GREEK VERSION OF A GLOBAL MATERIAL

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ABSTRACT.

The use of concrete as a construction material has virtually shaped, since modernity, the built environment of Greece and its local construction market. Nevertheless, cultural and social parameters that led to the organic implementation of concrete are mostly fragmentarily mentioned in Greek and international bibliography alike. Such is the case also for specific traits related to the use of concrete, both in terms of construction logic and of the material's finishing, which became synonymous of the work of architects such as Dimitris Pikionis or Aris Konstantinidis. A localised history of concrete has thus yet to be structured. This paper seeks to contribute to that direction by discussing a materiality (specific textures and colour schemes) connected with an increasing attention to the context, which grew typical of the work of a group of Greek architects, of modern lineage. By commenting upon a few, representative case studies, spanning from the first quarter of the 20th century to the present, the paper looks at principal traits of a localised appropriation of concrete construction.

It is also argued that the work of the two hegemonic figures of the Greek modernity, Pikionis and Konstantinidis, are *phenotypes* of the same *genotypical* concern for contextual architectural qualities that are apparent in the care instilled in the use of concrete.

1. INTRODUCTION

When modernity is discussed in relation to the Greek context, there are two names that unequivocally come up, those of Dimitris Pikionis (1887–1968) and of Aris Konstantinidis (1913–93). A generation apart, but of equal impact on Greek architects that succeeded them, they are distinguished among their peers for their unique architectural idioms, but also for their distinct stands towards modernity.

In this sense, the work of Dimitris Pikionis and Aris Konstantinidis is often presented as two distinct *genotypes* of the Greek modern: the former prioritising aesthetics, the latter functionality. It will be here argued that it represents two *phenotypes*¹ of the same generic architectural approach, animated by a desire to endow modernity with specific qualities characterising the local context. This approach is eloquently reflected in their use of concrete.

Concrete was, along with glass and metal, one of modernity's new materials. It has also worked as a medium for assimilating international tendencies in localised contexts around the world, and for widely implementing modernity into local construction markets. Hence, the history of Greek architecture during the 20th century is inextricably linked with the use of concrete.

By looking at the primary attributes of Pikionis' and Konstantinidis' concrete and at those of a few of their successors, it emerges that a new version of this history can be traced through the roots of a distinct architectural materiality, unmistakably linked with an alternative, localised modernity.

2. A NOT SO NEW CONSTRUCTION MATERIAL

Concrete was not an entirely new thing in the Greek context. French- and German-certified construction techniques may have been imported in the country in the first years of the 20th century, but a version of fortified cement

was already in use in the vernacular architecture of the islands since the mid-19th century.

Although mostly considered as a country in the margin of developments, integration of reinforced concrete construction techniques happened in Greece almost simultaneously with the latest steps of progress in central European countries and the United States. Several architects and structural engineers contributed with their work in this direction: among them, the engineer Pavlos Santorinis, the first one internationally to build mushroom pillars to support the domes covering the cisterns of the *Kronos* factory in Elefsina (1923). The first cement company to be founded in the country (1902) was Hadjikyriakos & Co. (later took up the name *Titan* and remains to this day one of the most successful and longer-lived Greek industrial companies).²

Relatively compatible with the country's climate, and suitable for the natural and human resources available, concrete cast on site met with huge success in Greece. *In situ* casting was a question of reusing already existing building skills, acquired by building with traditional materials such as stone and wood, while labour was cheap and easy to find, especially in post-war era. Apart from *pozzolana* (volcanic earth), many other types of aggregates, such as volcanic rocks and pumice, limestone and various types of sand available in different parts of the country, could adapt and significantly improve the material's performance. Thus, concrete became the current building material for housing types corresponding to the largest part of the building environment, and most of all, for the *polykatoikia*, the Greek version of developer-built, high-rise residential block.³ Nevertheless, the quality of these constructions could rarely match the relatively few examples of truly exceptional architecture, produced by professionals.

What happened in Greece was not an isolated case. Similar circumstances marked the integration of the material in Latin-American countries such as Brazil⁴ or Mexico. In these contexts, lack of infrastructure and technical expertise was



Fig. 1. **Dimitris Pikionis, Detail from the Acropolis pathways, Athens, Greece, 1954–57.** © A. Katsakou.

counterbalanced by research that sought to confirm local identities and to ensure that local architectural expressions and site-specific forms would find their place in the global history of modernity. This research concerned both morphologies enabled by concrete and the aesthetic aspect of the material's finishing.

3. TWO PHENOTYPES OF A LOCALISED MODERN

Pikionis belongs to the first generation of architects that introduced the modern in Greece, although his relationship with modernity was one of ambiguity. He produced his work that is closest to principles of the International Style in the beginning of the 1930s, when he designed the Pefkakia Primary School in Athens. The school was part of a building programme, mainly entrusted to a new generation of architects, most of whom eagerly supported the functionalist ideals of this period.

Pikionis found that the fitness for purpose and organic character of the building, preached by the modern avant-garde could well reflect not only the requirements of the new era but also intrinsic qualities of the vernacular. The early years of the architect's career, in the beginning of the 1910s, with his studies of the vernacular mark already his quest for a unique Hellenic identity. This quest is intensified after the completion of the Pefkakia school, when Pikionis expresses doubts about the suitability of the 'internationally' grasped modern for the local context.

Pikionis is mostly known internationally for the landscape project of the pathways up the Acropolis and Philopappou hills (1954–57). The layout of the paths is based on a

meticulous study of the place that binds together a series of 'spatial events', epitomised in vantage points, sitting niches, meditation alcoves carved out of the subdued Attic vegetation. A work traced with the help of harmonic lines, it figures out elements of the local scenery as episodes of a dramatic play in which the protagonist is the moving viewer (much along the lines of the definition of the *organic* introduced by Zevi after World War II⁵): "More than a utilitarian road, it is a symbolic object, it signifies a protest against the destruction of community, the splitting of human associations, the dissolution of human contact in our time."⁶

Thus, Pikionis focusses on people and the human being, as well as on the expressions of their artistic nature, the most straightforward of which are found, for him, in folklore art. His concrete is one of a humane character, where scale and moderation is the key to implementation. Through a high level of craftsmanship, morphological details formed with concrete tie the project up with the ancient precedents of architecture in the specific place and put emphasis on human scale and proportions, assimilating the 'new' material. Cut-off angles, special recesses to host wooden elements of specific sizes, cornices, stepped and plain-contoured mouldings, shadow gaps, and grips can be found in the transition between the manmade and the natural in the Acropolis pathways or in after-war projects, such as the Potamianos residence (Athens, 1953–55). Pikionis' concrete of an 'artificial stone' is treated after it is cast on site with the same tools used for the natural stone; both materials eventually offer an inviting haptic experience, when they have been equitably smoothed out by the specific light and weather conditions of the place (Fig. 1).



Fig. 2. Kyriakos Krokos, Multifamily residence at Benaki street, Athens, Greece, 1972–75. © A. Katsakou.

Featuring a strictly variant architectural expression, and a polemical social stance, Aris Konstantinidis is often studied as a counterpart to Pikionis. Konstantinidis mainly focussed on stark construction honesty that clearly distinguished materials depending on their primary or secondary role in load bearing. Such a compositional approach could not sustain fragmentary instants of craftwork as met in his mentor's⁷ 'decorative' details. Yet Konstantinidis was equally faithful to regionalist principles, displaying a keen interest in popular construction methods and local craftsmanship, and a deep concern about the user's experience and lifestyle. In projects such as the house and studio of the painter Nikos Moralis (1974–78), on the island of Aegina, the standard reinforced concrete frame complete with masonry infill for the walls was replaced by load-bearing stone masonry (vertical parts) and reinforced concrete slabs and beams (horizontal ones).⁸ Shear stone walls are alternated with stone columns in a neat expression of the functional grid that creates intermediary spaces of a diverse character. Wood is frequently used for casements; openings often cover entire steps of the grid. The architect takes care to adapt the extensive glazed surfaces to the Mediterranean climate and lifestyle. The roof is extended to create porticos/filter spaces that temper weather conditions and usually correspond to a

width of 2m, a zone working as an improvised resting and circulation area.

As in Pikionis' case, locally sourced materials achieve integration in the landscape in Konstantinidis' work. It is a question of a "concordant"⁹ existence of architecture with nature and the surrounding environment, characterised by a strong chromatic and textural kinship between the ochre stone walls, the rough surfaces of bare concrete and the rocky landscape. Mostly left apparent, Konstantinidis' concrete is, in some cases, even whitewashed; such details, borrowed from anonymous architecture introduce, according to the theorist David Leatherbarrow, a "sense of care"¹⁰ applied by the humans to the building in the course of centuries.

Innovative concrete structural solutions are also part of Konstantinidis' work, to substantially enhance the continuity between inside and outside. Such an example is his 'inverted' beams, which allow for the glazed parts of the façade to rise without interruption from floor to ceiling. Protruding from the upper side of the slab, they are also used as parapets/banisters, suitable for resting upon, in terraces on the upper floor. However, ultimately, concrete is here again dealt with as a 'natural' material, and in its essence, as part of the tectonic tradition of the local context, responding to the people's 'feeling'.

4. PHENOTYPICAL SPIN-OFFS

Pikionis' and Konstantinidis' *approche* was taken up by a line of Greek architects, whose works build on alternative interpretations of modernity. Characteristically enough, Dimitris (1933–) & Suzana (1935–2020) Antonakakis, whose work has informed the *critical regionalism* concept introduced by Alexander Tzonis and Lianne Lefaivre¹¹ place Pikionis and Konstantinidis in the same architectural group clearly promoting the exploration of the Greek cultural heritage, in the end of 1950s. Within the curriculum of the architectural school of Athens, Pikionis' and Konstantinidis' teachings were juxtaposed to an internationally oriented, alocal architectural trend, represented by Takis Michelis, Nikos Engonopoulos, Dimitris Fatouros, or James Speyer.¹² What the Antonakakis' report of their own work is the quest for a 'labyrinthian clarity',¹³ a simultaneous expression of both complexity and clarity which they have observed in the unaffected expressions of human life in the Greek countryside.

Through their emphasis on human scale and the moving viewer, expressed in the complexity of their interior spaces, such as their multifamily residence in the centre of Athens (Benaki str., 1972–75 / Fig. 2) they certainly build on Pikionis' heritage. However, the result of their architectural research is often of such intricacy, on various compositional levels (internal configuration of the plan, arrangement of the facades, colour palette) that it can hardly be read as a disciplined subordination to functional principles related to the use of grid. The influence of Konstantinidis can be here better read in spatial configurations searching for a user-friendly microclimate typical of vernacular architecture.¹⁴ Although featuring morphological details reminiscent of the vernacular, Antonakakis' bare concrete is often of a brutalist finish; their facades, where bare concrete is combined with an array of different materials (brick, wood, metal) can become bulky, while their intense and diversified chromatic palette is far from Pikionis' well-balanced classical schemes.

In some ways, the architectural production of Michalis Souvatzidis (1946–) resembles that of the Antonakakis' couple. Similarly declaring himself influenced by both Konstantinidis' and Pikionis' work and teachings, he has also pursued his personal intensive research with materials, which often led him in combining concrete or even concrete blocks with aluminium and bricks, while using morphological details reminiscent of the vernacular. Souvatzidis' architecture emphasises an eco-friendly aspect, found in vernacular constructions and passive energy devices, of which most relevant are his inclined surfaces of reinforced concrete that are framing openings and skylights, painted in shiny silver or golden hues to bring the daylight into the interior. Inspired by the popular architecture of his Minor Asian roots, they create a 'polished' effect, which reminds of art-deco devices in the interior.



Fig. 3. Kyriakos Krokos, Fassianos Building, Athens, Greece, 1990–1995. © A. Katsakou.

The work of Kyriakos Krokos (1941–98) is more frequently mentioned as relevant to Pikionis' architectonic spirit, by manner of his sensitivity, attention to detail, painter's eye and even decorative vein, all qualities reflected primarily in his use of bare concrete. Nevertheless, Krokos' compositions are solidly based on the functionalist grid and often distinguished for their tectonic rigorousness.

His affinities with Pikionis' compositional strategy culminate in his colour schemes and morphological details, both originated in the country's classical past, while his bare concrete elevates Pikionis' textural deftness to another level. Etched, bush-hammered, formed with special additives for better traction, and with carefully selected aggregates depending on the colour shades of natural pigments, Krokos' surfaces of bare concrete harmonically coexist with plastered, stone, or brick walls and metal details in works such as the Fassianos building in Athens (1990–95) or the Byzan-

tine Museum of Thessaloniki (1979–93). Revealing with special treatments of the surface concrete's true nature as a congregate material (which would otherwise remain mystified), Krokos used morphological details of exquisite quality to shape boundaries and determine outlines, as Pikionis had done: abaci of simple geometry capping along with golden astragals the bush hammered pillars, framings, mouldings, shadow gaps and drips create become a testimony to both the architect's and the builder's craft (Fig. 3).

5. IN CONCLUSION

The mixed influence of Pikionis' and Konstantinidis' site-specific architectures evoked in the work of more recent Greek architects reveals the genotypical connection of their distinct idioms. Their treatment of concrete in conjunction with natural materials, which is a significant feature of their work, as well as their chromatic compositions and effort to translate the material's qualities into forms born from the country's climate and lifestyle brings them into the spotlight of the Greek modern. While creating personal architectural idioms, they also essentially originate from the same principle of serving the user's needs to the best, at both a functional and psychological level, reweaving ancient bonds with the place of their architecture's existence, resuming and enhancing the genius locum. It is this quality of their architectural production, along with their distinctive features that makes them instigators of a distinct relationship of Greek architecture with the material aspect of architecture as an art through the implementation of concrete.

NOTES

- 1 The use of the terms *genotype* and *phenotype* is here inspired by the space syntax theory, which borrows them from biology to apply them in the built environment. In space syntax, the terms *phenotype* and *genotype* are originally introduced to make the distinction between "what was actually built and the general rules that determine how a building is to be built", or between an "underlying stable structure" and a "variably observable form". See Sonit Bafna, "Rethinking genotype: Comments on the sources of type in architecture", *JOS5*, Vol. 3 (1), 2012, 68–80, and Bill Hillier & Adrian Leaman, "How is design possible?" *JAR*, Vol. 3 (1), 1974, 4–11. Biology-related definitions: *genotype*: the genetic constitution of an individual organism; *phenotype*: the set of observable characteristics of an individual resulting from the interaction of its genotype with the environment, see lexico: a dictionary powered by oxford, accessed on February 22, 2020, <https://www.lexico.com/definition/genotype> and <https://www.lexico.com/definition/phenotype>.
- 2 Nikos Kalogeras, *Το Οπλισμένο Σκυρόδεμα — Η εμφάνισή του και τα πρώτα χρόνια της εφαρμογής του (1956–1923)* [Reinforced concrete — Implementation and initial uses (1956–1923)], Athens, ΕΜΠ (NTUA), 1994. See also: Nikos Belavilas, "Καινοτομίες σε τεχνικές και υλικά. Σίδηρος και μπετόν-αρμέ [Innovations in techniques and materials. Iron and reinforced concrete]", *Αρχαιολογία* [Archaeology] 97, 2005, 31–38.
- 3 *Polykatoikia* could be considered the Greek equivalent of the Swiss *villa urbane* or the Italian *palazzina*, multifamily residential blocks of a clearly urban character.
- 4 Styliane Philippou explains similar circumstances in the case of the free-form Brazilian modern, see Styliane Philippou, *Oscar Niemeyer: Curves of Irreverence*, New Haven, Conn & London, Yale University Press, 2008, 101.
- 5 Bruno Zevi, *Towards an Organic Architecture*, London, Faber & Faber, 1950 (first published 1945).
- 6 Orestis Doumanis, *Metapolemiķi arķitektonikī stīn Ellada : odigos = Post-war architecture in Greece*, Athina, Ekdosī "Architektonikō n Thematō n", 1984, 22.
- 7 Konstantinidis had been Pikionis' assistant at the National Technical University of Athens.
- 8 In a way, his rational compositions are close to the system tested by Le Corbusier in his villa Mandrot (France, 1929) or Errazuris house projects (Chile, 1930), which

are mentioned by Frampton as a version of *vernacular modernism*; see Kenneth Frampton, *A Genealogy of Modern Architecture; Comparative Critical Analysis of Built Form*, Ashley Simone (ed.), Zurich, Lars Müller Publishers, 2015, 11–12.

- 9 David Leatherbarrow, *Uncommon ground*, Cambridge, MA, MIT Press, 2000, 194.
- 10 Ibidem.
- 11 Alexander Tzonis & Liane Lefaivre, "The Grid and the Pathway; the Work of D. and S. Antonakakis", *Architecture in Greece*, 15, 1981, 164–178.
- 12 Dimitris & Suzana Antonakakis, et al., *Atelier 66: the architecture of Dimitris and Suzana Antonakakis*, Kenneth Frampton (ed.), New York, Rizzoli, 1985, 6.
- 13 Antonakakis et al., *Atelier 66*, 6.
- 14 Doumanis, *Post-war architecture in Greece*, 22.

Session 4-f

TECHNOLOGICAL/MATERIAL HERITAGE AND TECHNOLOGICAL INNOVATION AND ARCHITECTURAL DEVELOPMENT. CRITICAL AND ORIGINAL CONSIDERATIONS

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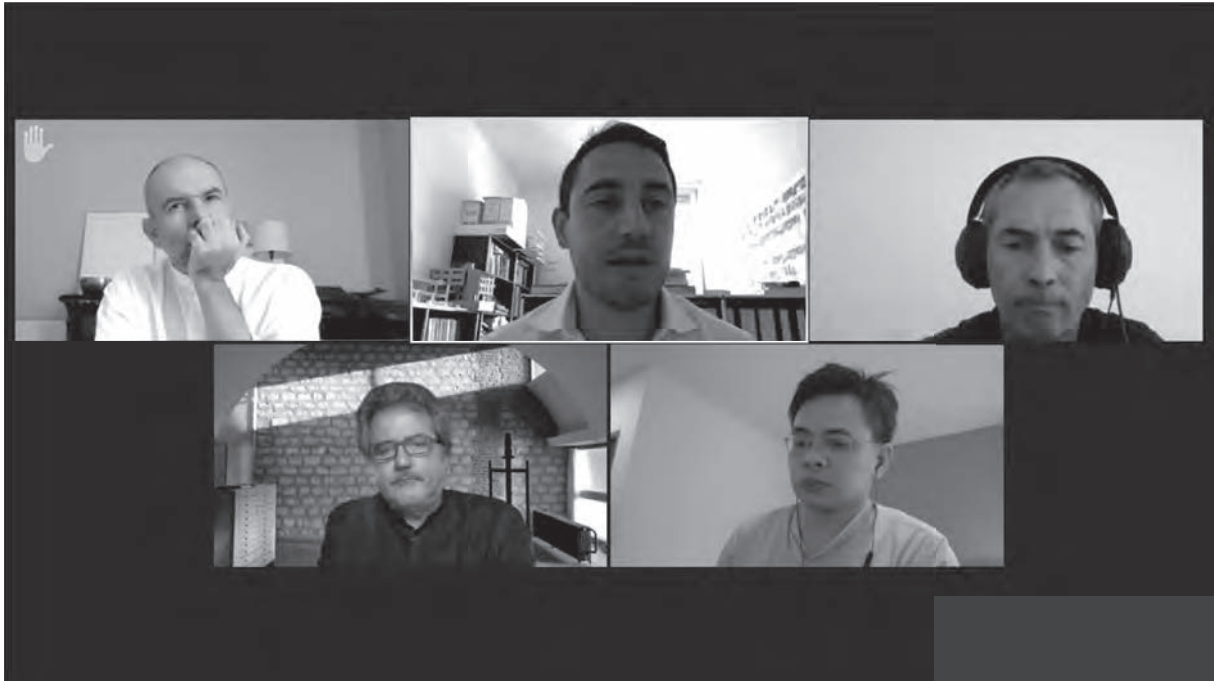
The session that I am pleased to introduce is dealing with "Technological Innovation and Architectural Development". The contributions will continue to consolidate the history of architecture by relying on the multitude of unprecedented technological innovations that took place in the last century in the construction of territory and cities.

It is of course the new materials, reinforced concrete of course, but also steel, glass and all synthetic materials that will be the subject of systematic investigations to bring their qualities to the limits and thus provoke an evolution of architecture, in terms of ever bolder load-bearing structures, economy of materials, permeability between the interior and exterior, etc. The structures developed by the self-taught architect Amorn Srivongse demonstrated this in Thailand in the 1960s. For the construction of three faculties of civil engineering, he produced structures that were site-specific but 'didactic': the suspension structure at Khon Kaen University (1964) in north-eastern Thailand, the steel spatial structure at Prince of Songkha University (1967–1971) in the south, and the reinforced concrete spatial structure at Chiangmai University (1971) in the north. Equally demonstrative, structural innovation can be diverted to architectural design based on flexibility and scalability, especially in housing. This is an issue that has crossed the twentieth century, from modern to contemporary housing, that of open modular prefabricated architecture. Transformations are planned from the design stage so that the inhabitants participate in the construction and subsequent transformations. An exemplary achievement is the one built by the architect Otto Steidle with Doris + Ralph Thut for the residential complex on Genter Strasse in Munich, Bayern 1969–1972, combining technical and architectural culture at the highest level.

If structural innovation is spectacular, so is innovation in electrical equipment and its consequences on the interior and exterior lighting of buildings. As a true building materi-

al, between the two world wars we saw the production of very different examples of architectural lighting, illuminated architecture and advertising buildings. Indeed, the use of electric light strongly influenced the design, materialisation and perception of architecture in the 1920s and 1930s in France and Italy, and this deserved an original contribution. Equally original is the analysis of a period in the history of modern architecture in mainland Portugal, where artisanal construction and industrial building processes coexisted in the typology of single-family buildings. It is not so much a question of technological innovation as of the fascination of some modern — rather Mediterranean in general — people for the construction processes and materials of vernacular architecture. After participating in a "Survey of Portuguese Regional Architecture", published in 1961 under the title "Popular Architecture in Portugal", some outstanding architects renovated modern architecture in the 1960s by reintroducing the values of regional history and cultural contexts.

Whether from the point of view of the evolution of materials and their technology in the 20th century or from the point of view of the influence of technological innovation on architecture itself, the reflections proposed at this 16th International Docomomo Conference in Tokyo have moved away from overly traditional and narrow approaches and have proposed original and in-depth visions on a global scale.



BUILT WITH ELECTRIC LIGHT. SIMILITUDES AND DIFFERENCES BETWEEN FRANCE AND ITALY

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ABSTRACT.

The concept of artificial light changed substantially over the course of the twentieth century, in relation to the succession of technological innovations. The variation in the type of electric lighting available influenced the image of both existing architectural artefacts and new ones, entering into symbiosis with the materials of “modern architecture”, such as glass, steel, and reinforced concrete. The perceptual effect of built volumes was no longer seen in the simple modelling of light and shade by the sun. To these were added sensations due to artificial light. The paper will focus on the way the use of electric light influenced the design, materialization and perception of architecture in the 1920s and 30s in France and Italy. The approaches to the use of exterior lighting in buildings in these neighbouring countries was extremely different and these differences led to the production of very different examples of architectural lighting, luminous architecture, illuminated architecture, and advertising buildings. The purpose of this analysis is to suggest that artificial light has in different ways exerted an influence on society and above all, gradually yet steadily, on architects, as much, if not more, than other technologies such as heating and forced ventilation, developed in the same period, or innovative building materials such as reinforced concrete and steel. The presentation can provide a new point of view from which to interpret the existing architectural heritage and can prompt reflection on the importance of the “restoration of electric light”.

1. INTRODUCTION

As Reyner Banham observes, electric lighting, after widespread use in other sectors, including the military, road and transport sectors, was finally used in architecture.¹ The first International Exposition of Electricity in Paris in 1881 presented an overview of the results obtained by these experiments and exhibited the progress achieved in electric technology in many countries, so the national and international exhibitions became ideal places to study and experiment with the first temporary applications of artificial lighting. These gradually developed into the practical use of electric light in everyday life, but only from the 1920s would there be tangible examples that attest to its potential application, leading to significant changes in the appearance of cities at night. In those years, moreover, the concrete answers that architects gave to the theme of electric lighting applied to architectural artefacts were still scarce. Most of the lighting systems were installed by the fitters who, without any design or planning, converted gas lighting to electric lighting. Despite this, the foundation at the turn of the century of companies such as Mazda, Philips and Osram made possible the development and availability of increasingly powerful and efficient light sources and innovative fixtures that enabled the utilitarian purposes of the first lighting systems, conceived to improve safety on the road or in the workplace, to be overlaid with symbolic meanings with purely decorative effects. In continuity with the temporary lighting of monuments developed during the nineteenth century, the first permanent installations adapted to old existing buildings made it possible to obtain the necessary experience to turn artificial lighting gradually into an integral part of the nascent modern architecture of the city. In this way a few attentive designers began to see the value of elec-

trical lighting systems applied or integrated into the architectural artefacts under construction. From that time on, we can make a distinction between buildings on the basis of the characteristics and purpose for which electric light was used in the exteriors. There existed an ‘architectural lighting’ applied to existing monuments and buildings, new ‘illuminated buildings’ in which the electric light was shed from outside, and new ‘luminous architectures’ which included all buildings in which the electric light was incorporated into the building itself. To these were added the ‘advertising buildings’ which used electric light as an eye-catching tool. In the nocturnal definition of cities, this cataloguing can be found in almost all major European capitals, including those of France and Italy. In these two countries, however, the use of electric lighting was profoundly different in terms of characteristics, times and modes of appearance, as emerges from the general architecture journals and reviews in the sector dedicated to the theme of electricity that appeared in those years.²

2. THE REVERSAL OF LIGHT AND SHADE: LIGHT PROJECTED ONTO BUILDINGS AND MONUMENTS

In the phase of strong expansion of the lighting industry in the early twentieth century, there was a need to create associations in France and Italy that had already existed for some time in Britain, Germany or the United States, with the purpose of promoting the use of electric lighting in architecture and coordinating the training of technical installers capable of dealing with this technological innovation. This need materialised in Italy in 1926 with the foundation in Milan of the Associazione Nazionale per lo Sviluppo dell'Illuminazione (A.N.S.I.) which, two months after its establishment, began to publish its newsletter intended for at citi-

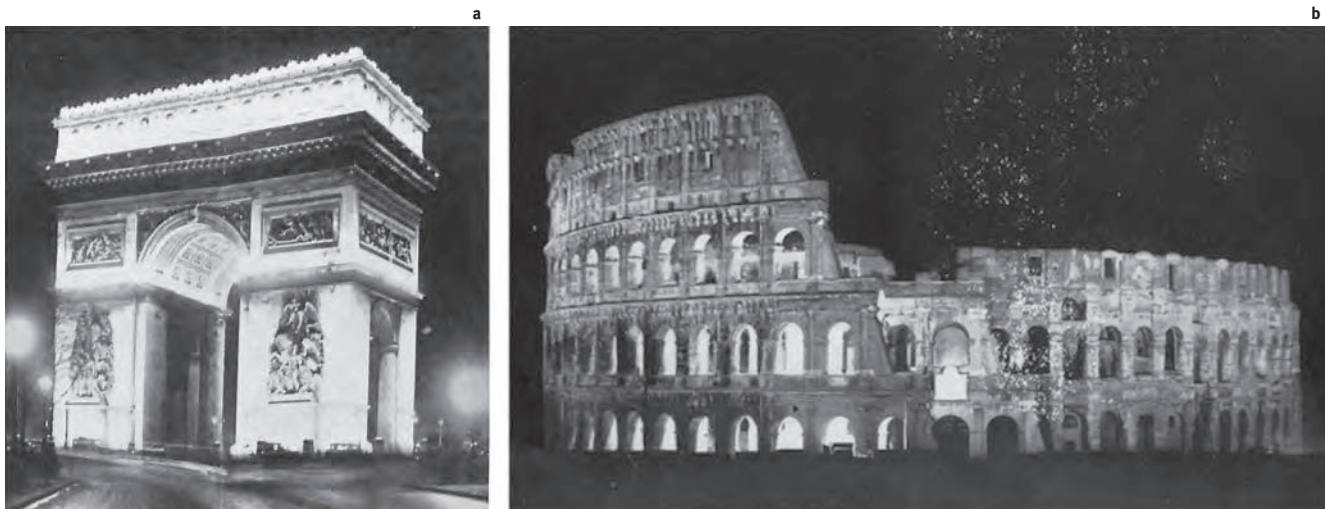


Fig. 1. The Arc de Triomphe de l'Étoile in Paris and the Colosseo in Rome illuminated. *B.I.P.* n. 2, 1929, 8; *Architetture luminose*, Milano, Ulrico Hoepli, 1941, 32.

zens and non-expert technicians.³ In France, the Association des Ingénieurs de l'Éclairage (A.F.E.) was created in 1930, proving a frame of reference in Paris for the designers with whom these lighting experts were now called on to work.⁴ France also saw the development of the professional figure of the engineer *éclairagiste* who, starting from his own technical skills, was capable of designing and producing the luminous image of architecture. These professionals were often employed in the service of specialist companies, including Claude, Paz & Silva (France and Belgium), Philips (Netherlands and Belgium) and Osram (Germany). The engineer *éclairagiste* was the essential figure⁵ for the production of these applications. Among them should be mentioned Ferdinando Jacopozzi,⁶ called 'the wizard of light'. He used projection lighting to illuminate the Arc de Triomphe de l'Étoile in Paris with powerful spotlights, concealed in the surrounding terrain (Fig. 1a): this type of illumination is termed floodlighting,⁷ the lighting of the monument was thus obtained from the ground, in a position opposite to that of the sun, producing an effect that contrasted with that of natural light, a negative of daytime lighting. The example described, however, remained an illumination applied to architecture, a post-intervention that corrected, emphasised or concealed what had already received its shape some time earlier. In Italy there are numerous examples of architectural lighting such as those presented in the book *Architetture Luminose*, which was intended to illustrate, especially through nocturnal photographs of the exteriors and interiors of illuminated or luminous buildings, the potential for the application and integration of electric light into architecture (Fig. 1b).⁸ Starting from these first attempts, the theme of lighting kindled the architectural debate in both Italy and France,⁹ and it was seen as a powerful and highly attractive advertising medium, especially for the construction of new buildings. In this way the idea grew up that "une

façade obscure est une façade morte",¹⁰ and for this reason various categories of workers including tradesmen, restaurant and hotel owners and the managers of cinemas and theatres started to take an interest in asking architects to design the nocturnal aesthetics of their buildings in order to promote their businesses.

3. ARCHITECTURE DESIGNED FROM SCRATCH TO BE ILLUMINATED

The use of electric lighting in public and domestic applications gradually altered the usual rhythms of existence in cities, making their nightlife possible and heightening its emotional quality. The lighting of avenues, neighbourhood streets, monuments and shops increasingly enabled people to appreciate cities during the hours of darkness and this prompted reflection on the possibility of creating new architectures to exploit the potential of artificial light.¹¹ This theme thus became a fundamental cultural, historical and artistic chapter in European architecture of the twentieth century and in particular modern architecture. In Italy there existed all the prerequisites for designing new illuminated buildings, and the generation of architects who would be active in the following years, including Pagano, Vaccaro, de Renzi, Terragni, Libera, Ridolfi, Moretti and then Albini and Ponti, was extremely interested in the expressive possibilities of electric light. Yet there was often a preference for devoting attention to existing buildings by applying decorative lighting to them, while observing the foreign examples and waiting for a favourable moment to attempt to embody this function in new projects. Hence in Italy, by the end of the 1920s, there were still few examples of new illuminated architectures, like the building that hosted the Mostra della Rivoluzione Fascista¹² in Rome, designed by de Renzi and Libera (Fig. 2a), while abroad rapid progress was being made



Fig. 2. The *Mostra della Rivoluzione Fascista* in Rome and the *Musée Permanent des Colonies de Vincennes* with a luminous silhouette effect. *Architettura luminosa*, Milano, Ulrico Hoepli, 1941, 23; *L'Architecture d'Aujourd'hui*, n. 9, 1935, 79.

in the study of illumination by projection or with fluorescent tubes in impressive buildings such as the Empire State Tower in New York, the Titania Palast in Berlin, or even the Tagblatt skyscraper in Stuttgart. Meanwhile, in France, too, the use of electric light to illuminate exteriors at night was developing steadily in parallel with the design of new buildings, as in the case of the Immeuble C.P.D.E.¹³ or the Musée Permanent des Colonies de Vincennes,¹⁴ for which Laprade, Bazin and Jaussely envisioned a luminous silhouette effect (Fig. 2b). In 1931 in Paris, Laprade and Bazin, in collaboration with the company Paz & Silva, also designed the external lighting of the Office Central Electrique:¹⁵ it undoubtedly conveyed the message that architectural modernity passed through the control of lighting, among other things. Light became an essential instrument by which to frame, accentuate, isolate, cut or efface the forms of architecture. White monochromatic light was not the only kind used. In those years, French buildings were deliberately multicoloured, like the Gaumont-Palace¹⁶ in Paris designed by Belloc. All this leads us to reflect on how far electric light can play the part of a true building material, becoming essential to give materiality and perception to an architectural artefact, while being at the same time fragile, since it can be easily omitted, although this leads to the loss of the technical and aesthetic significance of the building for which it was designed. In new buildings, in order to ensure that the lighting design was suitable for the architectural lines with which it was intended to cooperate, however, it was important for it to be studied at the same time as the general idea of the building was drafted. This happened in the case of the lighting of the

Immeuble du Journal le Jour,¹⁷ or the Nouveaux Magasins des Trois Quartiers in Paris by Faure-Dujarric.¹⁸ Mallet-Stevens also embarked between the two wars on the creation of illuminated architecture. Those that were perhaps most spectacular on the level of the city were the bar of the Compagnie franco-brésilienne de cafés,¹⁹ built in around 1928, and the Palais de la Lumière, built for the 1937 Exhibition, both designed in collaboration with André Salomon, one of the most important *éclairagistes* of those years. A very interesting case, perhaps the progenitor in Paris of this kind of newly erected buildings, which besides being illuminated was luminous, was the Maison Dalsace,²⁰ designed by Chareau and Bijvoet with Salomon in 1928 (Fig. 3a). This shows how, between the 1920s and 1930s in France, the close collaboration between architect and *éclairagiste* became a possible practice in design.

4. OPAQUE, TRANSLUCENT, TRANSPARENT: THE LIGHT EMITTED BY BUILDINGS

The constructional freedom granted by modern structures and the use of additional innovative lighting devices made possible a new synthesis between interior and exterior. In fact, in new architectures with a point-loaded structure, created by the use of concrete, iron and glass, the transparent or translucent surface area of the envelope often exceeded that of the solid and opaque parts, which led to a change in the approach to lighting. In these structures the internal spaces could also contribute to the building's nocturnal appearance by themselves becoming light sources

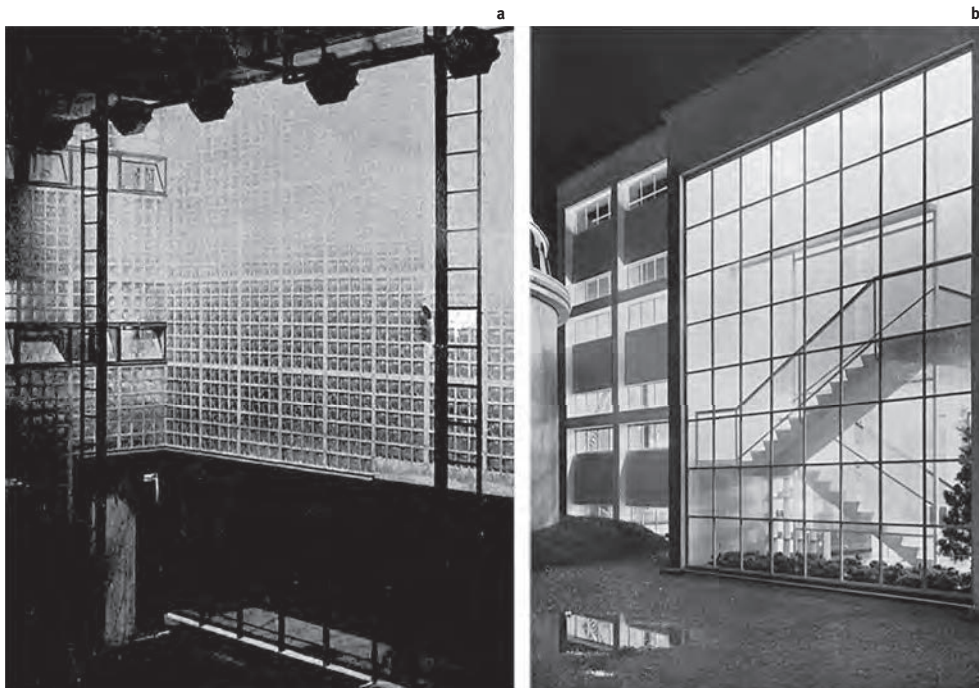


Fig. 3. The Maison Dalsace in Paris and the INA pavilion at the Milan trade fair, examples of illuminated and luminous architectures. *L'Architecture d'Aujourd'hui*, n. 9, 1933, 15; *Architetture luminose*, Milano, Ulrico Hoepli, 1941, 19.

towards the exterior. The architectural artefact could thus become a light box whose negative-positive effect, intensified by the darkness surrounding it, varied according to the decisions taken by the architect. There developed an urge to devise a new fusion between electric light and architecture, which Teichmüller in Germany called *Lichtarchitektur* in 1926. In France and Italy, magazines such as “Architecture d’Aujourd’hui” and “La Casa Bella” promoted this theme by publishing photographs of recent buildings at night beside their daytime images, taken from the same angle, and photographers emerged as the undisputed recorders of this possibility of change in modern architecture. After the First World War, the Italian night-time landscape was characterised by sporadic examples of luminous architecture, mainly connected with temporary exhibitions such as the entrance tower to the 6th Milan Triennale²¹ designed by Pagano and the luminous wall of the INA pavilion at the Milan trade fair by Albini (Fig. 3b),²² or commercial structures, such as the illuminated showcase of the Vitrum shop in Como, designed by Terragni.²³ To solve the problem of the lack of significant Italian examples of constructed luminous buildings and to exhibit the potential of the new artificial lighting, architecture journals resorted to the presentation of foreign cases. For instance, in the review “La Casa Bella” Sartoris presented the De Volharding Cooperative in the Hague by Buijts,²⁴ while Pagano-Pogatschnig proposed the Garage Marbeuf in Paris, describing it through a nocturnal image.²⁵ Electric light also characterised eleven architectural works by Mendelsohn, presented in the journal in 1934.²⁶ The Bat’a shop²⁷ in Prague likewise became iconic for its nocturnal image,

which made the grid-like arrangement of the internal spotlights visible from the outside. These foreign examples were crucial as references for the development in Italy of architectures that exploited the potential of electric light, such as the new railway station in Florence,²⁸ or the post-office building in Naples by Vaccaro and Finazzi that represent how the nocturnal appearance could be governed in architecture where the use of light was designed jointly with the general project. Meanwhile in France, as proof of how the study of the night-time image of buildings began to insinuate itself into the design process, architects such as Roux-Spitz, Dumont, Laprade and Nitzchké, even before one of their edifices was built, developed and published nocturnal views in the form of images of models illuminated from within or as axonometric sketches and photomontages incorporating the lighting devices. The numerous preliminary drawings and models that were made embodied the intentions containing the constructional principles of the building itself and artificial light became the new aspect of the project that architects were required to envisage.

5. BUILDINGS AS A SUPPORT FOR ADVERTISING LIGHTING OR ADVERTISING ARCHITECTURE?

From the late 1920s on, advertising lighting began to be superimposed on illuminated or luminous architectures. These were installations consisting of signs or decorations created mainly by using fluorescent tubes, which looked extremely striking by night, but which revealed their scenic fiction during the day by showing the disproportion and

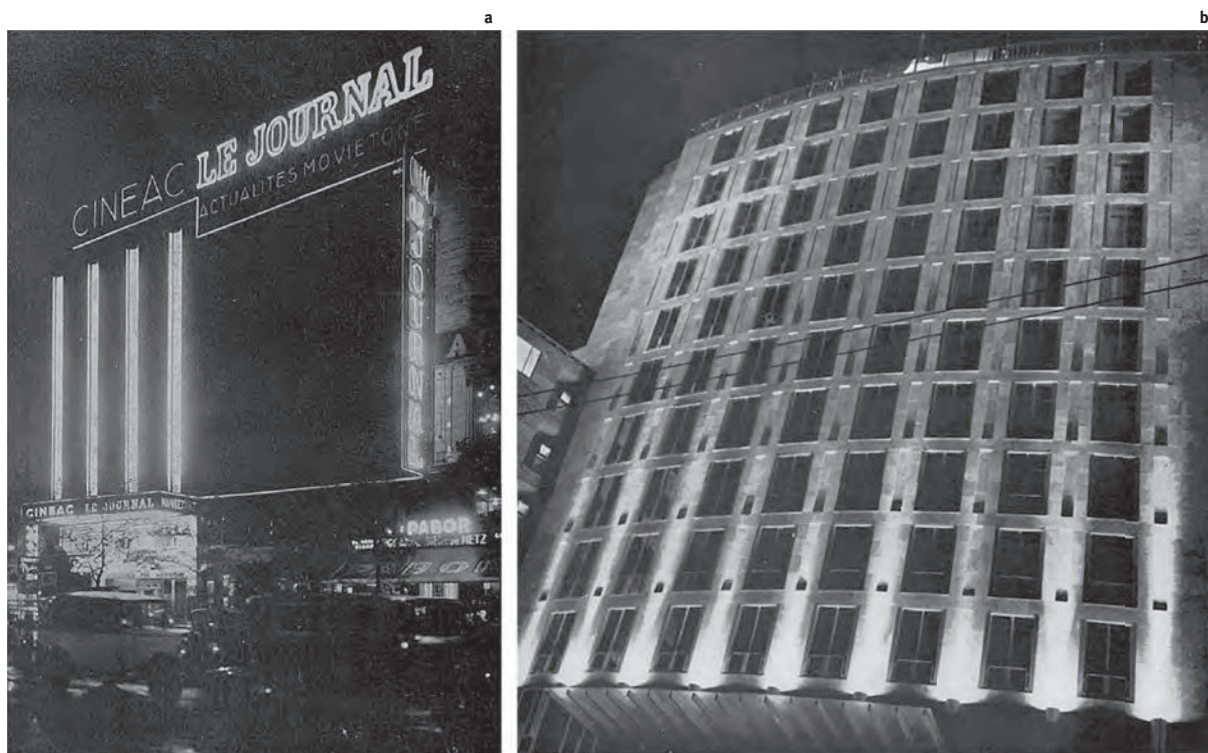


Fig. 4. The Cinéac le Journal in Paris and the Palazzo Montecatini in Milan, two advertising architectures. *L'Architecture d'Aujourd'hui*, n. 5, 1932, 75; *Architettura luminosa*, Milano, Ulrico Hoepli, 1941, 36.

inadequacy of the structures through which these signs were applied to the elevations. Illuminated advertising became an expedient to define the nocturnal character of many European cities, where it was used to transform marginal streets into attractive places. While in Italy this technology was still underdeveloped, France had been rich in it for some time. One of the first examples and perhaps the most monumental was the sign of the car manufacturer Citroën consisting of seven outside illuminated letters installed on the Eiffel Tower from 1925 to 1934.²⁹ Paris, however, adopted a different approach to other cities such as Berlin³⁰ or those in America.³¹ There was no desire to make the urban nocturnal atmosphere feel aggressive by allowing an invasion of neon signs positioned everywhere indiscriminately. Instead, an attempt was made to ensure that there was respect for the architecture of the buildings, whose forms could be highlighted or destroyed by advertising signs.³² This gave rise to the study of a true architecture of illuminated advertising that was intended to be in harmony with the architecture of the building on which it was placed. Not all these installations, however, succeeded in correctly mediating the use of lighting. In fact, although the Immeuble Ford was very charming at night, the presence of the lighting equipment on its façades in the daytime was an eyesore.³³ However, this problem did not arise at the Magasin 'Monoprix' in Paris³⁴ or at the Grands Magasins Décré in Nantes or

the Cinintran and Paris-Soir cinemas.³⁵ One of the greatest interpreters of the use of electric light to enhance the elevations of buildings was Adrienne Gorska. In 1931, together with the architect de Montaut and the Paz & Silva lighting company, she designed the Cinéac le Journal, which sought to ensure the effectiveness of advertising in both the daytime and at night (Fig. 4a).³⁶ In the 1920s and 1930s, the situation in Italy was different. There were some initial examples of illuminated advertising, but they were often used for political propaganda. An example occurred in Milan in 1932, when the 3000 light bulbs on the elevation of a building in Piazza del Duomo formed the word DUX in lettering 15 metres high.³⁷ General and technical Italian periodicals did not publish articles dealing with advertising architectures. Only in 1939, on the occasion of the Milan Fair, were buildings presented that sought to be examples of how to improve the nocturnal appearance of the avenues of the cities and the design of a glass newsstand by the architect Albini was one of these.³⁸ In Italy, 1939 truly marked a turning point. "Casa Bella Costruzioni" published a triple monographic issue presenting the most advertising building ever built so far, completely different from the first French examples and devoid of the illuminated installations displaying posters or advertisements made of light, but it was itself an advertisement. This was Palazzo Montecatini in Milan designed by Gio Ponti (Fig. 4b). It was the symbol of Italian progress and consti-

tuted an authentic catalogue of products marketed by the Montecatini company. They were modern materials that stood out at night thanks to the use of electric light, the fundamental ingredient without which this architecture would never have worked completely. With this example, which at the same time was a luminous, illuminated and advertising architecture, the role of electric light as an emblem of modernity was also affirmed in Italy.

6. CONCLUSION

The examples of illuminated or luminous architectures that were beginning to be seen between the wars showed how the nocturnal image of buildings was beginning to be given consideration by architects, since at night buildings lose the materiality that distinguishes them during the daytime and need to use artificial light to assert their presence and function. In this way architecture took on the task of a new constructional and functional element of the building, endowed, however, with the special characteristic of being visible and disappearing at whenever an electrical contact was opened or closed. Its use was increasingly studied and perfected in such a way as to make it possible to alter the weighting, the ratio between the supported and load-bearing mass and the colour of the volumes at night. In Italy there was a clear delay in the lighting sector compared to the most advanced European nations in this field, including Germany and Britain, while in France a *mouvement éclairagiste* had already developed among a group of artists, architects and decorators, to obtain new effects through the use of lighting and to create the luminous forms best suited to the conditions of use of electric light.³⁹ Moreover, new professional figures, like the *éclairagistes*, worked alongside architects in the process of including electric lighting in buildings already completed or under construction. The observation of foreign examples likewise enabled Italy to discover the intrinsic potential of using artificial light. It was realised that there were no standard solutions for lighting a given architectural brief and in history none had been put forward, but each project had to be studied on a case-by-case basis. However, many ideas were advanced before the application and then the integration of artificial light to buildings, which proved to be increasingly complex and varied, based on both functional and architectural needs. The use of electric light in architecture raises many issues and this matter can be continuously expanded. Over the years, therefore, the condition by which electric light passed from being a simple means of producing light when necessary in a somewhat casual way, evolved and itself became an indispensable construction material, enabling the study of the nocturnal appearance of buildings to become an important design theme.

NOTES

- 1 Reyner Banham, *Ambiente e tecnica nell'architettura moderna*, Roma-Bari, Laterza, [1960] 1995, 18.
- 2 In France are published *Lux: la revue de l'éclairage* (1928) and *B.I.P.* (1928). In Italy are published *L'illuminazione*, which later became *L'illuminazione razionale* (1928) and *Illuminotecnica. Rivista italiana di illuminazione* (1929).
- 3 C. Biagini & M. Fabbri, "Verso un'architettura della luce", *Bollettino Ingegneri*, n. 8, 2009, 14–20.
- 4 M. Leblanc, "L'Association des Ingénieurs de l'Éclairage", *L'Architecture d'Aujourd'hui*, n. 3, 1931, 79.
- 5 John Learned, "La collaboration entre l'architecte et l'éclairagiste", *Lux*, Octobre, 1930, 144.
- 6 "Fernando Jacopazzi", *L'illuminazione razionale*, n. 2, 1932, 37–40.
- 7 B. -H. Martin, "Le Floodlighting", *B.I.P.*, n. 2, 1929, 7–12.
- 8 Giovanni Canessi, & Antonio Cassi-Ramelli, *Architetture luminose*, Milano, Ulrico Hoepli, [1934] 1941.
- 9 "L'éclairage en architecture", *L'Architecture d'Aujourd'hui*, n. 2, 1935, 106–107.
- 10 Auneau, "Le Floodlighting", *L'Architecture d'Aujourd'hui*, n. 3, 1931, 95.
- 11 Gerhard Schmid, "La lumière considérée comme un élément de la construction", *Lux*, Mai, 1928, 82.
- 12 Giovanni Canessi, & Antonio Cassi-Ramelli, op. cit., 23.
- 13 B. -H. Martin, "Les nouveaux éclairages de façade à Paris", *B.I.P.*, n. 72, 1934, 166–167.
- 14 "Musée des colonies à Paris", *L'Architecture d'Aujourd'hui*, n. 9, 1935, 79.
- 15 E. Wallet, "Une installation moderne: Le 'building Taitbout'", *B.I.P.*, n. 52, 1933, 1–4.
- 16 M. Cohu, "L'éclairage du Gaumont-Palace", *B.I.P.*, n. 39, 1931, 161–164.
- 17 "L'éclairage à l'immeuble 'le Jour'", *Lux*, Décembre, 1933, 139–140.
- 18 Louis Faure-Dujarric, "Nouveaux Magasins des Trois Quartiers", *L'Architecture d'Aujourd'hui*, n. 4, 1932, 29–34.
- 19 Jean Chappat, "L'éclairage moderne des restaurants et des bars", *Lux*, Septembre, 1928, 108–112.
- 20 "Visite de la Maison de Verre", *Lux*, Novembre, 1934, 142–143.
- 21 A. L. Goldstein-Bolcan, "Una torre di cristallo", *Casabella*, n. 108, 1936, 30–33.
- 22 "Padiglione dell'I.N.A.", *Casabella*, n. 89, 1935, 6–7.
- 23 "La città che si rinnova", *La Casa Bella*, n. 44, 1931, 14–17.
- 24 Alberto Sartoris, "Il vetro nell'architettura moderna", *La Casa Bella*, n. 31, 1930, 11–19.
- 25 "Il Garage Marbeuf a Parigi", *La Casa Bella*, n. 41, 1931, 10–15.
- 26 "Undici opere di Erich Mendelsohn", *Casabella*, n. 76, 1934, 8–17.
- 27 Leonardo Sinisgalli, "Negozio", *Casabella*, n. 101, 1936, 27.
- 28 G. Pagano, "La nuova stazione di Firenze", *Casabella*, n. 63, 1933, 1–5.
- 29 "Essais du grand lustre de la Tour Eiffel", *Lux*, Mai, 1937, 75–77.
- 30 J. Posner, "Berlin la nuit", *L'Architecture d'Aujourd'hui*, n. 3, 1933, 56–58.
- 31 "L'éclairage aux États-Unis", *Lux*, Mars, 1929, 53–57.
- 32 "Les enseignes lumineuses", *L'Architecture d'Aujourd'hui*, n. 3, 1933, 66–68.
- 33 "L'éclairage du nouveau magasin Ford", *B.I.P.*, n. 41, 1932, 10.
- 34 Gabriel Renaud, "Magasin 'Monoprix'", *L'Architecture d'Aujourd'hui*, n. 8, 1933, 67–69.
- 35 "Enseigne et décoration lumineuse", *L'Architecture d'Aujourd'hui*, n. 3, 1935, 98.
- 36 A. Gorska, "Cinéac 'le Journal'", *L'Architecture d'Aujourd'hui*, n. 5, 1932, 72–76.
- 37 "50 milioni di lumen in Piazza del Duomo a Milano", *L'illuminazione razionale*, n. 11, 1932, 241.
- 38 "Un'edicola di cristallo", *Casabella Costruzioni*, n. 137, 1939, 18–21.
- 39 AA. VV., *Lux. Album de l'éclairage 1929*, Paris, Lux, 1929, 33.

FLEXIBLE EVOLUTIONARY HOUSING IN THE 20th CENTURY. DESIGN AND CONSTRUCTION OF THE RESIDENTIAL COMPLEX IN GENTER STRASSE, MUNICH, BY OTTO STEIDLE WITH DORIS AND RALPH THUT 1969–1972

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ABSTRACT.

Evolutionary housing is the specific category of flexible architectures intentionally planned, from the design phase, to be able to evolve during the lifecycle of a building, adapting to the changing demands and wishes of the people living in them. Open modular prefabricated architectural constructions are intentionally provided with a specific set of rules and reciprocal relationships between their parts and are designed to be easily transformed through participatory processes, first during the stages of design and construction and subsequently when the residents' needs change. The fact that planned transformations can always take place during the whole design process and life cycle of a building can make it possible for future residents to take part actively, knowingly and critically in the construction and subsequent transformation of their homes.

The residential complex, built by the architect Otto Steidle with Doris & Ralph Thut on Genter Strasse in Munich, Bayern 1969–1972, is an exemplary flexible-evolutionary construction, inspired by the ideas and principles of structuralist research, which reached the architectural debate in the late 1950s, as a reaction to some dictates of the Rationalist movement initially proposed at the CIAM meetings.

This contribution has been developed from a case study employed for the PhD research “20th Century Flexible-Evolutionary Housing. Project and Construction, Heritage Preservation and Innovation”. The research has the ultimate aim of including this prototype of flexible-evolutionary architecture in the current debate around the search for advanced design strategies for the innovative design, conservation and sustainable energetic requalification of Open System Buildings.

1. INTRODUCTION

Evolutionary homes are architectural constructions that, being intentionally equipped with a specific set of rules and reciprocal relations between the parts, are programmed to be easily transformed during the first stages of design and construction, or subsequently, to adapt to changing needs during the functional lifetime of the buildings.

The fact that changes can be made during the whole design process, at certain stages, enables the future residents to take part concretely in the construction of their homes. As for the subsequent alterations, it is a matter of giving the occupants the opportunity to adapt and customise the spaces of their homes over time (Fig. 1).

The residential complex designed by Otto Steidle with D. and R. Thut in the Genter Strasse 13 in Munich 1969–1972, was the first housing guided by the ideas and principles of structuralism to be built in Freistaat Bayern.

The structuralist approach was originally developed in the field of anthropology in the post-war years. It was then imported as a theory and method of critical analysis to linguistic research and later to the other human sciences.

In structuralist analysis it is essential to identify the primary structure and the secondary structure, in which the secondary elements are placed in relation to each other, on the basis of pre-established rules and organised by the primary structure.

Structuralism entered the architectural debate in the late 1950s, in reaction to the functionalist dictates initially

proposed by the rationalist movement at the CIAM congresses. The architects and protagonists of this new trend were some architects of primary importance in the post-war debate, such as A. van Eyck, H. Hertzberger and the Team X group, whose ideas largely marked a definitive attempt to move beyond purely functionalist architecture.

Unlike the rational subdivision of the city into different zones, each devoted to a specific function, such as housing, work, leisure and commerce, hitherto promoted by the CIAM, structuralism in architecture promoted a more communal city and model of life, capable of establishing a balance between the public and private spheres of each individual.

The characteristic elements of structuralism are grids, modules and units built out of potentially open prefabricated elements that allow for the combination and construction of structures adaptable over time. The condition of being able to adapt the buildings according to the needs and desires of the users is one of its fundamental principles. The general intentional and programmed flexibility-evolution of the living spaces underlies the whole design process, which is often participatory, as well as maintaining the full legibility of the main structural elements of the building, which are left exposed.¹

With respect to the historical location of the flexible-evolutionary residential complex in Genter Strasse, Kenneth Frampton wrote:

N. J. Habraken has opened up a line of research which has yet to be fully explored. A quite remarkable work apparently in-



Fig. 1. Genter Strasse 13, Munich, General view of the building on completion of work, S-E front on the street. © Steidle & Partner archive, 1972.

fluenced by Habraken's thought is the distinguished 'expandable' terrace housing built in Genterstrasse in Munich in 1971 by Otto Steidle and Doris and Ralph Thut.²

And the architects themselves, in the technical report they prepared for the presentation of the project for the mixed residential complex in Genter Strasse, confirmed that they had adopted principles consistent with the "support" and "infill" theory advanced by N.J. Habraken, writing that the most important aspect of their architectural design was the clear distinction between load-bearing elements and the fixtures and fittings.³

This is the innovative order they sought to create, using a versatile reinforced concrete skeleton structure and light and modular infill elements, such as the light plasterboard internal walls for the partitions and prefabricated sandwich panels for the building's envelope (Fig. 2).

2. PROJECT AND CONSTRUCTION

The building by Otto Steidle and D. and R. Thut at the

Genter Strasse 13, near the central ring of the Englischen Garten in the Schwabing district in Munich, is of the terraced type with a mixed functional programme, consisting of six residential units and one for tertiary use.

The architects' aim was to integrate an innovative idea of living into the typical urban fabric of the traditional Bavarian urban residential district. They started from the statement that buildings for housing or mixed use could no longer be designed as rigid objects and isolated from their context but ought to be designed to be open-ended and adaptable over time to the needs of their users and so capable of facilitating and accompanying relations between individuals.

The intention of openness and permeability of the whole complex at Genter Strasse 13 was immediately left to the visitor to understand by the presence of the direct free access link between the space of communal use in the basement and the public footpath running across the whole lot level with the park behind.

To render it possible over time to make changes to the layout of functions within the building, such as extensions, new or different compartments, or even complete changes

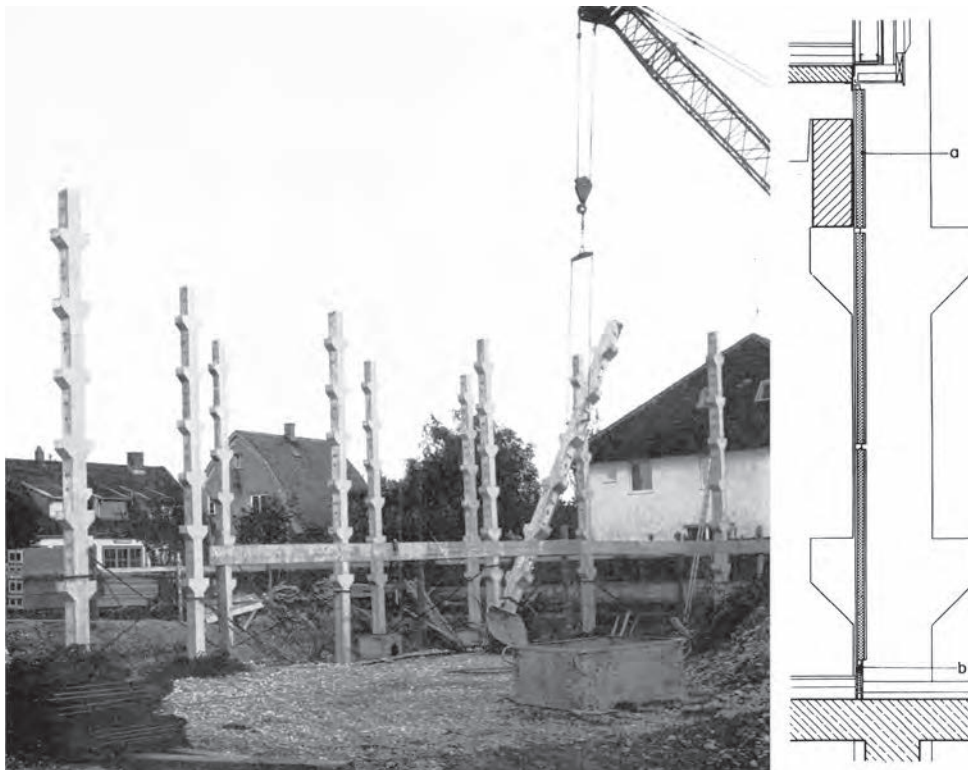


Fig. 2. General view of the construction site — phase of elevation of the pillars and main beams and typical section of the envelope.
© Steidle & Partner archive, 1970.

of intended use, the units were designed in accordance with an elementary constructional principle, devised by starting from the simple assembly of modular prefabricated elements. This system was devised to enable the inhabitants to articulate their ideas of the home and the *inhabitable space* with great ease and on a very small budget. In this way the process of continuous participation in the design of the spaces was kept constantly accessible to the self-determined group of families-clients who initially joined the private construction initiative, promoted by Otto Steidle himself.⁴

The broad *potential* left to the residents not only enabled them to change the layouts and functions of the different rooms of the individual units over time, but also to redefine the articulation of the elements of the façade envelope. In this respect, the flexible-evolutionary architectural project envisaged that both the overall volume of the project, namely the envelope, and the types of different panels that made up the envelope were predetermined, while allowing the modular compositional relationships between parts to be variable.

The ultimate intention of the design and construction of this building was to demonstrate that living is a process that is individual, social, and collective at the same time. The goal was to propose and then give the community of residents an active role in the direction of their emancipation, first by facilitating their participation in the architectural design process

and then through their direct appropriation of its spaces.⁵

Originally the primary supporting structure was designed in steel, but later it was built out of concrete in compliance with the stringent fire regulations, and with this the building gained an enhanced aesthetic that we could define as brutalist.

The load-bearing elements are ordered in a regular, free and independent three-dimensional grid which supports the various residential units. The latter, in turn, are enclosed and defined around their perimeter by the lightweight panels of the building's envelope.

The general approach to the project is based on the principles of structuralism applied to architectural design and these were taken as a theoretical prerequisite to define a clear and marked division between the primary structures (load-bearing) and secondary structures (the envelope and partitions). The structure itself is therefore organised in such a way as to guarantee the variation of the units as programmed by the rigorously modular set of rules as defined by the architectural project. Thanks to these principles it was possible to define spaces with inter-floors of full internal height, half height or one-and-a-half times full height, which make it possible to easily articulate a wide range of volumetric and functional layouts of the internal and external spaces, whether private or collective.

The construction system includes prefabricated rein-



Fig. 3. General view of the whole on completion of work, N-E front on the park. © Steidle & Partner archive, 1972.

forced concrete elements such as pillars, main beams, secondary beams and semi-finished floors prepared to accommodate the final pouring of the concrete. The building of the structure was then completed with the construction of the cavities for the reinforced concrete service ducts cast in situ, to which the bracing function of the whole building and the flat terrace roofs was also attributed, given their greater resistance to dynamic stresses. The main structural elements in prefabricated reinforced concrete were connected to each other by means of steel plates embedded in the casting and by bolted joints, left partly exposed to emphasise the tectonic character of the assembly.

The envelope of the complex was built by the simple assembly of industrialised lightweight prefabricated modular elements. The wholly prefabricated elements of the frames, in steel for the windows and partly in aluminum for the panels of the envelope, were designed according to a single modular coordination system, both in their general dimensions and the rules for their installation and assembly on site. The transparent panels were then composed of standard double glazing and the opaque ones were of the "sandwich" type, consisting of two thin panels produced by Eternit-AG, insulated in the middle with expanded polystyrene

and finished over the whole surface with synthetic enamel. The color of the opaque panels was never random, but followed a rule that varied according to their size.⁶

The construction of the partitions was lightweight. They were mounted completely mechanically and made of plasterboard, both for the elements placed between the home units and those separating the different internal rooms because, as with the envelope, none of these elements were or ever will be required to carry loads.

The exit from the apartments to the exterior and the layout of the rooms inside was ensured exclusively by removable steel stairs (Figs. 2–4).

3. PROTECTION

The building in the Genter Strasse 13 is today protected by the Bavarian State Office for Monument Protection-BLfD. Showing considerable sensitivity and farsightedness, in 2010 it prepared a fact sheet for its protection, full of useful information not only to preserve the building itself, but also to keep alive its uncommon, potential and characteristic evolution over time as envisaged by the project.⁷

Today we can see that the original idea of a building that



Fig. 4. Interior of the Steidle & Partner office — layout of the space with half heights. © Steidle & Partner archive, 1972.

could be adapted over time and the provision of private spaces, for common or public use that could in turn be variously organised and used by the residents, has partly functioned and has partly revealed its limitations.

As for the strengths, we can observe that in its day the building was certainly well conceived and built and so today, in general, it is in a fairly good state of preservation. It is fully used and well maintained. Also noteworthy is the fact that, in over forty-five years of its functional life, no resident of this building has ever voluntarily left their home, but on the contrary, from the interviews conducted, it is evident that the residents are strongly attached to their home units and each of them feels a significant pride in their personal interpretation and appropriation of its spaces, as the expression of their respective ideas of the home.⁸ These often took shape in the original organisations of the internal layouts, in some precise modifications of the external envelope and in the choice of the internal finishing materials, the latter indeed, not always entirely faithful to those originally planned by the authors of the project.

If we analyse the building with the eyes of an architect, it displays a surprising ability to absorb and contain innumerable variations and changes over time, while remaining faithful to the original paradigms and therefore without, as a whole, ever losing its unity. On the contrary, it has gained a progressively higher quality in its spaces, which have been

increasingly adapted to the activities and the atmosphere desired by the residents.

Finally, this building shows that, if the designer is put in a position to take responsibility for defining the design on its different scales and is capable of doing so, and if afterwards those involved act in compliance with clear and defined rules, it is possible, even in a residential building, to achieve a multiple variation and substantial customisation of the living spaces, without compromising the quality and unity of the architectural whole.

As regards the weaknesses, it is necessary to point out that, due to our current and advanced awareness of the efficiency of the constructional elements in terms of comfort and environmental sustainability, the typical detail of the assembly and installation of the elements of the envelope, although it is completely coherent with the project idea, today it is the main technological criticality in the entire building. Where the designers radically pursued the theme of the evolution of the configuration of the façade over time, the durability of the construction joints and the control of thermal bridges were partly sacrificed.⁹

4. CONCLUSION

With the aim of achieving the ideals of the generation that in 1968 fought for the emancipation of individuals, the

architectural design of flexible evolutionary homes offers an open structure that the residents can articulate and furnish, in accordance with their changing housing needs.

The building designed by Otto Steidle and D. and R. Thut in Genter Strasse 13 is showing a degree of ageing in its physical elements, but the construction system is so clear and rigorous that it compensates for the singular arrangement of some details.

In the 1960s Yona Friedman offered a model for a futuristic vision, beautiful but inaccessible, with the forward-looking urban plan designed for “*La Ville Spatiale*”. This was transformed by Otto Steidle’s project team into an innovative and concrete social experience by means of a very effective and strikingly simple constructional concept: a skeletal structure of load-bearing elements, coordinated with an open construction system of modular elements that enabled residents easily and over time to build habitable spaces adapted to their needs and expectations.

NOTES

- 1 Arnulf Lüchinger, *Structuralism in Architecture and Urban Planning*, Stuttgart, Karl Krämer, 1981, 16. “Many Structuralists would describe a structure roughly in the following terms: it is a complete set of relationships, in which the elements can change, but in such a way that these remain dependent on the whole and retain their meaning. (...) The elements are interchangeable, but not the relationships.”
- 2 Kenneth Frampton, *Modern Architecture a Critical History*, London, Thames & Hudson, 1985, 290.
- 3 In the technical report for the presentation of the project at the Munich City Hall the architects wrote that the basic load-bearing lattice consists of reinforced concrete columns with integrated brackets, set at a distance of 7.20m and left exposed. Above the brackets, placed apart at a distance of half a floor, the main girders are laid, which in turn support the secondary ones and the prefabricated slabs. In the whole building, the inter-floor of the internal spaces can vary over time, as can the size and layout of the rooms and, in part, the configuration of the envelope itself. The structure of the home units derives from the instances of the housing models, which make it possible to meet the needs of the residents during and in particular after construction.
- 4 Otto Steidle, *Ein Versuchsbau mit flexiblen Wohnbereichen in München*, Berlin, Bauwelt, 1972, Heft 1/2, 17–19. It is a fact: this building, if one only desires it, can be altered, enlarged, reduced, separated, connected, closed, opened over time. Residents’ needs and creativity replace the old way of pre-ordering residential units.
- 5 Otto Steidle, *Anpassbaren Wohnungsbau*, Munich, Baumeister, 1977, No. 12, 1163–1166. The users were able to produce their own concept of space step by step, for example by experimenting with a 1:1 scale model made out of cardboard. In Genter Strasse, Steidle was dealing with an organised and aware group of future residents, then directed towards the general concept of the project, intended as a process open to user participation.
- 6 Author’s interview with Doris Thut, architect & co-author with Ralph Thut & Otto Steidle, of the architectural design of the residential complex at Genterstrasse 13, Munich, May 2013.
- 7 It is interesting to note that the fact sheet of the Bavarian Regional Office for the Protection of Monuments, BLfD — ZI-1 / Mchn — 2010, has fully adopted the text by Steidle and D. and R. Thut cited in note 3.
- 8 Author’s interview with Mrs. Steidle & Mrs. Gager, residents, and Ulrike Fukas, senior architect of the Steidle & Partner office, Genterstrasse 13, Munich, May 2013.
- 9 To learn more, see the preliminary project dossier by the author: “An experimental method for architectural study and energy analysis for the integrated BIM project for the GBC-HB protection and sustainable requalification of the residential complex at Genter Strasse 13 in Munich” contained in the PhD thesis entitled “20th Century Flexible-Evolutionary Housing. Project and Construction, Heritage Preservation and Innovation.”, USI-AAM 2019.

PEDAGOGICAL ARCHITECTURE: THREE FACULTIES OF ENGINEERING BY AMORN SRIVONGSE

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ABSTRACT.

After the 1960s, higher education had become available in Thailand outside Bangkok for the first time. The paper looks at one particular building type: Faculty of Engineering, designed by architect Amorn Srivongse (1928–2012). Constructed in different locations, three faculties of Engineering share a sense of enjoyment and pedagogy in the design of their skeletons: suspension structure at Khon Kaen University (1964), steel space frame at Prince of Songkla University (1967–1971) and reinforced concrete space frame at Chiangmai University (1971). While the expressions of the buildings' structures were deliberately intended as pedagogical advantages for engineering students, each building was executed under different circumstances and locales. The paper aims, firstly, to show the daring aspects of the structures, and, secondly, to examine the construction processes of the buildings, asking how differing constructive possibilities brought about inventiveness in different structural and technological solutions. The paper draws primarily upon archival materials, interviews with peoples directly involved in the projects such as an engineer, superintendent and labour, and upon first-hand analysis of the architectures. The finding is that in none of the cases was the choice of a structure a foregone decision and that the circumstances of each project had been meticulously studied prior to the building process. Not only the structure of Faculties of Engineering can be understood as open lessons, but the processes through which they were constructed can also be read as their tacit curriculum.

1. INTRODUCTION

In designing the Faculty of Engineering [Chiangmai University], I conceive the structure for engineering students to study the direction of forces from the building itself. Thus, I chose R.C. SPACE FRAM [E] — a new kind of structure which has never hitherto been realised elsewhere. And this may be the case that the new structure is unfamiliar to the contractor.¹

So explained Amorn Srivongse to Vice-Rector of Chiangmai University in 1972, which gives an idea just how important the structure's readability was for his design conception. The ingenuity of Srivongse's idea about structure becomes even more apparent when considered in relation to the programme. Of all the building types Srivongse created, none offers more opportunity to play around with the structure than a Faculty of Engineering (FE). During the 1960s and the early 1970s, as part of a National Plan to expand higher education outside the capital, Srivongse was commissioned, amongst other several projects, to design a total of three Engineering Faculties in different universities and at different times. In every case, he deposited "engineering lessons" in the buildings' skeletons with varying types of structure: three-dimensional steel truss and suspension structure at Khon Kaen University (KKU, 1964–1966), steel space frame at Prince of Songkla University (PSU, 1967–1971) and reinforced concrete space frame at Chiangmai University (CMU, 1971–1973), in the last of which concrete structure was treated with particular attention. Unlike steel structure, where its skeleton can be readily arranged as if it were a diagram of forces at work in the buildings, concrete structure, by its compound nature, lacks the quality of transparency since its internal armature is hidden under the thickness of concrete.² What, then, the architect did with concrete to ren-

der its structural system comprehensible? This paper traces back the development of Srivongse's idea in preserving the visibility of the structure members to fulfil the pedagogical obligation through the three case studies. In particular, it explores how far this pedagogy is fulfilled when reinforced concrete was adopted as the primary structural material.

2. THREE FACULTIES OF ENGINEERING BY AMORN SRIVONGSE

2.1 Faculty of Engineering, Khon Kaen University (1964–66)

The first FE Srivongse designed is in Khon Kaen University, and probably his earliest attempt with the intended usage of steel to render the structure of a building visible in architectural forms. The FE consists of two main buildings positioned parallel to one another 18 metres apart. The front building is 9 metres in width and 84 metres in length, while the rear building is in the same width but shorter in the length of 30 metres. Between the two buildings, a double-height centre hall is located to facilitate the connection between them, within which the staircase and the roof structure of the hall attract our attention. The U-shaped stair with semi-circular landing stands out gracefully in the hall with only the first and the last steps touching the lower and upper floors without any support underneath. In contrast, the walkway of 3 metres wide which links the front and rear buildings on the second floor is fixed at only one side and left the other side of the walkway hung from the roof plane trusses spanning in the cross direction between supporting columns. Suspended from these plane trusses are steel rods, neatly detailed between the upper and lower rods with screw joints, to lift the I-beams supporting the walkway to a correct place. Thus, the dead loads and live



Fig. 1. Amorn Srivongse, Faculty of Engineering, KKU, Khon Kaen, Thailand, 1964–66, suspension structure is lifting the walkway at central hall. © Si-thisak Namkom, 2019.

loads of the walkway are partly taken to the supporting columns and partly taken to the plane trusses. So noticeably in the centre hall is an architectural expressiveness in which the different parts of structural members are distinguishable (Fig. 1).

Like the interior, the structural skeleton of the building is also left visible on the outside. The roof members composed of inverted triangular space trusses take the span of 9 metres between two supporting columns in the cross direction, and cantilever 3 metres beyond the façade lines. Above each truss, a gable roof made of wooden rafters covers an area of 6 metres wide by 15 metres long. Thus, on the whole, the gables of all spans constitute a series of folded roofs over the entire buildings. On the exterior, each end of the folded roofs is covered with concrete stiffeners to protect exposed rafter ends while at the same time preserving the exact shapes of the gables, as well as holding the folds firmly together. Suspension rods also play a part on the external façades. Hung from the end of the inverted triangular space

truss, they lift the weight of the horizontal protruding fins running along the longitudinal façades and by doing so demonstrate conspicuous characteristics to the façades. Accordingly, the four elements: inverted triangular space trusses, folded roofs, stiffeners, and suspension rods all form a prominent structural unit, in which each part has its structural function and is logically integrated into the overall expression of architecture.

2.2. Faculty of Engineering, Prince of Songkla University (1967–71)

The second FE to consider is located in Prince of Songkla University. Similar to the FE, KKU in that all fundamental elements are exposed both interior and exterior, at the FE, PSU, structural components are also confined to the same number of four elements of column, steel space frame, valley gutter, and roof dome. With these principle components, Srivongse managed to create the structural system to cover the entire site of 150 metres by 150 metres, making the FE at



Fig. 2. Amorn Srivongse, Faculty of Engineering, PSU, Songkla, Thailand, 1967–71, by far the most massive space frame under construction. © Amorn Srivongse, c.1969.

PSU the country's largest space frame structure at the time.

The faculty building is supported on twisted concrete columns positioned 10 metres by 10 metres apart. Sitting on the columns is the roof structure of a double-layer space frame, made entirely of steel tubes of 5-inch diameter at the lower level and 3-inch diameter at the top level of the space frame. On top of the space frame, valley gutters, designed into an equal-armed cross-component and made of precast processes, are installed as an integral part of the roof structure. These valley gutters were then joined together by welding the reinforcing bars left projecting from each end of the individual gutter with those adjacent to it. Grout was then filled between the sections of gutter components to achieve the structural continuity of the roof structure, creating grids of valley gutters upon which precast concrete dome components were to rest. Each of the supporting columns, together with the space frame and concrete gutters, supports a total of 16 concrete domes, thus, overall, the entire edifice consists of 3650 domes. Gargantuan though this may sound, the controlled dimensions of the structural elements lend a delicate lightness to this building (Fig. 2).

Of all the structural components, the concrete dome is the most prominent feature. The architect invented the method for manufacturing the dome himself by casting on the site using earthen formwork. This peculiar method not

only proved economical than a complicated formwork but, technically speaking, it was also practical enough to ensure greater contour accuracy demanded for making the dome components. As a module of concrete domes is designed into 40 centimetres in height with the square base of 2.5 metres by 2.5 metres, it meant that each component could be cast and their quality be controlled by human hands.

A closer investigation to the underside of the dome further reveals the usage of a local bamboo mattress called "sau lamphaen" in the construction process. Since earth mould suffers from the significant adhesion between the mould and wet concrete cast upon, by treating the earth mould with a bamboo mattress before pouring it helped to facilitate the casting processes. Not only did the mattress act supremely well as an agent release, but the pores within it helped stiffening wet concrete by draining its water excess. Besides, Srivongse made sure that this peculiar technique of casting once completed left some critical consequences in the finished result. Traces of this woven texture for the concrete dome, removed after the concrete was settled, are left visible. Rather than covering the underside surfaces of the domes with plaster to achieve a smooth surface, instead, he chose to apply only a thin layer of white paint to the surfaces, showing the visibility of the evidence of the construction. What is so remarkable about this building is

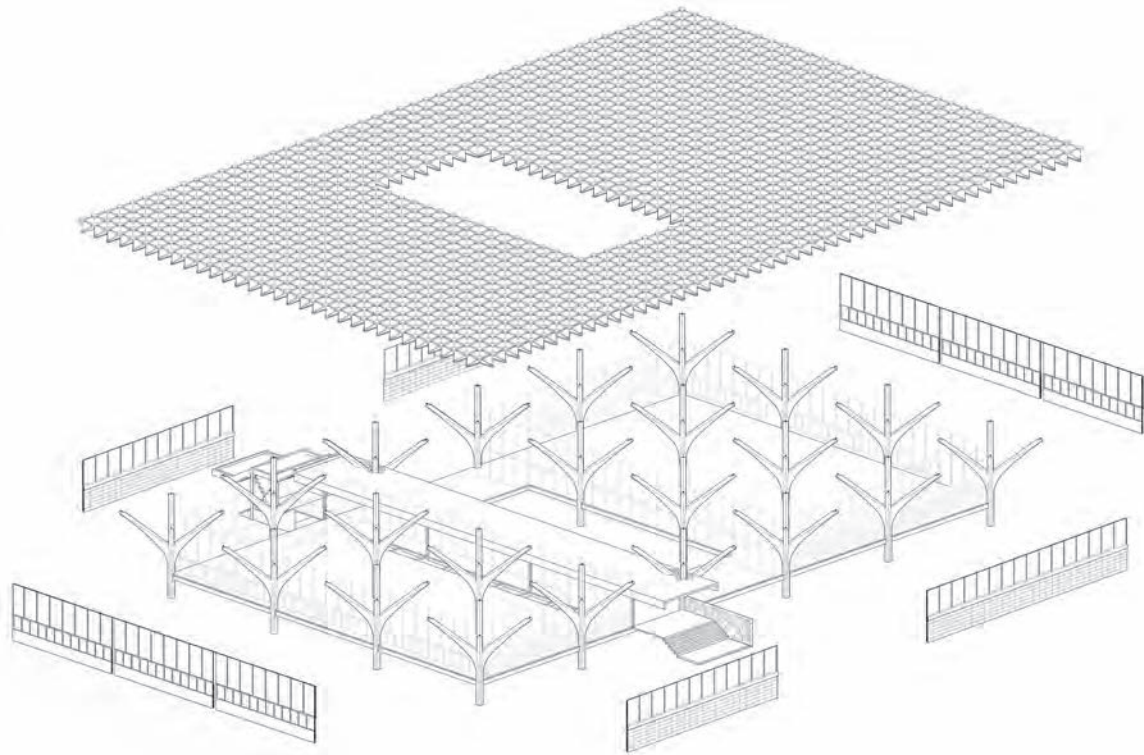


Fig. 3. Amorn Srivongse, Faculty of Engineering, CMU, Chiangmai, Thailand, 1971–73, isometric showing precast pyramid roof units. © Pinai Sirikiatikul, 2020.

its capability to show how constructional parts are produced and put together, making both the construction and its processes comprehensible.³

In so far, we have seen two Faculties of Engineering by Srivongse, let us now look at characteristics of his attitude towards structure and its materials. Firstly, the refining of structural elements into components mass-produced onsite was carefully calculated so that they could be carried out simultaneously with other parts of the construction, especially wet construction. Secondly, human elements, as part of the prefabrication processes, are not hidden but made visible and displayed.

2.3. Faculty of Engineering, Chaingmai University (1971–73)

Right after the completion of the FE at PSU, Srivongse received a commission to design his third FE at Chaingmai University. Conceived in 1971 and finished in 1973, the FE consisted of the main buildings built separately from one another: 4-storey Lecture Building, Administration&Library Building and Workshop Building. At the last two edifices, the space frame was adopted as the primary structural system, but with a significant change of structural material from steel to reinforced concrete. Srivongse chose concrete, partly because he did not want to repeat himself and because he

wanted to explore how to use concrete as if it were steel as evident in his experiment with precast concrete to create the structural system of the space frame.

At the FE, CMU, the roof geometry was determined by laying out precast concrete blocks in a plan. However, unlike the FE at PSU where two families of precast — roof dome and valley gutter — are adopted at CMU only one type of precast was required. In terms of structure, previously at PSU, there is a separation between the roof structure made of steel space frame and the roof blocks made of concrete precast. At CMU, however, these two essential elements are integrated as one made use of precast concrete units. With the precasting process, it meant that each unit, which merged the structure and the roof into the single element of the pyramid form, could be laid out and poured separately, while the preliminary foundation and pour-in-place columns were being poured. Each roof block was cast in a mould that was themselves made of concrete whose surfaces were applied with agent release called “De-ca-dec” to facilitate the casting process.⁴ Because of the size and weight of the precast elements, exactly half the size of the previous roof elements at PSU, so each concrete precast at CMU required a smaller crew and lighter equipment. Building reports made by site supervisors revealed that no more than eight workmen, all of them were unskilled labours hired and



Fig. 4. Amorn Srivongse, Faculty of Engineering, CMU, Chiangmai, Thailand, 1971–73, underside surfaces of precast pyramid roof units left fair-faced. © Sithisak Namkom, 2019.

paid daily by the contractor, were in operation for the precast production at a time.⁵ Besides, the size of 1.25 metres by 1.25 metres at its base and 65 centimetres at its height of the pyramid unit remain within the lifting capacity of derrick and the supporting capacity of temporary scaffolding.

In addition to being built economically and efficiently, the pattern of the precast space frame was astonishing. Looking from the top, the repetitiveness of the precast space frame created a compelling visual pattern. The upper chords of the space frame made of hot-dip galvanised steel tubes connect the zenith of the pyramid units, making each of the units into the larger structural whole (Fig. 3). Equally remarkable is its underside surfaces of the precast blocks, which retain the impression of worn-out moulds on which concrete was poured, and the sparse bits of workmanship. Though each unit is identical in size, the imprint of the moulds used many times to produce many casts, and the human labours employed to make them, render each one of them unique (Fig. 4).

In so far as we have seen, it is worth to comment that in the finished result, concrete does not conform to the demand for the distributions of forces as one can expect using steel. If steel was a favourable material at the first two Engineering Faculties for its demonstrative quality, the very same quality is not applied to concrete. Nonetheless, it is

another competence of concrete — its indexical property — of being able to “carry within its direct evidence of the moment of its making,”⁶ as the British historian Adrian Forty puts it, that was taken up and exploited knowingly by Srivongse at CMU.

Seen from below, the precast units assembled as both the roof and the structure over the building display the structural system observable, even though its visualisation of the reinforced concrete space frame is a lot less transparent than working with steel. What is achieved instead, however, lies in the rationalisation of precast production. By dividing it into components of pyramid unit that would be manageable by hands of the laypersons, whose manual labour could leave an imprint and displayed on the finished result, it succeeds in making a distinction between two different kinds of labours operating in conjunction. What we see at the FE, CMU is that, on the one hand, concrete masquerading as steel space frame structure, undoubtedly the result of a collaboration between the architect and engineer, and on the other hand, it is also evident that this daring structure was made possible by the manual labour of unskilled workers. Ultimately, at CMU, we are made aware of concrete as something that can represent at once both the mental labour responsible by the *white-collar* and the physical labour worked out by the *blue-collar*. It is this indexical

property of concrete that it can combine many different entities under its homogeneous substance while allowing each of them distinct that mattered most to Srivongse.

3. CONCLUSION

Of Srivongse's approach to the structure, the FE at CMU is most unusual in that the static performance, the structural comprehension and the visual effects of concrete, all arising from practical exigency and material relations of its construction, enjoy pretty much coexistence. It is something of a surprise to find these threefold pedagogies embedded themselves in concrete. What makes the three Faculties of Engineering designed by Srivongse so remarkable is that they offer some possibilities for learning about structure, material, and labour as indispensable for the apprehension of architecture.

REFERENCES

- FORTY, Adrian, *Concrete and Culture: A Material History*, London, Reaktion Books, 2012.
- LEGUALT, Réjean, "L'Appareil de l'architecture moderne: New Materials and Architectural Modernity in France, 1889-1934," PhD thesis, MIT, 1997.
- SIRIKIATIKUL, Pinai, "Onsite precast concrete: A critical approach to concrete at the Faculty of Engineering, Prince of Songkla University, Thailand," WOUTERS, Ine, VAN DE VOORDE, Stephanie, & BERTELS, Inge, et al. (eds.), *Building Knowledge, Constructing Histories*, London, Taylor & Francis Group, 1229-1235.

NOTES

- 1 Amorn Srivongse's letter to Vice-Rector of Chiangmai University, Okat Palangkul, 1 August 1972.
- 2 See historical investigation about the difficulty reinforced concrete had in conforming to the exposure of the structure material in the late nineteenth and early twenty centuries France in Réjean Legault, "L'Appareil de l'architecture moderne: New Materials and Architectural Modernity in France, 1889-1934," PhD thesis, MIT, 1997, 66-67.
- 3 See the detailed discussion about this project in Pinai Sirikiatikul, "Onsite precast concrete: A critical approach to concrete at the Faculty of Engineering, Prince of Songkla University, Thailand," Ine Wouters, Stephanie Van de Voorde, & Inge Bertels, et al. (eds.), *Building Knowledge, Constructing Histories*, London, Taylor & Francis Group, 1229-1235.
- 4 Building report on the construction of the Faculty of Engineering, Chiangmai University.
- 5 Busayapong Chaiyanpanachamnong, former construction superintendent of Silom Construction Company, interviewed by Pinai Sirikiatikul, 12 September 2019.
- 6 Adrian Forty, *Concrete and Culture: A Material History*, London, Reaktion Books, 2012, 254.

TRADITION AND CONSTRUCTIVE INNOVATION IN PORTUGUESE ARCHITECTURE: BETWEEN THE “SURVEY OF PORTUGUESE REGIONAL ARCHITECTURE” AND THE APRIL REVOLUTION, 1955–1974

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ABSTRACT.

This paper analyses a period in the history of modern architecture in mainland Portugal in which artisanal and industrial construction processes coexisted in the single-family housing typology. Key findings from four case studies, chosen from a selection of more than 200 examples taken from the “Inquérito à Arquitectura do Século XX em Portugal: IAPXX” (Survey of 20th century architecture in Portugal), are discussed, with a focus on key constructive and architectural features. While integrating vernacular architectural elements associated with local geographic, climatic, and constructive contexts, the works represented in these case studies are not only modern but also innovative. It is argued that these works, covering two generations of architects, born between the 1920s and 1930s, are aligned with the international disciplinary practice of the late 1950s and 1960s, corresponding to a moment of renovation in modern architecture that included the reintroduction of values from history and regional cultural contexts.

1. INTRODUCTION

This paper is part of an ongoing doctoral thesis titled “Designing with Portugal’s climate: between the “Survey of Portuguese Regional Architecture” and the April Revolution, 1955–1974”.¹ The research focuses on a recent period in the history of Portuguese architecture, in which vernacular construction and industrial construction processes coexisted in the building of single-family housing.² It is based on a review of more than two hundred single-family houses built in the 1960s and early 1970s, selected from the *Survey on 20th Century Portuguese Architecture*.³ After extensive on-site visits across the whole territory of mainland Portugal, six works considered to be particularly representative of the architectural practices of the surveyed universe were selected as case studies. The four most significant are presented in this paper.

In 1961, the book *Arquitetura Popular em Portugal* (Vernacular Architecture in Portugal) presented the results from the *Survey of Portuguese Regional Architecture*, hereby referred to as the Survey. The Survey was conducted by two generations of modern architects who surveyed vernacular buildings outside the large urban centres in six zones of mainland Portugal.⁴ This was an event of the greatest importance that reflected the spirit of the time, between “rupture and nostalgia”,⁵ inspiring a whole new generation of Portuguese architects to recognise and value the local context, the significance of the site, and the importance of the vernacular constructive methods.

The Survey must be seen in the context of the main architectural currents of the late 1950s and early 1960s. In the wake of the International Congresses of Modern Architecture (X CIAM Dubrovnik, 1956), this was a period of paradigm shift in the Modern Movement and reintroduction of historical values and cultural contexts in the architectural prac-

tice. In Portugal this paradigm shift took place in an “environment of resistance to official conservatism and the schematic nature of the International Style”.⁶ In the international context, this moment of “disjunctions and continuities”⁷ in modern architecture was expressed in the movements and works of architects who had significant influence on the Portuguese architectural practice at the time, such as the organicism of Frank Lloyd Wright (1867–1959), the new production of Le Corbusier (1887–1965) after the Jaoul Houses of 1952, the humanised architecture of Alvar Aalto (1898–1976), the Mediterranean architectural character of the Catalan José António Coderch (1913–1984), the “New Brutalism” from England and the “Neo-Realism” from the Italian architecture of the post-war period. As noted by Curtis, these currents “offered clues for interpreting the traditions of other parts of the World and adjusting buildings to foreign cultures and climates”.⁸

2. THE SURVEY ON REGIONAL PORTUGUESE ARCHITECTURE

Ana Tostões describes the spirit in which the Survey was launched, pointing out that one of its original objectives was to understand how vernacular architecture addressed “the challenges posed by climate, the materials available, the economy and the living conditions in each region”, and the extent to which such solutions “remained alive and functionally, economically and spiritually adequate”.⁹ The introduction to the Survey by Keil do Amaral (1910–1975) stated those objectives very clearly, listing the following as the key areas for detailed enquiry and classification: “occupation of the territory; the urban structure, materials and methods pertaining to construction; the influence of climate, economy, social organisation and evolutionary factors on the buildings and their groupings; and an analyses of the artis-



Fig. 1. Alcina Villa, 1971, Sergio Fernandez. Outdoor view of the porch facing west and also to the view of the Atlantic Ocean (current state). © João Santa Rita.

tic syntheses of these and others conditioning factors".¹⁰

The Survey presented a reading of the Portuguese territory that followed the work of the geographer Orlando Ribeiro (1911–1997), who, in 1945, in the book "Portugal, the Mediterranean and the Atlantic", had identified three major climatic regions in Portugal: the Atlantic north, with a humid temperate climate of high rainfall; the Trás-os-Montes north, with a cold continental regime; and the Mediterranean south, with a hot and dry Summer and a temperate Winter.¹¹ It is based on this classification that the Survey's six study Zones were defined.

The vernacular architecture represented in the six regions of the Survey publication comprises a series of invariable and variable features. The former includes an economy of means, both in the way the shape of the buildings is implanted into the topography of the places and in the whole construction process, taking advantage of the vernacular technologies available locally and the physical and mechanical properties of the materials, with low levels of material transformation and an overall lack of ornamentation. Variable features include constructive and climatic conditions, with a special emphasis on strategies for adapting the houses to the local context. This is reflected in the positioning of the buildings according to the orientation of the sun and the wind patterns, as well as in the application of materials with thermal functions, particularly on walls with high thermal inertia, on thatched roofs in the cold regions, on the roof interior linings made of reeds, and on white lime paint-

ed walls in the warm regions.

The architects who designed the houses reviewed in this article did not participate in the Survey. However, they were all young architects at the start of their careers who were influenced by vernacular architecture through their own professional trajectories and individual projects, as well as their relationship with the older generation that conducted the Survey, particularly Keil do Amaral, the leading Survey Coordinator and coordinator of the Beiras Zone, and Fernando Távora (1923–2005), one of the main Survey promoters and Coordinator of the Minho Zone.

3. CASE STUDIES CONSTRUCTIVE ANALYSIS

Four particularly insightful case studies are presented in this section, two for the northern region and two for the southern region. The northern case studies are representative of the Minho's Atlantic coast microclimate and the "hot earth" microclimate of Trás-os-Montes. The southern case studies are representative of the influence of the Mediterranean climate, which is more attenuated along the Atlantic coast and warmer and drier in the Algarve.

Alcina Villa (1971) by Sergio Fernandez (b. 1937) is located in Caminha, on the northern border with Spain, close to the sea (Fig. 1).¹² It comprises a set of two houses built with granite blocks and prefabricated concrete slab. The large porch that serves as an entrance to the houses forms an exterior living space similar to the balconies in vernacular architec-



Fig. 2. Joanamigo Farm, 1962, Alfredo Matos Ferreira. Outdoor view of the porch facing south (current state). © João Santa Rita.

ture. The structure of the porch and main glazed windows is made of reinforced concrete. Industrially processed materials of mineral or natural origin, such as painted stucco, tiles and plywood (walls and ceilings), hydraulic tiles, and wooden floors (alcoves), are used inside the house. The houses adapt to the steep slope through terraces that configure two half floors in their interior.

The Joanamigo Farm (1962) by Alfredo Matos Ferreira (1928–2015) is located in Barca de Alva, in the Douro Valley (Fig. 2).¹³ The house is built with masonry of shale, earth clay mortars, and wooden structure on the roofs. The use of concrete beams in the horizontal windows (garage and mezzanine) and concrete slab on the kitchen ceiling are the two exceptions to the adoption of artisanal construction processes. The materials in the exterior have rustic finishes, maintaining the appearance they had when extracted from nature, especially the piled shale stones in the walls. Inside, softened materials are applied, such as stucco on the walls, wood on the ceilings, and slates of shale on the floor. The way the house is integrated in the landscape, with the materials available on the surface of the land near the house used in the construction of the walls, merits special mention.

The Albarraque House (1961) by Hestnes Ferreira (1931–2018) is situated in Albarraque, near Lisbon (Fig. 3).¹⁴ The construction of the house revealed a constructive pragmatism that combined the regional constructive tradition with the materials and industrial processes that were common in the Lisbon region. It is built with stone masonry walls and ce-

ramic brick with a prefabricated concrete slab. The reinforced concrete appears on the floor slabs, on the window lintels, and on the roof gutters. Exterior finished walls and floors are made with lime plaster and ceramic, respectively. The interior walls are finished with lime plaster and tile, the floors with wood and hydraulic mosaic, and the ceiling lining with solid wood. The slight slope of the land led to the construction of an elevated ground floor that forms a south-facing patio, around which all spaces of the house are organised.

The Pitum House (1959) by Francisco Pires Keil Amaral (n. 1935) is located in Alporchinhos, in the Algarve region (Fig. 4).¹⁵ It is built with structural masonry walls and reinforced concrete flat cover. The interior spaces are finished with lime plaster on the walls and ceilings and ceramic tiles on the floors. The house shows the direct influence of the principles of the Survey, especially in the “ornamentation elements” inspired in local traditional houses, which can be seen in the upper coloured band that ends in a volute and in the ceramic chimney.¹⁶ The house is planted on a cliff over the sea, with care taken to preserve a fragment of the indigenous landscape from a morphological, mineral and vegetation point of view. The circular courtyard at the entrance of the house organises a transition outdoor space defined by a high wall that protects it from the prevailing winds and the strong coastal sun. In this courtyard there is also a cistern to collect rainwater and a staircase leading to a terrace, known locally as “Açoteia”.¹⁷



Fig. 3. Albarraque House, 1961, Raul Hestnes Ferreira. Outdoor view of the south courtyard (current state). © João Santa Rita.



Fig. 4. Pitum House, 1959, Francisco Pires Keil Amaral. Outdoor view of the circular courtyard facing south (current state). © João Santa Rita.

In concluding this section, we highlight the key construction features of the case study houses, according to their artisanal or industrial nature:

- Artisanal processes. First, the construction systems

were associated with the availability of materials regionally or even at the construction site: in the north, stone and wood, and in the south, lime and ceramics. Second, there was minimal transformation of the mate-

rials, which retain much of their original texture and finishing. Third, there was significant use of human labour, indicative of a low level of mechanical industrialisation, with greater incorporation of traditional technologies and indigenous materials in the more remote or isolated locations (Joanamigo, Pitum). Fourth, the incorporation of artisanal processes and local materials was also a consequence of circumstances. For example, at the Alcina Villa, the original project included a reinforced concrete structure with double walls of ceramic masonry, but the materials were subsequently changed because of economic reasons, as granite was locally available and much cheaper, and did not require skilled labour. At the Joanamigo Farm, a modern construction with a flat roof was initially planned, but the difficulty to access and transport materials to the site, as well as a lack of workers with experience building reinforced concrete structures, led the architect to change the concept for the house. Fifth, the artisanal character of the construction processes was also influenced by the local foremen, as in the case of Alcina Villa, which was built by a carpenter who had significant ship building experience, thereby mastering wood construction techniques.

- Industrial processes. First, reliance on industrial processes improved the functional performance of the construction: reinforced concrete belts built in solid masonry walls allowed for greater anti-seismic safety, while also increasing the resistance to fire, the protection against atmospheric agents, particularly on roofs, and the durability of the construction. Second, the construction of reinforced concrete slabs (Pitum), prefabricated concrete slabs (Alcina Villa, Albarraque), or wood slabs (Joanamigo) made the modern spatiality of ample social spaces possible. Third, isolated structural elements such as modern *pilotis* or horizontal windows were avoided, except for some glazed windows at the Joanamigo Farm and the Alcina Villa.

Finally, in climate adaptation, similar strategies to the ones implemented in vernacular architecture were adopted, alongside newer technologies and materials that improved the thermal performance of the houses. More specifically, natural or synthetic thermal insulation materials were applied on walls or roofs, such as double-wall with airbox (Joanamigo House) and rock wool blanket in the cover (Joanamigo House and Alcina Villa). It is also noteworthy that all windows were made of wood and simple glass.

4. CONCLUSION: TRADITION AND CONSTRUCTIVE INNOVATION IN PORTUGUESE ARCHITECTURE IN THE 1960s

Three conflicting cultural paradigms that shaped the modern architectural culture — the technological, the classical and the vernacular — were at the genesis of the Modern Movement, according to Kenneth Frampton. This author

notes that: “a hybrid species of vernacular modernism can be identified in modern architecture from 1923 onwards, in which the adjective vernacular implies a partial return to the rustic manner of building using traditional types and materials”¹⁸.

The four case studies presented in this paper should be regarded as examples of this “vernacular modernism”, where artisanal or traditional construction processes coexist with more industrial or modern construction methods and materials. They also reveal a continued belief in technology and the legacy of the “neoplastic” and “purist” vanguards of the Modern Movement, based on a free and flexible spatial organisation, resulting in non-hierarchical, asymmetrical formal compositions.

The analysis of these case studies produced three main conclusions.

First, the architects in question successfully incorporated vernacular construction traditions into their erudite work. Such integration was reflected in a return to forms delimited by walls with windows and door openings, in contrast to the modern aesthetic standard of reinforced concrete structure grids and large glazed surfaces. In a constructive sense, the heavy and densely compact nature of the houses contrasted with the lightness of the modern building. And there was an explicit pursuit of an organic integration into the site, evidenced in a fragmented formal game, organised according to different house levels linked to the pre-existing topography, as observed in the Survey. So, what stands out the most in the influence of vernacular architecture in the four case studies reviewed is a will to embed the houses in the geography, climate, and culture of each region, with clear implications in the way the buildings are positioned, built and inhabited.

Second, the case study constructive processes integrated the innovative proposal that was at the origin of the Modern Movement concerning technological and scientific advances. More specifically, the entire construction of the houses was subordinated to the design of the modern space, irrespective of the type of technology used. That is also why, in the Portuguese architecture of the 1960s, a combination of universal, mechanised and industrialised construction processes with local and humanised artisanal techniques produced such distinct buildings, characterised by a constructive coherence that was also observed in the seminal work of the modern architects referred to in the introduction.

Third, an approach to architecture based on the coexistence of artisanal construction processes found in vernacular architecture and industrial processes commonly employed in modern architecture advanced the Modern Movement project in Portugal without breaking-up with history and tradition, both in socio-economic and in geographic and cultural terms.

ACKNOWLEDGMENTS

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NOTES

- 1 The Doctoral thesis has a Supervisor and a Co-Supervisor, namely Prof. Ana Tostões (IST-UL) & Dr. Helder Gonçalves (LNEG), respectively.
- 2 See Olivier's definition of vernacular architecture and the characterisation of the Portuguese vernacular architecture in Paul Olivier (coord.), *Encyclopedia of Vernacular Architecture of the World* (3 Vols.), London, Cambridge University Press, 1998 [1st. ed. 1997].
- 3 Ana Tostões (coord.), *IAPXX — Inquérito à Arquitectura Portuguesa do Século XX em Portugal*, Lisboa, Ordem dos Arquitectos, 2006, accessed on 15 June 2020, <https://www.iap20.pt>.
- 4 Keil Amaral, et al., *Arquitetura Popular em Portugal (2nd ed.)*, Lisboa, Associação dos Arquitectos Portugueses, 1980 [1st ed. 1961], Order of Architects, OAPIX, Arquivos fotográficos do Inquérito à Arquitectura Regional Portuguesa, 2011, accessed on 15 June 2020, <http://www.oapix.org.pt/>.
- 5 Tostões, idem.
- 6 Ana Tostões, *Os Verdes Anos na Arquitectura Portuguesa dos Anos 50*, Porto, FAUP Publicações, 1997, 160.
- 7 William J. R. Curtis, *Modern Architecture since 1900*, 3rd. ed., London, Phaidon, 1996 [1st. ed. 1982], 471.
- 8 Idem, 492.
- 9 Tostões, idem.
- 10 Keil Amaral, et al., idem, 720.
- 11 Orlando Ribeiro, *o Mediterrâneo e o Atlântico*, Lisboa, Edições João Sá da Costa, Portugal, 1993 [1st ed. 1945].
- 12 Reference iap 20: N100577.
- 13 Reference iap 20: N200979.
- 14 Not represented at iap 20.
- 15 Not represented at iap 20.
- 16 According to the Survey's architects, the «valorisation elements» correspond to the ornament in traditional houses in the Algarve Zone, reflected in the introduction of colour and the chimneys.
- 17 «Açoteias» originated from the Arab presence in the Iberian Peninsula between the 8th and 15th centuries.
- 18 Kenneth Frampton, *A Genealogy of Modern Architecture: Comparative Critical Analysis of Built Form*, Zurich, Lars Müller Publishers, 2015, 8.

5

REGIONAL TIMBER STRUCTURE

Session 5-a

RETURNING TO WOOD, LOOKING IN TRADITION THE ESSENTIAL OF ARCHITECTURE

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Wood has been, since time immemorial, one of the most widely used tectonic resources in architecture; this reference has even been sought to justify the forms adopted by many stone architectural elements, such as the triglyphs and metopes of classical architecture.

Moreover, when Semper proposed his theory of the *four elements*¹ as a kind of refoundation of architecture, he sought the referential form in the hut built with sticks, which is the same thing that Laugier had done in his *Essai sur l'architecture*, some time before, with that image of the primitive hut², that will be used over and over again and will make you famous.

However, wood, within the modern movement, born under the protection of the industrial development of new materials, became an auxiliary material for finishes and carpentry, with the exception, of course, of North America or the regions of the East, especially Japan, where wood has always been a basic material for architecture, from the structural to the finishes.

In Europe only Gropius will make a song to the wood³ in the early days of modernity, but it seems that he did not so much because he sought its widespread use, but because one of his important clients was a wood industrialist (Adolf Sommerfeld⁴) for whom he built (with Meyer) several buildings in that material.

Because wood was not really a material of the avant-garde taste. And its use was limited to the field of unpretentious architecture, never in the field of distinguished architecture.

On the other hand, after the Second World War, when the first revision of the modern movement arrived, and with the irruption of organicism and the look towards Wright, wood recovered a certain leadership; and it found in the figure of Aalto a great defender, who placed this material again among those 'allowed' to modernity. This 'revival of wood'

gave rise to some very interesting buildings in different parts of the world; for example, in Spain, the Somosierra Schools by De la Sota & Corrales/Molezún (1957) or the Herrera de Pisuerga Institute (1958), also by Corrales & Molezún.

Although wood was the protagonist in both cases, it was not really the structural material but only the roofing material; the same as Siza will do in the swimming pools of Leça da Palmeira (1966). But in neither case did these works point out a path for its use outside the specific singularities. And they had no continuity, as happened with the Sommerfeld house by Gropius and Meyer.

The three texts presented in this section focus their attention on Japanese architecture, either in its concrete reality or as an inspirational reference; and show us different ways in which wood has acquired a new prominence; and although they refer to buildings of less architectural value than those mentioned above, they present strategies of great interest at present, due to the sustainable aspect of the use of wood.

The Japanese architectural tradition, represented as icon by the Katsura Palace as a fundamental reference, both for the richness it contains in terms of spatiality, efficiency, versatility, lightness and even adaptability, and for its notes of abstraction, universality and sensitivity towards nature and landscape; as well as for the spiritual values that characterize it, which make it something that goes beyond a simple technical strategy or the ease of industrialization and globalization.

Two of the articles show how these virtues, devoid of concrete materiality, were adapted in Norway and Finland to achieve architectural models adapted to the needs of both territories.

The other article refers concretely and locally to the re-adaptation, in Japan itself, of the constructive strategies of its own tradition, generating current ways of using the secular

and almost religious technique of the master carpenters.

Thus, Rusak shows us the links that were established from the 1950s onwards between the pragmatic and rural Norwegian woodworking tradition and the richness of Japanese architectural culture, which became known in Europe. Interesting is the analysis he makes of the figure of Korsmo as an outstanding protagonist of the process; and of how he tried to apply in his works the concepts of flexibility, modularity and change, on which the primary interest of Japanese architecture was centered.

It is interesting the consideration of the author on the distancing that Korsmo later established with Japanese architecture, precisely to better adapt to the peculiarities of Norway, after having built even sized houses based on the tatami module.

Similar consideration on Japanese modulation and abstract repetition, moves the contribution of Ferrer, who refers to the work of several Finnish architects, whom he presents as an alternative or reaction to the sensitive romanticism of Aalto. Among them is the figure of Blomstedt, who laid "the formal foundations of the new Finnish constructivist architecture in opposition to the subjective and romantic architecture of Alvar Aalto". That is, according to Ferrer, he went from Aalto to Pallasmaa; or from romanticism to theory, systematics, rationality and industrialization, excluding individualistic features. Notes that, according to him, come from Japanese architecture.

Yao's work shows us, through the figure of Gozoro Izuka, the recent attempt to reestablish in Japan the connection with its own tradition: Yao shows Izuka's strategies to revive the connection with the Japanese carpentry tradition after a long period, in which the use of wood in public construction was not allowed in Japan.

And finally, Genadt's contribution; which is a bit disturbing, because Kuma's way of assuming the tradition shown by Genadt, does not appear as an achievement but as a big lie; or, to be less dramatic, a bit false and insincere; clashing head on with that maxim formulated by Berlage at the beginning of the modern movement, which influenced Mies so much: That nothing should be built that is not clearly made⁵; which is also especially important in this case; because it affects the centuries-old tradition of Japanese carpentry; in fact Genadt repeatedly uses such terms as *tsugite* (継手), *ikibushi*, *kugi* (釘), *shinden zukuri* (寝殿造), ... taken from the tradition of the master carpenters; as if trying to show thereby the relation between it and Kuma's work; and yet Genadt then openly shows, without any attempt at dissimulation, how Kuma, in the works under consideration, supposedly employs the tradition of Japanese carpentry, but it is a false, apparent, feigned, and superficial use ...: as a "sleight of hand"; in reality he betrays absolutely all the traditional uses in the almost religious employment of wood in Japanese architecture; in this, the joints are always dry, without glue (only employing sometimes pastes based on rice, animals and resin, and lacquer to reinforce the joined

members) nor screwed joints; and even less employing wood only to cover steel or concrete.

For Ruskin in the *Seven Lamps of Architecture*⁶ show the insincerity as one of the most inadmissible things in architecture; as Kuma would do: the faking wood structure, that he expressly exploited, causing with that the appearance of disturbing instability; strategy less admissible still precisely as a proposal for the recovery of tradition; especially in Japan.

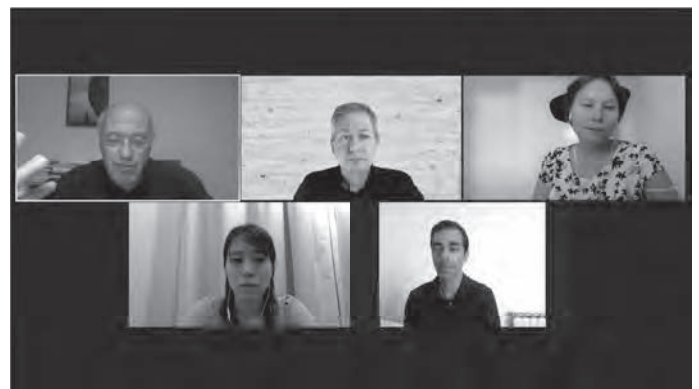
In this way is interesting the Genadt's reference a Frampton⁷ in relationship with the Kuma's Wood Bridge Gallery as "an exceptionally rhetorical... [and] highly theatrical work," achieved "not without considerable sleight of hand".

That is why I believe that if we want to speak of tradition, it would be not in the "primitive Latin sense" of "traditio" (to transmit) but in the opposite with the same root: "traditor" (to betray). Or as the Italian saying goes: 'traduttore: traditore' (translator: traitor).

Thus, Genadt openly shows us how Kuma, apparently seeking to update tradition in modernity (translate it into it), in reality introduces such essential changes that, in fact, he limits himself to partially recovering its external appearance; while completely distorting its essence through an exercise of construction, insincere and unnecessary, that betrays it.

NOTES

- 1 Gottfried Semper, *The Four Elements of Architecture and Other Writings*, Harry F. Mallgrave & Wolfgang Herrmann (trans.) Cambridge, 1989. Original ed. 1851.
- 2 In the second edition of the work (1755) he included an illustration of a primitive hut, which was very fortunate and which made him well known (Marc Antoine Laugier, *Essai sur l'architecture*).
- 3 Walter Gropius, "Neues Bauen", *Der Holzbau*, supplement of the magazine *Deutsche Bauzeitung* (Berlin) 1920, number 2, 5–6.
- 4 Adolf Sommerfeld (1870–1943) owner of a sawmill in Berlin and construction entrepreneur. For whom Gropius built his house (1921), completely in wood, as well as a series of dwellings for his workers, also in wood; but there is no record of Gropius doing more afterwards.
- 5 Cfr. Kenneth Frampton, *Modern Architecture; A Critical History*, Oxford University Press, 1980, 163.
- 6 John Ruskin, *The Seven Lamps of Architecture*, Chapter II, Smith, Elder and Co., London, 1949, *The Lamp of Truth*, 27–62.
- 7 Kenneth Frampton, *Kengo Kuma Complete Works*, London, Thames & Hudson, 2012, 19–20.



MODERN TIMBER STRUCTURES IN FINLAND

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ABSTRACT.

This paper aims to examine the transformable and experimental house design drawn up between the mid 1960s and the early 1970s in Finland evolving from the building traditions of timber framing and Aalto's standardized experiences in AA system. Many Finnish architects sought to produce designs for experimental private houses, holiday homes and industrial systems expressing the close bond between form and structure and focusing in particular on transformability. Among the Finnish examples of experimental transformable house were the modular Domino system of Raimo Kallio-Mannila and the prototype built by Eero Viljakka at Pakila, Helsinki, in 1969 made with load bearing structures and industrialized panels that prefigured the ease of assembly of the Moduli system which set a humane standard for affordable housing and a brilliant solution in the study of internal flexibility. Modular structural thinking similar to the 1950s Aulis Blomstedt aluminium house was implemented in the 1960s by Juhani Pallasmaa and Kristian Gullischen Moduli 225 home system in 1969. The modulated spatial division of the Moduli house and its beam and pillar structural system enabled different floor plan alternatives and transformations. All these experiences consider serialization, repetition, transformability, modularity, standardization and the desire to rationalize construction through industry. The prefabricated and transformable building has celebrated a renewed interest over the last years. This paper proposes a thorough analysis of the Finnish case studying standardization, transformability and lightness understanding logic and design efficiency, quicker construction time, and environmentally smarter use of resources applied to 1960s experimental houses.

1. INTRODUCTION

According to Sven Markelius and Alvar Aalto experiences of the 1940s, mass production of houses should be based on standardized parts. Steel and wood cells determined the formal and technological experiences throughout the 20th century in Finland. The experimental transformable house allows a quick and precise construction by hand, with light elements that are easy to manipulate. In all cases, the transformable house does not have a predefined form in the configuration of the unit, nor in the organization of the whole, so the solution depends as much on the particular features of the place and the terrain as on the specific demands of the users. These cells display a sophisticated study of the articulation of the structural elements and the light panels, which permit a free articulation of the integrated components assemblies. All these experiences consider serialization, repetition, transformability, modularity, standardization and the desire to rationalize construction through industry.

2. AULIS BLOMSTEDT AND THE FINNISH STRUCTURALISM

The renewing current of Finnish architecture is brought together around the figure of Aulis Blomstedt (1906–1979) and his constant search for the essential and fundamental principles of architecture. His studies on the proportion and evolution of the Canon 60 modular system are expressed in his projects through a sequence of dimensional series that determine tectonic order and spatial organization. In 1953, in order to respond to the needs of the time and as a counterpoint to the romantic and unique language of Aalto, the Finnish section of the CIAM, called PTAH Progrès, Técnica,

Architecture Helsinki, was founded in Aix-en-Provence. Led by Aulis Blomstedt, it sought to bring together the renewing current of Finnish architecture and vindicate theory, systematicity and rationality, industrialization and internationalization, excluding individualistic traits.

In his design for the summer houses competition convened by the Association of Finnish Architects SAFA in 1943, Blomstedt presents an entry named "Kennokehat" (1943 / Fig. 1a) which proposes an expandable and additive system through an abstract set based on a structural square-based grid and the metric standardization of the building components.¹ This reductionist line, with the structure as bare minimum, is outlined in his design for the international single-family housing competition for the "Canadian House of Tomorrow" organized by McGill University of Canada (1954 / Fig. 1b) where he presents a strict three-dimensional aluminium reticle. With the expression of the structural framework as guiding system, the cubic regular grid establishes the order of the composition and projects an interior characterized by flexibility, adaptability, and inner variability. Aulis Blomstedt thus traces the formal foundations of the new Finnish constructivist architecture as opposed to the subjective and romantic architecture of Alvar Aalto.

This polarization between the two currents, the intuitive and organic of Aalto versus the rational and theoretical of Blomstedt and Ruusuvuori that claims an essential modernity, putting the rigor of construction ahead of the form, will characterize this period in Finland vindicating rationalist coherence opposite Aalto's romantic and singular language.

3. CONSTRUCTIVISM IN WOOD

Small constructions for summer residences are an ex-

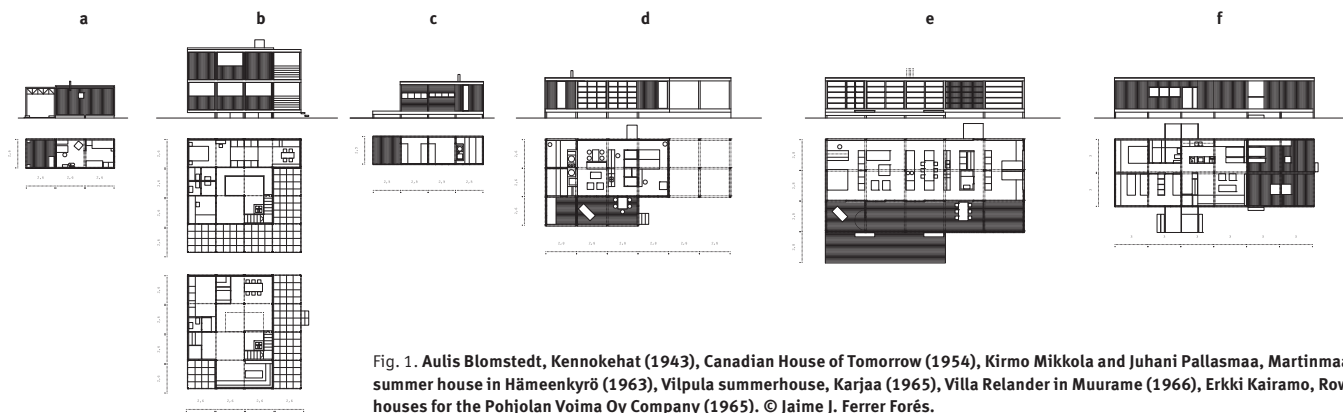


Fig. 1. Aulis Blomstedt, *Kennokehat* (1943), *Canadian House of Tomorrow* (1954), Kirmo Mikkola and Juhani Pallasmaa, *Martinmaa summer house in Hämeenkyrö* (1963), *Vilpula summerhouse, Karjaa* (1965), *Villa Relander in Muurame* (1966), *Erkki Kairamo, Row houses for the Pohjolan Voima Oy Company* (1965). © Jaime J. Ferrer Forés.

perimental laboratory of Finnish architects in the second half of the 20th century. From the 1960s on, all previous experiences materialize through an architecture of greater essentialism and formal abstraction with works of precise cubic geometries that govern architectural formalization.² The structure acquires a predominant expression and represents both egalitarian desires and industrial objectives. In their works and projects, they look for a universal and abstract approach to modern principles, adopting the rationality and coherence of the so-called Finnish constructivism, which is produced with the support of the thriving industry after the Olympic Games held in Helsinki 1952, at a time of economic prosperity and confidence in the technological future.

This constructivist impulse, from the rigorous modulation of the project with wood as an essential building material, characterizes the works of Kirmo Mikkola, Juhani Pallasmaa, Kristian Gullichsen, Erkki Kairamo, Aarno Ruusuvoori, Risto Kaurian, Paavo Mykk-sen, Eero Valjakka, Ilkka Salo or Pentti Piha among others. These approaches promoted constructive innovation and a greater technicalization of the components through Juhani Vainio's Bungalow systems (1965), Raimo Kallio-Mannila's Domino (1964), Moduli 225 for Ahlström Company (1968) by Kristian Gullichsen and Juhani Pallasmaa or the Marisauna for Marimekko (1968) by Arno Ruusuvoori, which summarize the archetypes of Finnish constructivism.

4. INFLUENCES. TRADITION AND THE ANONYMOUS EXPRESSION OF STRUCTURE

To Juhani Pallasmaa, this renewing current is "a constructivist classicism inspired as much in Mies, traditional Japanese architecture and Californian rationalism by Craig Ellwood, Pierre Koenig, Charles Eames, Raphael Soriano and others."³ Finnish constructivism subtly combines traditional craftsmanship with the research on new construction techniques that evoke the versatility and serial production of Bernd Wagner's modular constructions, the open systems of the "Packaged House" (1941–52) by Walter Gropius and Waschmann or the flexible standardization of Alvar Aalto, inspired by the organic growth of traditional Karelia

constructions. The strict latticework of wooden posts also refers to the houses of Danish modernity by Erik Christian Sørensen or Knud Peter Harboe, who critically reinterpret the constructive tradition.

The spatial continuity and the flexibility and modular combination of the domestic space resonates with the eastern world. The reverential respect for nature, the lightness of architecture that rises above the ground and the predilection for wood evoke the tectonic character of traditional Japanese architecture.

The rational root of constructivism is linked with the aesthetic and compositional refinement of modernity and Eastern culture, and favors the technological development of standardized construction in wood.⁴ Reconciling the modernity of Mies van der Rohe with the light metal structures of the American Case Study Houses, Finnish constructivism fuses modernity with tradition and universal with vernacular.⁵

5. FRAMEWORKS

The essential modernity of Kirmo Mikkola and Juhani Pallasmaa, in constructive, formal and spatial terms, condenses into a set of single-family houses that reflects trust in construction technology.⁶ The abstract aesthetics of the structural grid of the Martinmaa summer house in Hämeenkyrö (1963 / Fig. 1c), the Vilpula summerhouse, Karjaa (1965 / Fig. 1d) and Nurmi one-family house in Espoo (1963) reflects an idealistic attitude that tries to recover objective and logical construction as a systematic matrix of the project. The structure of the framework goes from being an instrument to build to a formal system that establishes the order of space.

To Mikkola and Pallasmaa, structure and construction are essential parts of the form.⁷ The structure becomes an instrument for conceiving rather than a technique to solve. The logic of the construction, the rigor of the structural grid and the systematic tectonic articulation of the construction components determine the Villa Relander in Muurame (1966 / Fig. 1e). The constructive imprint characterizes the formal expression of an open, light, strict and floating work. The rigorous structure of wooden pillars and beams defines a re-

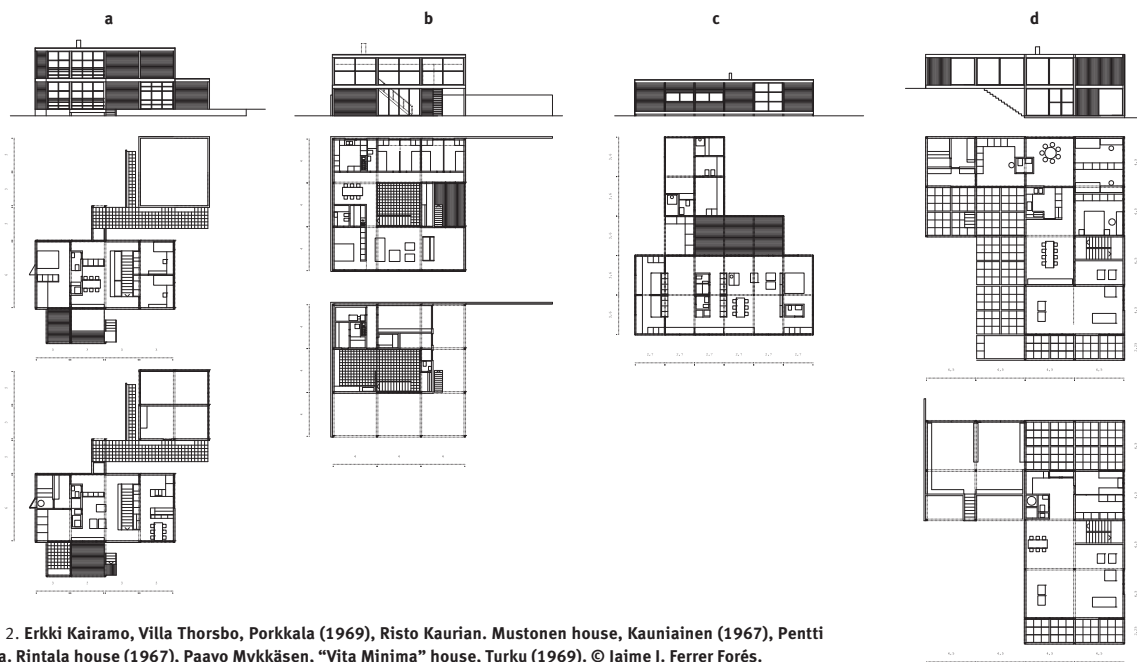


Fig. 2. Erkki Kairamo, Villa Thorsbo, Porkkala (1969), Risto Kaurian, Mustonen house, Kauniainen (1967), Pentti Piha, Rintala house (1967), Paavo Mykkäsen, "Vita Minima" house, Turku (1969). © Jaime J. Ferrer Forés.

sistant lattice whose basic module is 3.6x2.8m. The presence of the grid determines an isotropic space that uses furniture to segregate the different areas of the house. Visual openness as well as modern fluidity and expansion characterizes the domestic space. The structural transparency of the pavilion makes the building permeable to the surrounding vegetation. Raising the pavilion above the ground also illustrates a deep respect for the landscape. The lattice that delimits the large porch contributes to the lightness and transparency of the summer pavilion and anticipates the phenomenological approach of the architect. The terrace that mediates between the house and nature provides users in their daily life with an intermediate space that encourages interactions and exchanges.

To Kirmo Mikkola, the strict and essential framework of wooden beams and pillars determines a systematic, universal and abstract architecture. In his work, he vindicates the coherence of the expression built from the systematicity and geometric essentiality.

The rigorous syntactic standards of the structural framework define a set of row houses by Erkki Kairamo for the Pohjolan Voima Oy Company (1965), the "Slice Houses" (Fig. 1f). The expression of the grid is the argument of both the spatial configuration and the exterior aspect of the project. At Villa Thorsbo in Porkkala (1969 / Fig. 2a), Erkki Kairamo materializes the expression of the construction procedure through a reticle of structural bars compartmentalized with wooden panels. The house is completed by the addition of spaces for porches and terraces that accentuate the wooden structure and extend the domestic experience to the outside.

The Mustonen House in Kauniainen by Risto Kaurian (1967 / Fig. 2b) summarizes the geometric simplicity of Finnish constructivism and the expressive reduction of architec-

ture to its tectonic reality. The basic structure of the house is inscribed in a square divided orthogonally into nine other basic modules of 4x4m. The modern organization of the open floor plan is replaced by the additive extension of the structural modules. The identification between structure and exterior enclosure reveals the instrumental character of the three-dimensional grid as a direct expression of the structural system.

The prevalence of structural logic also determines the Rintala House of Pentti Piha (1967 / Fig. 2c), inscribed in a base module of 3.6x2.7m. The bar grid of the basic structure reveals the logic of the construction. The expression of the framework as an arranging system emphasizes the articulation of the wooden beams and posts and orders the two sections of the domestic spaces.

The "Vita Minima" house in Turku by Paavo Mykkäsen (1969 / Fig. 2d) expresses the geometric logic of the load-bearing system. The structural framework as the basic support of the form disciplines the construction and orders the program. In the two-floor domestic grid, two-storey spaces interrelate the areas inside and enrich the domestic experience.

The structural framework of the Halonen house in Pohja, Degerby (1969 / Fig. 3a) by Aarno Ruusuvuori shows the desire of reduction to the essence of Finnish constructivism. The expressive reduction and the stripping of what is superfluous are inscribed in a modular 75cm frame in which a framework of wooden beams and pillars is erected. The 3x3m grid articulates the basic grammar of construction in wood and determines the tectonic order and spatial isotropy. The structure qualifies the space and characterizes it. The order of the load-bearing structure rules the composition of the project and determines the construction of constructivist architecture in wood. The domestic program does not in-

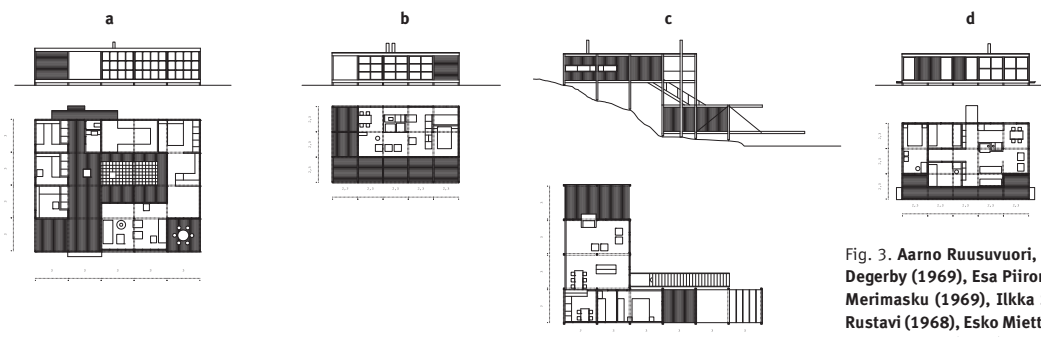


Fig. 3. Aarno Ruusuvuori, Halonen house, Pohja, Degerby (1969), Esa Piironen, Suojäranta villa in Merimasku (1969), Ilkka Salo, Heinonen house, Rustavi (1968), Esko Miettinen, Miettinen House, Uusikaupunki (1971). © Jaime J. Ferrer Forés.

terfere with the three-dimensional grid that reflects the constructive reality of the framework through the autonomy of the structure regarding the exterior enclosure and the partitions. The domestic program is organized around a central courtyard and side terraces. Slightly raised above the ground, allowing nature to spread below the house, openness, transparency and interrelationship with surrounding nature characterize Ruusuvuori's domestic project by reconciling the universality of the framework with the raw materials of Finnish industry.

The ideals of this current, widespread in Finland, are illustrated by numerous works among which stand out the Suojäranta villa in Merimasku (1969 / Fig. 3b) by Esa Piironen; the Heinonen house in Rustavi (1968 / Fig. 3c) by Ilkka Salo, or the Miettinen House in Uusikaupunki (1971 / Fig. 3d) by Esko Miettinen. The physical presence of the structural wooden grid reaches its maximum expression in this large set of houses in the final stages of the 1960s that respond to the new postulates of Finnish constructivism.

6. OPEN SYSTEMS: DOMINO, BUNGALOW, MODULI, MARISAUNA

With the desire to extend the postulates of Finnish constructivism and demonstrate the universality of their approaches, they will develop open industrialized systems that reflect the aspirations of this renewing current of Finnish architecture. To Juhani Pallasmaa, the building "as a project unit will disappear and be replaced by the planning of extensive and adaptable technical structural systems".⁸ The Domino systems (1964–1981) by Raimo Kallio-Mannila and engineer Teuvo Koivu; Bungalow (1965–) by Juhani Vainio and engineer Matti Pohjankyr; Moduli (1968–1974) by Kristian Gullichsen and Juhani Pallasmaa and Marisauna (1968) by Aarno Ruusuvuori try, from the standardization and systematization of the project, to provide a larger flexibility through an industrial modular construction process.

The mass production of these modular construction systems based on the addition of space units through a limited series of standardized elements allows for a high degree of adaptation and a large number of possible configurations with the minimum number of standardized components. The reduction and repetitiveness of industrialized components and quick and simple assembly processes sustain the

economic profitability of these lightweight systems. Manufacturers are thus looking to expand the market with the production of industrialized systems for holiday housing.

6.1. Domino System

Architect Raimo Kallio-Mannila and engineer Teuvo Koivu developed the Domino system (1964–1981).⁹ Conceived from a 60cm modular grid, the system is based on a metal pillar and a prefabricated 2.4x4.8m panel and is completed with a wide range of enclosure panels and prefabricated services. As load-bearing element it uses a metal pillar composed of hollow square section profiles. The connection with the perimeter structure of the prefabricated panel of the roof is made with a square profile welded to the perimeter structure of the panel. The coating materials of the structure and finish of the outside enclosures provide the aesthetic variability of the system.

The Domino system was used by Eero Valjakka to build two houses in Papinmäentie, Pakila, Helsinki (1968 / Fig. 4a), which illustrate the potential for adaptation, functional efficiency and direct expression of the construction system. A range of finishes that combine industrial textures with primary colors in the outside enclosure and carpentry complements the tectonics of the additive extension of the Domino system. An empty base that expresses the palafitte-like condition of the load-bearing structure solves the connection with the terrain.

This system will be widely developed in housing and public programs. Highlights include the Domino housing complex in Laajasalo, Helsinki (1970) by Risto Kaurian and Antero Mustonen and the apartment complex in Kannelmäki, Helsinki (1975) by Eski Kahri.

6.2. Bungalow System

Architect Juhani Vainio and engineer Matti Pohjankyr conceived the Bungalow system in the final stages of the 1960s. The modular 90cm grid determines an isotropic reticular system in wood of 3.75x3.75m, completed with 1.8m exterior enclosure panels. The joints of the 115x115mm wooden post load-bearing system and the 115x200mm beams are made by means of metal plates. In order for all beams to work under similar conditions, the direction of the secondary structure is toggled with those in the contiguous modules.

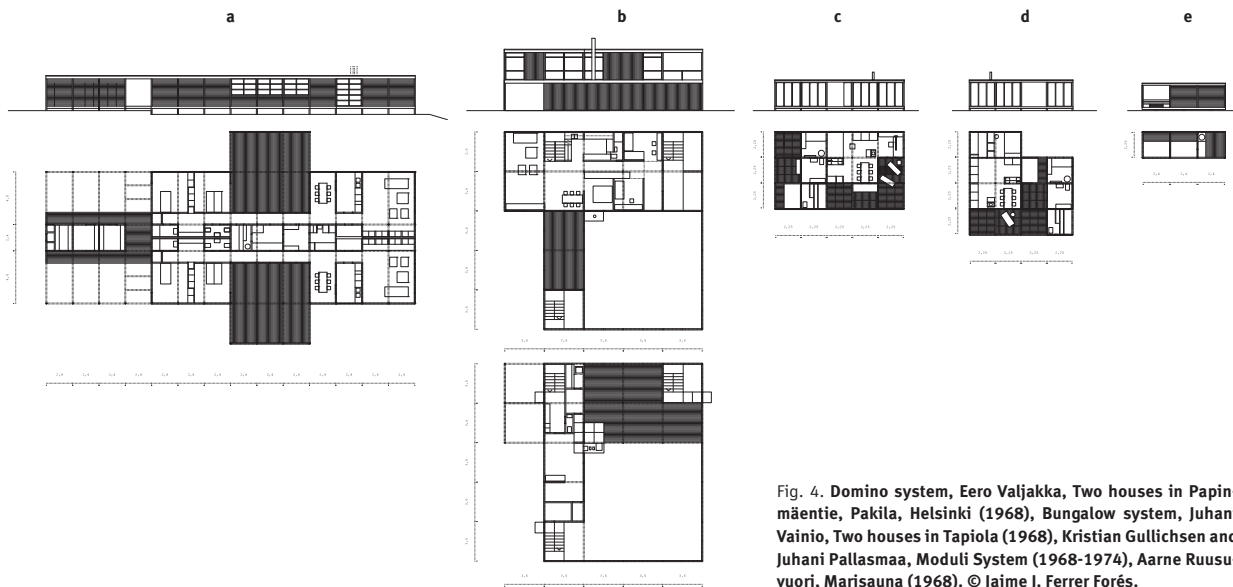


Fig. 4. Domino system, Eero Valjakka, Two houses in Papinmäentie, Pakila, Helsinki (1968), Bungalow system, Juhani Vainio, Two houses in Tapiola (1968), Kristian Gullichsen and Juhani Pallasmaa, Moduli System (1968-1974), Aarne Ruusu-vuori, Marisauna (1968). © Jaime J. Ferrer Forés.

The assembling of the elements generates a strict and slight elemental grid that Juhani Vainio uses in the two houses he builds in Tapiola (1968 / Fig. 4b). The system is based on the addition of structural modules that establish the structural grid or framework characterized by spatial isotropy. The versatility of the Bungalow system allows a great flexibility in order to organize the floor plan and configure the facade. The three-dimensional system unifies the volumes placed perpendicularly generating a protected outer area that acts as an element of relationship between the two pieces. The functional organization promotes the spatial continuity of inhabited spaces and the opening and contact with nature through terraces or thresholds delimited by the three-dimensional grid. The constructive expression of the framework of wooden pillars and beams is completed with a small range of materials.

6.3. Moduli System

Relying on the systematicity of construction, Kristian Gullichsen and Juhani Pallasmaa develop the Moduli System (1968-1974) for the Ahlström Company.¹⁰ This abstract and minimal construction system, dimensions 225x225x-225cm, presents the notion of architecture as an assembly of components (Fig. 4c). This open, light, portable and expandable system proposes the additive extension of cubic volumetric units formed by a framework of wooden pillars and beams.¹¹

The 9.2x9.2cm wooden pillars are formed by two glued boards and crossed together, achieving great resistance and dimensional stability. The 9.2x15.5cm beams consist of three glued boards. The pillars and beams have little indentations that facilitate the placement of the outside enclosure panels and an innovative connection mechanism produced from a single extruded aluminum profile. The metal connector fitting to the pillar and the indentation of the profile allows the joints to be concealed and protected from fire.

The system is based on the addition of structural modules that establish the structural framework or grid characterized by spatial isotropy (Fig. 4d). To achieve transverse stability, elements such as non-bearing enclosures that act as rigid plates, solidly attached by neoprene bands to the structural skeleton, bear horizontal stresses.

The outside enclosure is composed by panels of standard dimensions 72x225cm that are inserted in the three-dimensional framework allowing multiple combinations and configurations according to the needs of the house. It includes blind, glazed or lattice panels. Two laminated wood boards, dimensions 72x225cm, with thermal insulation form the structural modules of the floor and roof. In order to distribute evenly the loads, the direction of the panels in the contiguous modules is toggled. Without the need for costly auxiliary systems for system assembly, all elements weigh less than 50kg and facilitate their installation.

The system rises above the ground with an empty base that barely rests on the site. The foundations assume the topographical variation of the terrain by means of height-adjustable metal elements fixed to the small reinforced concrete footings.

The Moduli system combines modular rigor with a haptic and intimate character, unusual in this type of prefabricated constructions. Gullichsen and Pallasmaa conceive intimate and emotional intermediate spaces in these summer pavilions. Tactility is an essential part of the architectural experience and richness of the surfaces of the inside walls and the emphasis on the articulation of intermediate spaces characterizes the environmental quality of the system.

Structural modulation governs the compositional pattern of the project and the assembly of the elements reflects the constructed reality of the load-bearing system. It evokes Le Corbusier's experiences with his 226x226x226 Le Brevet industrial system (1949) through a profile with which he builds works such as the flexible framework of the Maison

de l'Homme in Zurich (1964–1967).

The successive addition of modules, the modular combination of outside enclosures and partitions, and the adjustment to the base module characterize a system that, from 1969 to 1974, builds fifty experimental houses. The Moduli catalogue also includes furniture, a fireplace, a sauna and skylights. Its low profitability gives rise to the abandonment of its production.

6.4. Marisauna

Aarne Ruusuvuori's prefabricated prototype for Marisauna (1968 / Fig. 4e) is conceived as a kit of components intended to be marketed in Marimekko stores. Ruusuvuori graphically explains the construction sequence with the 15 phases of assembly of the 13 wooden panels of the sauna by industrializing the components, mass production and dimensional coordination. On a base module of 2.4x2.4m, the prototype is characterized by the spatial continuity of the three areas of the sauna, porch, dressing room and sauna.¹² The images of the built model illustrate Ruusuvuori's technical and esthetic refinement and summarize the ideal of Finnish constructivist architecture of the 1960s.

7. CONCLUSION

The structure of the framework of these works of Finnish constructivism qualifies space, characterizes and defines it. The lightweight systems they develop aim to demonstrate the universality of the approaches of this renewing current of Finnish architecture. The system, opposite individual expression, proposes a homogeneous, light and open formal language with carefully studied, strictly modulated and standardized systems that facilitate its construction and assembly. In this essential and logical architecture, constructive precision and speed in assembly execution are paramount issues. Moduli 225 is the structural and modular connection system of vertical and horizontal units by means of an aluminum connector. The opening and lightness of the system promotes visual expansion and the relationship with nature. The lightness and timely implementation on site denote the reversible character of the construction. The system allows for a high degree of adaptation and a wide number of possible configurations, adapting to changing user requirements. The internal flexibility, the lightness of the compartmentalization and the scarce determination of the structure of the framework favors spatial continuity and the predilection for open spaces. The system is conceived as a frame where life takes place. The tactile and visual warmth of the wooden construction contributes to enrich the architectural experience. The system combines the abstract universality of the modular system with the haptic and intimate character of the intermediate spaces. The filters are arranged rhythmically and define permeable boundaries and intimate spaces.

The project is thus conceived from the standardization

of elements to the assembly of components, from the coordination of the base module to the systematic successive addition of modules that define the three-dimensional grid characterized by isotropy, structural transparency and the versatility of the system that allows for adaptation and change. Moduli 225 and Marisauna are the most refined works of Finnish constructivism, which combines the modern ideals of Aulis Blomstedt and the influences of Japanese and eastern world as well as American modernity on architecture. In 1974, Aulis Blomstedt held an exhibition dedicated to Finnish architecture in Helsinki's Kaivopuisto Park and built an industrialized, lightweight, transportable and detachable modular framework that condenses and closes the yearnings of the current of Finnish constructivism.

REFERENCES

- BRANDOLINI, Sebastiano, *Gullichsen, Kairamo, Vormala: Architecture 1969–2000*, Milano, Skira, 2000.
- GULLICHSEN, Kristian, "Loma-asuntoarkkitehtuurista. On holiday-hime architecture", *Arkkitehti*, Helsinki, SAFA, 1968, 4, 52–53.
- KAILA, Anna-Mikaela, *Moduli 225. A Gem of Modern Architecture*, Helsinki, Aalto University, 2016.
- KALLIO-MANNILA, Raimo, & KOIVU, Teuvo, "1968 Domino elementtjärjestelmä", *Arkkitehti*, Helsinki, SAFA, 1968, 1, 57–58.
- LAPPO, Osmo, "The need for flexibility. A problem of modern architecture", *Arkkitehti*, Helsinki, SAFA, 1968, 1, 17–19, 26–29.
- MIKKOLA, Kirmo, & PALLASMAA, Juhani, "Puuarkkitehtuurista. Wooden Architecture", *Arkkitehti*, Helsinki, SAFA, 1966, 3, 42–47.
- PALLASMAA, Juhani, "Structure and Technology", *Arkkitehti*, Helsinki, SAFA, 1967, 6, 31–34.
- PALLASMAA, Juhani, "Man, Measure and Proportion. Aulis Blomsted and the tradition of Pythagorean harmonics", Helsinki, Museum of Finnish Architecture, *Acanthus*, 1992, 6–31.
- POOLE, Scout, "Tradición de silencio. Las nuevas generaciones", *Arquitectura Viva*, 1993, 30, 17–22.
- RUUSUVUORI, Aarno, *Aarno Ruusuvuori. Sauna y casa experimental*, Madrid, Ministerio de Vivienda, 2005.

NOTES

- 1 Juhani Pallasmaa, "Man, Measure and Proportion. Aulis Blomsted and the tradition of Pythagorean harmonics", Helsinki, Museum of Finnish Architecture, *Acanthus*, 1992, 6–31.
- 2 Kristian Gullichsen, "Loma-asuntoarkkitehtuurista. On holiday-hime architecture", *Arkkitehti*, Helsinki, SAFA, 1968, 4, 52–53.
- 3 Scout Poole, "Tradición de silencio. Las nuevas generaciones", *Arquitectura Viva*, 1993, 30, 17–22.
- 4 Osmo Lappo, "The need for flexibility. A problem of modern architecture", *Arkkitehti*, Helsinki, SAFA, 1968, 1, 17–19, 26–29.
- 5 Martti Jaatinen, "The architectonic scale", *Arkkitehti*, Helsinki, SAFA, 1968, 1, 24–25.
- 6 Juhani Pallasmaa, "Structure and Technology", *Arkkitehti*, Helsinki, SAFA, 1967, 6, 31–34.
- 7 Kirmo Mikkola & Juhani Pallasmaa, "Puuarkkitehtuurista. Wooden Architecture", *Arkkitehti*, Helsinki, SAFA, 1966, 3, 42–47.
- 8 Juhani Pallasmaa, "Structure and Technology", *Arkkitehti*, Helsinki, SAFA, 1967, 6, 31–34.
- 9 Raimo Kallio-Mannila & Teuvo Koivu, "1968 Domino elementtjärjestelmä", *Arkkitehti*, Helsinki, SAFA, 1968, 1, 57–58.
- 10 Anna-Mikaela Kaila, *Moduli 225. A Gem of Modern Architecture*, Helsinki, Aalto University, 2016.
- 11 Sebastiano Brandolini, *Gullichsen, Kairamo, Vormala: Architecture 1969–2000*, Milano, Skira, 2000.
- 12 Aarno Ruusuvuori, *Aarno Ruusuvuori. Sauna y casa experimental*, Madrid, Ministerio de Vivienda, 2005.

JAPANESE TEMPORARINESS IN NORWEGIAN SYSTEMS ARCHITECTURE

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ABSTRACT.

In the 1950s, as the dynamically changing post-WWII world placed new demands on architecture that could no longer be static, Nordic tradition of building with timber was modified to fit the image of new modernity, rethought with industrial technology. As Nordic architects travelled further abroad and fostered intellectual connections with their colleagues in Europe and Japan, new systems-thinking, ideas of growth and change emerged in Norwegian architectural discourse. This paper studies how these new ideas found their expression in the design of “regional” modern housing in Norway in the 1950s–60s through two specific examples: Arne Korsmo’s cluster houses at Planetveien and Skjetten housing development, designed as a collaborative effort. Both projects rethought the traditional use of timber for residential construction within new industrial conditions and accommodated ideas of modularity, temporariness and growth from two different standpoints: one of a singular hyper-designed architectural object with custom-made flexible solutions, and another that appropriated industrial production to offer a solution general enough to accommodate growth and change in the context of mass-housing. While the Japanese inspiration for the Planetveien houses was more direct, it was nevertheless a *perception* of Japanese culture, rethought through Korsmo’s own aesthetic experiences and adapted to the conditions of Norwegian construction in the 1950s. Skjetten project with its “genetic” design drew indirectly on the ideas of additive architecture, growth and change that emerged at the same time and were specifically articulated in Fumiko Maki’s Group Form. Translation of intellectual ideas is a complex field of inquiry, in which the reciprocal impulses can be hard to trace directly. This paper thus suggests to complicate the narrative of post-WWII regional modernism, where these two Norwegian projects serve as litmus paper to detect diverse regional adaptations of the late-modernist ideas of architecture of transformation and change.

1. NORWAY, JAPAN & TIMBER ARCHITECTURE

While Japan has always posed as a source of enigmatic inspiration for western architects, in the second half of the 20th century it gained particular attention. Norwegian architects borrowed — at times third- or fourth-handed — Japanese influences from Danish import of Bay-area architecture in the 1950s,¹ while fascination with modularity of Japanese construction — following suit of the 1953 *Architectural Forum* — entered pages of Norwegian architectural magazines. Both Arne Korsmo and local timber-master Gullik Kollandsrud wrote articles inspired by order and variation in traditional Japanese construction.² As a part of his European tour, Kenzo Tange visited Norway in 1959,³ Shinhi Koike lectured in Oslo in 1960,⁴ while Korsmo and Grete Prytz-Kittelsen attended the 1960 World Design Conference in Tokyo, organised by the new generation of Japanese architects.⁵ By 1964, a number of Norwegian architects — Håkon Mjelva, Knut Bugge and Per Capellen — travelled to Japan,⁶ and in 1971 Mjelva listed Tange as one of the most significant architects that “set the tone” in Norwegian architecture.⁷ The increasingly globalising world allowed for a closer exchange of ideas: Norwegian architects saw affinities between the traditions of timber construction in Norway and Japan, and were inspired by the new generation of Japanese architects that sought to rethink traditional construction with contemporary industrialised means.

This paper studies how the tradition of building with timber was rethought with contemporary technology in the design of “regional” modern housing in Norway in the

1950s–60s, with particular attention to both the direct inspiration gathered from Japan and concerns of flexibility, modularity and change, essential to the “modified modernism” of the post-war period. By the late 1950s, ideas of system thinking, order and variation, modularity and change permeated the architectural discourse, and landed particularly well in countries that had a tradition of modular construction. Detached villa Katsura — that first entered the Western architectural imaginary with Bruno Taut’s publication in the 1930s⁸ — was recovered by Tange and Gropius’ book in 1960 as the main architectural reference for organic composite construction.⁹ A copy of the book, signed with “respect and friendship” from Tange was found among Korsmo’s personal things.¹⁰ This paper will study how these ideas of modularity and change found their expression through timber construction both in singular architectural projects, directly inspired by the Japanese sources — Arne Korsmo and Christian Norberg-Schulz houses at Planetveien, and in the design of a “genetic” system able to accommodate growth and change for more than 2000 single-family units in Skjetten-town, inspired indirectly by the experiments of Group Form. Both projects rethought the traditional use of timber for residential construction within new industrial conditions, and accommodated ideas of modularity, temporariness and growth from two different standpoints: one of a singular hyper-designed architectural object with custom-made flexible solutions, and another that appropriated industrial production to develop a systematic solution able to accommodate growth and change in the context of mass-housing.



Fig. 1. Planetveien houses on the cover of *Byggekunst* magazine, Oslo, Norway, 1955. Architects: Arne Korsmo and Christian Norberg-Schulz. *Byggekunst*, No. 7 (1955). Public domain.

2. ARCHITECTS' SYSTEMS: THE MECCANO OF THE HOME

In 1956, Arne Korsmo — a Norwegian architect that according to Jorge Otero-Pailos had a “compulsive obsession to appear at the forefront of Norwegian Modernism”¹¹ — wrote one of the first pieces on Japanese architecture in Norway titled “Japan and Western Architecture.”¹² His early interest in Japanese architecture from Hamburg and Stockholm was revived in the late 1940s, when Korsmo received a Fulbright scholarship to study and travel in the US.¹³ There, he met Mies, Frank Lloyd Wright and the Eames, but most importantly visited a number of Case Study Program houses in California. Korsmo got the first-hand experience of Bay Area architecture that re-interpreted traditional Japanese

composition adapting it to local conditions with moving screens and disintegrating building volumes.¹⁴ If the Japanese-American architecture made a solid entry into Scandinavia in 1957, Arne Korsmo — the frontman of Norwegian modernism — by 1956 had not just already built a “Japanese” house, but incorporated its description into his article on Japanese architecture.¹⁵ An “experimental” cluster of three houses was designed and built at Planetveien between 1952 and 1955 together with Christian Norberg-Schulz (Fig. 1). Comprised of three separate flat-roofed cubic residences, its modernist image is conveyed through a dark-wooden grid with infill of modular white panels. Lightweight construction methods, temporariness and flexibility — according to Elisabeth Tostrup — were three crucial principles for the design of Planetveien.¹⁶ However, to fully understand the

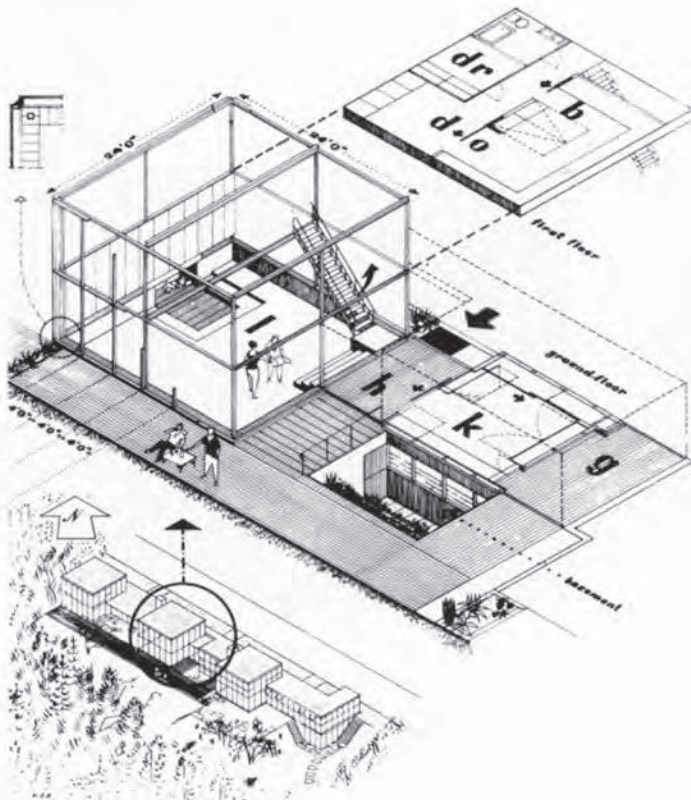


Fig. 2. Axonometric drawing of Planetveien houses by Arne Korsmo. Arne Korsmo archive, undated. First published in Christian Norberg-Schulz, *The functionalist Arne Korsmo* (Oslo: Universitetsforlaget, 1986). Public domain.

role of modularity and flexibility in Korsmo's designs, as well as particular use of timber, one needs to look back at his early experiences in the 1950s.

Korsmo — the head of the Norwegian CIAM section in 1950, as many of his modernist colleagues was enticed by the ideas of modularity, flexibility, and change.¹⁷ Together with his students at SHKS (soon to become Oslo architecture school), he tested possibilities of order and variation provided by a 60cm module.¹⁸ In experimental 48m² and 80m² apartments, all the furniture was mobile and hidden in the in-built closets that, in turn, opened with Japanese-style triple finger pulls.¹⁹ Korsmo enriched the rational modernist approach to modularity with his interest in organic growth, human dimension and playfulness, that resulted in a somewhat haphazard manifesto of the "Meccano of the house" that drew examples from Corbusier's *Le Modulor* to sea shells and Japanese-system cupboards.²⁰ These principles of flexibility and temporariness were enacted in his early home in Bygdøy — what Astrid Skjerven refers to as "the first Norwegian example of post-war Japanese inspiration," seen through the lens of the West-coast architecture.²¹ All the "non-beautiful" was hidden behind a modular wooden framework in Oregon pine with stretched white canvas that

served as flexible partitions reminiscent of Japanese light walls and screens in rice paper. The impression was confirmed by the modular "all-in-the-wall" cupboards and shelf-system, light and mobile furniture that could free the floor spaces in Japanese-inspired simplicity.²² While these examples of flexibility and temporariness were a function of the post-war scarcity and minimal available space, they provided direct prototypes for the design of Planetveien.

For Korsmo, series of inspirations, including Japanese organicism or the logic of modularity, were aesthetic tools used to achieve overall spatial expression.²³ The wooden lattice frame of Planetveien façade reinterpreted traditional Norwegian construction, rethought to achieve an updated, modernist expression. Horizontal planks framing the vertical panels were turned planar, so that the narrow width of the horizontal profile would create an image of lightness even at the expense of structural solidity.²⁴ Although Planetveien houses were praised for their logic of modularity and standardisation, in fact, neither are true: as Jorge Otero-Pailos pointed out, the steel envelope placed under the wooden framework is not only redundant but also skews the module to an "awkward 11 feet and 7 inches" (Fig. 2).²⁵ While the architects made axonometric drawings to communicate with the carpenters the intricacies of mortise-and-tenon joints and fitted timber elements inspired both by the traditional Norwegian and Japanese construction, the timber structure within the house was painted white and rendered almost invisible.²⁶ In this way, neither a "faithful" character of wooden structure nor a modular network were the end-goals in themselves, but rather tools towards achieving a comprehensive plastic spatial expression. As Korsmo strove to update the tradition of building in timber with modernist aesthetics, wooden skeleton was filled with industrially produced Thermopane glass and Eternit panels. However, while claiming the use of "standardised elements," in fact the dimensions of the infill panels had to be custom-made to conform to the modular dimensions.²⁷ Overall, it is only the wooden frame, infill panels and 100 cushions in the living room that follow the praised modular coordination: the rest of the interior elements, according to Elisabeth Tostrup, are "neither particularly standardised nor based on the module's dimensions."²⁸ Korsmo was not bothered by these inconsistencies: the redundancy of the load-bearing structures facilitated flexibility: the in-between 8cm gap allowed to accommodate hidden shelves, creating a unified surface comprised of series of rotating screens. Modular square cushions in the lowered living room drew directly on the Japanese floor-culture and could be rearranged to accommodate a variety of programs. Shifting screens and partitions, sunken living room and interplay of opacity, light and reflections framing the outdoor landscape reaffirmed Korsmo's fascination with Japanese poetics of space.

In this way, Japanese sources of inspiration in the modular houses at Planetveien were complex and indirect, and, in the words of the architect himself, "one should avoid any



Fig. 3. Skjettenbyen under construction. Skjetten, Skedsmo, Norway, 1969. *Skjettenprosjektering IS. Byggekunst*, No. 4, 1971. Public domain.

superficial aesthetic comparison.²⁹ While Japanese ideas of order and variation, organic growth and traditional woodwork have contributed to the overall house design, they were not just re-worked into conditions of Norwegian construction of the mid-1950s, but rethought through the lens of Korsmo's personal aesthetic experiences and his interpretation of Japanese culture. It is only in the 1960s that Korsmo would go for a long study trip to Japan to become largely disillusioned.³⁰

3. PLANNERS' SYSTEMS: SKJETTEN TOWN

The search for new non-monumental architecture of networks, growth and change found a particularly fertile ground in Scandinavia, whose burgeoning economy by the 1960s had allowed to overcome the immediate post-WWII housing shortage as its welfare states ventured into providing "good housing for the masses."³¹ Throughout the changing CIAM discourse of the 1950s, Norwegian architects have always seemed to have a particular concern for the individual expression: from the Sigtuna meeting in 1952, as the group emphasized the importance of recognising the spiritual needs of an individual at any urban scale,³² to the 1956 Dubrovnik Oslo Grid, where Korsmo and Grung accused modernist town planning and architecture of turning inhabitants into passive subjects, instead demanding a "more personalised society with a more active individual in

it."³³ For Norwegian architects in the 1960s — as for their colleagues abroad — there was a general ambition to design more flexible, adaptive structures that would be able to incorporate change. If in Japan this new architecture of flexibility and change was rethought within the conditions of absence, *tabula rasa* and parcelled land ownership that prevented horizontal logic of additions³⁴ — thus Metabolist projects reaching upwards, creating artificial ground and three-dimensional infrastructural solutions — in Norway similar concerns were worked into the conditions of available open land, welfare state engagement with housing provision and new, industrialised means of productions.

Skjetten housing project in Norway comprised of 2000 wooden row-houses implementing the new ideas of temporariness, flexibility and change on an unprecedented scale (Fig. 3). The units were designed with a genetic rule-system that accommodated additive growth based on prefabricated timber elements, more similar to the additive architecture of low-tech Group Form, rather than heavy prefabrication of Japanese "techno-utopian" Metabolism. Group Form, as formulated by Maki in the mid-1960s, drew on genetic forms, patterns and repetition of limited components, inspired by ancient settlements, basic materials and construction methods.³⁵ Skjetten project was designed around the same notion of the genetic form: the planners devised a system, a frame, that would be able to accommodate change and growth within the conditions of a large state housing development.

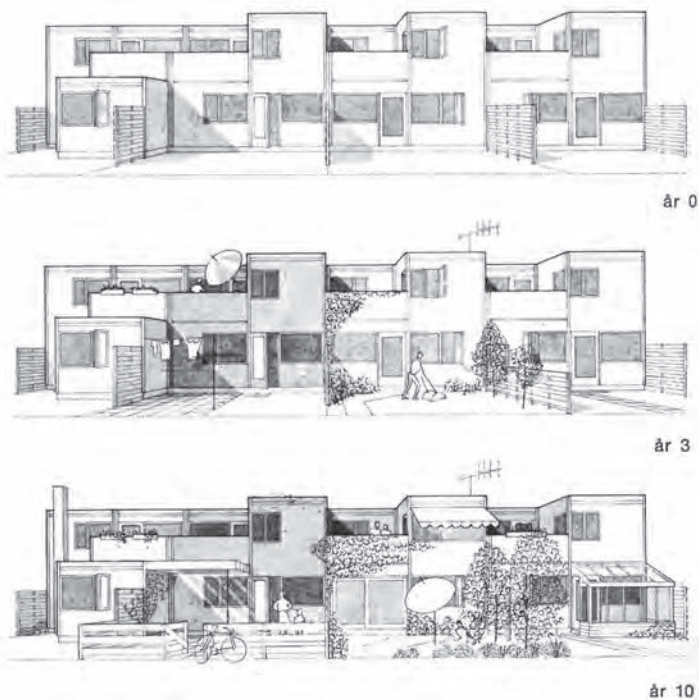


Fig. 4. Schematic drawing of Skjetten variation and growth over 10 years. Skjetten, Skedsmo, Norway, 1969. *Skjettenprosjektering IS*, with Nils-Ole Lund, Hultberg, Resen, Thorne-Holst og Boguslawski. *Byggekunst*, No. 4, 1971. Public domain.

The elements were made out of timber, a traditional Norwegian construction material. Skjetten units were arranged in a system of elongated land parcels of 6 by 27 meters. Load-bearing laminated timber columns placed on a 3 by 3 meters grid were to be filled with different combinations of prefabricated timber panels.³⁶ While the system allowed for more than 3000 variations, the planners settled on 20 different basic types that dwellers could choose before moving in, but that could later be adjusted and modified. Unlike singular architectural projects — Korsmo's Planetveien house — that accommodated temporariness and change through personally tailored elements, Skjetten designers strove to create a flexible system, able not only to accommodate individual concerns but also to fit within a larger regulatory framework of the Norwegian welfare state that thought to balance individual expression, public good, and private production apparatus (Fig. 4).

The system was to comply not only with the spatial limitations placed by Norwegian housing regulations, but also with the demands for rational, economic production: thus, using prefabricated elements from the local producer Moelven Brug. The company, originally a saw-mill, updated the tradition of building with timber and produced prefabricated timber elements and sections that could be stacked or added together in length to accommodate a variety of programs. Skjetten project drew on the standard dimensions of

prefabricated panels, offered by the company, but developed a more intricate system of structure and infill based on the 60cm planning module. The elements for housing modifications had to be ordered at the factory and 120-page manual with axonometric drawings explained possible typological adjustments provided by the genetic structure. As Norwegians enjoy an extensive tradition of domestic wooden construction and a culture of self-built architecture, Skjetten's use of familiar materials made flexibility more attainable and modifications easy enough to pursue. Exposed load-bearing construction within the house and the façade facilitated the understanding of the structure and infill, while non-load bearing internal partitions, continuous flooring, and flexible interior elements allowed to accommodate smaller changes.³⁷ In this way, if Moelven updated the tradition of building with timber through an elaborate system of industrial assembly, Skjetten architects fitted that updated traditions into the new international discourse of architecture of temporariness and change.

Designed by a team of young architects in 1967, the external influences on Skjetten design are harder to decipher. While the original competition had little traces of adaptability and change, by 1967 it became the main feature of the project.³⁸ This can be attributed to many influences: from the Metabolist Manifesto distributed at the door of WoDeCo in 1960 attended by Korsmo, Alexander and Chermayeff's *Community and Privacy* from 1963 widely read by the young Norwegian architects,³⁹ to *Collective Form* published the same year. As intellectual exchange became tighter — Norwegian architects went to North Africa, Asia and Japan, Tange visited Russia and Maki travelled in Mediterranean — it became harder to trace the origins of the new additive architecture based on a tool-kit of components. The new generation was inspired by "architecture" and not by "architects", by clusters of organically constructed Mediterranean and North African cities or ancient settlements in Asia, as ideas of flexibility and change found their different adaptations around the world. Maki called this a concept of "open regionalism":

*The same forces of technology and communication can produce different results. [...] In group form, the possibility for creating grain elements hence regional qualities exists. The reciprocal relation between the generative element and the system can produce strongly regional effects.*⁴⁰

In this way, Norwegian architects adapted the ideas of temporariness, flexibility and change to the local culture of building with timber, creating a strong, grain element of a "modified modernism".⁴¹ A softer, more humane alternative to prefabricated high-rises of a developer-driven modernist planning apparatus was envisioned.⁴²

4. CONCLUSION

In the post-war period, Japanese architecture and new

ideas of temporariness and growth were among of the impulses that contributed to a rethinking of Norwegian residential construction. These ideas produced unique hybrids that updated and adapted local timber traditions to the new realities of the fast-changing world and industrial production. While the houses at Planetveien with intricate wooden skeleton filled with hi-tech materials and flexible elements sought to update the tradition of building with timber into a modernist image, Skjetten project used technologically advanced prefabricated timber elements to provide a user with an unprecedented agency in shaping their built environment. As Korsmo carefully curated moments of temporariness and change, tailored to his personal taste, reworking fragments of inspiration from the Japanese culture, Skjetten planners strove to find a systematic solution able to accommodate temporariness and change on a much larger scale, similar to the genetic thinking of Group Form developed at the same time. The field of intellectual ideas exchange is complex and hard to decipher: while certain intellectual influences were more direct — Korsmo's interest in organic growth, his travels to the US and familiarity with Bay Area architecture — the impulses for the Skjetten project were more indirect, as ideas were shared among the networks of the new generation of architects and reworked into local conditions to produce regional "grains". Through closely studying these two modernist housing projects it is possible to distil how international ideas of temporariness and change were rethought through a prism of local building traditions and adapted to the changing modernity of the 1950s–60s Norway.

NOTES

- 1 Nils-Ole Lund, *Nordic Architecture*, Copenhagen, Arkitektens Forlag, 2008, 49.
- 2 "Hjemmets Mekano," untitled but attributed to Arne Korsmo, *Byggekunst*, 34, No. 4, 1952, 110–113; Gullik Kollandsrud, "Modulens hjemland," *Byggekunst*, 41, No. 2, 1959, 41–49.
- 3 *Dagbladet*, 29 September, 1959, 11.
- 4 *Dagbladet*, 29 September 1960, 13.
- 5 Schedule and guest list in WoDeCo Bulletin No. 6, Rem Koolhaas, *Project Japan: Metabolism talks*, Köln, Taschen, 2011, 191.
- 6 *Sunnmørsporten*, 20 January, 1964, 6.
- 7 Håkon Mjelva, interview in *Aftenposten*, 25 September, 1971, 13.
- 8 Bruno Taut, *Houses and People of Japan*, Tokyo, Sanseido, 1937.
- 9 Walter Gropius, Kenzo Tange, & Yasuhiro Ishimoto, *Katsura: Tradition and Creation in Japanese Architecture*, New Heaven, Yale University Press, 1960.
- 10 Note 143 in Elisabeth Tostrup, *Planetveien 12: The Korsmo House*, London, Artifice Books on Architecture, 178.
- 11 Jorge Otero-Pailos, "Norberg-Schulz's House," *ArkitekturN*, 05 November 2006, accessed on 09 February 2020, <https://www.architecturenorway.no/questions/histories/otero-pailos-planetveien/>.
- 12 Arne Korsmo, "Japan og Vestens arkitektur," *Byggekunst*, 38, No. 3, 1956, 70.
- 13 Tostrup, *Planetveien 12*, 131.
- 14 Lund, *Nordic Architecture*, 49–55.
- 15 Korsmo, "Japan og Vestens arkitektur," 75.
- 16 Tostrup, 134.
- 17 Christian Norberg-Schulz, *Arne Korsmo*, Oslo, Universitetsforlaget, 1986, 70.
- 18 "Praktisk eksperimentoppgave 1953, 48m² leiligheten," SHKH, *Statens håndverks-og kunstindustriskole årsmelding 1952–1953, 1953–1954*, unpaginated.
- 19 Tostrup, 144.
- 20 Korsmo, "Hjemmets Mekano," 113.
- 21 Astrid Skjerven, "Ny helhet," Jon Brønne (ed.), *Arne Korsmo. Arkitektur og design*, Oslo, Universitetsforlaget, 2004, 167.
- 22 Skjerven, 166–167.
- 23 Tostrup, 171, also in Skjerven, 164.

- 24 Tostrup, 151.
- 25 Otero-Pailos, "Norberg-Schulz's House."
- 26 Pailos, also "Timber studding" construction documents, 12 August 1954, reprinted in Tostrup, 109.
- 27 Tostrup, 143.
- 28 Tostrup, 143.
- 29 Korsmo, "Japan og Vestens arkitektur," 74.
- 30 Christian Norberg-Schulz, *The Functionalist Arne Korsmo*, Oslo, Universitetsforlaget, 1986, 85–86.
- 31 Karl-Otto Ellefsen, "Homely structures," *Nordic Journal of Architecture*, No. 2, 2012, 47–48.
- 32 Norwegian group contribution recorded in Sigtuna papers, cited in Annie Pedret, *Team 10: an archival history*, London, Routledge, 2013, 85.
- 33 Tom Avermaete, "Designing for the anonymous collective," *Nordic Journal of Architecture*, No. 2, 2012, 52.
- 34 Koolhaas, *Project Japan*, 187, 301.
- 35 Fumihiko Maki, *Investigations in collective form*, St. Louis, School of Architecture, 2004, 11.
- 36 Nils-Ole Lund, "Skjetten Town Norway," 25; Nils-Ole Lund, "Looking back at Skjetten, 2010," 29, all in *Nordic Journal of Architecture*, No. 2, 2012.
- 37 Margrethe Doublog, "Skjetten. A User Manual," *Nordic Journal of Architecture*, No. 2, 2012, 34.
- 38 *Norske Arkitektkonkurranser*, No. 116, 1965; Ole-Lund, "Skjetten Town Norway."
- 39 Mari Hvattum, "Modified Modernism," *Nortopia. Nordic Modern Architecture and Postwar Germany*, Berlin, Jovis Verlag, 2009, 105.
- 40 Maki, *Investigations*, 15.
- 41 Mari Hvattum, "Modified Modernism," *Nortopia. Nordic Modern Architecture and Postwar Germany*, Berlin, Jovis Verlag, 2009.
- 42 Ellefsen, "Homely structures," 48.

THE FOUNDER OF ENGINEERING DESIGN IN JAPANESE WOODEN ARCHITECTURE

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ABSTRACT.

It is commonly believed that Japan is a country of wooden buildings, and one of the few country which have experienced “Wooden Modernism”. However, most architects in the modern era were not interested in wood or timber itself. Rather, they made use of Japanese traditional wooden styles to show national identity or to create new modern expressions.

On the other hand, through World War II, there was a movement in which engineers of national institutes had tried to develop new wooden structure. They had been required to construct military facilities with wood because of strict restriction on steel. They regarded wood as an important material. They conducted many experiments to know the characteristics of timber, and invented new timber structure. However, engineers had gradually stopped these researches after the war.

To determine who took over their mission, I searched for engineers or architects of wooden buildings in early postwar era. Here I found that Goro Iizuka was the one who contributed early to engineering design of wooden architecture. He was an engineer and a designer. Iizuka had started study of laminated timber from right after the war. He also cooperated with Mitsui Mokuzai Kogyo Co. and designed prefabricated houses using new wooden materials. He had combined wooden technology with design in his works.

In this study, I trace his works and found relationships between them and his unique carrier. These results provide new insights for our understanding of the modern movement in wooden architecture in Japan.

1. INTRODUCTION

It is commonly believed that Japan is a country of wooden buildings, and one of the few countries that has experienced a “Wooden Modernism”. This movement has been regarded as just “regionalism” in Japan. However, there was an architect who separated wood from Japanese Identity, redefined wood as a new material and tried to find new designs using new construction methods. Goro Iizuka was an architect, engineer and researcher of wood in the postwar period. He took over studies and technologies of wooden structure which had been developed during the war, and realized wooden large span building using laminated timber frame.

“Modernism” itself is innovation of design supported by development of new materials: concrete and steels. We have to assess “Wooden Modernism” not only from the aspect of design but also from aspect of material and technology. Unlike works of “Wooden Modernism”, Iizuka’s works were neither following Japanese traditional styles nor rules. He had tried to combine new technologies of wooden structure or construction systems with design. Here I show how he developed the combination of technique and design of wooden architecture, and why he found potential in wooden materials.

As a previous research, we can see Iizuka’s works and his concepts in “The Concrete Idea for Design — The Materials and Method of Construction”, a book written by Iizuka himself. And from “Development of the History of Modern Japanese Architecture”, we can know the history of developments of architecture in Japan until the end of war.

In this study, I show the connection between Iizuka’s

works and the historical and social backgrounds which may have affected his ideas.

2. HISTORY OF RESEARCHES OF WOODEN STRUCTURE BEFORE IIZUKA

Ahead of Iizuka’s activities, there was a movement to develop wooden technologies to construct large span structure during the war. In this chapter, I show the history of development of technology of wooden structures (Table 1).

2.1. Beginning of the Engineering of Wooden Structure in Japan

It was in the late 1860s that Japanese buildings had started to be designed or assessed scientifically. Houses, temples, and any other buildings in Japan had built by carpenters based on their experiential sense.

Therefore, traditional houses were neither earthquake-resistive nor fire-resistive.

Education of architects started after the Meiji Restoration in 1868. Young researchers who learned in college had investigated disaster areas to reveal the mechanism how wooden houses got damaged by earthquakes. They had improved construction methods based on the results of these surveys.

On the other hand, wood had been replaced by brick, steel or concrete as construction materials of large buildings. Many researchers were mainly interested in new materials and construction methods using them.

Developments of new wooden structures could therefore be found rather in the private projects. New building types had appeared with the modernization of society.

Year	Career of Gorozo Itzuka	Social Back Ground	Movement in Wooden Architecture	Wooden Buildings
			Research / Technology / Organization	Public / House / Works of Itzuka
1936	(born in 1921)		Soshiroda Visiting Europe and the US (~1937)	
1937		The Sino-Japanese War	Restrictions on the construction of steel structures started	Movable assembly house, Tsutomu Maeda
1938			Investigation Committee of standard of Wooden Buildings	
1939		World War II	Story of Shinkei Moku Kozo', Kenzaburo Takeyama	
1940			Calculation method of Timber Frame, Heigaku Tanabe	Kishi Memorial Gymnasium, Kunio Maekawa and Kenzo Tange
1941				Prefabricated house by wooden Panel, the foreclosure of a home
1942			House standardization and prefabricated houses', Saburo Soshiroda	
1943	Graduated from Waseda University			
1944			Study on properties of wood, Shinji Hirai	
1945	Study on 'Prefabrication of Houses'	End of World War II		
1946				PREMOS Prefabricated house, Kunio Maekawa
1947				Kinokuniya Book Store, Kunio Maekawa
1948	Completion of graduate school		• Research on glued composite beam, Toru Mori and Ikuo Asano and Katsuyoshi Imaizumi • the Ministry of Construction was established	
1949	Teaching Associate in Waseda University			
1950	Lecturer in Yokohama National University		Proclamation of the Building Standards Act	Three-dimensional Minimal Housing, Kiyoshi Kabe
1951	Assistant Professor in Yokohama National University			Forest Memorial Hall, Toru Mori and Japan Forestry Engineering Association
1952	Study in MIT for 6 month			Minimum House, Makoto Maszawa
1953	Lecturer in Kanto Gakuin University			SH-I, Kenji Hirose (Lightweight steel frame)
1954				
1955				Seijo Kindergarten
1958				Hidachi Elementary School, Masatsune Matsumura
1959		Isewan Typhoon	Strengthening regulations regarding fire protection	
1960	Dr.Eng.'Study on laminated timber for building and its construction method'			
1961				Tokyo Holy Cross Church, Antonin Raymond Mitsui U-Shaped House
1962				Shibata City Gymnasium
1963			Japanese Laminated Wood Products Association established	
1964				Tsukuda House (House covered with plywood) Mitsui House H-Type
1965				
1966	Professor in Yokohama National University			Catholic Shibata Church, Antonin Raymond Mitsui House E-Type
1971				House with curved beam of laminated timber
1972			"Development History of Modern Japanese Architecture" published	
1973	Lecturer in Japan Women's University			Mitsui House F-Type
1974				House of log columns with wood panels
1975	Lecturer in Musashi Institute of Technology			Log house restaurant in Karuizawa
1982	Research inspection of laminated timber in the US / "House design and wooden structure"		Uneregulation for height of Laminated timber Architecture	
1987	Retire from Yokohama National University / Professor in Showa Women's University		Reversion of the Building Standard Law	
1988				Kukai Dome(Strait Laminated timber), Kajima Co. Oguni Dome(Space frame), Shoen Yoh

Table 1. Chronological table of Japan from 1930s to 1980s, compiled from 'Development History of Modern Japanese Architecture' (1972). © AIJ and 'SD0009 Modernism in Wooden Construction 1930s to 1950s — Japanese Approaches Transform Materials' (2000) © Kajima Institute Publishing Co.

Large private mansion, halls of school, factories and barn required large span space. Truss system had been introduced as roof structure of big building. The mechanism of truss system had theorized by the end of Meiji era.

2.2. Developments in Wooden Structure in the War time

"Looking back from the current situation, regrettably, we have to admit that researchers had not been eager to construct a theory of wooden structure except for two or three examples"¹, Kenzaburo Takeyama, an engineer of the Ministry of Finance's Buildings and Repairs Section, described the situation of that time in 1939. It was during the wartime that researchers had begun to face the needs of developing wooden structures in earnest.

During the World War I, Germany and some European countries and the United States had started to develop wooden construction system because of a shortage of steel and other resources. Japan also introduced these technologies from Germany. These techniques aimed to construct large span structures like aeroplane hangars or army practice grounds by assembling small and short timbers. Structures made by these techniques were called "Shinko Moku Kozo" in Japan. In 1925, Tachu Naito designed the first building of Shinko Moku Kozo, "Practice Grounds of Toyama Military School". Naito was a renowned structural engineer, and had taught at Waseda University when Iizuka was studying there.

After the war with China started in 1937, the government set up a strict restriction on steel. Imported timber from the United States, which had been important material for constructing on that time, had been restricted as well. Engineers working at government offices were told to construct military facilities without steel. Subsequently, Takeyama and his colleagues started trials to develop wooden construction systems. Domestic small timber was the only material they could use, so engineers had tried to invent an assembling system by using metal joints like "dübel" or bolts for the sake of avoiding loss of timber section.

In addition, another engineer, Kazuo Goto, had found a way to combine two timbers and make larger section. Toru Mori, specialized in material engineering, tried to invent glued timbers to save metal joints and make joint parts rigid. However, this had not come true because the casein glue they used then was not strong enough for outdoor use. Mori would engage in the development of laminated timber after the war like Iizuka.

Glued wood was also required urgently for making wooden airplanes. For cooperating this mission, Saburo Soshiroda, an engineer specialized in material properties of wood and the supervisor of Iizuka in Waseda University, had been appointed researcher at the Institute of Aviation Technology in 1945.

Moreover, Iizuka also had joined one of these researches. He conducted material experiments on foreign wood with Soshiroda. Here, he witnessed trials of researchers to develop new wooden technologies.

2.3. Practical Application of Laminated Timber After the War

After the end of World War II, large span wooden structures became not needed anymore, so the mission of Shinko Moku Kozo ended. However, some engineers like Kenzaburo Takeyama or Toru Mori continued to develop laminated timber. In 1951, the first building using laminated timber frames "Forest Memorial Hall" was built in Tokyo under the direction of Mori. Following this, Mitsui Mokuzai Kogyo Co., the only company which could produce laminated timber, built own warehouse by using own products.

At the same time, construction of houses for military personnel from the United States had started. Japanese manufacturers received order to make plywood that would be used as building material. Soshiroda and Iizuka had been inspired by these methods of glue timbers and started to conduct some experiment to assess the characteristics strength of plywood panels.

Iizuka would follow these movement and contribute to introduce new wooden materials to Japanese architecture.

3. CONNECTION BETWEEN TECHNOLOGY AND DESIGN IN WORKS OF GOROZO IIZUKA

"Wooden Modernism" appeared in the 1920s in Japan. After the war, the character of each work became more diverse. In this chapter, first I show the trend of designs of postwar wooden modernism architecture. Subsequently, we see Iizuka's unique works and concepts.

3.1. Wooden Modernism Architecture in Postwar Period

In early Wooden Modernism, many works had features of Japanese traditional style. However, works of the postwar time (1950s) follow more practical concepts. Some architects had tried to establish prototypes of houses for urban life. Makoto Masuzawa, Kiyoshi Ikebe, and Kiyoshi Seike had proposed series of pilot houses which has specific concepts.

Some larger projects, such as the office buildings of the Ministry of Communication or school buildings, were made of wood because steel or concrete were still expensive. However, public wooden buildings had become replaced by steel or concrete along with the economic recovery in 1950s.

Moreover, Kunio Maekawa proposed a wooden prefabrication system called "Premos" in 1946 ahead of Iizuka. However, this project did not go well as proposals were too early to be realized.

Unlike the movements mentioned above, Antonin Raymond had tried to find new expressions by using various wooden structural system. In this sense, his design method for wooden houses was similar to Iizuka. He used a unique structural system called "Scissors Truss" or log in design of roof structure. Plus, Raymond designed "Tokyo Seijuji Church" using laminated timber as main structure frame in 1961.

Such, it was probably the postwar movement that affected Iizuka's trials.



Fig. 1. Gorozo Iizuka, Shibata City Gymnasium, Shibata, Japan, 1962, a municipal sports hall of 36m spanning laminated wooden arch. Permitted to publish by Masayuki Miyabayashi.



Fig. 2. Gorozo Iizuka, U House, Japan, 1961, a small house with U shape laminated wooden arch. Permitted to publish by Masayuki Miyabayashi.

3.2. Large Span Structure with Laminated Timber Frame

Iizuka graduated from Waseda University in 1943 and went on to master course. He joined a research group of Shinji Hirai and Saburo Soshiroda. In their group, Iizuka helped to bring laminated timber into practical use. He felt the high potentials of laminated timber and studied in the US for 6 months in 1952 to deepen his knowledge.

After coming back to Japan, he got the chance to design "Seijo Kindergarten" in 1955. The client was his father Yuichiro Iizuka. Iizuka decided to use laminated timber as the main structure in this project, and got in touch with Mitsui Mokuzai Kogyo Co. He asked them to make timber frames, and realized playroom's structure with them.

Ichiro Kobayashi, the mayor of Shibata city in Niigata prefecture of that time, found Iizuka's works on a magazine and asked Iizuka to design some buildings in Shibata city with laminated timber. Shibata City Gymnasium was one of these works. It had become famous within engineers for its 36m large span and structural beauty of frames (Fig. 1).

At that time, there was high demand for school buildings all over the country, so Iizuka had designed many gymnasiums in various area.

At the same time, as a structural engineer, Iizuka did some experiments such as tests of relations of curvature and the strength of bent laminated timber. In addition, he shared invented formula to calculate required size of the laminated timber from span for the other architects.

In the Ministry of Construction, the organization which gives authorization for constructing laminated timber building, Toru Mori and Katsukichi Imaizumi were working at that time. These engineers who had tried to develop laminated timber since war time and Iizuka had promoted laminated timber together.

3.3. Pilot Houses with New Wooden Materials

Iizuka had also begun to develop new designs using new wooden materials for housing construction.

After the project of Seijo Kindergarten, Mitsui Mokuzai Kogyo Co. had decided to enter the market of prefabricated houses, so they asked Iizuka to supervise their products. Iizuka himself had already begun studies of prefabricated housing within his master course. He had designed a series of experimental pilot houses for Mitsui Mokuzai Kogyo Co.: U-Shaped House, H-Type House, E-Type House, and F-Type House. Here I show features of each house below.

The first work of this project was "U-Shaped House" (1961). The main structure was bent laminated timber looking like a "U" shape (Fig. 2). Because laminated timber was the main product of Mitsui Mokuzai Kogyo Co, Iizuka adopt it in small prefab house adventurously.

The next project was "H-Type House" (1964) that had two stories, which was a rare case at the time. In this project, Iizuka used straight laminated timber as floor beams of second floor. For the joint part of column and beams, he used a method called "Hasami-bari". "Hasami-bari" means the way to make joints by sandwiching column between two thin beams and fasten them with bolts. He chose this method for avoiding loss of column / beam, which is similar to the idea of Shinko Moku Kozo. With this method, it also will be able to lengthen beams forward, and build a balcony on them. In addition, Iizuka showed edge sections of these beams as accent of façade design. He also used "Hasami-bari" in E-Type House, F-Type House, and other projects.

"E-Type House" (1966) was made based on a challenging concept, namely that "the house can be expanded to the second floor while living on ground floor" (Fig. 3). The basic construction system was similar to H-Type House, but he made



Fig. 3. Gorozo Iizuka, E House, Japan, 1966, A system of construction extending the second story with ease. © SPS.

some modifications such like making members slimmer, or adding the newly designed joint system on the top of the column of first floor to make it possible that another column will be added on it in the future.

Mitsui Mokuzai Kogyo Co. accomplished the commercialization of the final pilot model, "F-Type House". Although the basic construction method was similar to the conventional wood construction methods (the most popular wooden construction system in Japan), F-Type was mixed structure. Iizuka used lightweight steel for the frame of second floor.

From U-Shaped house to F-Type house, the structure become less exaggerated each time, and the design had become calm. It can be regarded as an attempt to adopt wooden structure systems which had been previously used in large span buildings to small houses. Through this project,

Iizuka had tried to make use of new construction systems and materials in design.

4. THE BACKGROUNDS WHICH ENCOURAGED IIZUKA TO WORK ON WOODEN ARCHITECTURE

Iizuka's works and ideas were unique within postwar architects.

During that time, it was said that wood was not a "rational" material, because woods cannot be fully handled unlike industrial materials. Nevertheless, Iizuka kept on using this flammable, weak, outdated, irrational material.

To know why he believed in the potential of wood, here I show backgrounds.

4.1. Studying in the United States

Iizuka had studied in the US for six months during his time as an associate professor at Yokohama National University. I guess that he might have been inspired by Soshiroda, his supervisor. Soshiroda went to Europe and the United States from 1936 for one year to study wood engineering. Iizuka told that he referred to Soshiroda's reports on wooden prefabrication houses in Stockholm and steel structure house in Germany when he was researching prefabricated houses during his master course.

Soshiroda had visited the Forest Products Laboratory in Madison, Wisconsin. In this laboratory, the first laminated timber building in the US had been realized in 1934. Soshiroda got the opportunity to visit this building:

The strength test of glued timber arch had been held, and the loading test using sandbags had went on the top of the roof of warehouse (48m span, 14m depth) of which structure was made of these timber arch frames and built on the premises.²

Soshiroda got the chance to witness the cutting-edge technologies and newest architecture using laminated timber. Iizuka must have heard such situation in the US from his professor.

Iizuka joined the summer school of MIT for three months, and spent another three month there looking around for architecture and factories of laminated timber. His supervisor at MIT was Professor Albert George Henry Dietz, who specialized in material engineering, especially laminated timber and plastics. Iizuka, inspired by him, wrote reports titled "The use of plastic for architecture" in 1953. Laminated timber which used plastics as glue was also regarded a new material. In the US, therefore Iizuka might have felt certain that wood will be an innovative material again in the near future.

4.2. Movement Among the Architects of Iizuka's Generation

I found possible reasons why Iizuka proposed experimental wooden houses in the movement among architects

of that time.

The 1950s were a period of reconstructing war damages when many architects proposed prototypes of urban housing. Iizuka also launched a study group of industrial housing of lightweight steel structure with researchers of his generation: Kiyoshi Ikebe, Kenji Hirose, Yoshichika Uchida. He himself was interested in lightweight steel, so Iizuka built his own house with lightweight steel in 1958. However, Hirose already started to design the series of experimental houses using lightweight steels from 1953. Therefore, Iizuka may have decided to make his proposals with wooden prefabricated houses. Both Hirose and Iizuka were engineers that developed the combination of construction system and design.

5. WOODEN STRUCTURAL DESIGN AFTER IIZUKA

Iizuka contributed to the construction boom of buildings with laminated timber frame from the 1950s to 1960s. However, this movement ended quickly.

The regulations on construction of large buildings with laminated timber were tightened in 1959. In September of that year, there was a catastrophe caused by the Isewan Typhoon. Strong winds caused collapses or serious damages of more than 150,000 wooden houses and wooden structures lost trust completely. This legal changes in 1959 were the start of “the missing period of wooden structure in Japan”.

After a blank period, wooden large buildings had started to reappear again from the 1980s. In 1982, the regulation for the laminated timber structure was eased. Domes using straight laminate timber had been built throughout the country.

Even new roof structures showed up in 1988. Oguni Dome, designed by Shoei Yoh, has a space frame consisting of small thinned wood in its roof structure. The engineer of this project was Gengo Matsui, who graduated from Waseda University in the same year like Iizuka. He had worked with famous modernist architects like Kiyonori Kikutake, and realized many masterpieces with concrete. It is interesting that such a distinguished structural engineer had become aware of the uniqueness of wooden structures after a period of concrete modernism.

However, Iizuka was the one who had known the value of wood earliest.

6. CONCLUSION

In this study, it became clear that Iizuka took over the researches which had been developed during wartime and realized them in projects of gymnasiums and houses. He had been trying to combine wooden material and structural method with design through his carrier. Moreover, I find it likely that his motivation to pursue the potential of wood may have been encouraged by researches with Soshiroda, his experience in the MIT, and his engagement with archi-

tects of his generation.

Looking back at Iizuka's works and ideas, we understand that a technology will develop not only due to technological demands but also due to demands in design.

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REFERENCES

- IIZUKA, Gorozo, *The Concrete Idea for Design — The Materials and Method of Construction*, Shinjuku, SPS, 1989.
- Architectural Institute of Japan, *Development History of Modern Japanese Architecture*, Tokyo, Architectural Institute of Japan, 1972.
- KOMATSU, Kohei, *The History of the Development of Laminated Timber*, Kyoto, Kyoto University Press, 2016.
- Kajima Institute Publishing, *SDOoog Modernism in Wooden Construction 1930s to 1950s — Japanese Approaches Transform Materials*, Tokyo, Kajima Institute Publishing, 2000.
- OGAWA, Kohei, “The Wooden Structure in the Time of World War — Wooden Large Span Structures Developed in the Time of World War”, *From Master Thesis of The University of Tokyo*, Tokyo, The University of Tokyo, 2006.
- TAKEYAMA, Kenzaburo, “Story of Shinko Moku Kozo”, *Kenchiku Zasshi*, Vol. 650, Tokyo, Architectural Institute of Japan, 1939, 671–700.
- SOSHIRODA, Saburo, “The Current Situation of the European and American Wooden Architecture”, *Kenchiku Zasshi*, Vol. 638, Tokyo, Architectural Institute of Japan, 1938, 543–551.
- IIZUKA, Gorozo, “Plastic architecture and Prefabrication”, *Kenchiku Zasshi*, Vol. 837, Tokyo, Architectural Institute of Japan, 1956, 27–30.

NOTES

- 1 Kenzaburo Takeyama, “The Story of Shinko Moku Kozo”, *Kenchiku Zasshi*, Vol. 650, Tokyo, Architectural Institute of Japan, 1939, 673.
- 2 Saburo Soshiroda, “The Current Situation of the European and American Wooden Architecture”, *Kenchiku Zasshi*, Vol. 638, Tokyo, Architectural Institute of Japan, 1938, 544.

LAMINATE, INTERLOCK, BOLT — EXPRESSIVE TIMBER ASSEMBLY IN YUSUHARA

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ABSTRACT.

While for most of the 20th century public buildings in Japan could not use wood in compliance with fire codes, in the 1990s, new fire-retardant technologies and revisions of code enabled the use of exposed timber in mid-size buildings. Exploiting this freedom, Kengo Kuma is one of a few architects who have brought timber back to Japan's urban and suburban realms. In using it both for cladding and for hybrid structures, he aims to revive architecture's role as cultural production respectful of Japan's heritage, while rekindling principles of a place-sensitive modern monumentality. This paper examines how he has put these motives to practice in his designs for civic buildings in Yusu-hara, a town in the wooded hills of Kōchi — a region specializing in Japanese cedar production. The town's *sugi* industry has integrated cutting-edge technology with its age-long tradition — two elements that the municipality asked Kuma to celebrate in his designs. By analysing three works in Yusu-hara, the paper highlights the tension between Japanese traditions of solid timber work and 21st-century engineered details. It focuses on three assembly techniques — glue-laminating (glulam), interlocking and bolt-jointing — as demonstrated in Kuma's designs for a town hall, a wood bridge gallery and a community library. For each, it considers its practical constructive aspects and their expressive potential, the interdependence of which has often been overlooked. In so doing, the paper reflects on how an informed use of digital-age tools may contribute to the renewal of tradition by transforming rather than repeating it.

1. INTRODUCTION

During the Meiji era in Japan, timber was overtaken by brick, stone, concrete and steel in the construction of public buildings. This material change entailed that almost no examples of modern use of timber existed in civic buildings for most of the 20th century, even though it continued to be used in housing. Notable exceptions of timber use in public buildings by a modern architect include Antonin Raymond's Saint Paul's Catholic Church (1935) in Karuizawa and three works by Kunio Maekawa: Kishi Memorial Hall (1940), Kinokunya Bookstore (1947) and Keio University Hospital (1947).¹ Rapid reconstruction after 1945 spawned a shortage of construction materials that ushered a momentary surge in the use of timber for framing in public buildings, but that period was an exception. As a result, for most of the 20th century, Japan's civic architecture was detached from its pre-industrial construction heritage — a problematic sacrifice for a culture that sanctifies carpentry knowhow, as ritualized in the vicennial reconstruction of the Ise Shrine. Consequently, despite the place-sensitive use of wood in domestic architecture by some modern architects, the haptic, aesthetic and environmental qualities of timber have disappeared from Japan's public realm and skilled carpentry became rare and costly.

In the 1990s, new fire-retardant technologies and revisions of national codes enabled the use of exposed timber in mid-size buildings, albeit very partially as structure. Exploiting this freedom, Kengo Kuma is one of a few architects who have brought timber back to Japan's urban and suburban realms. In using it both for cladding and for hybrid structures, he aims to revive architecture's role as cultural pro-

duction respectful of Japan's heritage, while rekindling principles of a place-sensitive modern architecture. This motive is most explicit in his designs for civic buildings in Yusu-hara, a town in the lushly wooded hills of Kōchi Prefecture. The region is known for its production of *sugi* — Japanese cedar (*Cryptomeria Japonica*) — a species endemic to Japan, and one of the three most used for construction in the country along with hinoki and pine.

Through three of Kuma's buildings in Yusu-hara, this paper examines the tension between Japanese traditions of solid timber work and 21st-century engineered details. It focuses on the techniques of glue-laminating, interlocking and bolt-jointing. For each building, it considers the relations between practical constructive aspects and their expressive potential, the interdependence of which has often been overlooked. In so doing, it reflects on how an informed use of digital-age tools might contribute to renewing tradition by transforming, rather than repeating it.

2. KUMA'S WORK IN YUSUHARA

Since 1994, Kuma has been commissioned by the town to design six public buildings for its 4000 inhabitants, aimed to promote its environmentally friendly and carpentry-based identity while invigorating local craftsmanship.² The buildings he designed demonstrate a combination of abstract formal references to a pre-industrial tradition, which I propose to qualify as 'defamiliarization' (異化) — a literary trope that consists in altering some descriptive aspects of a familiar place or person, and changing its name, to call attention to the source object's qualities.³ In using it, Kuma sheds light on the town's past and on its present technological progress.

He has made manifest the intersection of the old and new as Yusuvara's *genius loci*, while responding to its people's respect to their natural environment. The three buildings discussed here are: a town hall (2006), a bridge-gallery (2010), and a community library (2018). I will examine how in each one the architect has used the techniques of laminating, interlocking and bolting expressively and distinctly from traditional log construction.

2.1. *Ki no Machi* Town Hall

Located at the village center, the *ki no machi* (wood town hall), completed in 2006, owes its name to the apparently overwhelming use of locally-sourced *sugi*, both for its envelope and the interior structure (Fig. 1). In reality, the use of wood is less pervasive than it appears, since the structure is hybrid, comprising hidden concrete walls around the visible timber of the main hall, steel bracing bars in the ceiling, and a 20-meter steel beam spanning the entrance portal, but dressed in wood.

The civic façade is a random patchwork of low-E glass panes and steel-framed *sugi* panels, whose visible thinness suggests their role as cladding. This irregular checkered pattern, reminiscent of the *ichimatsu* (市松) pattern on the façade of Antonin Raymond's Italian Embassy Villa in Nikko (1928), is a variation on Kuma's many references to textiles as inspiration for building envelopes that confer a sense of weakness and "warm transparency."⁴ A double glulam architrave crowns the façade supporting an array of slender purlins, that call to mind Buddhist temples' eaves. Oddly, where one would expect the architrave and girders to interlock, they seem merely stacked on edge, fixed by hidden steel bolts, and the whole appears unstable as a house of cards. This appearance is suggestive of a flexible, informal interface between the municipal institution it houses, the people it serves and the building's surrounds.

Contrasting the façade's ambiguous tectonics, the main public hall boasts a structural tour de force, engineered by Mr. Katsuo Nakata, who specializes in hybrid timber-steel systems that minimize material and optimize strength. Accordingly, the posts have been split into four, and they support a four-tier lattice of glulam beams 20x70cm in section, spanning 18-meter — the longest allowed by code. This section-to-span ratio would have been impossible with non-laminated lumber, usually cut to 6-meter segments.⁵ The beams are spaced with wedges that extend beyond their structural length (Fig. 2). Despite the sheer mass of timber used, the Jenga game-like ensemble exudes instability, permeability and weakness, themes the architect uses to suggest an environmentally oriented monumentality. This idea already appeared in the work of modern masters like Junzo Sakakura and Kenzo Tange, but it breaks the classical link between monumentality and *firmitas*, still pervasive in Japan at the end of the 20th century. At the same time, the design alludes abstractly to the national heritage of timber construction by the forms and arrangements that *seem* fa-



Fig. 1. Kengo Kuma, Yusuhara Town Hall. Main façade. © Ariel Genadt, 2015.



Fig. 2. Kengo Kuma, Yusuhara Town Hall. Interior. © Ariel Genadt, 2015.

miliar. Yet, since the wood of traditional temples and industrial glulam have distinct properties, this material substitution is akin to a 'defamiliarization.' It calls attention to forms that did not exist in the past, but nevertheless evoke a craft-based spirit of place.

Laminate beams are a modern invention, contrasting preindustrial carpentry that used solid logs and mostly dry interlocking joints. Mostly, since rice-based, animal and resin pastes, and lacquer were sometimes used to reinforce jointed members, so adhesives are not entirely estranged to tradition. With a similar purpose as old *tsugite* (継手) splicing joints, glulam allows using shorter, cheaper lumber and local species, while obtaining long beams that would be expensive and wider with solid logs.⁶ Furthermore, glulam exploits trees that would not be suitable for monumental construction otherwise. This allowed commissioning small local workshops rather than transporting the wood from afar. What may be a constraint for some projects, became an asset for an architect interested in the expressive potential of aggregating multiple slender elements.

These advantages of glulam should also be coupled with



Fig. 3. Kengo Kuma, Wood Bridge Gallery, Yusuhara. © Takumi Ota Photography.

their aesthetics: the surface pattern, linear and rectangular geometry, layering and aggregation, which reveal their mechanical processing. In traditional log construction, the wood's age was manifest in the members' girth and the age-rings exposed in section. That age was an expression of the building's importance, its social and political status, also symbolizing a deep connection to a place and memory. These symbolic aspects are lost in industrial products that use young wood, and whose age is not readily visible.

Directionality in timber has practical and aesthetic aspects. Massive logs have an optimal orientation for use, since every tree has a sunny and a shady side: the sunny, south face is sturdier having withstood harsher weathering than the shady north face. It has a fine clear grain and many *ikibushi* knots, replete with oil that protects it from humidity. Common practice has pillars face the same side as during the tree's growth, to avoid cracking.⁷ That split logs tend to bend can be used to offset sagging in rafters. Laminated beams may be directional or not, depending whether they are 'balanced', i.e. statically symmetrical, or 'unbalanced', when bending is controlled by a compression lam at the top and a tension lam at the bottom.⁸ Thus, in addition to being more efficient structurally, 'unbalanced' beams mimic more closely natural logs' sunny and shady faces.

Another aesthetic aspect of directionality is the log's grain in length and in section. In glulam, as in massive logs, the grain of all lamina runs parallel to the member's length. But in addition, lamination marks the length by multiple horizontal lines of constant width which signal the material's artificial transformation. The visual difference between logs and glulam is also related to humidity. Logs shrink and expand regularly due to their water content, while humidity in glulam is controlled to maximum 15%, so shrinkage is not a design parameter.⁹ Therefore, expansion joints that appear as shadow gaps in traditional structures, are rare in glulam ones. All these properties of glulam were harnessed in Kuma's design for the town hall through the trope of 'defamil-

iarization' of the vocabulary of log construction.

In the town hall's main public interior, steel-bolting is a dominant aesthetic feature. Most of the bolts are manifestly visible, perhaps 'defamiliarizing' the iron tie nails *kugi* (釘) used since the 9th-century in aristocratic mansions and temples of the *shinden zukuri* (寝殿造). But in Yusuhara, the steel bolts are not as singular ornamental elements, but become expressive by their multiplication and aggregation. And unlike traditional hardwood dowels in *tsugite* joints that sit flush with the beam's surface so as to be barely noticeable, the contrast between steel and wood is here celebrated. Finally, this bolt-jointing precludes the need to notch and interlock the beams — an opportunity the architect used to suggest fragility, in what is, in effect, a perfectly stable structure.

2.2. Kumo no Ueno Wood Bridge Gallery

Like the Town Hall, the Kumo no ueno Wood Bridge Gallery was engineered by Katsuo Nakata & Associates and opened in 2010 (Fig. 3). It was built to provide a 4-m long covered passageway between a hotel, and the *onsen* facility located lower on the hill. This practical brief was turned by Kuma into a rhetorical and even theatrical work. The structure's wondrous effect revolves around the central wooden pillar, which seems, especially under certain lighting and from specific angles, to support the load of a concatenated tree structure. But this wooden pillar hides its steel core, and one is tempted to overlook the fact that the bridge's ends rest on black steel frames, perhaps because they perform like those black-clad *kuroko* (黒衣) stagehands in *kabuki* and *bunraku*, present yet absent. Hence, one's attention is directed to the exuberant concatenation of cantilevered beams, 18x30cm in section, the largest that could be manufactured in local timber workshops. The ensemble demonstrates their skills of precision in execution.

Explaining the design, Kuma evoked covered wood bridges in the region, and the *saru hashi* (猿橋) "Monkey Bridge" in Ōtsuki, that employs the *hanebashi* (桔橋) method of cantilevered beams.¹⁰ But the assembly principle more directly alludes to the *masugumi* (斗組) block-and-bracket system common in Japanese temples. In that sense, Kuma 'defamiliarizes' an element of religious monumental vocabulary into a secular civic function. In the *masugumi*, the small *makito* (巻斗) blocks were the base unit from which all other dimensions of the building could be derived.¹¹ This modular principle sits well with Kuma's search for an organic, non-hierarchical aggregative aesthetic, which here shares with traditional brackets their rhetorical function. As Klaus Zwerger explained, beyond the efficiency for production, modular bracket systems allowed carpenters to cantilever roofs well beyond the walls, initially for protection, and then, during the 7th-9th centuries, for visual expression of a building's prestige. Kuma's sleight of hand in using unintelligible joints is not far from the traditional practice of *hanegi* — those hidden cantilevering timber members that allowed carpen-

ters to design expressive roofs.¹²

Yet, despite the resemblance to *masugumi*, this exact spatial layout of rectangular spars has no precedent in Japanese carpentry, religious or secular, and its structural principles rely entirely on the properties of modern glulam beams and steel bolting, here hidden. As in the Town Hall, Kuma exploited the minimal interlock to confer on the whole a sense of fragile stability and permeability to the natural landscape. This environmental kinship is reinforced by the glulam's stratification and fragmentation, which further contributes to its visual blending into the forested hills where its material was harvested. Meanwhile, its organized rectilinear geometry underscores its artificiality. This kind of dialog between the monument and the surrounds had already been identified by Bruno Taut in 1936, in his commentary on the Ise Shrine. The German architect believed Ise's cultural value lies in its being built from the hinoki trees of the surrounding Kiso forest, which made it integrated in its place ecologically, aesthetically and culturally.¹³ Kuma's environmental thinking was most influenced by Taut's, and in describing the Yusuhara Bridge he has reiterated the adage: "the best wood for a building is always found in the forest nearby," since it is the most climatically adapted material to the site.¹⁴

2.3. The Yusuhara Community Library

Like the Town Hall and Bridge, the Yusuhara Community Library completed in 2018, has a hybrid structure, combining a steel frame with timber. But here the locally sourced *sugi* cedar is solid rather than glulam, and is used only for diagonal bracing (Fig. 4). Slats are aggregated into a rhomboid lattice, engineered by Jun Sato and already applied in two of Kuma's buildings in Fukuoka and Tokyo. Though its structural role is minimal, its rhetorical performance is significant, aiming, according to the architect, to express a forest canopy, with sunlight filtering through the branches, an effect known as *komorebi* (木漏れ日), achieved here by a clerestory in the staggered roof.¹⁵ The architects' motives seem similar to the ones at the town hall: creating a civic focal point that exudes a weak, flexible, dynamic relationship between people, town and environment. To this end, the library's façades are layered with floating wood lamellae vertically clustered like a textile motif. Their spacing seems randomly syncopated, presumably hinting at the surrounding forest's fuzziness.

Though neither the façade nor the rhomboid lattice formally allude to traditional carpentry, they testify to the local craftsmen's ability to translate a complex architectural design into building, and to cut and assemble this very sophisticated system, adapted by Jun Sato from the traditional *jigoku gumi* ("hell joint") used for assembling *shoji* frames.¹⁶ Digital tools were necessary but insufficient for producing the complex geometry of the fragments and assembling them into a seemingly organic lattice. The digital and manual had to be combined.



Fig. 4. Kengo Kuma, Community Library, Yusuhara. Interior. © Erieta Attali, 2019.

Since the wood is solid, not laminated, the craftsmanship and the ensuing haptic qualities are closer to traditional carpentry than the other two buildings discussed earlier. On solid wood, the carpenter's plane reveals the grain, and cutting is part of the finish, since the wood section emits natural water-repellent oils.¹⁷ At the library, unlike in the Town Hall and Bridge, the wood shows its age rings, like traditional logs, which in turn reinforces the forest metaphor that inspired its form.

Lastly, this pseudo-organic lattice shares with traditional carpentry the principle that multiplying joints is costly, due to labour-intensive manufacturing and expert assembly and then to high maintenance. While repetition of joints today hints at a mechanical production and perhaps a robotic assembly process, in this case, the painstaking manual labour involved is a sign of a community's means and dedication to cherishing its craftsmanship as part of modernity.

3. CONCLUSION

Kuma's designs in Yusuhara demonstrate how the use of engineered timber and universal jointing details can contribute to expressing a civic agenda in the 21st century. Each of the methods of lamination, bolting and interlocking has practical and economic aspects, and not least, expressive implications. These are harnessed through Kuma's 'defamiliarization' of traditional forms and tectonics, whereby engineered timber substitutes the vocabulary of massive logs. He has thus imbued the building with symbolic and tactile qualities, and an environmental sensitivity, albeit more rhetorical than scientific.

The projects discussed show that for Kuma the revival of craftsmanship as it used to be practiced is neither possible nor desirable. His motive is not nostalgic but stems from a concern with the emptiness of civic meaning found in Yusuhara at the onset of the 21st century, as in many parts of Japan. To mitigate the inevitable use of universal technology he combines it with local craft, so as to 'situate' it in a specific cultural and natural milieu. Hence, craft and technology are mutually inflected towards expressive ends, ultimately driven by the architect's humanist ideal, whereby

architecture is foremost a cultural generator rather than a techno-scientific demonstration of power.

In recent years, Kuma's abstract inspiration from tradition have made his designs popular among politicians, developers and laypersons, and even earned him the title "wa-fu taika (和風大家)" (Japanese style expert), which he rejects.¹⁸ All the while, Japanese carpentry purists see the work as a far cry from tradition. Either way, he has reinstated references to tradition into a contemporary architectural discourse, which may be seen as a post-modern search for civic meaning as a form of critique of universal modernism. Perhaps not least valuable is his contribution to reinstating the use of timber in the lineage of modern masters who sought an environmentally situated monumentality. Supporting this endeavour was not only Kuma's technological savvy but an appeal to popular human sentiments. To the exasperation with the sterility of industrial materials in the civic realm he responded with the haptic qualities of an organic material. This constructive and critical act suggests architecture's agency in establishing a more sensible and sensual relationship between humanity and its habitat.

NOTES

- 1 Takaaki Kumagai, "Maekawa Kunio: Prefabrication and Wooden Modernism 1945–1951", *Dearq*, n. 22 (201801), 36–45.
- 2 Kengo Kuma, "Why I went to countryside?", Tokyo University, *Four Facets of Japanese Architecture: Technology*, 4.2., 2018, accessed on Jan. 31, 2021, <https://courses.edx.org/courses/course-v1:UTokyoX+UTokyo005x+3T2016/course/>.
- 3 Viktor Shklovsky, *Art as Device (1917–1919)*, Reprinted in Šklovskij, Viktor Borisovič & Alexandra Berlina, *Viktor Shklovsky a reader*, New York, Bloomsbury, 2017, 80.
- 4 Kengo Kuma & Ariel Genadt, "Kengo Kuma — Au Naturel" in *Architect's Newspaper*, Feb. 2012, 22.
- 5 Kazuo Nakata, interview with the author, Jul. 2015.
- 6 Kiyosi Seike, *The Art of Japanese Joinery*, New York, Weatherhill, 1979, 105–107.
- 7 Tsunekazu Nishioka & Jirō Kohara, *The Building of Horyu-ji: The Technique and Wood That Made It Possible*, 2016, 54.
- 8 The Engineered Wood Association, *Engineered Wood Construction Guide. Form No. E30v. C, 2011 APA*, 20.
- 9 Kazuo Nakata, interview with the author, Jul. 2015.
- 10 Kengo Kuma, "Why I went to countryside?", and Toshihiko Kiuchi, "Yusuhara wooden bridge museum", *Japan in Architecture — Genealogies of Its Transformation*, Tokyo, Mori Art Museum / *Kenichiku-shir*, 2018, 58.
- 11 Klaus Zwerger, *Wood and Wood Joints: Building Traditions of Europe, Japan and China*. Basel, Birkhäuser, 2012, 297–298.
- 12 *Ibid.*, 196.
- 13 Bruno Taut, *Fundamentals of Japanese Architecture*, Tokyo, Kokusai Bunka Shinkokai, 1936, 15–16.
- 14 Kengo Kuma & Kenneth Frampton, *Kengo Kuma: Complete Works*, New York, Thames & Hudson, 2013, 8.
- 15 According to project architect Kazuhiko Miyazawa in an email to the author, Dec. 2019.
- 16 Engineer Jun Sato in conversation with the author, July, 2012.
- 17 "The Thinking Hand", *a+u Architecture and Urbanism*, 2019:02 #581, 24.
- 18 "Kengo Kuma: 'Tokyo and Architecture beyond 2020'", [video] Lecture at the FCCJ, Tokyo, Nov. 5, 2019, accessed on Jan. 20, 2021, https://youtu.be/Jd_WtuxuOQ.

Session 5-b

MODERN ARCHITECTURAL THINKING IN REGIONAL TIMBER BUILDINGS: IN LIGHT OF REGIONAL ARCHITECTURAL INDUSTRY BACKGROUND

Manabu Synbori

Architect

In this session, we will analyze the modern architectural thinking in modern regional timber architectures rooted in regional conditions. Also In these studies, we clarify the influences of the European modernist architectural movement to those modern regional timber architectures.

The subjects are on article No. 0103, the architectural heritage of modern regional timber architectures in southern Chile, on No. 0104, the modern transformation of wooden modernist housing and local forestry in New Zealand, on No. 0105 the influence of Japanese architectural culture on Schweitzer's modern regional timber architectures in France in the 1970s, and on No. 0092 modern Japanese architecture by Shoei Yoh has the vision to transform timber architecture.

In the first two articles, we analyze the background of industry and production in the adoption of modernist architecture at the national and subnational level. We show how the modernization in architectures proceeded on the basis of the productive environment by promoting the modernization of design. That corresponded to the required social functions and spaces. While using timber as the main material of construction rooted in the national background.

In article No. 0103, "Modern wood architecture in Southern Chile: 1940-1970" is a report on the process by which the nation and industry applied the cultural scape and material industry. And construction environment created by the country's forestry resources to integrate modernist architecture during the period of its global expand. They can be broadly divided into the first modernity, in which the existing construction industry was oriented toward "modern-styled" architecture, and the second modernity, in which grown professionals achieved a mature architectural expression.

In the first part of the article No. 0104, "Territoriality and Timber: Wooden Modernist Houses in New Zealand," the

context of Japan and the International Style is analyzed in the story of a house by the immigrant architect Ernst Plischke on the background of the timber production environment of New Zealand. In the latter part of the paper, the paradox of the national production shift to radiata pine and the architectural design shift toward regionalist style, triggered by the depletion of traditional rimu trees material around the end of World War II, is discussed.

In other two articles, based on the tradition of the axial construction method of Japanese wooden architecture, one is the discovery of a design philosophy that resonates with modernist architecture, and the other is the development of the axial construction method from a two-dimension to three-dimension. This paper also describes the development of wooden architecture based on computational design.

In article No. 0105, "Roland Schweizer: Learning from Kyoto?", a French architect was inspired by Japan in the 1970s to create a qualitative Japanese architectural thinking in the Brest Youth Hostel, using industrial construction methods. It was employing the methods of axial construction and tatami modulation to integrate nature and the environment. The project was paralleled Moduli 225 project in Finland. This was similarly inspired by traditional Japanese architecture. Article reported that the subsequent appearance of these buildings showed the limits of the application of the modernist style, not in spatial quality, but in architectural weatherability.

In article No. 0092, "The Pioneering Computational Architecture of Shoei Yoh: A Study of the Avant Garde Timber Space Frame Structures in Oguni, Kumamoto," they introduced a wooden space frame project designed by Japanese architect Shoei Yoh in Kumamoto Prefecture in the 1980s. It reports on the project background and impact of the project's aspirations to connect Japanese forestry with modern architecture, and to introduce computer design into timber

architecture, which was still in its early age.

What these analyses show is that modernism as a phenomenon is on the background, underlying production structure, and material supply environment.

And the process of interpreting and accepting modernist architecture as an ideological image based on this. In the first two articles, the potentials of the production culture and material supply environment of the national land were brought to fruition in the “form” of modernist architecture, while in the latter two articles, the “thinking” of modernism was used as a tool to graft and develop different national cultures on the one hand, and to elevate the existing national timber culture on the other.

What is the relationship of these local timber architectures to the central modernist architectural movement thinking?

For one thing, in contrast to the historical view of architectural style of the Giedion-Johnson “The modernist architectural style,” in which the form of the architectural project shapes the concept, analyzing the modernist architecture of each country and region in the context of Banham-Frampton’s “Tectonic” analysis is a way of looking at the history that gives a perspective at the location of the “movements” that are connected to the present and move toward the future.

In other words, it is a perspective that escapes the obsession of the confrontational structure of the central European modernist movement VS. sideline marginal world episodes. And reveals the modernist movement itself is in the here and now. And the potential of architecture exists in each country.



MODERN WOOD ARCHITECTURE IN SOUTHERN CHILE: 1940–1970

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ABSTRACT.

The south of Chile is a territory where a wood architecture of such quality has emerged that is today the country's cultural heritage. The wood then here should not be understood only as a constructive material, but also as a matter associated with history, crafts, ways of life, culture and identity of this vast territory. Wood in southern Chile is, first and foremost, a cultural material.

In that context, in the south of the country, there was a very particular variant of Modern Architecture, since while in the rest of Chile and the world it was executed mainly with the new proposed materials — reinforced concrete, reinforced masonry, glass and steel — in the south of the country said architecture was produced in a natural material, wood.

This new Modern Wood Architecture was conceived among all areas: housing, architecture for the industry, architecture for tourism, architecture for education and culture, and in religious buildings. Thus, in the period 1940–1970, public equipment was built in wood such as schools, churches, industries, cinemas and many other architectures that, through wood, embrace the postulates and principles of Modern Architecture in a reinterpreted and local version, today considered architectural heritage of southern Chile.

1. INTRODUCTION

The constructive tradition of wood in southern Chile comes from two aspects: on the one hand the ancient existence of native forests and, consequently, on a constructive material, wood, and on the other, the development of processes of appropriation and adaptation of models that serve as a reference source to the wood architecture that is developed.

A feature that exemplifies these processes of adaptation and appropriation in southern Chile is given by the replacement, since the eighteenth century, of construction materials of architectures originally thought and resolved with materials such as stone, marble, brick masonry and reinforced concrete, which are reinterpreted and resolved in wood and metal plate. Similarly, the development of modern wood architecture in the south was a process of adaptation, mixing and appropriation of models.

In the south of the country, it is in the room sets — public and private — where we find an architecture that can be called authentically modern. Since the 1940s and especially thanks to the actions of the State and the industry, wooden housing assemblies were built that incorporate a new conception of space, new concepts of constructive rationality, standardization, and even in some cases prefabrication.

In the same way, modernity came coupled with the emergence of new programs, such as cinema, or the action of the Educational Establishment Society that built several types of wooden schools. In religious architecture, in those years of the 1960s, there were important changes from the Second Vatican Council, which is expressed in an architecture in which new space canons were developed.

It is important to highlight the action of the State in the development of housing policies, as well as the action of companies such as Railroads of the State, the National Petroleum Company ENAP, or private companies such as Oveja Tomé Cloth Factories or Cervecería Anwanter in Valdivia,

who built modern housing complexes for their workers and employees completely in wood, giving continuity from the State and industry, to a constructive tradition and a culture that regarded wood as a material linked to the cultural landscape of the southern Chilean territory.

2. MODERN WOOD ARCHITECTURE

Between the 1940s and 1970s, a particular development of Modern Architecture associated with the constructive culture of that territory emerged in southern Chile, which resulted in what we can now call Modern Wood Architecture (Rojas; Fischer, 1985). This development can be divided into two stages: the first between the 1940s and 1960s called First Modernity here and the second between the 1960s and 1970s called Second Modernity here (Cerda, et al., 2005).

The architecture produced in the First Modernity stage (1940–1960 decades) corresponds on the one hand to the work of the State destined to the modernization of the country and to improve the living conditions of the population. On the other, to the action of individuals and master carpenters who — without the participation of architects — ventured to develop their own and vernacular interpretation of Modern Architecture.

The architecture developed in the so-called Second Modernity (1960–1970) already corresponds to a mature expression of Modern Architecture developed by professionals, who arrived in the area after the Valdivia earthquake of 1960 (9.5 ° R) and renewed the architecture in its functional, expressive and constructive aspects (Fig. 1).

The modern wood work was vast and covered various areas of life such as housing, education, culture, health, industry, tourism, religion and agriculture, among others. In order to provide an overview of this development, an architectural review of some of these areas is delivered here.



Fig. 1. *Andean Club House*. O'Higgins street 1073, Osorno. Architect Erwin Piwonka. c.1950. Digital perspective. © Pablo Miranda C.

2.1. MODERN HOUSING IN WOOD:

Collective Housing Complexes

Be it housing built by the State or industry, a new way of living appears strongly in the 1940s, namely that of collective housing complexes. Although these already existed previously especially in cities and towns of mining exploitation such as saltpeter, copper or coal, from that date its use as a typology is extended and popularized (Fig. 2).

A series of architectural approaches and proposals allow these sets to be classified as modern, providing living conditions associated with modernity, in contrast to pre-existing precarious conditions. Thus, its inhabitants were able to enjoy naturally lit and ventilated homes, electricity, heating, bathroom, hot and cold drinking water, separate bedrooms for parents and children.

From the point of view of its architectural expression, we are in the presence of buildings that merge the traditional architecture of southern Chile with modern architecture.

Features of the former are found in a unit volumetry, strong presence of the roof, roof tiles and wood, to name a few, and modern architecture, the seriation and standardization of a repeating model, the fair use of space, the rationality of the constructive-structural and spatial solution.

The rationality of the development of the plants is demonstrated in the reduction of the circulations to the minimum necessary, in the concentration of the wet enclosures — kitchen and bathroom — which allows a rational, logical and economic distribution of the sewage and drinking water facilities. The incorporation of the bathroom inside the house represented one of the most substantial and innovative proposals of these sets.

In replacement of the traditional wardrobes, what this new architecture proposed were closets. The closet represented another revolutionary innovation in the architecture of this period, in the idea of order, cleanliness, and functional use of space.



Fig. 2. *Huerto Obrero population, Osorno. Corporación de la Vivienda CORVI, 1960. Digital perspective. © Pablo Miranda C.*

2.2. Architecture for Tourism

Towards the 1950s and 1960s, tourism began to represent an eminently modern activity, associated not only with the recovery of physical health — hot springs and sanatoriums — or religious pilgrimage, but with the administration of leisure and free time. This brought new social and cultural practices such as trips to previously unknown places, especially encouraged by the development of rail connectivity that towards southern Chile was already towards those dates perfectly consolidated (Cortés, 2014).

In this context, and supported by CORFO through the National Hotel Sociedad Anónima HONSA, numerous hotels arised, among which the hostels designed by the architect Emilio Duhart in the cities of Castro and Ancud in Chiloé, stand out (Esparza, 2012). In that same idea of building small wooden hotels, the Hotel Eberhard of Puerto Natales stands out in a strategic location on the way to Torres del Paine National Park in southern Patagonia. Tourism development in the south of the country was strongly linked to Modern Architecture, which in the 1950s and 1960s produced countless hotels built entirely of wood (Fig. 3).

2.3. Architecture for Education

The Educational Institution Building Society (SCEE) was

a State agency created in 1937 (Law No. 5,989), aimed at developing the educational infrastructure that the country required, in the fields of schooling, higher education, and professional technical education. The action of the SCEE promoted the development of Modern Architecture in the country, because this was a vehicle that allowed to provide school infrastructure to a society with increasing demands in education. Thus, rationalization, standardization, hygienism and spatial functionalism became the fundamentals of public school architecture design (Torres, et al., 2015).

Due to the climatic conditions, the rural schools in the south of the country replaced the open corridor with a glazed and closed gallery, which is called a covered patio. This is the most significant social space of the school and in it there is not only the play of children but various acts, all school ceremonies and even physical education classes.

A little known link in this intense architectural and constructive production is the development of wooden school projects. In the south of the country, the SCEE developed an extensive program for the construction of wood schools, especially Elementary Schools and Rural Type Schools. In this way, and following the prototypes developed especially in the central zone of the country, in the southern region it goes to the available material — the wood — and to the con-

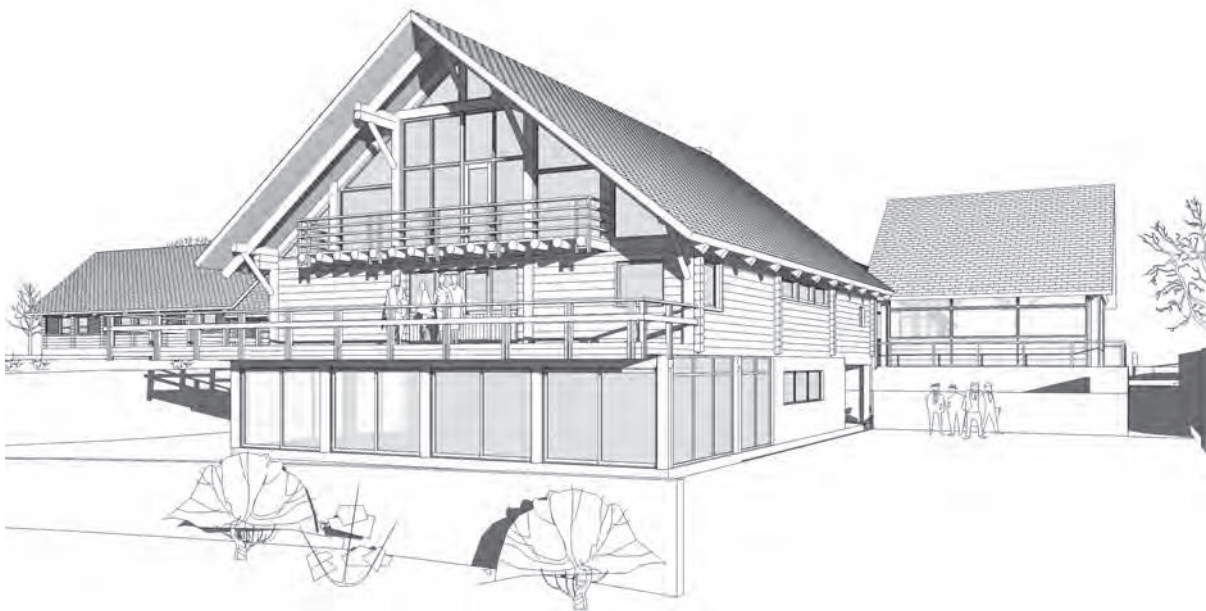


Fig. 3. **Ancud hotel**. San Antonio street 30, Ancud; Chiloé; Architect Emilio Duhart H. 1962. Digital perspective. © Claudio Monje M.

structive culture of the place, to develop its work.

2.4. Architecture for Culture: Cinemas and Theaters

The cinematographer is one of the most characteristic expressions of modernity and constitutes a fundamental element in the history of visual culture associated with art, technology, mass media, recreation, and leisure. Between the decades of 1940 to 1970, going to the movies was a social event, an urban and cultural ritual. Consequently, the cinema building became a key piece of neighborhoods and cities, and in the smaller towns, an urban landmark.

With the rise of cinema in the 1940s–50s, these buildings adopted modern architecture as their own and in many cases constitute, today, a modern heritage of significant value. These buildings were associated not only with an architectural language, but also with the new materials proposed by modern architecture, especially reinforced concrete. However, in southern Chile, there was a particular modern wood architecture that represented a very unique appropriation and adaptation of these models, associated with the tradition and constructive culture of the place.

Notable examples of modern wooden cinemas in the south of the country are the Galia de Lanco cinema-theater (1945) in the Ríos Region, and the Purranque cinema-theater (1948) in the Los Lagos Region. The first of them was declared a National Historic Monument by the Council of National Monuments in 2013, with a heritage rehabilitation project under development and the second already rehabilitated in 2011. Both cases represent modern wooden buildings that

are important pieces of architectural heritage from the south of the country, but above all, they continue to be spaces for citizen meetings (Fig. 4).

2.5. Religious Architecture

On the occasion of the earthquake of 1960, between 1961 and 1964, the Institute of Architecture of the Catholic University of Valparaíso was involved in the construction, repair and transformation of seven chapels in the area between Concepción and Puerto Montt, all seriously damaged or disappeared by cause of the earthquake. These are the chapels of Lebu, Curanilahue, Arauco, Florida, Candelaria de Concepción, Puerto Montt and Corral. The architectural impact that this intervention had was of great significance, since it allowed the development of a concrete and effective proposal about the new liturgical approaches raised by the Second Vatican Council.

The architectural and spatial foundation of these renovating proposals is expressed in a manuscript by Alberto Cruz, creator and theorist of said school, called Liturgical Studies (Cruz, 1960). Its main approaches are the following:

Development of plants that approach the square, in order to produce neutral spatial tensions and achieve greater closeness between the officiant and the faithful. Alberto Cruz says: "... the faithful should not be far from the altar, they should be close to the altar" (Cruz, op. cit.).

The meaning and orientation of the altar is another of the key transformations introduced to the Catholic rite of the Mass. Previously the priest turned his back on the gath-



Fig. 4. *Purranque cinema*. 21 de mayo street, Purranque. Unknown architect; 1948. Digital perspective. © Claudio Monje M.

ered people, from now on the officiant looks at the faithful. This implied a fundamental transformation in the sense and functional organization of space, which was also accompanied by another change of the rite: the Mass is no longer done in Latin.

Another structural issue raised is the use, control and spatial intension of light. What is proposed is a new light to pray, while highlighting, with the light, the site of the altar. The proposed new light is colored, with the object "... that the liturgical colors be present on the altar" (Cruz, op. cit.).

3. CONCLUSIONS

Between the 1940s and 1970s, a particular development of Modern Architecture associated with the constructive culture of that territory emerged in southern Chile, which resulted in what we can now call Modern Wood Architecture. This development can be divided into two stages: the first between the 1940s and 1960s called First Modernity here and the second between the 1960s and 1970s called Second Modernity here.

The architecture produced in the First Modernity stage (1940–1960 decades) corresponds on the one hand to the work of the State destined to the modernization of the country and to improve the living conditions of the population. On the other, to the action of individuals and master carpenters who — without the participation of architects — ventured to develop their own and vernacular interpretation of Modern Architecture.

The architecture developed in the so-called Second Modernity (1960–1970) already corresponds to a mature expression of Modern Architecture developed by professionals who arrived in the area after the Valdivia earthquake of 1960 (9.5 ° R) and renewed the architecture from its functional, expressive, and constructive aspects.

The action of the State was substantive, as it, through its various agencies, promoted the development and modernization of the country — and southern Chile in particular — through modern architecture, which in that territory was initially built completely in wood. The modern work in wood was vast and covered various areas of life such as education, culture, housing, health, industry, tourism, religion and agriculture, among others.

In the field of education, the action of the Construction Society of Educational Establishments SCEE was decisive, as it developed between 1945 and 1965 in the south of the country a large and modern program of construction of Basic Schools and Rural Schools completely in Wood. In the field of culture, modern cinemas and wooden theaters were built, which in turn became citizen meeting places in localities located in remote points of the national territory.

Modern wooden churches were built in the 1960s with which the cult was renewed in light of the new liturgical approaches raised by the Second Vatican Council.

From the 1940s, thanks to the action of the Corporation for Development and Reconstruction CORFO that created the HONSA, Hotelera Nacional SA, the tourism and hotel infrastructure in the country was expanded, resulting in the

construction of a significant number of hotels and hostels, many of which were built in wood, which allowed expanding the benefits of tourism to other strata of the population.

The modernization of agricultural and fruit production promoted in the 1940s by the Ministry of Agriculture, Land and Colonization resulted in modern industrial wooden buildings in which the field and agricultural production were mechanized and modernized.

Between the 1940s and 1970s, the development of better living conditions for the population was promoted through housing programs promoted by the State, that through its agencies (Obligatory Workers' Insurance Fund; Popular Housing and Corporate Housing Fund CORVI Housing) developed modern housing complexes built in wood. The industry, public and private, also promoted housing plans for its workers, operators and employees, building modern housing complexes entirely in wood.

The Modern Architecture in wood today constitutes a recognizable architectural corpus that is part of the valuable architectural and urban heritage of southern Chile and its works have contributed to the strengthening of the architectural identity of the south of the national territory.

The architecture that emerged in southern Chile between the 1940s and 1970s corresponds to a local expression, a reinterpretation of Modern Architecture strongly rooted in the construction tradition of the south of the country through the use of wood. This new architecture has its rational conception as modern, but it has the material with which it is constructed, the wood. It is an architecture that accompanied the processes of social, cultural transformation and modernization of the country and represented a historical continuum regarding the uses and trades of wood in southern Chile, resulting in buildings and urban complexes that are now part of the urban-architectural heritage of the south of the country.

REFERENCES

- AGUIRRE, Max, *La Arquitectura moderna en Chile (1907-1942)*. *Revistas de Arquitectura y estrategia gremial*, Chile, Santiago de Chile, Editorial Universitaria, 2012.
- CERDA, Gonzalo, ROJAS, Edward, LOBOS, Jorge, DE PAULA, Luciana, CARTES, Iván y, & BURDILES, Roberto, *Arquitectura Moderna en Madera en el sur de Chile: 1930-1970*, *Revista Arquitecturas del Sur* N° 30, Universidad del Bío-Bío, Concepción, 2005.
- CORTÉS, Macarena y otros, *Turismo y arquitectura moderna en Chile: guías y revistas en la construcción de destinos turísticos (1933-1962)*, Santiago de Chile, Ediciones ARQ, 2014.
- CRUZ, Alberto, *ESTUDIO LITÚRGICOS: Estudio de iglesias parroquiales; territorios parroquiales*, Instituto de Arquitectura de la Universidad Católica de Valparaíso, Valparaíso (manuscrito), 1960.
- ESPARZA, Verónica, *Hostería de Ancud en Chiloé de Emilio Duhart H. Modernidad adaptada de una tradición vernácula*, Chile, LIBRO DE ACTAS IV Seminario DOCOMOMO, Trayectorias de la Ciudad Moderna, Concepción, 2012.
- ROJAS, Edward & FISCHER, Rodrigo, *Arquitectura Culta y Naif en Chiloé*, Chile, Ediciones del Mirmecoleón Bordemarino, Castro, 1985.
- TORRES GILLES, Claudia, VALDIVIA ÁVILA, Soledad, & ATRIA LEMAITRE, Maximiano, *Arquitectura escolar pública como patrimonio moderno de Chile*, Santiago de Chile, Facultad de Arquitectura y Urbanismo Universidad de Chile, DOCOMOMO Chile, Consejo Nacional de la Cultura y las Artes, 2015.

TERRITORIALITY AND TIMBER: WOODEN MODERNIST HOUSES IN NEW ZEALAND

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ABSTRACT.

Narratives of modernist architecture in New Zealand are dominated by a tug-of-war between the smooth geometricisation of International Style buildings favoured by European émigré architects and those with a regional inflection. Architectural historians Julia Gatley and Andrew Barrie have described this variant of the “Battle of the Styles” in their discussion of the detached house type in New Zealand as an oscillation between the sugar cube and brown bread. Baked from undisguised materials, the brown bread modernist house revels in the versatility of its timber construction. Where the sugar cube house hides its structure beneath smooth painted surfaces, its virtuous brown bread counterpart features exposed timber posts, beams and rafters, complemented by timber linings. This paper will show that opposing these two modernisms has created a false dichotomy since both used similar timber technologies to achieve their aims. Post-war restrictions on materials in New Zealand ruled out concrete and steel. At least at mid-century therefore, architects from both camps built solely in timber, its flexibility making it the most appropriate material for the earthquake-prone islands of New Zealand. Significantly, as Andrew Barrie has argued, Jirō Harada’s 1936 book on *The Lesson of Japanese Architecture* was an important shared reference for both internationalist and regionalist when deploying timber technologies. By analysing the way in which local timbers — rimu, kauri, matai — were deployed in modernist houses built in New Zealand between 1940 and 1965, this paper will argue that regionalist and internationalist architects practising during the period have much more in common than has previously been acknowledged.

1. TIMBER IN NEW ZEALAND

Visiting New Zealand on board the *Endeavour* in 1769, the English botanist Joseph Banks joined Captain James Cook in exclaiming over the potential they saw in “the immense woods, lofty trees and the finest timber” of native forests. By 1840, fires had halved that verdant cover to clear space for Māori settlement. Soon, phalanxes of masted ships were tied to the shore in the Kaipara, encircling giant floating rafts of thousands of kauri (*Agathis australis*) logs destined to become gleaming floors in Sydney, Melbourne, Hobart and Brisbane.

As well as the excellent building material to be found by milling a kauri tree, kahikatea (*Dacrycarpus dacrydioides*), rimu (*Dacrydium cupressinum*) and tōtara (*Podocarpus totara*) were logged for their utility in construction in New Zealand, while rātā (*Metrosideros robusta*) and manuka (*Leptospermum scoparium*) fuelled the cooking and heating in every cottage and whare, the single-roomed dwelling of the indigenous people of New Zealand, the Māori. In the specifications of modern architects, and the government housing programmes instituted to improve living standards after World War Two, reddish brown rimu succeeded its blonder brother kauri as the favoured material for both structure and finishes, deployed in framing, weatherboards, flooring, doors and panelling. Seismic activity ensured the continued viability of timber construction throughout the twentieth century. State housing exhibited variations of layout, form and cladding, but was always framed in wood, efficiently planned, and oriented north for sun with small windows and a roof with a low, 30° pitch (Fig. 1).

2. FROM EUROPE TO NEW ZEALAND

Arriving in New Zealand as a refugee from Vienna in 1939, Ernst Plischke (1903–1992) worked initially in the governmental Department of Housing Construction, learning the local building codes and the local construction technologies. Plischke’s father had been an architect with the Ministry of Public Buildings in Klosterneuberg, and his family background was in carpentry. Plischke’s first private commission in New Zealand was a modernist house in wood for the Christchurch-based Viennese geneticist who had facilitated his immigration. Otto Frankel (1900–1998 / Fig. 2). Despite the Frankel house’s distracting modern L shape, it uses many of the same construction details as a government-built state house. The framing is 4 inch by 2 inch (100x50mm) rimu studs spaced at 16 inches (400mm) fixed to top and bottom plates, with a stud height of 9 feet (2.7 metres). Rimu dwangs, (horizontal timber blocking between the studs), was fixed in horizontal rows with 32” (800mm) centres to provide edge fixing for the sheet lining of plywood panelling. Bracing was provided by 6x1” (150x25mm) timbers fixed at approximately 45° between the top and bottom plates and housed into each stud where they intersected. The flooring was tongue-and-groove matai with diagonal struts cut in between the joists, and rough-sawn rimu weatherboards for cladding. In Austria this would have been left untreated to acquire a patina, but Plischke was still unsure of his materials and the climate in New Zealand and followed advice to treat the wood with burnt umber and raw linseed oil for preservation. As a result the cladding on the Frankel house resembles the finish used on traditional Japanese houses, created by burning the wood to preserve it.

Plischke’s other major deviations from the standard ap-



Fig. 1. Building site of a state house showing carpenters at work, Attached to the house is a sign which reads "State houses built entirely by Govt carpentry trainees". © Alexander Turnbull Library, Wellington 1/2-092041-F.



Fig. 2. Ernst Plischke, Frankel House, 9 Ford Road, Opawa, Christchurch, 1940. Photographer unknown, Author's collection. Ernst A. Plischke estate © Bildrecht Vienna, 2021.

proach to house building in New Zealand at mid-century were the mono pitch sloping roof, and the innovative treatment of fenestration. Both the dining area and the hall leading to the bedrooms having fully glazed French doors giving onto a flat terraced area of garden. Windows of 1940s houses were customarily either 54x24" (1350x600mm), three-pane casements, or 39x24" (990x600mm), two-pane casement. In the Frankel house, there is sense of meaningful simplicity: open planning with shared dining and lounge spaces, and large areas of glazing facing north to the sun, lighting up the

interior and promoting the relationship between house and garden.

3. THE JAPANESE HOUSE AND GARDEN

This expression of organic order has some correspondences with Japanese architecture. In Plischke's library, relocated from Europe, was a copy of Tetsuro Yoshida's, *Das japanische Wohnhaus* first published in Berlin in 1935. As Friedrich Kurrent notes, "Japanese houses, rooms and gar-

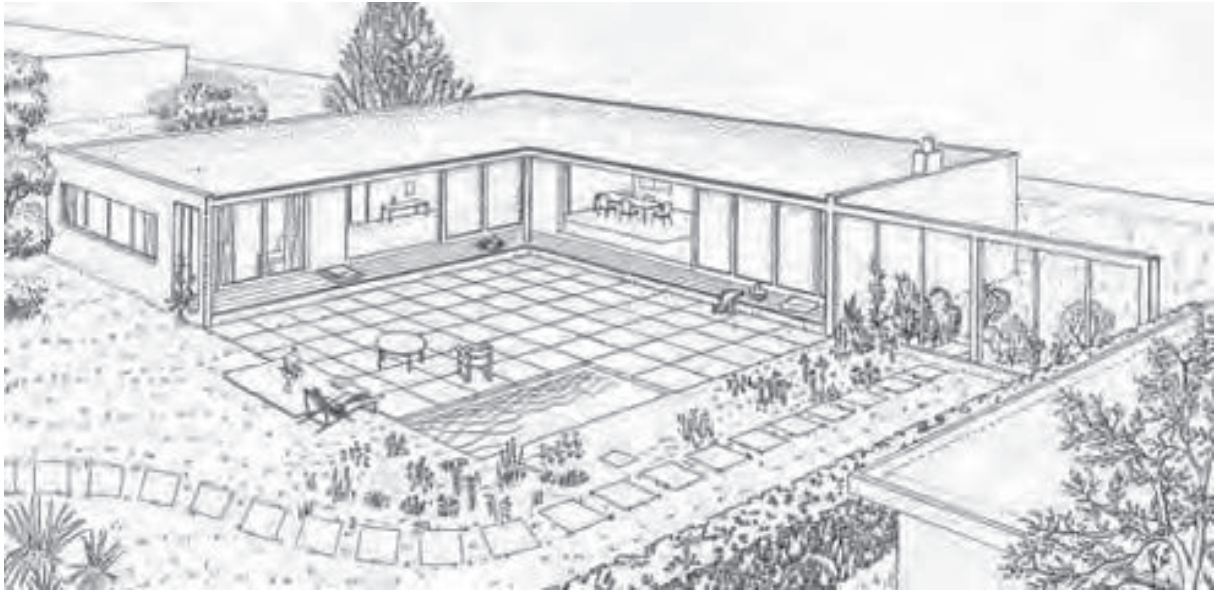


Fig. 3. Axonometric perspective for the Frankel House, 1939, published by Plischke in *Design and Living* (1947). Ernst A. Plischke estate. © Bildrecht Vienna, 2021.

dens, the Japanese way of building fascinated him and when in the year 1935 the book 'The Japanese House' by Yoshida appeared, he absorbed it keenly".¹ This book outlines the development of the Japanese house with chapters on typical layouts, construction principles and details, building materials and gardens. Yoshida emphasises the uniquely Japanese factors which he argues shaped this development — the extensive use of timber for building construction and the Japanese custom of using tatami mats to measure space as well as the typically low seating position. Yoshida's articulation of what constituted the most important aspects of Japanese architecture such as the relationship of the building to its surrounds, flexibility, standardisation, the use of natural materials and simplicity had obvious parallels to contemporary concerns in modern architecture in the West.

An influence from Japanese geometry and composition is apparent in the perspective of the Frankel house which Plischke published in his influential 1947 publication *Design and Living* (Fig. 3). The drawing does not make it apparent that the construction material is timber. In the text, Plischke advocates for this L-shaped form to become the prototype for New Zealand housing developments, each dwelling oriented to its garden, which is structured with paving, planting and a pond, an extension of the main design. Able to be played in by the children of the household as well as viewed from the main spaces of house, this garden is homage to a South Pacific climate, and an integral part of the architectural expression.

Marriage to garden designer Anna Lang (1895–1983) in 1935 had a profound effect on how he integrated his houses into the landscape. She collaborated with him frequently,

creating gardens around his house designs so that they merged into an organic whole. While it is usually argued that the homegrown designs of New Zealand-born architects reflect the informality of the Kiwi lifestyle and more authentically convey a sense of place than anything an imported modernism could achieve, the Frankel house is evidence to the contrary. It is not the similarities with Japanese precedents which are most obvious in this house, but the interpretation and synthesis of its forms and principles in an original way.

4. THE END OF THE NATIVE FORESTS

Perhaps the lack of specificity in the delineation of the construction materials in the Frankel house in 1947 were Plischke's reaction to the loss of native timbers as building material in New Zealand. A peak in production of milled rimu in New Zealand was reached just after the end of the Second World War. To supplement the dwindling supply of natives, the government had experimented with economic botany in the Wellington Botanic Garden. Monterey pine (*Pinus radiata*) was confirmed as an ideal import for New Zealand conditions, maturing faster here than it did in its home of California. From 1899 it flourished in the volcanic plateau where acidic soils thwarted agriculture. As a result, the largest radiata plantation in the world was established at Kāingaroa — 188,000 hectares — and mills were built at Tokoroa (Kinleith) and Kawerau (Tasman).

Ironically, Plischke, now in the Town Planning Department, designed the town centres for these new forestry towns in masonry and glass to resist fire. The monoculture



Fig. 4. John Johns, Kāiāroa State Forest, 1960. © Archives New Zealand — Te Rua Mahara o te Kāwanatanga Reference: AAQA 6395 M3580.

of pine trees had an irrevocable effect on the natural landscape in New Zealand. In John Johns' aerial view of Kāiāroa State Forest being harvested in 1960, the trees form their own map over the wrinkled surface of the land (Fig. 4). Scrupulous boundaries are observed where clear felling has occurred, quilting a patchwork from squares of green and brown seamed by forestry roads. By 1953, pine had replaced the use of native timbers for framing of houses. Soon rimu would be gone from interior finishing as well. When the young Auckland School of Architecture graduates (calling themselves Group Architects) were building First House (1949), construction was stalled when they realised that the sheets of matai plywood (*Prumnopitys taxifolia*) for the wall lining would need to be cut to fit the framing, wasting the precious native timber in the process (Fig. 5). In New Zealand's architectural historiography, the Group Architects are associated with developing an indigenous style of architecture with broad verandahs at the front which made reference to the welcoming porch of a Māori whare. In developing this indigeneity in the late 1940s and 1950s, they showed great affection for using the rapidly disappearing native timbers, rimu and matai. What could be more regionally specific than building houses from the timber of endangered endemic species?

5. STYLE AND ATMOSPHERE

According to Justine Clark and Paul Walker, the Group

Architects found Plishcke's architecture "old-fashioned in its placelessness."² One of them, Allan Wild, later to become Dean of the Faculty of Architecture at Auckland University, commented,

*Mr Plishke is a distinguished, but virtually unique exponent of the European architecture which developed directly from the aesthetic revolution of cubism allied to the traditionally meticulous attention to detail and proportion. He has had wide local influence but few local imitators.*³

Clark and Walker are here using the rhetoric of the period as evidence for the polarity of styles of Plishcke as the exemplary European émigré and the regionally inflected "authentic" New Zealand modernism that they are seeking.

This opposition has calcified into characterising mid-century modern housing design in New Zealand as either from here or from elsewhere, or as Gatley and Barrie describe it, sugar cube or brown bread. Sugar cube (internationalist) architecture aspires to be crystalline, and is often perceived as solidly white, hiding its granular composition in geometric form. Brown bread (regional) design may not be as glamorous or as neat, but it is healthier. It can be easily digested by a local population, borrowing its forms and arrangements from the familiar configurations of the ubiquitous seaside shack or beach house — a vernacular form of architecture, fondly referred to by New Zealanders as "the bach".



Fig. 5. Group Architects on the verandah, outside Second House, Auckland, (architects and builders: Group Architects) constructed in 1950, Front row: Campbell Craig, Bret Penman, Bruce Rotherham. Back row: Allan Wild, Ivan Juriss, Bill Wilson, Absent: James Hackshaw, Photographer unidentified, Alexander Turnbull Library, Wellington PAColl-08 11-12-07-01. © The Architecture Centre, Wellington.

But was the local variant of modernism really so different from that practised by the emigres who made New Zealand their home? Europeans also have a tradition of building summer houses, for example. In 1950, Plischke published an article in which he compared the design of two of his houses, one built in by a lake near Salzburg in Austria and the other on a hilltop in Wellington, New Zealand. Both are built in timber, but the Austrian one is finished in cement plaster and the New Zealand one in weatherboards. Environmental conditions and constructional technology differ, but he argues that the two structures share the same sensibility, appearing to touch the ground lightly, with interiors that open up to the surrounding nature.⁴ He writes that he mistrusts the quest for indigeneity in architecture which for him too easily elides with nationalism. Materials alone will not result in a modern New Zealand style he warns, it has to come from the conception of space and form and the attitude towards construction. And perhaps a knowledge of architecture from a much longer tradition of building in timber. In his articulation of structure and space, and each dwelling's relationship with nature, Plischke's affinity with Japanese building is evident.

6. SHARED SOURCES

Rather than a battle of the styles, the relationship between local and imported modernisms in architecture in New Zealand can be understood as an instance of horizontal intertextuality, where references are on the same level, neither more important than the other. There is an interrela-

tionship between the Plischke and the Group which generates a related understanding about both bodies of architecture produced, particularly with respect to how each side of this divide incorporated the influence of Japanese architecture into their work. Just as Plischke had read Yoshida in German in 1935, the Group Architects made reference to *The Lesson of Japanese Architecture*, written by Jirō Harada, published by the Studio in London the following year. The 150 photographs are prefaced by an introduction where C. G. Holme explains how the lesson of Japanese architecture for the Western world neatly matches the goals of architectural modernism. He summarises "the lesson" as "standardisation, variety in unity, conformity to a mode of living, connection with nature, simplicity and, of course, usefulness to purpose".⁵ Bruno Taut's books, *The Fundamentals of Japanese Architecture* and *Houses and People of Japan*, also published in the late 1930s, further promoted the connections between the principles of Modernism and traditional Japanese architecture for New Zealand architects. Significantly, German edition folios of Frank Lloyd Wright's work with its assimilated Japanese influence were shown to Plischke by his tutor Peter Behrens at the Academy of Fine Arts in Vienna in the 1920s. Traces of referential and typological similarities to Japanese architecture echo through New Zealand house design at mid-century.

7. CONCLUSION

The proliferation of house building in this period led to the loss of whole forests of native timber which have been

replaced by introduced conifers. Ironically, the quest for the indigenous in architecture coincided with the loss of the indigenous in nature. Sharing an interest in the Japanese conceptualisation of the house, architects of significance working in New Zealand in the post-war period developed parallel practices in timber construction. By taking a synchronic view of the different modernisms that existed in New Zealand in this period it is possible to see both the local and the imported as part of an interconnected body of architecture responsive to both natural and cultural ecologies of place.

REFERENCES

- CLARK, Justine, & WALKER, Paul, *Looking for the Local: Architecture and the New Zealand Modern*, Wellington, Victoria University Press, 2000.
 GATLEY, Julia, *Group Architects: Towards a New Zealand Architecture*, Auckland, Auckland University Press, 2010.
 HIRADA, Jirō, *The Lesson of Japanese Architecture*, Revised Edition, Boston, Charles T Branford Company, 1954.
 PLISHKE, Ernst (sic), *Design and Living*, Wellington, Parson's Bookshop, 1947.
 PLISCHKE, Ernst, *On the Human Aspect in Modern Architecture*, Vienna, Kurt Wedl, 1969.
 TAUT, Bruno, *The Fundamentals of Japanese Architecture*, Tokyo, Kokusai Bunka Shinkokai, 1936.
 TAUT, Bruno *Houses and People of Japan*, Tokyo, Sanseido, 1937.
 YOSHIDA, Tetsuro, *Das Japanische Wohnhaus*, Berlin, Verlag Ernst Wasmuth, 1935.

NOTES

- 1 Friedrich Kurrent, "E. A. P.: Curriculum vitae", E. A. Plischke, *On the Human Aspect in Modern Architecture*, Vienna, Kurt Wedl, 1969, 16–17, 21.
- 2 Justine Clark & Paul Walker, *Looking for the Local: Architecture and the New Zealand Modern*, Wellington, Victoria University Press, 2000, 39.
- 3 Allan Wild quoted in Clark and Walker, 39.
- 4 E. A. Plishke, "Two Houses", *Design Review*, February / March, 1950.
- 5 Jirō Hirada, *The Lesson of Japanese Architecture*, Revised Edition, Boston, Charles T Branford Company, 1954, 9.

ROLAND SCHWEITZER: LEARNING FROM KYOTO?

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ABSTRACT.

Roland Schweitzer pioneered the renewal of timber architecture in France in the early 1970s. He drew his inspiration from traditional Japanese architecture which he had discovered in the course of numerous trips. His work testifies to this influence through its lightness, fluidity, transparency, and use of wood. Similarly, his buildings cultivate an attentive and empathetic rapport to the surrounding nature, going against the brutalist modernity of the *Trente Glorieuses*. But what Schweitzer discovered in Japan was also the modularity allowed by a systematic timber frame that enables great flexibility in terms of composition, based on a post and beam structure and a unique tatami module that allows for an infinite number of possibilities. Schweitzer's discovery coincided with and nourished another one of his concerns as he was involved in researches on the industrialization of construction in France in order to improve architectural quality and optimize costs. The house of the director of the *Auberge de jeunesse de Brest* Brest Youth Hostel — which only very recently became a *Monument historique* — a national heritage site — testifies to this dual cultural and technical influence. It can be compared to the traditional Japanese house as well as the very similar Moduli 225 house by Finnish architects Palasmaa and Gullischen who, in 1969, aimed at conceiving industrial houses destined for serial production. This twofold analysis highlights the difficulty in transferring an Eastern architectural model to the modern West with its vastly different cultural contexts and ways of inhabiting.

1. ROLAND SCHWEITZER

Roland Schweitzer (1925–2018) was one of the pioneers who renewed timber architecture in France in the early 1970s. He drew his inspiration from traditional Japanese architecture which he had discovered in the course of numerous trips to the Land of the Rising Sun which he loved. His work testifies to this influence through its lightness, fluidity, transparency, and, of course, its use of wood. Similarly, his buildings cultivate an attentive and empathetic rapport to the surrounding nature, going against the brutalist modernity of the *Trente Glorieuses*.

But what Schweitzer discovered in Japan was also the modularity allowed by a systematic timber frame that enables great flexibility in terms of composition. This system, based on a post and beam structure and a unique tatami module, allows for a great variety of configurations based on an isotropic spatiality. Like many architects before him, from Bruno Taut¹ to Heino Engel,² Schweitzer saw in the traditional Japanese house the possibility of standardization and a promise of industrialization through the house's simplicity and systematism. His discovery of Japanese architecture coincided with and nourished another one of his concerns as he was involved, in France, in researches on the industrialization of construction in order to improve architectural quality and optimize costs. These research projects at the time aimed to transform building construction into an assembly of industrial components compatible between every manufacturer, based on the common rules of dimensioning. A few young architects were involved in the industrial development of timber architecture: Christian Gimonet, Pierre Lajus, Jean- Pierre Watel, and Roland Schweitzer.³ The French government, in the context of the program *Industrialisation Ouverte*^{4 5} (Open Industrialization), had com-

missioned experimental projects (Rex)⁶ to develop timber construction with industrial methods in order to offer an economic alternative to masonry methods in the construction of affordable housing. While Lajus, Gimonet, or Watel had turned to American models and balloon framing, Roland Schweitzer drew his inspiration from the Japanese post and beam building system based on the tatami module to imagine this new architecture based on neutral and standardized building systems.⁷

A technical and Cultural Approach

If analyzed culturally and technically, Roland Schweitzer's architecture is much more than a mere anachronistic transfer of traditional Japanese architecture. If he is inspired by it, it is in order to promote a Western modernity that is interested in reconnecting with nature and the materiality of its elements. But he does not seek to imitate Japanese frameworks nor to renounce the comforts of modern life. He always uses the industrial means of his time — metal connectors and prefabricated panels — to offer a new architectural experience inspired by Japan. It's also in the European cultural context that he creates his body of work, careful about Western praxes as is shown by the composition of his plans, where different rooms are never indeterminate, as they can be in Japan, and respect the social codes and comfort of the West.

2. THE HOUSE OF THE DIRECTOR OF THE AUBERGE DE JEUNESSE DE BREST (BREST YOUTH HOSTEL)

The house of the director of the *Auberge de Jeunesse de Brest* (Fig. 1), finished in 1983, shows the two-fold influence of Japanese architecture and Schweitzer's research on *Industrialisation Ouverte*. This project can be analyzed as an at-



Fig. 1. The building in the park.
© Roland Schweitzer.

tempt to adapt the traditional Japanese model for the cultural and technological Western context of the 20th century.

2.1. Fitting in the Landscape

This house was built almost concurrently with the youth hostel itself. It is located in a large wooded park which gently slopes down the Moulin Blanc beach, across the Roadstead of Brest. These exceptional landscape and architectural characteristics have led to the site's designation as a *Monument historique*,⁸ a national heritage site, in September 2019, one year after Schweitzer's passing. While the hostel was made of concrete with facade timber panels, the director's house is an isolated pavilion entirely built of cedar. The one-story structure has a flat roof with a skylight that admits natural light. The structural posts form stilts that raise the house above the soil to let surface runoff flow but also to ventilate the timber building and protect it from the soil's humidity. The building's lightness allows for minimal foundations that do not excessively alter the root system of the numerous surrounding trees.

2.2. Western Organization of the Plan

The L-shaped plan of the house separates, with the lobby at its heart, the dayrooms (kitchen and living room) from the three bedrooms and two bathrooms (Fig. 2). The lobby is located at the high point of the sloped site. It nests itself inside the western façade, thus forming an exterior threshold protected by a timber pergola. There is also a small patio on this western façade in order to preserve a hundred-year-old

beech tree. A tall stone fireplace separates the kitchen from the living room. Unlike traditional Japanese houses, each room in this house is defined by its use and surface; the partitions are permanent.

Yet the rooms, because they extend outside, all have a strong rapport with the park and the surrounding nature. The kitchen and dining area are oriented toward the north but let in natural light from the south through the ridge. The living room has a large outdoors terrace on the south side, raised a meter above the soil because of its slope, with clere-stories for sun protection (Fig. 3). The rooms have an unobstructed view deep into the park, towards the rising sun and the sea. The master bedroom extends into an outdoors terrace. The two bathrooms face the beech tree's small patio.

2.3. Timber Building System

A 2.7m x 2.7m x 2.7m post and beam grid structures the plan in a systematic way. According to the architect, this measure is a multiple of a 1.8m x 0.9m tatami. The 2.7m grid is built with thin posts of 10cm x 10cm and beams of 20cm x 10cm. It is assembled with metal plates with halved joints. But the living room is twice this dimension: 5.4m x 5.4m. To achieve this, a post had to be removed and replaced by a bowstring truss that supports the room's width. The posts are connected to the foundation piles with metal rods that prevent rising damp. The exterior envelope of the house is made of timber panels for the doors and windows, and 10-centimeter-thick panels with a light skeleton of the balloon framing type, insulated and covered with cedar siding



Fig. 2. Plan and section of the building. © Roland Schweitzer.

on the outside, and painted plywood on the inside. These panels as well as the partitions brace the structure. They are all 2.7m x 0.9m and were prefabricated in a workshop before being assembled on site. 20-centimeter thick panels, similarly built and sized, are used for the floor and roof. The wood used for the roof structure as well as for the façade panels is weatherproofed by a timber preservative that gives a honey color to the building as a whole. With just two elements, a 2.7-meter cubic grid and 2.7m x 0.9m glass or timber panels, the house can be built almost entirely. Yet, a subtle shift in the position of non-load-bearing walls allows for a plan that never seems restricted by its system.

2.4. West vs. East

This house also borrows elements from traditional Japanese architecture: the wood's lightness and its grid, the tatami module, its inclusion of nature, its connection to the soil. The organization of the plan, however, is quite Western; rooms have a predetermined and fixed purpose. There are

no light sliding walls, neither between the rooms nor between the inside and the outside. The lobby and hallway lead to rooms that are independent of one another. This modernist house is organized around a massive stone fireplace. Only one skylight in its flat roof admits natural light in the dining area. Its relation to the outside remains distant, like a series of park views, without the continuity and immersion characteristic of traditional Japanese architecture. Western imperatives related to thermal comfort seal the structure's envelope too tightly and represent a limit between the inside and the outside despite the architect's efforts.

3. ROLAND SCHWEITZER AND THE INDUSTRIALISATION OUVERTE PROGRAM⁹

This project concludes an important period of research on industrialization that the architect led for ten years. Its aim was to conceive structures with standardized compo-



Fig. 3. Living room terrace. © Roland Schweitzer.

nents in order to reduce construction time, lower construction costs, and improve quality without limiting architectural possibilities. These components had to be simple and compatible with one another regardless of the supplier so that the construction would be as quick as the assembly of a Meccano set. Roland Schweitzer was very involved in this research and development program as a few of his timber projects attest. A few examples: the building rue Domremy,¹⁰ in Paris between 1979 and 1983, as well as the competition *Bois de l'Est*¹¹ (Eastern wood) in Alsace in 1982, with Weisrock company, and *Groupement Pavillonnaire*¹² (Pavilion grouping) in Liverdun in 1982, with Houot Company, all for which he experimented with prefabricated tridimensional modules in partnership with an industrial timber construction company. But in 1983, the research program *Industrialisation Ouverte*, sponsored by the French government was coming

to an end and had not been met with the success that was hoped for. The main reason for the failure of these timber experimental projects is that their cost turned out to be higher than masonry building systems — an insurmountable obstacle for affordable housing projects.¹³ Another reason was the important number of building pathologies observed in these first experimental timber buildings.¹⁴

Built outside of the governmental program but simultaneously, the Brest house is representative of Schweitzer's research. This house has been built with the Levourch company who unsuccessfully planned to mass-produce it for the French single-family housing market.¹⁵ As far as we know, the Brest house is the unique prototype of this project. Interestingly, Schweitzer never mentioned his research on industrialization in his publications about the house but rather insisted on its spatial and sensory qualities inspired

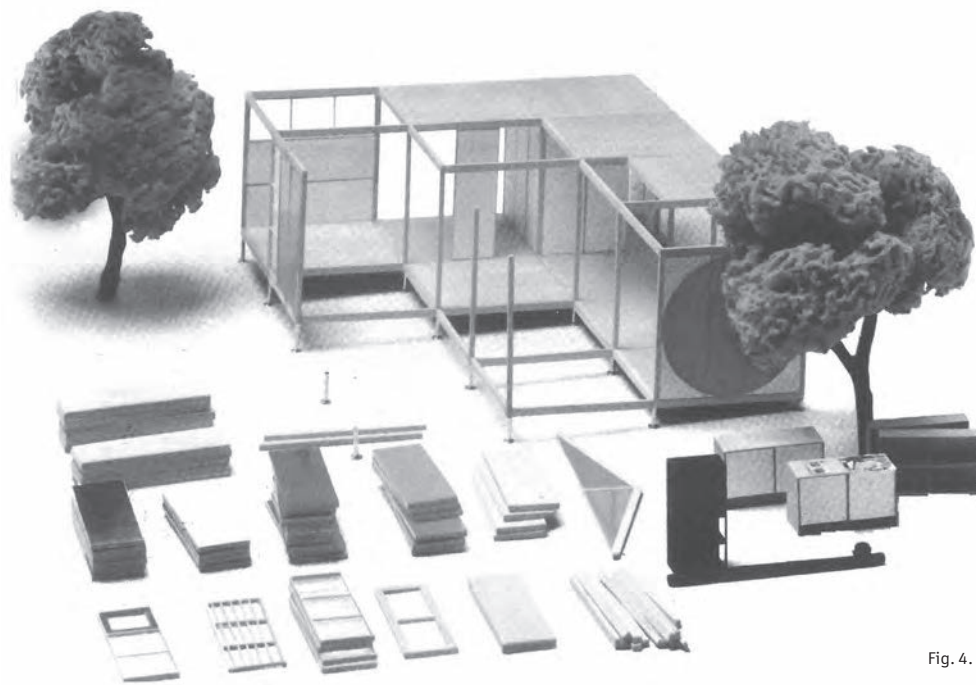


Fig. 4. Model of the moduli 225. © KG.

by Japan and more particularly by Daitoku-ji, a Buddhist temple in Kyoto.¹⁶

3.1. Similarities with the Moduli 225 House

He also does not say anything about the strong similarities between his Brest house and another well-known modernist project, Moduli 225 by Finnish architects Pallasmaa et Gullishen.¹⁷ This project, invented in 1969 for the company Ahlström Oy, aimed to conceive a kit holiday home (like an industrial product) that people would build themselves (Fig. 4). This construction was also based on a timber post and beam square grid, filled with prefabricated glass or timber panels that brace the structure. It, too, was raised on stilts which allowed for sanitary ventilation and it was also supported by concrete piles. Skylights could be added to its flat roof to admit natural light. This construction was more sophisticated than the Brest house: the posts and beams were in glued laminated timber shaped to fasten prefabricated panels. The assembly was done with clever aluminum quick-fix connectors. The connections between the components of this Meccano were conceived for self-building with a minimum of skills and tools required. Similarly, no component weighed more than 49kg in order to easily be handled by two people without any lifting apparatus. This project was a real industrial project, conceived with the company Ahlström Oy and its means of production. Cost control was at the heart of the project in order to conquer the Finnish vacation home market. Unfortunately, only fifty units were

produced between 1968 and 1974. The project was a commercial failure, which can be partly attributed to the Finns' cultural preference for the traditional *mökki* made of stacked logs.

The architects Pallasmaa et Gullishen also claimed that they drew their inspiration from traditional Japanese architecture,¹⁸ for reasons similar to Schweitzer's. But their discourse was founded on industrial arguments about the technical innovations that would make a self-build kit possible. The system's dimensions (2.25m x 2.25m x 2.25m) were optimized with this goal in mind, so that the components would remain light and easy to assemble. They did not refer to the tatami module but to Blomstedt's proportional system Canon 60, based on Pythagorean harmonics.¹⁹

3.2. Paris's Maisons de Bois Exhibition in 1979

Roland Schweitzer knew the Moduli 225 house very well since he had curated the *Maisons de bois*²⁰ (wooden houses) exhibition at the Centre Pompidou in Paris in 1979, in which a prototype of the Finnish house had been shown. He had thus had the opportunity to study all of its details and to interact with the architects who hoped that this event would give new momentum to their project after its commercial failure in Finland. The exhibition catalog specified that this house was presented to the French public because

the most elaborate timber house on the European market; its

*price is affordable to the largest possible number of people. [...] It allows buyers to build the house themselves. All the elements can be interchanged. Owners design their plan entirely freely. [...] One can invest and buy the elements one at a time.*²¹

This text does not make any culturalist references to Japanese architecture; it presents an innovative industrial product. Four years later, when he published his similar project for the Brest house,²² Roland Schweitzer erased any references to industry in order to emphasize the architectural qualities inspired by traditional Japanese architecture and its relation to nature. One can theorize that this radical change stems from the emergence at this time in France of postmodernism which rejected reflection about technique in order to focus on the culturalist and sensory elements of architecture.

4. THE LIMITS OF THE MODERN WESTERN AESTHETIC: THE PATHOLOGY OF TIMBER CONSTRUCTION

Another reason for the failure of this light and industrialized architecture lies in its fragility. These two modernist projects, uncluttered, built with timber and flat eaveless roofs have caused significant pathologies. The material is not weatherproof, which is why Japanese houses have imposing roofs that go much farther than their façade. Timber's thin and light exterior supports the natural ventilation of all the elements. Our recent diagnostic of the Brest house²³ as well as Anna-Mikaela Kaila's diagnostic of the Moduli 225 house²⁴ reveal that the exterior wood components are severely damaged. In Brest, the terraces and their unprotected horizontal timber pergolas have rotten. The stilts as well as the low parts of the façade, sometimes too close to the ground, were also damaged by humidity. Not as visibly, the bracing of the structural grid by prefabricated panels was not supportive enough and the house now exhibits slight deformations that have altered the watertightness of the seals. In contrast, the absence of air gaps in the cladding panels — a choice inconsistent with the rules of contemporary timber construction — does not appear to cause trouble. Inside, the beam that allowed to double the range of the roof above the living room has caved in because it wasn't sufficiently supported by the 10 x 10 posts. An emergency replacement was done ten years ago: a metal post was inadequately placed right in front of the fireplace. The house is neglected and is progressively falling apart. It must be renovated urgently. To put it quite simply: the house is like a piece of wood furniture left outside in the rain. In a way, the traditional Japanese house inspired modernist architecture by supplying it with a model that appeared to fit its desire for industrialization. But modernist uncluttered design rid itself of protective elements at the expense of the durability of timber construction. Also, the requirements of Western thermal comfort call for a thick and waterproof envelope that doesn't adapt well to the lightness of Japanese con-

struction. This modern envelope is not compatible with the natural deformations of the material, nor does it allow for its natural ventilation, necessary to protect wood from humidity. The prospective renovation of this house, which is now a national heritage site, poses many questions related to the building adaptations that will be necessary to its durability and that must preserve the original design.

NOTES

- 1 B. Taut, *La maison japonaise et ses habitants*, Paris, Éditions du Linteau, 2014 (1937).
- 2 H. Engel, *Measure and construction in the Japanese house*, North Clarendon, Tuttle, 1985.
- 3 S. Berthier, "Le renouveau de l'architecture de bois en France 1965–85 : une expérimentation industrielle", *Les livraisons de l'histoire de l'architecture*, n°34, Ecole Nationale des Chartes-La Sorbonne décembre 2017.
- 4 D. Grèzes & J-P. Charon, *Industrialisation ouverte, recherches et expérimentation 1971–1983*, Paris, Plan Construction et Habitat, 1983.
- 5 *Techniques & Architecture*, n°327, thématique "industrialisation ouverte I : principes et expérimentations", Novembre 1979, 70–143.
- 6 D. Grèzes, op. cit.
- 7 R. Schweitzer, "Construire en bois, variation sur le poteau-poutre" *Techniques & Architecture*, n°365, Avril–Mai 1986, 42–51.
- 8 République Française, Préfecture de la Région Bretagne, *Arrêté portant inscription au titre des monuments historiques de l'auberge de jeunesse du Moulin Blanc à Brest (Finistère)*, 19 Septembre 2019.
- 9 D. Grèzes, op. cit.
- 10 *Techniques & Architecture*, n°347, Mai 1983, 81.
- 11 R. Schweitzer, *Roland Schweitzer, un parcours d'architecte*, Paris, Ed. Arsign, Paris, 2014, 308–309.
- 12 Ibidem, 334–335.
- 13 S. Berthier, "Entretien avec Roland Schweitzer du 10 février 2011", *Création architecturale et industrialisation de la filière bois : l'architecture comme milieu d'expérimentation des innovations techniques*, Thèse de doctorat, Université Paris-Saclay, Octobre 2017, 412–417, accessed on June 10, 2021, <https://hal.archives-ouvertes.fr/tel-01629655>.
- 14 Ibidem.
- 15 Ibidem.
- 16 R. Schweitzer, op. cit., 327.
- 17 A-M. Kaila, *Moduli 225, A gem of modern architecture*, Lahti, Aalto University Publication Series, 2016.
- 18 Ibidem, 71.
- 19 Ibidem, 72.
- 20 N. Gauzit, P. Jean, J. P. Pigéat & R. Schweitzer, *Maisons de bois*, exhibition catalog, Centre Georges Pompidou/CCI, 1979.
- 21 Ibidem, 70.
- 22 *Techniques & Architecture*, n°365, op. cit., 46–50.
- 23 S. Berthier visit of the director's house, Auberge de jeunesse de Brest, 28 November 2019.
- 24 A-M. Kaila, "disassembly of the Hanko Moduli" op. cit., 177–277.

THE PIONEERING COMPUTATIONAL ARCHITECTURE OF SHOEI YOH: A STUDY OF THE AVANT GARDE TIMBER SPACE FRAME STRUCTURES OF OGUNI, KUMAMOTO

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ABSTRACT.

This paper discusses the birth of both large-span timber structures and computational design in Japan through the examination of a series of cutting-edge projects designed by Japanese Architect Shoen Yoh in the 1980s. Although Shoen Yoh (1940–) has achieved limited appreciation as an innovator of large span timber structures in Japan and for computational design within the international computational design community, a wider appreciation of his significant legacy has been largely missing. This paper uses field visits, in depth interviews and a newly developing archive of his work to examine the underappreciated legacy of this avant-garde architect. The distinct oeuvre and innovations of Shoen Yoh emerged in the town of Oguni in Kyushu, Japan, which is famous for its cedar industry and forests. Through close collaboration with local politicians and industry, Yoh addressed the need for economical and functional building methods that were radical for their time and predated the event of large-scale timber construction and computational design by more than two decades. The local cultural context of Oguni was fertile ground for Yoh's design innovation and this is evident from timber projects which include: 1.) the Music Atelier 2.) the Oguni Dome. Through collaborations, Yoh developed technical solutions to realize large three-dimensional timber space trusses utilising new joints and other innovations as in the Oguni Dome. These new forms and technologies were made possible through the pioneering use of computational programming.

1. INTRODUCTION

Today, Japan is well known for its compelling fusion of traditional materials and innovative structural approaches in architecture. Internationally well-known architects such as Kengo Kuma, Kazuhiro Ishii, Toyo Ito and Shigeru Ban have integrated traditional materials using new construction techniques and architectural geometries. Following the excesses and subsequent economic crash of the 1980s, a greater sensitivity to traditional materials was integrated with new innovative and resourceful building methods.¹ In the 1990s bamboo, timber, paper, cardboard and stone were repeatedly used in the form of screens, louvres or gridded structures within the work of contemporary architects. These materials were used in a non-monumental way to visually dematerialise and give a weightless quality to the structures.

Whilst the above-mentioned names are well known around the world, one of Japan's foremost avant-garde architects, Shoen Yoh, has received relatively little acknowledgment for the material and structural innovations that pre-empted much of the work of the above architects. Working in the late 1980s, architect Shoen Yoh (1940–) was responsible for inventing large-span timber structures and introducing computational design to architecture in Japan. This was achieved through a series of cutting-edge projects in Oguni, Kumamoto, from 1984–1994. Shoen Yoh has achieved limited appreciation as an innovator of large span timber structures in Japan and for computational design within the international computational design community. However,

a wider appreciation of his significant legacy has been largely missing. This paper seeks to communicate the significance of Shoen Yoh's creative oeuvre to clarify the origin of large-scale timber architecture at a time when timber architecture is achieving greater relevance around the world. Although timber is growing in stature as a material for commercial and civic architecture few anthologies or monographs on contemporary timber architecture mention the work of Shoen Yoh.²

An analysis of a newly developed archive of original design and construction models and drawings at Kyushu University, primary interviews with Shoen Yoh (conducted in 2018–2019); and field surveys of the works at Oguni Town are used to create new and detailed insights into the development of this important application of computational approaches to the innovative use of timber three dimensional trusses. To supplement the above primary sources, archival journal and magazine and newspaper articles on the architecture from the 1980s are examined. These sources of data are triangulated and used to generate new historical insights on this missing part of Japan's architectural heritage.

2. THE BEGINNINGS OF LARGE SCALE TIMBER ARCHITECTURE IN JAPAN

After the WW II, the construction of large-scale timber building was limited in Japan. Timber architecture lost relevance as an industrial or urban building material and new materials such as concrete, steel and glass were championed by modern architects for both practical and ideological rea-

sons. For one speed and scale of reconstruction efforts were facilitated by modern construction systems and there was a pervasive fear of fire, earthquake, and typhoons. Following several disasters including the catastrophic Isezaki typhoon, in 1959 the Architectural Institute of Japan declared “the decision to prohibit wooden architecture”. Following this influential decision large scale timber building became difficult to build in Japan and virtually disappeared. The Building Standards Act, in principle, didn’t allow the design of a timber building over 13m height or more than 3000m² GFA.³ As well as the above practical reasons it is also likely that the mental associations with the past were painful in the post-war period and modern materials promised a new more optimistic future, much as they did in Europe.⁴

The engineer and theorist Koshihara (2019) has described the development of large span timber buildings in Japan in the 20th century. In this narrative the Oguni Dome is positioned as a key work in the “Renaissance of wooden buildings” in 20th century Japan.⁵ Overcoming legal restrictions of the late 1980s, the Oguni Dome was a ground-breaking work that stimulated further evolution of building codes and made way for the more timber friendly laws of the 2000s. The recent development of the Building Standards Law in the year 2000 now allows greater flexibility permitting the construction of timber buildings four-stories or more using fire-resistant technologies.

The beginnings of Shoei Yoh’s engagement with timber began with a phone call from Nobutoshi Miyazaki, the mayor of Oguni Town in 1984.⁶ Oguni Town, is nestled amongst cedar plantations, and required a new series of civic buildings to service the local population. The town’s cedar plantations required continual harvesting and thinning and were a bountiful and cost effective resource close at hand. They also contributed to the identity of the city. During this period, the town was also undergoing an industrial transformation. Trucks replaced the train system and in doing so freed up a lot of industrial land previously occupied by rail infrastructure. Shoei Yoh saw in his brief the opportunity to utilize the local cedar trees and the post-industrial sites to build the new civic buildings. Cooperating closely with the Mayor Nobutoshi Miyazaki, Shoei Yoh designed Oguni Town Masterplan and located a series of new builds, many of which use the local cedar (1985).⁷ Yoh therefore had plenty of material, building sites, and a town with a strong identity tied to timber. However, the existing legislation — Article 38 of the Building Standards Act in Japan — prevented him from using the timber unless approved by a special appraisal committee (Hyoutei). Despite the formidable challenge and uncertainty this presented, Shoei Yoh designed a series of experimental projects to demonstrate the validity of his computational approach to timber. Shoei Yoh’s first project to be approved by the committee was the “Music Atelier” built in 1986 in the nearby town of Minami Aso, in Kumamoto. Following, these three significant projects — Yu Station, the Office of the Forestry Cooperative and Oguni Dome —

were approved for construction in Oguni by the committee. Yoh’s innovative large-scale timber works therefore paved the way for a wide variety of new timber projects in the following decades.

3. SHOEI YOH AND THE ORIGINS OF COMPUTATIONAL ARCHITECTURE

Shoei Yoh overcame the legal limitation of working with large scale timber structure through political networking and systematic development of prototypes and exhibitions for review by construction authorities. But to overcome the technical limitations he realized he needed a completely different approach and design method. To do this, Shoei Yoh pioneered computational design, years earlier than other architects. He was able to apply new methods of systematic structural analysis to generate greater optimization of timber members. This outlook may have its origins in his early years as an economics student.⁸

Born in Kumamoto in 1940, Shoei Yoh, studied Economics and econometrics at Keio University, Japan, in 1958–62, and interior design, fine arts and applied arts at Wittenberg University, US, in 1962–1963. After his study in the US, Yoh came back to Japan and started his career as designer in the interior design office in Tokyo then Fukuoka.⁹ In 1970, Yoh established his own office, “Yoh Design Office” in Fukuoka. His interior and product designs in the 1970s were highly valued in and outside of Japan.¹⁰ Gradually, Yoh’s interest shifted from interior design to architectural design. His supervisor at Keio University, Prof. Iwao Ozaki, was an authority of econometrics in Japan. Under Ozaki, Yoh was first introduced to computers and become familiar with their capabilities.¹¹ Another important part of his education was through his passionate interest in the efficiencies and elegance of natural and historical structures, both ancient and modern. As a student, he visited the Pantheon in Rome and saw the structure as lit by sunlight from the oculus at the top of the dome.¹² It was a special moment and fostered in him an appreciation of both natural phenomena and the perfect optimization of form and material. After that, the expression of natural phenomenon became his leitmotif; with light, gravity, wind, water continual sources of inspiration. In addition, Yoh bought Frei Otto’s book prior to studying architecture.¹³ Otto’s book introduced Yoh to the structural elegance and optimisation of form found in natural phenomenon. Such concepts helped lead Yoh to understand the potential of computational design.

Yoh’s first applied conversations around computational design were with the engineer Kenshi Oda from the construction and engineering company Taiyo Kogyo, that was famous for its membrane structures. During the Yu Station Project in Oguni Town it imported 3D truss joinery from the German company MERO. Taiyo Kogyo had a contract with MERO, and they provided a computer program to analyse 3D truss structures.¹⁴ Oda operated the program. Yoh and

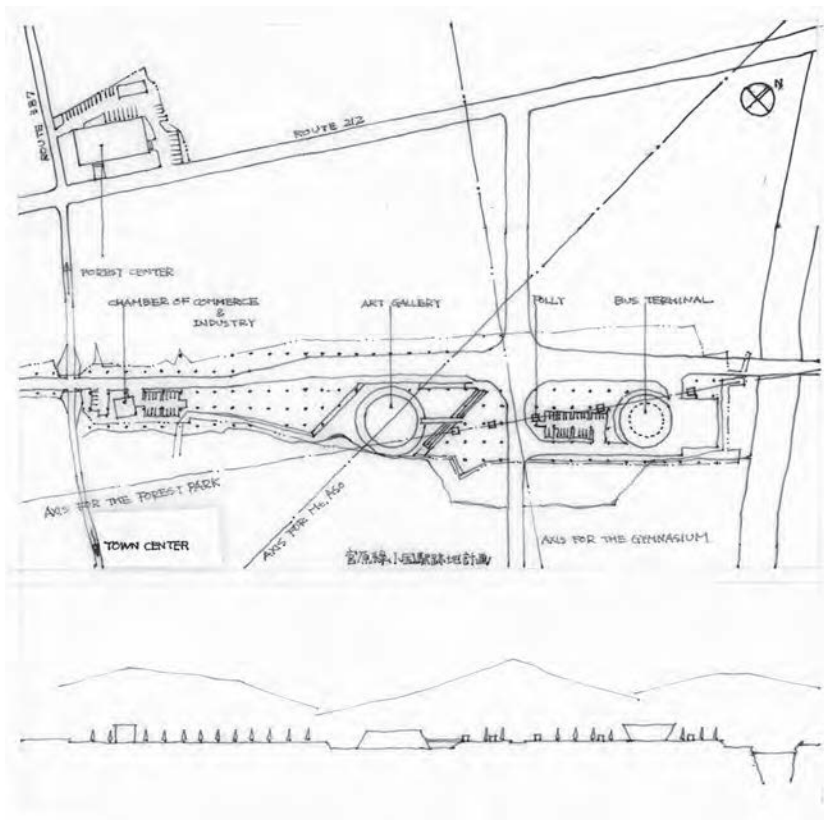


Fig. 1. Yoh Design office, Oguni Masterplan, 1985, from Shoei Yoh Archives, Kyushu University. ©Shoei Yoh.

Oda discussed the truss structure often via telephone, to decide upon the geometry. The size of the timber rod sections, the location of the joints and the geometry of the structure were all decided through computational analysis as related but flexible variables. A timber model facilitated their discussion.¹⁵ Through the collaboration with Taiyo Kogyo, Yoh started to understand the logic, process, and potential of computational or 'parametric' design.

Whilst Yoh is more famous in Japan for his timber architecture. For Shoei Yoh, Computational design was not the main theme of or focus of his projects, but a method to realize an unprecedented modern timber structure in Japan.¹⁶ However, his computational approaches developed to design and deliver the Oguni Dome, have brought him more fame outside of Japan than his material innovations. In "Archaeology of Digital", Greg Lynn's influential book on the computational design community, Lynn selected four important pioneers of computational design. These are Frank Gehry, Peter Eisenman, Chuck Hoberman, and Shoei Yoh.¹⁷

4. THE OGUNI PROJECTS

Oguni town includes some of the most important projects of Shoei Yoh. The project masterplan of the Oguni town center (1984–85, partly realized / Fig. 1) includes three realized

buildings; Yu Station (1987), Office of Forestry Cooperative (1987), and the Oguni Dome (1988). The Cultural Centre and Chamber of Commerce were also designed and planned to be built in 1989, but both were not realized. All buildings, except for Oguni Dome, are located in postindustrial sites, where Oguni train station was formerly located. Oguni Dome is located at the foot of the surrounding.

All three buildings have timber truss structures, and together the series of buildings won the Prize of Architectural Institute of Japan in 1989.

For inspiration for the Oguni Projects, Yoh visited traditional timber structures in Japan, such as Ise-Jingu. Since Japan has a long timber tradition, he wanted to gain inspiration from them but he soon realized that there were no traditional timber structures of great enough scale.¹⁸ Instead he looked to the foreign contemporary work of Frei Otto and his "Multihalle in Mannheim (1974)".¹⁹ In this work, Otto had created an organic large span timber structure with short and slim timber elements. Yoh also found Norman Foster's steel barrel vault project, most likely his National Indoor Stadium in Frankfurt (1981–1986), inspirational and he sought to create similar structures with timber. After these inspirations from Otto and Foster, Yoh started to make physical models of three-dimensional truss structures, before making any drawings.²⁰



Fig. 2. Shoei Yoh, Music Atelier, Minami-Aso, Kumamoto, Japan, 1986, photo by the author, 2019.

To develop the vast spans required using timber, Yoh enlisted the help of structural engineer Yoshihiko Morikawa and Prof. Gengo Matsui at Waseda University, Japan. Matsui was most likely chosen because he had engineered the timber structure of Eishin Gakuen Higashino High School (1985) which had been designed by Christopher Alexander. Its gymnasium was the largest timber structure at that time (GFA=1000m²).

For the Oguni Projects, Matsui proposed a joint system using steel plates, steel globes, bolts and epoxy resin.²¹ Epoxy resin transfers the force between the timber rods and steel globes. Yoh was happy, since Matsui's joinery detail made his "space frame" (truss) possible.

With Prof. Matsui, Yoh visited Kumamoto prefectural office and convinced the officers that his design of timber truss was possible. Yoh was excited, and held an exhibition in Tokyo to show the models of buildings of Oguni project; "Forms in Wood"²² in August 1985. This exhibition was controversial and the officers from the Ministry of Construction specified that the 3000m² GFA project should be examined through a special appraisal committee in September 1985.²³

According to Shoei Yoh "Oguni Town wanted to create large scale timber structures. But since it had no precedent the ministry of construction was embarrassed".²⁴ At this moment, Kumamoto Mayor Hosokawa Morihiro (later he became the prime minister of Japan) was crucial in stepping forward as the project champion. According to Yoh, Hosokawa wanted to help the challenge of Oguni town to build these innovative timber structures, therefore decided to support the process by financing a small demonstration project first.²⁵ This prototype was the Music Atelier (1986).

4.1. The Music Atelier

The Music Atelier is located in Minami-Aso, near an outdoor theatre called ASPECTA, designed by Yoh (Fig. 2). The building is designed for full orchestra practice. A simple rectangular volume is rotated by 45 degrees, and a part of it is embedded into the ground, creating a triangular gable to cover the interior. The whole structure (roof and wall) is composed of a three-dimensional timber truss structure. However, under the Building Act of that time, it was not defined as a timber structure. Therefore, the construction of the building was permitted through the appraisal committee. The buildings construction therefore established a precedent for other innovative timber works.²⁶ Experts and specialists of the appraisal committee asked a lot of questions about the timber's performance, durability, and deformations in the structure. Since there were no sufficient studies on such timber structure, experiments and simulations were necessary. The joints using epoxy resin were critical in convincing the committee. In the structure steel plates are inserted into the timber, and fixed by a bolt. Around the bolt, epoxy resin is then injected to integrate the steel and timber. This joint resulted in minimal deformation and high strength.²⁷ "Therefore, the credit goes to Prof. Matsui's pressure injection of epoxy resin".²⁸

4.2. The Oguni Dome

The Oguni Dome spans 56m on long axis, and 46m on the short axis (Fig. 3). The roof is three-dimensional timber truss, composed of 5,602 timbers and 1,455 metal globe joints.²⁹

The roof of the first model, 1985, is a simple barrel vault, arching only on short axis. But in the final design, the roof arches on both the short and long axis, and the geometry



Fig. 3. Shoei Yoh, Oguni Dome, Oguni, Kumamoto, Japan, 1988, photo by the author, 2018.

became more complicated. In addition, the first model shows that all the timbers were planned to be identical in section. But in the final design, the section of timbers varied from 90x90mm to 175x175mm. Yoh followed the result suggested by the computational analysis and accepted the larger timbers where structurally necessary (Fig. 4).

For the Oguni Dome project, the basic roof and truss shape was essentially decided by Yoh and Oda before they started the computational analysis. But through the process of detailing the structure, Shoei Yoh came to realize the potentials of parametric design for form development. Following this, Yoh developed the parametric design of the three-dimensional truss for Galaxy Toyama (1992) and Odawara Municipal Gymnasium proposal (1991). In the Galaxy Toyama truss, the edges of the rectangular roof were all same height, but the depth of truss was diverse according to the position of columns. During the construction of Galaxy Toyama, Yoh submitted an entry to the competition of the Odawara Gymnasium. For Odawara, Yoh developed parametric design further. The outline of the plan became free form, and positions of the columns were free, therefore the truss became wave like and new elastic geometries were generated. It is interesting to see the difference and evolution between Oguni Dome, Galaxy Toyama and Odawara Gymnasium. Oguni Dome had arbitrary vault shape before the computational analysis. Toyama, had an outline of rectangular roof with a wave like inner surface. At Odawara, the roof and wall became dramatically more free-form. More and more parts of the structures were freed to become

parameters in what was by then a fluid structural problem defined by a range of flexible parameters. Oguni Dome, and the associated projects such as Galaxy Toyama and Odawara Gymnasium, show the moment that computational design transferred from mere structural analysis to a method of form-finding and a creative architectural project

Since it is the very first timber building of over 3000m² GFA, both the structure, and method of fire protection had to be approved by the appraisal committee. To find a way to prevent fire, Shoei Yoh visited a large-span timber building in US, Takoma Dome, and adapted technology that allowed sprinklers to be placed in the ceiling in case of fire.³⁰ The minimum distance between the floor and the ceiling was decided as 6.2m, in order to avoid fire from the floor catching the roof alight.³¹ These structural and fire safety ideas became the basis of future large-span timber buildings in Japan. During construction, both the construction company, and the Forestry Cooperative conducted quality checks of the timber to confirm their safety.

5. CONCLUSION

For Shoei Yoh, computational design was not the main theme of his Oguni projects, but a method to realize unprecedented large scale timber structures in Japan. However, through the challenges of these large-scale timber works, the power and effectiveness of computational design became evident. This realisation led to a greater use of computational design as a dynamic tool that resolved structural

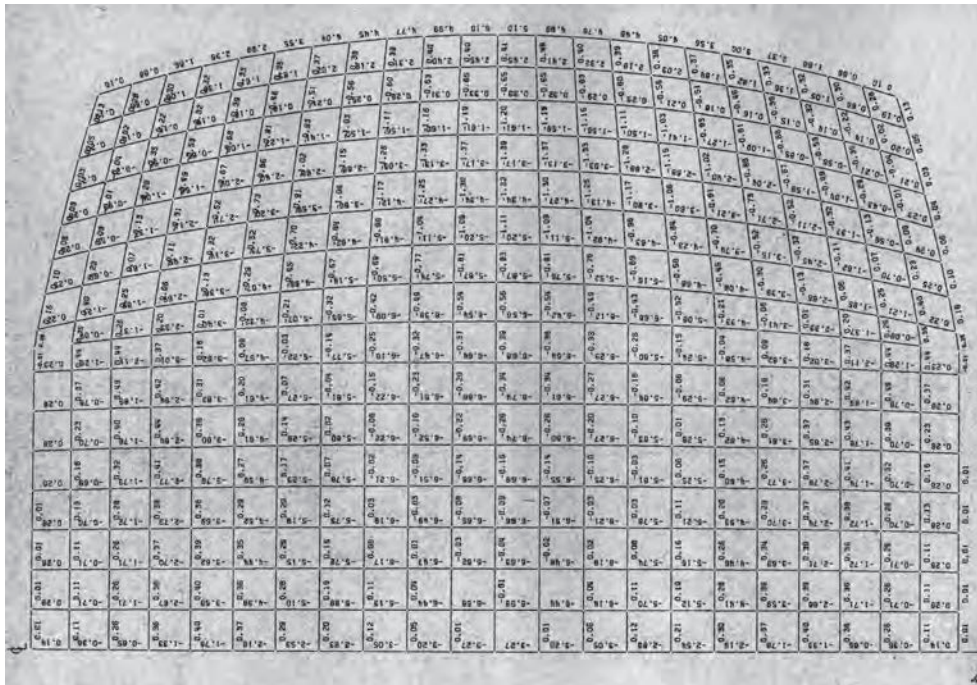


Fig. 4. Shoei Yoh, Oguni Dome, Oguni, Kumamoto, Japan, 1988, structural analysis by Taiyo Kogyo, ca. 1986, from Shoei Yoh Archives, Kyushu University.

challenges and inspired the imagination of new structures and geometries. Oguni Dome is therefore a landmark project in the development of this innovative approach and an early experiment in the development of parametric design. Previous research has overlooked the close relationship between material and computational design. Through historical studies, a new appreciation of computational design and new and emerging possibilities is likely.

NOTES

- James Steele, *Contemporary Japanese Architecture: Tracing the next Generation*, New York, Routledge, 2017.
- Marc Wilhelm Lennartz & Susanne Jacob-Freitag, *New Architecture in Wood: Forms and Structures*, Birkhäuser, 2015.
- Until 2010, Japanese building code expected no timber building over 13m height or more than 3000m² GFA, Kohei Komatsu, "The State of the Arts on Current Timber Structures — III: The State of the Arts on Large Scale Timber Structures", *Journal of the Society of Materials Science*, Vol. 53, No. 2, 2004, 230.
- Kristin Ross, *Fast Cars, Clean Bodies: Decolonization and the Reordering of French Culture*, Cambridge, Mass., MIT Press, 1998.
- Mikio Koshihara, "Large-scale wooden architecture by lumber", *AJ Kenchiku-touren*, 2019, accessed on 28. Jan. 2020 <https://link.medium.com/93JEqIMIMY>.
- Nobutoshi Miyazaki, *Top Pass* (in Japanese), Tokyo, Shichiken Publishing, 1994, 97.
- Oguni Town, *Oguni-Mirai 21 — Scenario for the creation of YUKI-NO-SATO* (in Japanese), Kumamoto, Oguni Town, 1986.
- Greg Lynn, *Archaeology of the Digital*, Quebec, CCA and Sternberg Press, 2013, 105.
- Yoh worked for Pacific House in 1964–67 and NIC in 1967–1970. See SD (ed.), "Shoei Yoh — The Form and Esprit of his World", *SD*, No. 185, 1980, 76.
- As an example, Yoh's interior and product design works in the 1970s were frequently published by Editoriale Domus, Italy.
- Anthony Iannacci, Kisho Kurokawa, Greg Lynn & Shoei Yoh, *Shoei Yoh: In Response to Natural Phenomena*, Milano, L'Arca, 1997.
- Interview by Masaaki Iwamoto, 2. Oct. 2018.
- Hiroyuki Suzuki & Shoei Yoh, "Between Technology and Cosmology" (in Japanese),

Kenchiku Bunka, Vol. 42, No. 491, 1987, 138.

- Greg Lynn, op. cit., 106.
- Interview by Masaaki Iwamoto, Akihiro Mizutani & Toshiaki Sato, 5. July. 2019.
- Interview by Masaaki Iwamoto, 2. Oct. 2018.
- Whilst the first three of these are relatively well known Yoh is still a peripheral figure, "Archaeology of Digital" (Exhibition at Canadian Center for Architecture), curated by Gregg Lynn, had big impact on computational design community, since this is the earliest attempt to historicize digital design in architecture.
- Hiroyuki Suzuki & Shoei Yoh, op. cit.
- Konrad Gatz & Gunter Henn, *Holzbau Atlas*, Munich, München Institut für internationale Architektur-Dokumentation, 1978.
- Shoei Yoh, "Oguni Town Plan 1984–1989" (in Japanese), *Shinkenichiku*, Vol. 60, No. 8, Tokyo, 228.
- At that time, adhesives were not trusted and liked by architects in Japan. Yoh's trust in the adhesives lead him apply the epoxy resin for timber joints.
- The exhibition was organized by Japan Design Committee and held at Matsuya Design Gallery, Tokyo, in August 1985, accessed on 28. Jan. 2020, <http://design-committee.jp/1985/08/3411953-forms-in-wood.html>.
- Yoh Design Office, *Forms in Wood*, 1988, 12, Yoh's document, from Shoei Yoh Archives, Kyushu University.
- Interview, 5. July. 2019.
- Ibid.
- Ibid.
- Shoei Yoh, "Music Atelier" (in Japanese), *Shinkenichiku*, Vol. 61, No. 6, Tokyo, 252.
- Interview, 5. July. 2019.
- Shoei Yoh, "Oguni Dome" (in Japanese), *Shinkenichiku*, Vol. 63, No. 8, Tokyo, 191.
- Shoei Yoh, "Oguni Dome" (in Japanese), *Shinkenichiku*, Vol. 63, No. 8, Tokyo, 193.
- Ibid.

6

PEDAGOGIES OF
DOCOMOMO

Session 6-a

SOCIO-CULTURAL LESSONS FOR FUTURE HERITAGE EDUCATION

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In early 2020, a new type of coronavirus infection started spreading all over the world. Since then, international and national societies have severely restricted physical contact and movement between people. In order to adapt to the new social life (called “new normal”), people have been forced to rapidly accept the advanced information technology that was gradually spreading into societies.

In short, it would be a crisis for on-site heritages as a reality. An extension of today’s social situation may eliminate the need for people to communicate spatially in real, and they may come to preserve real space through information technology without actually visiting architecture or cities. However, as a network of experts whose mission is to record and preserve architecture and cities related to modern movements, here we start a discussion on pedagogy of Docomomo to overcome this crisis.

In the article 1 of Eindhoven-Seoul Statement, Docomomo declared that they “bring the significance of the architecture of the Modern Movement to the attention of the public, the authorities, the professionals and the educational community”. Considering Docomomo has been focusing on pedagogy since its establishment, it is time to learn lessons from over three decades of experience around the world. At the same time, now that the Tokyo 2020 congress have been postponed for one year, it is time to reconsider what pedagogy of Docomomo is and to come up with strategies to embody the article 1. During the pandemic, Docomomo has been forced to make a new attempt to incorporate online tools in various situations: not only the congress, but also the international student workshop (oDOMOs), virtual tours and exhibitions. However, this experience is also a great opportunity to renew the traditional methodology of Docomomo’s professional education and how to share the value of modern architecture with the public. Following the two streams of the times, a roundtable meeting is planned

in the end of the Tokyo congress as a starting point of writing an educational charter.

In this session, every written paper is based on educational experiences before the pandemic, which covers a wide variety of topics. Quiroga and Moniz explain new strategies on modern reuse education, which adapt to contemporary social contexts. They illustrate participation, gender, diversity, equity and inclusion as necessary notions with the experiences of heritage education at the universities in Portugal (University of Coimbra) and Argentina (University of Buenos Aires and Belgrano). Allweil and Gitler find a necessity of contacting the local publics using local language, which is essential for recognition and preservation of the heritage of the Modern Movement in the local context. Through two interrelated Docomomo-Israel events, that is the conference Ideal(istic) Education and the exhibition named Timely Teaching, they show the Hebrew-first approach brought broader understanding to both professionals and lay audiences on the international spread of the modern movement. Kawagoe and Muramatsu focus on silent majorities unconsciously involved in a decision of modern heritage conservation. Observing conservation movements and demolition of Metabolism architecture Miyakonojo Civic Hall in Japan, they draw lessons from a negative spiral between silent majorities and self-enclosed experts, enforcing continuous education for the general public. Finally, Leman introduces the efforts of the City of Gdynia in Poland to popularize modernist architecture as well as to build residents’ understanding and awareness of the local heritage. Her paper shows education can lead local residents to feel proud and co-responsible for modernist heritage buildings which relate closely to their local lives.

All the papers in this session discuss on social and cultural aspects of heritage education, which have been missed in excessively specialized, technology-centered pedagogical

approaches. Moreover, in the Tokyo congress, we will discuss about continuous efforts and radical changes in their pedagogical approaches during the pandemic, or possibilities onsite and online in the future as well, using a virtual conference system which has become a familiar tool for us.

In order to qualitatively improve heritage education, we will learn lessons from the variety of experiences in a traditional or challenging way, and may combine some possibilities of spatial communication with information technology. This will be a new approach for us to reframe future heritage education of Docomomo with some fundamental questions: what is education for Docomomo? Who is the stakeholder? Why do we continue to discuss the international

spread of the modern movement? How can we develop a sustainable project of conservation? What changes are we facing in onsite and online experiences? Then finally, we may reach the main purpose that is to solve the lack of mutual understanding among the public, the authorities, the professionals and the educational community citizens. This is our social responsibility based on the article 1 of Eindhoven-Seoul Statement. It is also a task for us to reconfirm the significance of preserving on-site heritages as a source of quality education. I look forward to the fruitful session which would be an inspiration for the Tokyo roundtable and future heritage education of Docomomo.



NEW CHALLENGES ON MODERN REUSE EDUCATION: SOCIAL PARTICIPATION AND GENDER

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ABSTRACT.

In the last decades, **docomomo** had a substantial role in the theoretical production, instrumental development and technological innovation to face the training with students on conservation and reuse of modern heritage in architecture schools worldwide. However, despite these advances, today a new set of educational challenges arises: the social dimension integrated to the processes of design, research, valuation, documentation and reuse of modern buildings, sites and neighbourhoods.

The schools of architecture are more focused on the artistic and technical education of the architect and have some resistance to integrate a social one, which in general appears as a theoretical consideration or applied to minor activities but not as a true philosophy of learning. In this context and taking into considerations the pedagogical and research experiences carried out in Portugal (University of Coimbra) and Argentina (University of Buenos Aires and Belgrano), we underline 8 goals for an inclusive education for reuse focus on the users: Interdisciplinary Study plan, Activist Students, Co-Design Methodology, Identity Heritage, Social Practice, The Woman Architect and The Participative Users.

1. INTRODUCTION

In the last decades, **docomomo** had a substantial role in the theoretical production, instrumental development and technological innovation to face the training of students on conservation and reuse of modern heritage in architecture schools worldwide. However, despite these advances, today a new set of educational challenges arises: the social dimension integrated to the processes of design research, valuation, documentation and reuse of modern buildings, sites and neighbourhoods.

The schools of architecture are more focused on the artistic and technical education of the architect and have some resistance to integrate a social one, which in general appears as a theoretical consideration or applied to minor activities but not as a true philosophy of learning. In this context and taking into considerations the pedagogical and research experiences carried out in Portugal (University of Coimbra) and Argentina (University of Buenos Aires and Belgrano), we underline 8 goals for an inclusive education for reuse focus on the users.

2. STRATEGIC GOALS FOR MODERN REUSE EDUCATION: A NEW SOCIAL PARADIGM

Thinking about new criteria and pedagogical methods and tools implies, first of all, placing them in the context of complexity and of new social paradigms that characterize our contemporaneity. Social asymmetries, gentrification and migration, new forms of human grouping and diversification of family structures, the growing role of women in the productive life of cities, the dissolution of the bounda-

ries between domestic space and work space, extension of life, the new technological demands of users, are some of the profound social transformations that need to be included in the reuse of the Modern Movement's legacy.

These new social scenarios claim the idea of thinking teaching and learning strategies that integrate the community as an active part of the design process. This advances substantially on the traditional practices of the schools of architecture where users are abstract subjects analysed and interpreted in an abstract way, without making real contact with their problems, experiences and desires and, much less integrating it into the field of design decisions. The challenge today is moving from an informative participation to an active participation, more close to co-creation.¹

It is worth mentioning some valuable antecedents of the Modern Movement that understood the relationship between architecture and community as an indivisible pair. For example, the ideas of Aldo van Eyck, Fumiko Maki, Giancarlo de Carlo, Alison Smithson, Peter Smithson, among others. The buildings like the Church of the Holy Spirit in Uberlandia by Lina Bo Bardi designed and built in cooperation with the local community. Or the experiences of "radical pedagogies" in São Paulo, Porto, Yale, Paris or Chile schools, in late 1960s,² where students claimed for the social and political role of architecture.³ However, these ideas still do not have much resonance in academic institutions, namely with the focus on the reuse of modern buildings. And, they were not updated considering the aforementioned social transformations.

Within this framework, we have outlined 8 educational goals that aim to rethink the architecture pedagogy, from the study plan to citizen's engagement, in order to train fu-

ture architects to develop their practices with a true sense of equity and social inclusion:

2.1. Interdisciplinary Study Plan

From a disciplinary to Interdisciplinarity approach to support participatory processes and gender mainstreaming in design studio curricula.

The study plans are an important tool to frame the goal of a course of architecture and the profile of the architect training. We might say that all the combinations were tested, from the artistic orientation of the beaux-arts model, to the more technical approach of the modern education with several scientific disciplines, ending in the one single discipline Architecture, in the 1968 anarchist proposals.

In Europe, with the Bologna reform, the study plan develops a thematic approach, namely in the 2nd cycle (4–5 year), promoting the dialogue with other disciplines in order to explore innovative design studio, more related with social, environmental or technological issues. This strategy opened the architecture education to the reuse focus, considering that the profession is looking for answers to solve the huge number of buildings that need to be transformed. In the next few years, the cities will reuse instead of expanding. In fact, the reuse is an interdisciplinary issue, considering its technical, social and environmental dimension.

These interdisciplinary approaches can be better appropriate by students through the design process, where the other disciplines meet in the studio or workshops as laboratories for critical innovation, combining the theoretical reflection with practical experiments. But, considering the social issues, these renovations of the design studio can be also a platform of dialogue with the community, where the citizens can bring their expertise to the university, but also where the university goes to the community to listen, to learn and to share in a collaborative platform.⁴

The studios and workshops are also an important methodology to face and education for the Reuse of Modernist Building that needs to be addressed at several levels, from secondary schools, to graduation, master, PhD or even at professional one, going from the society to the university.

2.2. Facilitator Teacher

From authority to facilitator to empower the student's participation in the learning process.

According to the modern pedagogy, teachers don't teach because students learn by doing.⁵ In this sense, the architecture teacher tried to develop a pedagogical method closer to dialogue with the students than to do unidirectional lessons. Teamwork became the main tool for a democratic and humanistic education more focused on the students.

Today, the teachers are abandoning their authoritarian or their powerful profile and are adopting a facilitator attitude to mediate the dialogue inside the classroom and the collaboration with users, as citizens or stakeholders. In this sense, the assignments become more real with real build-

ings for real people. The reuse of buildings is always an opportunity to dialogue and think about the future with the users or formal users.

2.3. Activist Students

From learning to activism to enroll the students in social issues, with an active attitude inside and outside of the classroom.

It is missing the final point student unions were always a counter power in the architecture schools, since the Beaux-Arts and also in the universities. Usually, they are the first to question the pedagogical method with strikes, with written documents and with cultural activities. With the 1968 movements, architecture students led the fights in the university, claiming for a democratic education where students can play a role in the government of the faculty.

Today, architecture students continue to play a political role, not between left and right, but fighting for human rights, gender issues, the ecological approach, the solutions for the climate changes, and for the community-based solutions. Students reject the artistic role and look for the social one, where their work is to serve people and communities.

2.4. Co-Design Methodology

From design methods to co-design process to explore co-design tools to delineate criteria, programs and intervention techniques with the inhabitants.

The participatory process aims to develop a method of design that we call co-creation, because it integrates space users in the construction of the idea of the project through a set of activities, which combine tools from anthropology and sociology with the tools of architects, such as "design thinking" through 3D models, photo-elicitation, drawing directly on photographs, or "walkthrough", asking citizens to guide a tour through the building or urban complex. The project strategy or even the project themes emerge indirectly from these actions, which allows to develop an interpretative framework that leads to the project. In this way, project decisions are shared, contributing to an effective appropriation of the project by the community and avoiding the traditional void that exists between the architect and the user. According to Jeremy Till,⁶ "Participation effectively addresses this gap through involving the user in the early stages of architectural production, leading to an environment that not only has a sense of ownership but is also more responsive to change".

Thus, the foundational question, which Marieke Kuipers and Wessel de Jonge⁷ pose in his book about the master in conservation and conversion of modern architecture, gains new outlines here: "The key question in each and every intervention decision is whether the priority is to preserve the original idea or to preserve the original substance". However, in the participatory project, the decision is not only for the architect, but also for the social actors who inhabited, inhabit, or will inhabit the space, as suggested by Tim Ingold⁸ "a

building design through the practice of dwelling and sharing everyday life with stakeholders”.

The role of the architect therefore incorporates new responsibilities, not only because he has to make strategic choices, but also because he has to create conditions for the citizens to participate in them.

2.5. Identity Heritage

From iconic to collective memory to promote the assessment not only of modern relevant buildings but of those that contribute to the community identity.

The valuation, conservation and education around modern architecture emerged as a field of knowledge strongly associated with the idea of monument or those iconic buildings, of exceptional characteristics and / or designed by well-known architects. Today it is necessary to expand the concept of modernity as a monument to cultural heritage. This implies considering the material and immaterial aspects of the modern legacy that represent the history and memory of the different groups that make up a society.

Anonymous architectures, industrial architecture, urban infrastructure works, — education, health, recreation —, neighbourhoods and mass housing complexes are part of the daily life of the community. And they are also those that lack protection, maintenance and appropriate interventions. Thus, it becomes relevant in the first place to take this non-iconic and representative architecture of local realities as a case study in design courses. Second, that students can think of creative proposals for reuse with active community participation.

2.6. Social Practice

From the artistic to the social role to collaborate to a professional practice committed to the real needs of the cultural context.

Architecture schools have historically trained their students by prioritizing the artistic and technical role of the architect. And proposing a way to professional practice focused on the figure of the architect as the most qualified voice to formulate ideas about how spaces should be used and built. On many occasions, this impact on urban and architectural designs truly disconnected from the real needs of society.

On the contrary, education for the re-use of modern heritage must prioritize the social role of the architect in order to anticipate a professional practice truly consistent with the demands and desires of its social context. The design of pedagogical strategies — programs, activities, study trips, case studies, bibliography — focused on strengthening the relationship between future architects and citizens is of great potential to understand architecture and conservation as a social, ethical and democratic practice.

2.7. The Woman Architect

Gender and Collaboration to light up female architects' contributions to modernity, who have been excluded or

overshadowed by a large part of historiography.

Women architects have developed an extremely important role in the architecture, urban planning, landscape architecture and design of the Modern Movement, in theory and practice. However, these contributions have been systematically excluded and made invisible from the history of architecture and the references used in schools of architecture.

Since the beginning, women architects defined the meaning and the image of modernity: Eileen Gray, Elsie Borg, Aino Aalto, Clara Porset, Nobuko Tsuchiura, Nina Pavlovna Vorotyntseva, Charlotte Perriand, Lotte Stam, Mary Turner Shaw, Luz Sobrino Sanz, Itala Fulvia Villa, María José Marques da Silva, Franca Helg, Jane Drew, Lina Bo Bardi, among others. In recent years, many publications, projects — MOMOWO, *Un Día / Una Arquitecta* — and seminars have been doing valuable work to reverse modernity silenced by a clear androcentric bias. Similarly, education in architecture is challenged to propose a pedagogy of modernity with gender equity by valuing the work of female architects in all its contents — history, theory, technique, design.

2.8. The Participative Users

Gender mainstreaming and Community to engage citizens in the design process by integrating the needs and experience of the most excluded social groups as women, children, older people.

The aforementioned concept of heritage as a monument was also associated with a form of professional practice as a territory restricted to specialists from the past: restaurateurs, archaeologists, architects, historians, anthropologists, among others. It was this expert knowledge with a strong historical and technical charge that delimited what is heritage, as well as its preservation criteria.

Expanding the practice and education of monumental restoration to a co-design of cultural heritage and memory implies the use of new design approaches. Thus, the gender mainstreaming is a strategic project approach that allows an assessment and intervention of inherited heritage with criteria of greater equity and inclusion. It is about exploring theories, methodologies and operations that question and reverse the phenomena of inequality to ensure that all social groups of a citizen have access and representation to the material and intangible heritage. Although women represent one of the most impacted groups, this perspective is not only a matter of women but of considering those subject by ethnicity, class, race, age.

Introducing students to the use of a gender perspective for the various modalities of citizen participation — informational, consultative, management, empowerment — becomes an understanding of architecture as a discipline shared and committed with all sectors of the community. The contemporary role of women in everyday life, at home, at work or in the public space requires new lens to integrate their needs, perceptions and desires. In this sense, the wom-



Fig. 1. Re-use of the Primary School of Norton de Matos Neighbourhood, Design studio with the courses of Architecture, Anthropology, Geography and Construction, Master in Architecture of the University of Coimbra, 2017-18. © Gonalo Canto Moniz.

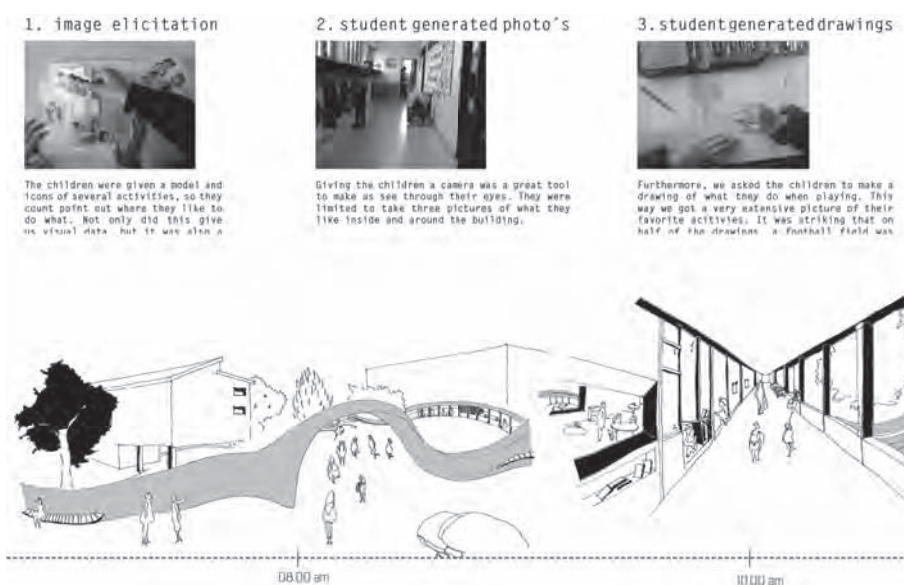


Fig. 2. Re-use of the Primary School of Norton de Matos Neighbourhood, ERASMUS Workshop on Reuse of Modernist Buildings, Coimbra, April 2018. © Gonalo Canto Moniz, Ana Goes Monteiro.

en lens as a user, as a stakeholder, as a decision maker demands to be included in the redesign of modern buildings and cities, that were framed by men lens, towards and inclusive reuse of modern buildings.

An example of these goals is the academic exercise on the Primary School of Norton de Matos Neighbourhood. It was developed in 2017-18 in two stages: first, as a Design Studio articulated with the courses on Anthropology, Geogra-

phy and Construction (goal 1) at the Master in Architecture of the University of Coimbra (Fig. 1); second, as ERASMUS Workshop on Reuse of Modernist Buildings⁹ (Fig. 2). The school was built in 1970 and is part of the memory of the community (goal 5). The reuse strategy is based on the dialogue between the architecture students and the pupils as users (goal 8). They contribute to the co-design process with their perceptions and experiences through workshops with



Fig. 3. Re-use of the Observatory of the Argentine Association of Friends of Astronomy, University of Belgrano, Argentina, 2018. © Carolina Quiroga.



Fig. 4. Re-Use of the National Library of Argentina, University of Belgrano, Argentina, 2019. © Carolina Quiroga.

models, plans, photos and walkthrough (goal 4). The aim was the transformation of the school in a social facility opened to the community (goal 6).

Other representative cases are the two activities carried in the Conservation and Re-use course at the Faculty of Architecture and Urbanism of Belgrano University (Buenos Aires, Argentina). First, the Astronomical Observatory (José Millé Gimenez, 1944 / Fig. 3) where the students worked with a little-known modern heritage (goal 5) that nevertheless defines the identity of the city. First, the students did activities

and interviews with the community to spread the history of the building and learn about its needs (goal 8). Then, they made different plans for the renovation and re-use of the building that allowed evaluating its new urban relations. Second, the National Library of Argentina (Clorindo Testa, Francisco Bullrich, Alicia Cazzaniga, 1961 / Fig. 4) designed by modern woman architect Alicia Cazzaniga (goal 7). Although the building is one of the most published, her authorship is generally unknown. They learned the contribution of the female architect not only to the design of the building but to

the local modern architecture. This activity empowered the students (goal 3) who integrated the vision of the female architect into their own reuse plans. And the role of teachers was important to encourage teamwork and an inclusive approach to redesign (goal 2).

Architectural education or *learning by doing* method, as defined by Gropius and Schön,¹⁰ involves the concomitant management of scientific, artistic, social and technical knowledge that simultaneously bring rational and intuitive aspects into play. Also, this thought in action is a creative process framed in its cultural and political context. In this sense, integrating the goals mentioned in architecture schools means a contribution of quantitative and qualitative value in education for reuse modernity.

On a humanistic level, these objectives enable students to become aware of modern heritage as a human right and integrate emerging notions such as cultural diversity or collective memory. Regarding the conceptual aspects, they are essential to understand the conservation of modern legacy not only as a mere formal or technical research but as an activity that by integrating the community builds new notions of identity. In the operational and technical field, it is a platform for experimentation of urban, programmatic and technological strategies as well as new design criteria — flexibility, diversity, mutation, hybridisation — to rehabilitate modern architecture attending to the real needs of society.

3. CONCLUSION

Modern Architecture was based on a deep human sense that guided a new way of thinking about cities, landscape, programs and space. This modern legacy today faces little recognition in relation to old buildings and deep deterioration caused by the passage of time, situations of obsolescence and the need to adapt its spaces to the demands of today's life.

These complex scenarios represent a conflict, but at the same time an opportunity in the schools of architecture to reformulate traditional or conventional pedagogies towards new educational strategies adapted to contemporary social contexts.

Thus, participation, gender, diversity, equity and inclusion today arise as necessary notions in architectural education to re-signify the social sense of modern heritage.

REFERENCES

- MONIZ, Gonalo Canto, "Training the Architect: Modern Architectural Education experiences", From Docomomo Journal 49, 2013, 10–15.
- FRANCHINI, Caterina, & GARDA, Emilia, *Women's creativity since the Modern Movement. A European Cultural Heritage*, Torino, Politecnico di Torino, 2018.
- JONES, Peter, PETRESCU, Doina, & TILL, Jeremy, *Architecture and Participation*, London, Taylor & Francis, 2005.
- QUIROGA, Carolina, et. al., "Heritage, Images and Gender: new criteria to value and intervene heritage", *Proceedings XXXIII Research Seminary FADU*, University of Buenos Aires, 2019.
- UNESCO, Gender Equality, Heritage and Creativity, 2014.
- AAVV. *Docomomo Journal 49. For an Architect's training*, Guest Editor Canto MONIZ, G., 2013.1

NOTES

- 1 Gonalo Canto Moniz, Andrea Canziani & Carolina Quiroga (2018-08-28), "Learning to reuse modernity: the educational challenge", Ana Tost es & Natasa Koselj (org.), *Metamorphosis. The Continuity of Change*, Lisboa, Docomomo International, 532–539.
- 2 Beatriz Colomina, "Radical Pedagogies in Architectural Education", *Architectural Review*, 2012, accessed on 10th June 2020, <https://www.architectural-review.com/today/radical-pedagogies-in-architectural-education/8636066.article>.
- 3 Gonalo Canto Moniz, "The Portuguese "May 68", Politics, Education and Architecture", *European journal of American studies*, 3, 2008, 2.
- 4 The Erasmus research project RMB (2016–2019), coordinated by Michel Melenhorst (OWL), developed a proposal for a Master on Reuse of Modernist Buildings based on the studio and workshop methodology, that includes the social approach (Michel Melenhorst, Gonalo Canto Moniz, & Paulo Providencia (eds.), "Teaching through Design", 2nd RMB Conference, University of Coimbra and Technische Hochschule Ostwestfalen-Lippe, Detmolder Schule f r Architektur und Innenarchitektur, Coimbra, 2018).
- 5 Walter Gropius, "Training the Architect", Dorothy Norman (ed.), *Twice a Year*, 2, Spring-Summer, 1939.
- 6 Jeremy Till, *Architecture Depends*, The MIT Press, 2013, xiv.
- 7 Marieke Kuipers & Wessel de Jonge, *Designing from Heritage: Strategies for Conservation and Conversion*, 2017, 101, doi: <https://doi.org/10.7480/isbn.9789461868022>.
- 8 Tim Ingold, *The Perception of the Environment: Essays in livelihood, dwelling and skill*, London, Routledge, 2000.
- 9 Melenhorst, Moniz, & Providencia, 2018.
- 10 Donald Schon, *The Reflective Practitioner: How Professionals think in action*, Basic Books, 1984.

TIMELY TEACHING — FOSTERING PUBLIC AND PROFESSIONAL AWARENESS AND ACTION

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ABSTRACT.

This paper discusses the pedagogies of Docomomo by looking at two interrelated Docomomo-Israel events: the conference *Ideal(istic) Education* (2016) and the exhibition that followed it: *Timely Teaching* (2018–2019).

In 2016, Docomomo Israel organized a conference for academics and professionals. This project was then transformed and shared with the general public, by producing an exhibition and a Hebrew-language edited book based on new research presented at the conference. The exhibition and the catalog were central to mediating appreciation of modern architecture to the public.

Looking at these projects, we argue that Docomomo's activities can be effectively disseminated beyond the West, in lesser-explored geographies, by 1) identifying local cultural connections for modern architecture; 2) revealing the Modern Movement's place within national built heritage and 3) approaching publics in their native language.

As with many countries, modern architecture in Israel is depreciated in comparison to its ancient built environments. Apart from Tel-Aviv's UNESCO-listed architecture, most of the modern movement's sites and gems are only beginning to be publicly recognized. The three goals set by the local Docomomo chapter were realized by discussing and presenting the theme of architecture for education, with which the public is closely familiar through personal or familial functions. The conference, edited volume and exhibition held by Docomomo, were all produced in Hebrew, so that the public could share and participate.

Finally, this central aspect of local modern heritage was presented in Germany, hence promoting and underscoring the need for worldwide cooperation among Docomomo branches.

1. INTRODUCTION

This paper discusses the pedagogies of Docomomo by looking at two interrelated Docomomo-Israel events: the conference *Ideal (istic) Education* (2016) and the exhibition and proceedings that followed it: *Timely Teaching* (2018–2019 / Figs. 1 & 2).

As with many countries, modern architecture in Israel is depreciated in comparison to its ancient built environments. Apart from Tel-Aviv's UNESCO-listed architecture, most of the modern movement's sites and gems are only beginning to be publicly recognized. Our activities in Israel address these significant gaps in research, conservation and documentation, and are geared towards raising awareness and engaging both urban and rural modernist architecture.

Within this framework, in 2016, Docomomo Israel organized a conference for academics and professionals. Both architects and researchers presented and participated. The ensuing Docomomo activities demonstrate how a project intended for professionals, was transformed and shared with the general public. This was achieved by producing an exhibition and a Hebrew-language edited book based on new research presented at the conference. The exhibition and the catalog were central to mediating appreciation of architecture, as Israel, a small country with limited resources, has had few public architectural exhibitions and its architecture bookshelf in the chief spoken language — Hebrew — is very limited in scope and its development is slow.

The theme for the conference and the ensuing public dissemination was architecture for education. We began by identifying education as a major and timely issue for the Israeli public, as urgent debates were (and still are) taking place regarding whether or not to introduce ideologically-charged contents into kindergartens, schools and higher-education campuses in a multicultural society. We further approached educational idealism and modern architecture as fundamental in shaping the country's diverse communities.

In this paper we demonstrate, by using the case of architecture for education in Israel, that Docomomo's activities can be effectively disseminated beyond the West, in lesser-explored geographies, by 1) identifying local cultural connections for modern architecture; 2) revealing the Modern Movement's place within national built heritage and 3) approaching publics in their native language.

Second, *Timely Teaching* and its accompanying publication engaged a typology-based approach to modern architecture, thematically connected to socio-historic issues. The theme of architecture for education, with which the public is closely familiar through personal or familial functions, served as a powerful demonstration of the need for acknowledging modern architecture, and revealed it as a crucial aspect of local heritage. We further underscored the relevance of the modernist heritage of architecture for education to today's world, where architecture is responding to new requirements and dilemmas of how to teach — such as the Active Learning Classroom, online courses, special needs



Fig. 1. *Timely Teaching* Exhibition, Architects House Gallery in Tel Aviv – Jaffa, 2018–2019. Photographed by Meir Allweil.



Fig. 2. *Timely Teaching* exhibition catalogue, 2018.¹ Photographed by the authors.

and more, stopping to think about what was architecture for education in past decades, can teach us a lot about how to plan for today's changing needs.

2. IDENTIFYING LOCAL CULTURAL CONNECTIONS FOR MODERN ARCHITECTURE

When we re-inaugurated the Israeli branch of Docomomo we decided to hold our first conference on the subject of architecture and educational ideologies in Israel/Palestine. A fascinating study-day resulted, with papers, and ensuing proceedings, that covered case-studies and ideologies ranging from kindergartens to universities, from playgrounds to youth villages. We really felt that the researchers that participated, presented a case in point in challenging — as we said at the outset — accepted definitions of modernism, and the perception that architecture always follows ideology, rather than, at times, having a key role in creating it.

The architecture under scrutiny was Jewish-Zionist, from the period prior to the establishment of the state of Israel in 1948 and after, through the 1980s. We feel that it's important to point out that when we set out to organize the conference we encouraged topics that discuss Palestinian architecture for education too. However, none came forth — and while we'll address this issue briefly, it is clear that more research is required in all aspects of this theme.

Since Docomomo is entirely committed to disseminating modern architecture to the public, when we were approached by Eran Tawil-Tamir of the Architects' Gallery in Tel Aviv to turn the conference into an exhibition — we did not hesitate. It was with the help of the gallery that the proceedings were published, and the exhibition gave us the opportunity to add more case-studies and examples. The exhibition was also evidence of the merits of a research-based exhibition — an exhibition in which the selection of buildings is foregrounded by historical investigation that, in this case, enabled us to identify a group of ideologies — at times related to each other through a broader cultural common denominator — and trace their discourse and connections to architecture. Research enabled us also to investigate development over time, and modernism's modularity also inspired the interactive game designed for the exhibition.

The designing of architectural exhibitions is always a challenge, regardless of space and budget limitations. In the means that stood at our disposal, we opted, as you can see here, for a very simple and straightforward display, augmented by historic posters, pamphlets and Hebrew-Language essays (that we didn't bring here either). These mediated the fervent dedication to educating the young, which characterized twentieth century Israel and Palestine.

3. REVEALING THE MODERN MOVEMENT'S PLACE WITHIN NATIONAL BUILT HERITAGE

The contents of the conference and the exhibition in-

volved for us revealing to the general public the Modern Movement's role within Israel's built heritage. Architecture for education in Israel/Palestine participated in formulating both modernism and post-modernism in the twentieth century. And the transfer of modernism to the Middle East and more specifically to Palestine, is a key aspect in architecture for education. First, three major institutions of higher education were founded by Zionists or established with their involvement: the Bezalel Academy of Art, the Technion Institute of Technology and the Hebrew University. Indeed — the architecture of these institutions, and the architecture of Zionist schools, such as the Gymnasia Herzeliya, formed the earliest secular civic spaces of Jewish society in Palestine. Hence, to a great extent, it was architecture for education that prescribed a model and incentive for other civic buildings. By model we mean that buildings such as the Gymnasia, planned by Bezalel Academy professors, the Hebrew University, planned by the Scots Patrick Geddes and Frank Mears, or the Technion, planned by German architect Alexander Baerwald, constituted the formulation of the so-called early "Hebrew" style in architecture — a rather Orientalized search for a Zionist architectural idiom. We should point out that the Technion in its beginnings was not a Zionist initiative, but reflected a similar search for style, that serviced a modern higher education institution.

The Gimnasia Herzelia, the Technion and Bezalel (which resided in a rented space) were established before World War I; the Hebrew University was established Immediately after the war, with the advent of the British Mandate. In this period, of the early 1920s, we can already see new developments: the process of the transfer of modernity begins and can be identified in new architecture for education.

It should be said that Palestine of the 1920s and 1930s — those formative years when modernism was refined and disseminated — saw an adoption of new educational ideologies and a growth in education among all its cultures and ethnic groups: in both Muslim and Christian Palestinian society, the amount of schools in villages and cities grew by 300%-400% when compared to their number before World War I. Both Palestinians and Zionists viewed education as a tool for creating a new generation that would form a modern society and used education to indoctrinate Arab and Jewish Nationalism, respectively.² The British, in turn, applied colonialist ideologies of educating the subaltern.³ British interest in promoting education testifies to modernist approaches that treated education as an egalitarian civil right. In practice, they financially supported the Jewish School System⁴ and established new schools in Arab villages.

So we have two key modern social processes: nationalism and colonial development. We would like to show you two examples — each representing modern architecture's role in inscribing these processes. In Palestine this, one of the most interesting aspects of this modern education was the promotion of advanced agricultural education. This in

itself was an ideology — based on the three communities' — British, Jews and Arabs — view of Palestine as a land whose economy is based upon agriculture. Hence, while managed as a complex and separatist economic system, these communities shared the perception of the need to develop advanced agricultural technologies and tying them to a national ideology of agriculture as a historical and social construct.

For Jewish immigrants, this could best be seen in the settlements of the kibbutz and the moshav. Architecture for education there was pioneering and novel. This is clearly observed in one of the most telling examples presented in the exhibition: the children's home in Kibbutz Beyt Alpha constituted a new typology. This was a modernist concrete building, albeit with a pitched red-tiled roof. It was an architecture specially designed for the new ideology of the kibbutz — the communal agricultural settlement that became one of the formative solutions of Jewish settlement in Palestine overall.

The Zionist movement in general viewed the children born in Palestine as the promise of a new society, so modernism as a new form of architecture was deemed appropriate for it. The choice of bright-plastered walls and pure functionalism that catered for education and hygiene, and considered local climate, resulted in a space fit for raising the children and protecting them, in a settlement that was otherwise constructed of huts and tents. In this architecture, kibbutz ideology regarding the children's place in society was formulated. The children's home evolved into the physical space intended to educate children together, outside of the nuclear family, as belonging to the whole "family" of the kibbutz. Moreover, the Children's House became the first permanent site of social gatherings in the Kibbutz and served as the tiny settlement's fort in times of violent conflict. So, as I/Yael discussed elsewhere, this house — one of the first examples of architecture for education in the Kibbutz settlements — "identified the home as the site in which one begins one's formation as a good member of society."⁵ The children's house's modernist design thus had a central role in paving the road for adopting modernism in other typologies, as well as other buildings for education, both in the Kibbutz and in other settlements.

There was stylistic variety in the designs: for example, in the design of the roof: in the buildings for Nahalal Women's Agricultural School, architect Lotte Cohn changed her original, modernist flat-roofed plan to one of a pitched roof. These variations lead to one of the important issues that this exhibition seeks to address, which is, challenging accepted definitions — both theoretical and formal, of modernism and its spread.

The British also contributed to the establishment of agriculture schools and their architecture. The schools built by them reflect mandatory ideologies of progress, as well as the British policy of preserving a status-quo among Jews and Palestinians as much as possible. They therefore built two

schools: one for Arabs and one for Jews. Austen St. Barbe Harrison, the chief British architect in Palestine designed them. Building the schools was made possible through a donation from Jewish philanthropist Ellis Kadoorie — one for Arabs and one for Jews, in Tulkarm and near Mt. Tabor, respectively.

The Jewish Agricultural Kadoorie High School, displayed in the exhibition, was very advanced (as was its Arab counterpart). Harrison used modernist elements such as long flat roofs, and a partially asymmetrical plan; he combined horizontal and vertical unadorned fenestration and used stone cladding that created a very smooth, almost plaster-looking, exterior. These principles and elements were integrated with a formal and symmetrical entrance, and a restrained use of local elements such as the arched doorway. Inside, pure functionalism served the staff and students, and agricultural utility workshops and sheds were built on the site as well. Architecture defined the relationship between the different sectors of the school: the director resided near the students, so that a socialization different from, for example, British boarding schools, was created. Who had the "honor" of being relegated the second floor? The medical ward, so as to isolate the sick. Hygiene and functionalism thus created a new agricultural educational framework, adding values and principles to the initial ideas. This point becomes even more succinct when comparing the Kadoorie School in Mt. Tabor, to its counterpart in Tulkarm. This architecture is conservative and historicist judging by its exterior, and more research needs to be done into this older building. The employment of markedly different designs for similar educational programs of modern agricultural techniques, indicates that the commissioners of these schools had different interests in modern education and how it related to nationalism and colonialism.

And moving on to institutions after Israel's establishment in 1948. The new state was required to establish a national education system, and a ministry of education oversaw the schools of all sectors of society. The state confronted significant challenges and contrasting ideologies: the official ideology was that of the *melting pot* — bringing Jews from all over the world to Israel, and educating them according to a Western, largely secular, Zionist ideology. This aspiration met with difficulties from the start — in the absorption of new immigrants, in the need to provide the different education demanded by Arab Israelis and Orthodox Jews, for example, and more.

As architecture for education advanced with architectural developments worldwide, the use of bare concrete, that we usually term Brutalism, was adopted as well. Both the conference and the exhibition presented one of the first discussions of Brutalism for education in Israel. In Israeli society, the adoption of Brutalism represented a national self-image that accentuated Western progress, and the continuation of educational and architectural experiments into late modernism. Such was the case with the High School

adjacent to the Hebrew University, designed by Shimon Povsner in the 1960s using bare concrete, with an educational mission of progress and innovation. Experiments — both architectural and educational, were also performed at kindergarten level. One of the most interesting examples in the exhibition is the kindergarten in Nazareth Illit, designed by architect Ze'ev Druckman. Here, the child-centered approach was expressed in a unique, bare concrete architecture that exhibited child-sized spaces that only children could enter, termed by the architect “under-the-table” spaces. Adeeb Daoud Naccache, who contributed the research of this building to the exhibition, illustrates three important points: first, that this building was brutalist in the fullest, Smithson-sense of the word — having not only exposed concrete but also exposed plumbing, with the intent that the children learn how a building works. Second, that architect Druckman was aware that he's inserting a highly experimental and unusual building into a low-income and problematic neighborhood, manifesting what Druckman viewed as the “state's role in... initiat[ing] change [by]...study[ing] the community, its values and language.” Third, that the design evolved not from prescribed ideologies, but from the architect studying children's behavior patterns and arriving at the conclusion that they need spaces that suit their size and activities. The ideologies of brutalist architecture, with their clear social agendas, were hence integrated here with an ideology that experiments can and should be introduced in any type of neighborhood, that the state has a responsibility to do so, and that childhood requires architecture that is different from that of adults.

Brutalism was also applied in the WIZO Daycare center in the town of Givatayim. This center, designed by the firm Nadler-Nadler-Bixon-Gil, approaches bare concrete as if it were children's playing blocks, and has a look of pre-cast concrete elements. Color is combined to relate to the children's world, as are circles, semi-circles and repetitive well-defined volumes. Despite this, this is very “serious” architecture. The Nadlers and their partners were working on three university libraries during the same years and prior to planning the daycare center, attesting to their great interest and contribution to architecture for education in Israel. In each case they approached concrete and the materials integrated with it in a different way, and with a lot of attention to climatic adaptation. At times with a “vernacular” touch — as can be seen in the Tel Aviv University Library, at other times with a single-mass, Louis Kahn-approach to building, as in the Ben-Gurion University Library in the Negev desert. So, from their buildings for higher education and the daycare center, we can see the Brutalist idiom is conceived as appropriate for all ages, receptive of color, and its pliability is exploited by the Nadlers to its maximum. Architecture creates shaded, intimate and usable spaces for playing and learning — and mediates the centrality of education at all stages of youngsters and adolescents' life.

Finally, during the 1970s and 1980s, hundreds of schools

were built in Israel with precast, factory made elements and a basic plan that was reproduced and replicated as their architecture. This, too, is an architecture seldom displayed or presented to the public. Its presentation at the conference and in the exhibition provided an example of the ideology of the Israeli Ministry of Education, which attempted to provide a unified educational curriculum to the entire country — a curriculum that disregarded local ethnic, religious and cultural differences, and which attempted to use architecture as a tool for equalizing conditions between center and periphery. The precast concrete elements took their cue or inspiration from structuralism and were considered the most advanced building technology of their time. So that architecture for education, one of the most common typologies in the country — since, after all, every town and village requires a school — continued to be a trailblazer of late modernism and the beginnings of postmodernism. Hence, we see here again how architecture becomes the defining functional space of ideologies of advanced education, prescribing a social unity that effectively glosses over differences.

4. APPROACHING PUBLICS IN THEIR NATIVE LANGUAGE

One of our preliminary decisions was the decision that all products — conference, edited book and exhibition, were produced in Hebrew, making them accessible to numerous audiences.

We believe that, apart from the discussion of ideas, their history, and their relation to the built environment, the exhibition presented to the public that modernism — both its earlier and later phases — has a lot to show beyond its canonic examples. Architecture for education, as a typology that stood in the center of ideas of the nation and the nation-state, demonstrates that traditional elements were not necessarily abandoned, and that place was never really disregarded, especially when transferred across the globe. Sarah Williams Goldhagen reminds us that relating to tradition and negotiating site-specificity were not unique to modern architecture's exportation: its masters — Le Corbusier, Mendelssohn, Wright, Aalto, Gray and others, were confronted by these issues during modernism's formative years.

Contacting and speaking to the local publics is, in our view, essential for recognition of the heritage of the Modern Movement, and eventually for its preservation and for remaining in the built fabric. Using local language therefore fulfills one of docomomo's key goals.

As academic research tends to privilege writing and publishing in English as key to the dissemination of knowledge, our Hebrew-first approach may seem counterproductive, even sectorial. However, from the very start our approach has been of Hebrew *first*, namely of extending research of Israeli Modern architecture beyond the local.

This goal has been met via the dissemination of *Ideal*

(istic) *Education* conference and the exhibition *Timely Teaching*, advocating a shared international heritage: the exhibition was translated into German and exhibited at the Bauhaus University in Weimar. It thus underscores the need for worldwide cooperation in providing global perspectives to both professional and lay audiences with regard to the international spread of the modern movement.

NOTES

- 1 I. Ben-Asher Gitler, Y. Allweil, D. Gordon, & E. Tamir Tawil, *Timely Teaching: Educational Idealism and Modern Architecture*, Tel Aviv, Israel Association of United Architects, 2018.
- 2 W. Matthews, *Confronting an Empire, Constructing a Nation: Arab Nationalists and Popular Politics in Mandate Palestine*, London, I. B. Touris, 2006.
- 3 Matthews, *Ibid.*, ch. 2.
- 4 *Report by His Majesty's Government in the United Kingdom of Great Britain and Northern Ireland to the Council of the League of Nations on the Administration of Palestine and Trans-Jordan for the Year 1931* (London: His Majesty's Stationary Office), 161. *National Archives of Great Britain* CO 1071/308, 18–19.
- 5 Y. Allweil, *Homeland: Zionism as Housing Regime, 1860–2011*, London, Routledge, 2017, 162.

HEAR THE VOICE OF THE SILENT MAJORITY FOR THE CONSERVATION OF MODERN MOVEMENT ARCHITECTURE: A CASE STUDY OF MIYAKONOJO CIVIC HALL

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ABSTRACT.

The Miyakonojo Civic Hall (1966) built in Miyazaki Prefecture, in the southwest of Japan, is a representative work of Kiyonori Kikutake (1928–2011). In addition, the hall was an example of the Metabolism style of architecture that led to the international recognition of post-war Japanese architecture. The hall was demolished while receiving objections from many experts and specialists both inside and outside Japan. This paper analyses why modernist architecture is so often demolished in Japan, using Miyakonojo Civic Hall as an example. As a result, we show that there were three reasons: (1) the lack of awareness of the silent majority, (2) the spread of closed evaluations made by construction professionals, and (3) the diffusion of defamation by the noisy minority for demolition. Regarding (1) the awareness of the silent majority, we will introduce the experiences of the programs that the authors actually launched, such as the collection of memories, the care of the ruined architecture, and the pre-demolition care program. For future conservation of modernist architecture, we present the importance of prior conservation.

1. INTRODUCTION

In January 2020, we were deeply moved in front of the vacant lot which previously housed the Miyakonojo Civic Hall. Why did this hall have to be demolished?

It was completed in April 1966 in Miyakonojo city, Miyazaki prefecture, in the southwest of Japan. This is a representative post World War II work of famous Japanese architect Kiyonori Kikutake (1928–2011). In addition, the hall was an example of the Metabolism style of architecture that led to the international recognition of post-war Japanese architecture¹ (Fig. 1).

Another reason that this Civic Hall is famous is that the demolition was executed despite receiving objections from many experts and specialists both inside and outside Japan. The conservation and demolition of this building was frequently reported not only by specialized magazines, but also by journalism in general, which usually does not pay much attention to architecture.²

One of the authors of this paper, Yuko Kawagoe, is in a strong opposition to demolition, while another, Shin Muramatsu, who majored in architectural conservation sociology remains neutral. Despite some disagreements, we solicited one other person (neutral or previously indifferent) and set up a program to increase attachment by rediscovering the public's memory of the hall. This paper deviates slightly from the usual academic papers. However, through actual experience, it shows both the necessity and possibility of continuous involvement in activities such as rediscovering memories of citizens and caring for buildings in the current situation in Japan in which modernist architectures are frequently demolished.

2. MIYAKONOJO CIVIC HALL AND THE PROCESS OF ITS DEMOLITION

Miyakonojo Civic Hall was completed in 1966 to commemorate the 40th anniversary of the municipal administration of the city. The city requested of the architect a place which could hold 1,500 people, had a wedding hall, and to continue maintenance of the facilities once open due to lack of budget. In order to compensate for the low budget and the weakness of the ground, the structure was centralized and its shape was devised. This shape also overlaps with the mountains of Miyakonojo. The first floor does not change as it's made of reinforced concrete. The steel frame roof that covers it does change, and thus it is evaluated as an architecture that embodies Metabolism.³

The citizens were amazed at the unusual building that appeared in the quiet countryside.⁴ They participated in weddings, coming-of-age ceremonies, presentations, concerts, etc., and the hall has been loved as the base for citizens' cultural activities.⁵ In 2006, 40 years after its opening, a new hall was opened in another location due to the deterioration of the facilities and equipment. Accordingly, Civic Hall had closed. Before closing, the Miyakonojo city held a social gathering and took a survey to decide the future of the hall. In the survey, more than 80% of the respondents agreed to the demolition.⁶

During this period, some citizens who loved the hall launched a group that appealed for its conservation. They invited famous architects, architectural historians, and architectural critics for symposia, then submitted requests and petitions for its conservation, as well as conducted a petition. In addition, the hall was also designated as a "DOCO-



Fig. 1. Demolition of Miyakonojo Civic Hall, October 25, 2019. We posted a daily picture of the Hall on Facebook. ©Yuko Kawagoe.

MOMO Japan select building” in 2006. Nevertheless, the city council finally decided to demolish the hall.⁷

Later, the hall was rented free of charge by the local university for 20 years, saving it from demolition. Renovation of the hall and its use as a satellite facility of the university was considered, but no conclusion could be drawn. In the end, the hall was returned to the city without being used because of the large cost of renovation. As a result, the city council again decided to demolish the hall in March 2019.⁸

3. ANALYSIS OF REASONS AND HYPOTHESIS FOR DEMOLITION

In recent years, many so-called modernist architectures have been demolished in Japan. The causes are dysfunction (leakage, weakness of earthquake resistance), economic principle (redevelopment), etc. For example, Izumo Taisha Chonoya (Kiyonori Kikutake, 1963) was demolished in 2016 due to leaks and rising maintenance costs. The former Ogachi-cho government office (Seiichi Shirai, 1956) was demolished due to deterioration in 2017. Hosei University '55 Hall and '58 Hall (Hiroshi Oe, 1955–58) were removed in 2020 due to campus reorganization. There are 238 “DOCOMOMO Japan select buildings” (as of August 2020) designated by

DOCOMOMO Japan, which was established in 2000, but not all exist.⁹

On the other hand, some modernist architecture has somehow been conserved: Kanagawa Prefectural Music Hall (1954), Kyoto Kaikan (1960) by Kunio Maekawa, Kanagawa Prefectural Museum of Modern Art (1951) by Junzo Sakakura, Osaka Shin Kabukiza (1958), former Yahata Civic Hall (1958) by Togo Murano, among others. However, there is generally little recognition of modernist architecture. The general public knows Japan's leading modernist architects Kisho Kurokawa (1934–2007) and Kenzo Tange (1913–2005), but not Kunio Maekawa (1905–1986), Junzo Sakakura (1901–1969), or Takamasa Yoshizaka (1917–1980).¹⁰ Akihiro Hatanaka, a folk researcher, points out that one of the causes of demolishing modernist architecture is that people have no story or common memory.¹¹

Regarding the Miyakonojo Civic Hall, a survey regarding its survival was conducted by Miyakonojo city in 2006 and again in 2018. The survey in 2018 was conducted on 4,000 randomly selected citizens, with just under 35% responding. Eighty percent of them were in favor of demolition. The reasons were the cost of renovation, maintenance, and aging. On the other hand, there are mainly three opinions from those who oppose demolition: (1) it has value (2) it's memora-



Fig. 2. "The 1000 Memories of Miyakonojo Civic Hall Project" on Facebook. We call the hall "Miyakonojo Snail-kun". ©Yuko Kawagoe.

ble, (3) it has potential for use.¹² Following this survey in 2018, a conservation group focused on (1) it having value and (3) it having potential for use.

With regard to (1) the value of the hall, there was support from domestic and foreign experts. We have already mentioned that it had been certified by DOCOMOMO Japan and that there had been frequent symposia by architectural historians and critics. In addition, there were statements against demolition from DOCOMOMO International and ICOMOS headquarters, and the possibility of it becoming a World Heritage site was also discussed.¹³

Regarding (3) the potential use of the hall, a proposal was made by the Architectural Institute of Japan. However, the utilization plan would have cost a large sum of money, and no private companies or groups responded in the end.¹⁴

Based on the above circumstances, if we consider the reasons why the Miyakonojo Civic Hall was demolished, it can be summarized in the following three points.

- 1) Failure to respond to the silent majority
In the 2018 survey mentioned above, the second reason against demolition was because (2) it was memorable. There were some people (1.2%) who answered that it should be neither conserved nor demolished. Furthermore, there was no response to the 70% who didn't reply.

Many papers have already pointed out that they must side with the silent majority due to peer pressure.¹⁵

- 2) The statement of it having value was too technical
The value of Miyakonojo Civic Hall, which many experts claim is a masterpiece of both Metabolism architecture and of architect Kiyonori Kikutake, and that the structure has novelty, received a certain amount of interest, but its value did not reach the citizens.¹⁶
- 3) The message of value deviated
While the procedure for demolishing the hall progressed, although it didn't cause heated debate, many defamatory comments toward the administration and citizens who agreed with demolition appeared on social media.¹⁷ We speculate that the opinions of the so-called noisy minority, as opposed to those of the silent majority, resulted in the demolition of the building rather than the conservation of it.

4. ATTEMPT TO IMPROVE PLACE ATTACHMENT: LISTENING TO VOICES OF THE SILENT MAJORITY

Based on the aforementioned understanding of the current situation and hypothesis, we tried to visualize the value of the hall by listening carefully to the voice of the silent



Fig. 3. Workshops held at an elementary school near the hall. Children learned about history and design of the hall during their visit. ©Yuko Kawagoe.

majority. The motivation was that one of the authors, Shin Muramatsu, visited Miyakonojo City in January 2019 before its demolition. When he met with multiple citizens and asked about the hall, he found that they had fond memories of it but were also indifferent towards its demolition.

First, we created a Facebook page “The 1000 Memories of Miyakonojo Civic Hall Project”¹⁸ (Fig. 2). It is a collection of photos and stories which shows the citizens’ memories of the hall. For the citizens, this has long been their only huge hall. They held ceremonies, concerts, weddings, among other events here. This is a reason why people answered that it was “memorable” in the survey conducted in 2018. “I’ve been singing on this stage since I was little. I grew up thanks to this place” (40s, female). “At the time of my wedding, I had cool photos taken around the hall” (70s, male).¹⁹ These memories were sent with photos and posted on Facebook. Some person’s memories were extremely personal, and as such have been neglected. The purpose of this project was to group them and make them visible.

Second, we started to care for the hall. This hall hadn’t been used since 2007. The door was closed, its windows were dirty, and the plants around it had withered.²⁰ One of the grounds for demolition was that neighbouring people had complained about this desolate situation from the perspec-

tive of safety and security. The waste in such a situation spreads far, not only in the neighbourhood. So we recruited volunteers, cleaned it, and planted flowers in the flower beds.

Third, we communicated the value of the hall to the citizens. We held a workshop at an elementary school near the hall to teach students rather than that is a representative work of Metabolism architecture or an important architectural work by Kiyonori Kikutake, but that it was used by many citizens and is a place that stores many memories (Fig. 3). The elementary school students who participated responded as follows. “I always pass in front of this hall. I always thought it was large,” “I thought it was amazing that architecture introduced in the textbooks used in foreign countries was near our school,” and “It is sad that the hall will disappear at the age of 53.”²¹

It has been pointed out that place attachment is important for architecture conservation.²² The purpose of this project was to rediscover and amplify that attachment. Unfortunately, the effects of this project could not be measured. However, more than 100 citizens visited the final tour and farewell concert which was held on July 21, 2019, just before demolition (Fig. 4). The participants talked about their small memories of this hall and gave the hall one last



Fig. 4. Farewell and thank you concert for Miyakonojo Civic Hall on July 21, 2019. About 100 citizens were present. ©Shin Muramatsu.

"goodbye". It was similar to the condolences when a friend or close relative dies. It can be said that this is proof of the improvement of place attachment.

5. CONCLUSION

As we pointed out earlier, the conservation movement of modernist architecture in Japan is not always successful. We speculate that the reasons are the same as the three which occurred when the Miyakonojo Civic Hall was demolished. (1) Lack of response to the silent majority, (2) Closed evaluations made by experts, (3) Defamation by the noisy minority for demolition.

On the other hand, in this paper, we have made the following hypothesis based on our experience. In order to conserve modernist architecture, alongside professional expression of value, steady and continuous rediscovering and sharing of memories, care for architecture, and activities that raise awareness for the general public are effective. It will slightly boost the survival of architecture. This paper differs from the hypothesis-verifying academic papers in

that it only presents a hypothesis, but we predict that such experimental attempts will likely prove effective the next time modernist architecture is demolished. The project to collect 1000 memories on Facebook has continued even after the demolition of Miyakonojo Civic Hall was completed.

NOTES

- 1 The Metabolism Group was formed in 1959 by young Japanese architects prior to the World Design Conference (1960) in Tokyo, and since has attracted worldwide attention.
- 2 "Former Miyakonojo Civic Hall "No change from demolition" Opinion of the city on ICOMOS objection", *Miyazaki Nichinichi Shimbun*, "Demolition of the former Civic Hall Miyakonojo city "No change" Opinion on ICOMOS documents", *Asahi Shimbun*, February 19, 2019.
- 3 "Miyakonojo Civic Hall Reuse Plan Review Special Committee Report", *Architectural Institute of Japan*, 2018.
- 4 Facebook, "The 1000 Memories of Miyakonojo Civic Hall Project", February 2 and March 31, 2019.
- 5 "40-year activities at Miyakonojo Civic Hall", Blog / Architecture Rondo, accessed on August 28, 2020, <http://daikiti33.cocolog-nifty.com/blog/2010/10/40-6dab.html>.
- 6 Comprehensive Policy Department, Comprehensive Policy Division, Miyakonojo City, "Regarding future policy of former Miyakonojo Civic Hall", 2018, accessed on August 28, 2020, <http://www.docomomojapan.com/docomomo/wp-content/uploads/2018/09/a5d793d3ede74a02a5cc9f0713615c34.pdf>.
- 7 Miyakonojo City HP, "Regarding policy decisions of former Miyakonojo Civic Hall",

- accessed on August 28, 2020, <https://www.city.miyakonojo.miyazaki.jp/soshiki/78/9533.html>.
- 8 Miyakonojo City HP, "We will inform you of the circumstances after the dismantling policy of the former Miyakonojo Civic Hall was announced", accessed on August 28, 2020, <http://daikiti33.cocolog-nifty.com/blog/2010/10/40-6dab.html>.
 - 9 The demolished architecture is also listed on this list of DOCOMOMO Japan. I guess it's because they are not indifferent to demolition and have not yet defined what demolition is.
 - 10 Accessed on August 28, 2020, <https://www.tourism.jp/tourism-database/column/2017/06/modern-architecture-tourism/>.
 - 11 Akihiro Hatanaka, " 'Should it be conserved or should it be demolished' The value of postwar architecture and traditional events", 2016, accessed on August 28, 2020, https://wired.jp/series/commons-in-a-digital-age/9_heritage/.
 - 12 Miyakonojo City, "Survey results regarding former Miyakonojo Civic Hall".
 - 13 "Miyakonojo Civic Hall Symposium for Reutilization", organized by Architectural Institute of Japan, December 16, 2018.
 - 14 Architectural Institute of Japan, "Miyakonojo Civic Hall Reuse Plan Review Special Committee Report", 2018.
 - 15 E. Noelle-Neumann, "The Spiral of Silence: Public Opinion — Our social skin", University of Chicago, 1984.
 - 16 The Architectural Institute of Japan held four briefing sessions and symposia for Miyakonojo Civic Hall on July 14, August 6, November 24 and December 16, 2018. Approximately 50–80 people participated.
 - 17 We know that the conspiracy by the mayor, the low cultural level of the mayor and the citizens, etc. were frequently posted on social media.
 - 18 Accessed on August 28, 2020, <https://www.facebook.com/dendenoden>.
 - 19 Each is posted on Facebook on January 25, April 8 and April 21, 2019.
 - 20 June 9, 2019, Interview with the director of the community hall of Hachiman-cho, Miyakonojo city.
 - 21 June 18, 2019, Message to Miyakonojo snail-kun by third grader of Meido Elementary School.
 - 22 Maria Lewicka, "Place attachment: How far have we come in the last 40 years?", *Journal of Environmental Psychology*, 31 (3), 2011.

GDYNIA — A CITY WHERE EDUCATION LEADS TO MODERNIST HERITAGE PRESERVATION

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ABSTRACT.

Established in 1926, Gdynia is a Polish port city on the Baltic Sea. Numerous buildings, both in the port and in the city centre, were designed and constructed as modernist structures. Modernism is thus a prevailing architectural style of the city, an element of its architectural identity. Gdynia authorities undertake numerous projects and programmes in order to reach the wide public and make them aware of true value of its modernist heritage.

Lots of initiatives are targeted at young generation to have them involved in the preservation of modernist architecture. Apart from classes on Modern Movement, children also take part in hands-on workshops. Running educational activities, Gdynia attempts to include all generations. Thus, the city runs workshops for seniors as well as whole families. There are also multigenerational guided tours to enhance people's understanding of modernist heritage.

What is more, Gdynia regularly organises international conferences on modernism, which enable academia, monument conservators and city residents to meet and discuss various aspects of modern movement.

Educating residents and building their awareness of local modernism results in their huge involvement in the preservation of modernist buildings. Owners of these houses preserve them because they fully understand their uniqueness and significance for the city's identity. Thus, Gdynia residents take an active part in the protection of modernist architecture. Many of these initiatives are initiated by the city, but there are also numerous community-driven projects, e.g. a small private museum run by residents of one of Gdynia's flagship modernist buildings.

1. INTRODUCTION

The origins of Gdynia date back to the Middle Ages when it was just a small village. With Poland regaining its independence and access to the sea after WWI (1918), the construction of an independent port became a nationally crucial investment (the port in the nearby Gdansk did not belong to Poland then, it was part of a separate entity called the *Free City of Danzig*). Thus, in 1921 the decision was made to build a new port in the area located near the village of Gdynia. This is how the Polish dream of creating a window on the world started to come true: in the late 1930s the modern port of Gdynia became one of the biggest on the Baltic Sea. Along with the port, an entirely new city emerged. Yet, its development was well considered and designed by two Polish urban planners: Roman Feliński and Adam Kuncewicz, dedicated followers of modernism. Created in 1926, Gdynia's first urban plan ensured a strong link between the city and the sea with a spacious city square open to the gulf. Thus, in the late 1920s and throughout the 1930s the city's grandest buildings (both residential, public services and industrial ones) started to emerge, most of which represented modern architectural features. Consequently, the Modern Movement became the symbol of Gdynia's development, its identity and the spirit of the place. It turned into a feature which united the residents of the pre-war Gdynia, some of whom took an active part in the development of their modernist city. Then came WWII, and many residents were expelled from their homes. When they returned to Gdynia af-

ter the war, many of them were deprived of their houses due to political regulations of the post-war socialist Poland which failed to foster private ownership. Only with the fall of communism were they able to retrieve their property. And this is one of the reasons why modernist architecture in Gdynia is more than local heritage, it is part of lives and identities of many residents who not only recognise its value, but feel its uniqueness for their home city but also for their own individual stories. And many of them take a very active part in the preservation of Gdynia modernist architecture, which for many is simultaneously a precious heritage of their ancestors. Thus, they welcomed the decision of the President of Poland (2015) to grant Gdynia modernist city centre the status of the Monument of History, which is the highest national distinction assigned to Polish outstanding historic sites. This, in turn, motivated the city authorities to apply and succeed (in 2019) in inscribing Gdynia on the UNESCO Tentative List of Poland.

2. EDUCATION

Modernism is not only a prevailing architectural style of Gdynia, which clearly defines its architectural identity, but it also constitutes an area which offers great educational opportunities. Being a member of docomomo, Gdynia undertakes projects and programmes targeted at reaching the wide public and making them more aware of true value of modernist heritage as well as a need for its preservation. And residents (as well as tourists) eagerly respond to and



Fig. 1. Workshops for children organised by Gdynia City Museum. © Gdynia City Museum, photo by Bogna Kociumbas.

benefit from these initiatives. Educating and popularising knowledge about modernist architecture helps to better protect and preserve the city's architectural heritage.

2.1. Museum Activities and Workshops

Lots of initiatives are targeted at young generation, first of all to build their awareness of modernist architecture and then to develop in them co-responsibility for this heritage. One of the institutions responsible for these educational activities is the Gdynia City Museum which has been running various classes on modern movement for several years. Attending these activities, children and young people learn, among others, how to plan a city or to design a building. They also discover the characteristics of local modernist architecture, get to know the most significant architects of Gdynia as well as learn the secrets of taking good photos of modernist buildings.

Additionally, they can take part in hands-on workshops where they create small models of modernist buildings, design their own patterns of tiled floors or make their modernist signboards (Fig. 1). In this way they develop a better understanding of the Modern Movement. What is more, they can also get inspired from modernist fashion, which is one of the themes of birthday parties (very successful) held at

the Gdynia City Museum.

Running educational activities, Gdynia makes efforts to include all generations. Thus, apart from the above-mentioned initiatives for children and young people, the city runs workshops for whole families. The objective is once again to popularise Gdynia's architecture and foster the sense of co-responsibility for the city. A very successful series of family workshops was organised by the Gdynia City Museum within the educational programme *Journey Inside the Home*, which was financed both by the City of Gdynia and the Polish Ministry of Culture and National Heritage. Apart from activities for families (guided walks, lectures and workshops e.g. on designing a perfect modernist flat or on modernist floor tiles), an educational book entitled *Pan Nowoczesny. Barwne życie w białej Gdyni. [Mister Modern. Colourful Life in White Gdynia]*¹ was published. Entertaining to readers of all ages, the book tells a story about a fictitious resident of Gdynia called Maurycy Modern. This is in fact a pretext for presenting the city's modernist architecture of the late 1930's, for learning more about the interiors of the most significant buildings, their staircases, ceramic tiled floors, double doors, windows with special mechanisms (Fig. 2) etc.²

While popularising knowledge about Gdynia modernist



Fig. 2. Workshops on floor tiles at Gdynia City Museum. © Gdynia City Museum, photo by Bogna Kociumbas.

architecture, the City also prepares a special offer for senior residents, e.g. Nordic walking tours which are an interesting combination of enhancing their knowledge about the city's heritage as well as keeping active.

Gdynia is a barrier-free city, and thus tries to include all its residents in all areas of city life, and this is also true when it comes to educational and cultural programmes. *Turn on the Museum!* was a project addressed to people with visual and hearing disabilities, and its objective was to let them touch, hear and feel the best examples of Polish design as well as monuments of Gdynia modernism.³

Additionally, inclusive educational activities are organised by the Emigration Museum located in the modernist building of the former Marine Station constructed in 1933 to handle overseas passenger traffic. One of its very interesting initiatives was a dancing spectacle entitled *7 Lessons of Geometry* (2019), inspired by Oscar Schlemmer, a German artist associated with the Bauhaus school, and his *Triadisches Ballett* [*Triadic Ballet*].

2.2. Guided Walks

To enhance people's understanding of modernist heritage, the City of Gdynia organises multigenerational guided tours (both for residents and tourists) which have various

forms, e.g. walks (including visits to otherwise unavailable buildings). Guided by licensed guides, most of the walks are held within the series *Holidays with Architecture* which started nearly a decade ago. As for the guides, they attended a special course on Modern Movement in general and on Gdynia modernist architecture (including exterior but also interior of buildings), which was organised by the Municipal Conservator Office. After passing an exam, they not only guide around Gdynia modernist centre but also have an opportunity to participate in workshops to get up-to-date information about the preservation of modernist buildings.

Additionally, the City organises thematic walks combined with lectures given by Modern Movement experts as well as special photo tours where the focus is on the secrets of photographing modernist buildings.

2.3. Exhibitions

What is more, residents and tourists eagerly benefit from exhibitions organised by Gdynia museums to learn more about various aspects of modernist heritage. Two exhibitions: *The Birth of the City. Gdynia Modernism* (2014) and *Gdynia — open work* (2017) were displayed at the Gdynia City Museum. They presented the development of the city, and thus naturally focused on its modernist heritage as well



Fig. 3. *Glass, Metal, Detail* Exhibition at Gdynia City Museum.
© Gdynia City Museum, photo by Bogna Kociumbas.

as architects who designed the city's residential, public services and port buildings. Another very interesting exhibition entitled *Glass, Metal and Detail. Gdynia's Architecture Close Up* was organised by the same museum and displayed in 2016 and 2017 (both in Gdynia and Warsaw). This time the emphasis was not so much on architectural designs or works, yet on small interior furnishing elements, interior installations, floor tiles, cladding as well as window and door woodwork. These little pieces are part of Gdynia's interwar architecture, reveal modernist aesthetics and standards as well as prove technological advancement of modern movement (e.g. an electric cooker displayed at the exhibition). What should be stressed here, the exhibits not only came from the Gdynia City Museum or the Municipal Conservator Office but were also donated by local people — both descendants of city constructors and mere enthusiasts of modernism who wanted to preserve and save them for future generations (Fig. 3).

In 2020 the Gdynia City Museum presented a comparative exhibition which featured *Gdynia and Tel Aviv*. Founded at a similar time and representing dreams of their nations, these two cities share characteristic modernist architecture, which was one of the focuses of the exhibition.

Since many residents are descendants of those who built the city and the port, they are justifiably very proud of their heritage, and some go even further and promote it by organising, among others, photographic exhibitions. In some tenement houses the civic initiatives resulted in putting up small exhibitions on the history of the buildings, their architects and architectural designs as well as their owners, e.g. at 9 Słupecka Street or in the gate of the tene-

ment house at 53 Świętojańska Street, a building which is equipped with a still working pre-war lift (meticulously maintained).

Another valuable civic initiative of this type is a unique museum established in a residential building of interwar Gdynia (located in the historical centre of Gdynia at 27–31 3 Maja Street). It all started with residents collecting objects related to the building and the people who had lived there. Next they allocated a separate room to display old documents, original details and elements of the decor, as well as everyday objects that had been dismantled during various renovations of the building. And this is how in 2009 a Mini Museum was opened to tell the story of the building as well as to present some characteristic features of modernism (Fig. 4).

These community-driven projects prove the residents' sensitivity to the value of modernism and serve as an inspiration for others. And they are financed from the community own resources.

2.4. Conferences, Seminars, Competitions

For many years Gdynia has been supporting scientific research related to modernist architecture (in the local and international context) as well as has been popularising its value and advocating a need for its preservation. This is one of the reasons why the local government every two years organises international conferences entitled *Modernism in Europe, Modernism in Gdynia*. They not only support research extending beyond Gdynia but also offer great opportunities for academia and monument conservators to meet and discuss various aspects and challenges of Modern Movement. Conference sessions are open to everybody, so



Fig. 4. Section of exhibition at Mini Museum in Gdynia. © Gdynia Development Agency, Photo by Przemysław Kozłowski.

Gdynia residents (who may not belong to expert circles but are simply enthusiasts of modernist architecture) attend them. The first conference was held in 2007, and the next one (the eighth one) will take place on September 23–25, 2021. Apart from domestic speakers, the conference was attended by international experts, among others from Germany, United Kingdom, Israel, Lithuania, Ukraine, Russia and many others. After each conference a book with conference papers is published by the City. This is one of many publications issued by local authorities who try to reach readers of different ages (adults, young people and children), but also of different backgrounds (professionals, advanced or elementary amateurs and enthusiasts).

Every now and then local guides specialising in modernist architecture attend and organise seminars on the subject. They do it upon their own initiative in order to enhance knowledge about Modern Movement.

Apart from the periodic conferences which focus more on research and conservation issues, Gdynia also organises *The Architecture Weekend*, an annual event for a broader audience, which takes place at one weekend of August or September. Its programme includes meetings and debates with contemporary architects, theorists of architecture and renowned experts on modernist architecture, screenings of

films on the subject, guided walks and photo exhibitions. Both local people and tourists enjoy participating in these activities very much.

Additionally, the City organises various competitions to present and promote its modernist heritage, among others, an annual photographic competition *Gdynia Modernism in the Lens*, which encourages people to approach modernist architecture from various perspectives, to learn more about its forms, colours, materials and details. Organised since 2010, the competition has gained on popularity, and for the past few years the number of photos submitted amounted to a few hundred per competition.

2.5. Others

In order to popularise Gdynia's modernist architecture, the City runs a separate website dedicated to this heritage (<http://modernizmgdyni.pl>) as well as regularly puts social media posts. This is additionally a very good way of informing the public about the coming initiatives aimed at popularising the knowledge about modernist heritage.

3. CONSERVATION AND PRESERVATION

Educating residents not only builds their understand-

ing and awareness of the city's architectural heritage, but more significantly results in their huge involvement in the preservation of modernist buildings. The majority of structures, especially in the city centre) are mostly privately owned (with the exception of public buildings); however this does not prevent them from being restored to their original splendour. The owners of modernist houses are determined to protect them since they understand their significance for the city fabric. In their endeavours the residents are supported by the city which offers financial grants. Gdynia was one of the first municipalities in Poland to introduce (in 2009) a programme which subsidises conservation, restoration and construction works in the buildings owned by individuals or legal entities and listed in the regional register of architectural monuments or located within the borders of the Monument of History site. The grant may cover from 30% to 75% of the incurred costs, and the granted amount depends on the historical value of the structure in question. Recently measures have been taken to expand this programme and offer an extra subsidy for the conservation of original plasters, cladding panels (made of stone, brick or ceramics) as well as architectural details made before WW2. It should be stressed here that the subsidies programme is financed entirely from the city budget, and so far 180 subsidies have been granted.⁴

Residents of Gdynia not only apply for financial support to preserve historical buildings, but some of them also run an NGO called *Historic Gdynia* whose objective is, among others, to raise awareness of the need for the protection of Gdynia modernist heritage.

4. CONCLUSION

The efforts of the City of Gdynia to popularise modernist architecture as well as to build residents' understanding and awareness of the local heritage have been rewarded with their increasing involvement in its protection. More and more residents feel proud and, more importantly, co-responsible for the city's architecture. However, initially many of them failed to appreciate it. Only after years of awareness-raising campaigns can we observe residents' growing understanding of the city's modernist architecture, in particular, that of the pre-war period. They know why it is valuable, and thus they want to protect it. What remains to be done is to sensitise them to the value of post-war modernist architecture. This heritage is very often perceived as having political (socialist) connotations. Yet, consistent educational activities can assist in promoting its value as well as encouraging residents to appreciate and consequently preserve it, as was the case with the building of the railway station in Gdynia (designed by Wacław Tomaszewski and constructed in 1950–1955).

Despite some challenges the city may be facing, Gdynia is a place where education leads to modernist heritage preservation. Thus, if you wish to protect the modernist heritage,

you should first start with explaining its significance to people and demonstrating how much it relates to their lives. I hope my paper shows some ways of achieving this target.

REFERENCES

- SOLARZ, Ewa, *Pan Nowoczesny. Barwne życie w białej Gdyni*, Gdynia, Projektor Group, 2016.
 SOŁTYSIK, Maria Jolanta, *Gdynia miasto dwudziestolecia międzywojennego. Urbanistyka i architektura*, Warszawa, Wydawnictwo Naukowe PWN, 1993.
 SOŁTYSIK, Maria Jolanta, *Na styku dwóch epok. Architektura gdyńskich kamienic okresu międzywojennego*, Gdynia, Alter Ego, 2003.
 FRIEDRICH, Jacek, & ŚLIWA, Anna, eds., *Glass, Metal, Detail. Gdynia's Architecture Close Up*, Gdynia, Muzeum Miasta Gdyni, 2017.

NOTES

- 1 Ewa Solarz, *Pan Nowoczesny. Barwne życie w białej Gdyni*, Gdynia, Projektor Group, 2016.
- 2 Martyna Groth, "A journey into a modernist interior", Jacek Friedrich & Anna Śliwa eds., *Glass, Metal, Detail. Gdynia's Architecture Close Up*, Gdynia, Muzeum Miasta Gdyni, 2017, 62–63.
- 3 "Gdynia City Museum", accessed on January 20, 2020, <http://www.muzeumgdynia.pl/english-version/?lang=en>
- 4 Data obtained from the Municipal Office of Monument Conservator of Gdynia City Hall.

Session 6-b

TELLING STORIES FOR A NEW AUDIENCE

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Modern architecture and landscape, as well as modern objects and furniture, have always played a primary role in shaping our collective identity and society. Architects and designers express ideas and dreams through the modification of our built environment, and they usually try to point out a better present, heading for a better future. A key role in such a mechanism of identity is held by what we consider as Cultural Heritage: we recognize through it what we consider as art, as the best manifestation of our achievements, as something we want to be inherited by future generations, because we are concerned with the importance of legacy.

But legacies are not always self-evident, and modern ones are the most difficult for general appreciation. Even if some neuroscientists see interesting parallels between our brain network functions and the essence of modernism, we are still wondering why many people find hard to appreciate it.

Scholars assess the impact of buildings, objects and documents on shaping our cultural identity because of their aesthetic quality, material and technical innovation, or more intangible cultural significances, but it happens that they are ahead of their time, and they are not understood. Therefore, we recognize the need of a critical curatorial work on modern heritage.

That's why is so important talking about pedagogy and education. That's why Docomomo give so much importance to the education of the younger generation, the general public and the society at large on the value of modern heritage preservation. We take very seriously the task, because education is not something belonging only to our school age of primary schools or universities but is connected with a long-life training on curiosity and development of new knowledge. Sometimes such a knowledge has much to do with unlearning, because we need to forget biases, bounds and

stereotypes.

As our authors Joana Couceiro and Josè Miguel Rodrigues highlight in the present session, we believe that architecture, as any other artistic expression, gains another meaning, another density, when it is seen through the lens of the history of the processes. We can say that it gains another density when we make clear that it's speaking of us. There is, indeed, a human dimension in any architecture, talking of time, of lives, of dreams overtaking the dimension of purely object-like icons, that motivates anachronistic restorations to some "supposed" original state.

Narrating that story therefore gains even greater importance as an essential element for the appreciation of architecture, without which the sensory and aesthetic experience of the finished object is penalised because of the merely superficial appreciation that the five senses can give us in only a limited manner.

That's why these stories — precisely in its condition as History — are absolutely indispensable to the architectural experience and deserve to be (and must be) told.

We can do that in many different ways. For example, we can learn a lot from the museology, as Bàrbara Coutinho explains here. Museums may contribute to a real transformation of a broader public through design collections with exhibitions, acquisitions and an educational programme helping to raise awareness of the ethical responsibility of individual and collective action. Rethinking modern principles of innovation, utility, simplicity, rationality, durability, quality and intelligibility may assist the conscious and responsible praxis of design and aid the urgent redefinition of progress, production and consumption, awareness and creation of critical users, instead of producing more consumers.

Cultural Heritage is then a result of the reassessment of our own attitudes, values, emotions and skills. With this ap-

proach, narrating the stories of a building or curate and exhibit modern design nowadays can contribute to the urgent rapprochement of art and life, aesthetics and ethics towards an effective education for citizenship and social engagement worldwide.

Education and citizenship are also the backbone of the contribution by Junko Taguchi, presenting a different possible point of view in approaching the heritage narration, when mutual understanding between professionals and the general public is essential. She describes 'lay experts' of heritage management in Japan as a possible tool for solving the professional-public divide.

The interview surveys conducted with two associations in Japan, Chochikukyo Club and Tatemono Ouendan, show how lay experts of heritage management do not necessarily have architectural expertise, but they are able to develop an engaging human-relation expertise indeed. They become a

buffer or a catalyst for activating communication between the general stakeholders, without goals of 'education' or 'enlightenment'.

Science communication models and theories explain that we cannot explain everything through the "knowledge deficit model" that assumes that science communicators can change public attitudes by providing more information. There are different communication modes we can use in heritage management and there is an indubitable importance of the public engagement. So, it's very important and significative to import in architecture and heritage the ideas of audience development and engagement that we learned from other cultural sectors.

The papers in this session offer to us an opportunity to cast a glance at the future of possible pedagogies for our beloved modern heritage. Be curious.



PROFESSIONALS OR THE GENERAL PUBLIC? EMERGING LAY EXPERTS OF HERITAGE MANAGEMENT IN JAPAN

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ABSTRACT.

In this paper I aim to describe 'lay experts' of heritage management in Japan for solving the professional-public divide. Science communication models and theories were overviewed to illustrate what 'communication' is to be in heritage management rather than 'education' or 'enlightenment'. The interview surveys were conducted with 2 associations in Japan, Chochikukyo Club and Tatemono Ouendan. In the results, lay experts of heritage management do not necessarily have architectural expertise, but they are developing human-relation expertise indeed. I discuss with an arranged theoretical model, in which lay experts become a buffer or a catalyst for activating communication between the general stakeholders. More human-relation training courses will be expected for non-professionals, which is also useful for sustainable community management.

1. INTRODUCTION

In the context of collaborative and sustainable heritage management, mutual understanding between professionals and the general public are essential. Neither professionals alone nor the public alone can achieve the goal of conservation without continuous cooperation of each other.

Sometimes conflicts between professionals and the public happen concerning their respective values and interests. Maikhuri et al. (2001) argued conservation policy-people conflicts from a case study of Nanda Devi Biosphere Reserve in India, which is one of the World Heritage Site. They pointed out a need for developing policies and management actions which fulfill the local people's interests of economic growth in relation with enhancement of the goal of conservation.

Public visitors' interests also have an effect on heritage management. Calver and Page (2013) studied approximately 180 heritage attractions, monuments, gardens and countryside managed by the National Trust in England, Wales and Northern Ireland, focusing on the influence of service value to the visitor enjoyment and behaviour. They confirmed the visitors' requirements and their co-created values in their visitation experiences have matured and are still developing.

However, the professional-public divide on heritage management is still existing over various surveys and actions. Only one-way education or enlightenment from professionals to the general public cannot work. As Pettersen and Boks (2008) suggested, lay involvement and user-centred design at a proper level of heritage management are desirable.

Therefore, in this paper I aim to describe 'lay experts' of heritage management in Japan and what 'communication' is to be in this field rather than 'education' or 'enlightenment' for solving the professional-public divide. Science communication models and theories are overviewed in first. Through

the interview surveys with 2 associations, I focus on lay experts' way of communication, discussing the results with an arranged theoretical model. Conclusion follows with the future job training of heritage management.

2. THEORETICAL REVIEWS

2.1. Science Communication / the Public Understanding of Science

Although the term "science communication" has multiple meanings and related terms are often used interchangeably (Burns et al. 2003), science communication is one of disciplines of social science, which has developed theoretical grounds that are solid but differ in their status from theories in natural science (Delacôte 2001).

In theory and practice of science communication, some models have been proposed to illustrate how people, including professionals and the general public, communicate science; such as "deficit model", "contextual model", "lay-expertise model" and "public participation model".

Before these models were discussed, there was a remarkable publication in UK, 1985 by the Royal Society. Its title was "The Public Understanding of Science", which is also known as the "Bodmer report" (Royal Society 1985). The report was commissioned in the belief that the public's interest in and support for science and scientists was decreasing and at the same time, scientists themselves had stayed away from public debate (Sturgis and Allum 2004). In all aspects from people's daily lives to national prosperity, it emphasized the importance of the public understanding of science, which is called as PUS.

2.2. Models of Science Communication

The "deficit model" of PUS was proposed after the Bodmer report, though there is no clear-cut definition of it in the literature (Pfotenhauer et al. 2019). The underlying idea of the deficit model was that the public has a 'knowledge

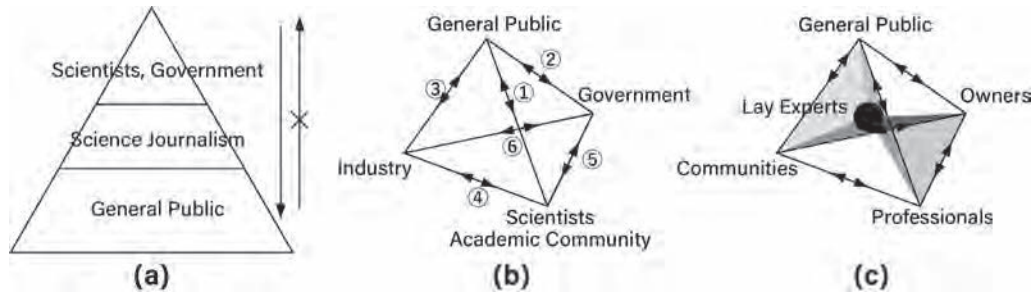


Fig. 1. (a) Deficit Model and (b) Tetrahedral Model in Science Communication, redrawn by the author, referenced from Hayashi et al, 2005. (c) Tetrahedral Model (Arranged) in Heritage Management. ©Junko Taguchi.

deficit' that affects their perceptions of science and scientists. The deficit model thus assumes that science communicators can change public attitudes towards science by providing more information (Short 2013). It represents a one-way, top-down approach as described in (Fig. 1a).

The "contextual model (contextual approach)" was derived from the criticisms in 1990s to the deficit model of PUS. The two models were contrasted as the deficit model is asymmetrical, while the contextual model is symmetrical (Gross 1994). This new, reflective approach drawn from sociology, history, and sometimes from philosophy developed through studies which stated the importance of social context and lay knowledge playing a significant part in how science was used by members of the public (Miller 2001).

The "lay-expertise model" deeply focused on lay knowledge — as anthropology and ethnology had also focused on local knowledge and indigenous knowledge — which is shared among local communities historically or in their daily lives. Lay knowledge was often criticized as limited and sometimes wrong, but the criticisms also went for expert knowledge (Myskja 2007). The lay-expertise model argued lay knowledge would be as relevant to solving a problem as expert knowledge, which affects our real-world personal and political decisions (Lewenstein 2003a).

The "public participation model" was as new as the lay-expertise model, which enhanced public participation or public engagement. It committed "democratizing" science, which took control of science from elites and gave it to the public (Lewenstein 2003a). The involvement of scientists to PUS activities was also argued for achieving more feasible operation rather than obligation (Pearson 2001).

2.3. Interaction of Models

Referring to these models of science communication, Lewenstein (2003b) argued that the models are at work in all the contexts studied in relation to PUS, and its goal must be, not to promote one model over another, but to understand how the models and perhaps others interact.

In contradiction to the deficit model alone, Hayashi et al. (2005) introduced the "tetrahedral model" proposed by Kenji Makino, with a caption of "6 edges corresponding to 6 bidi-

rectional communication and 4 faces plus inside corresponding to 5 multidirectional communication" as described in (Fig. 1b). The tetrahedral model was multilateral, including the interaction of the models and their stakeholders that Lewenstein suggested.

2.4. Analytical Framework for This Study

In the context of heritage management, the deficit model could be used with an assumption that the public has a 'knowledge deficit' that causes unconcern towards heritage. However, the deficit model couldn't explain why the professional-public divide is still existing, while professional organizations such as Docomomo have been providing information.

Instead, I assumed that the tetrahedral model could be used for discussing how the stakeholders of heritage management communicate each other and what is the missing point. Additionally, I focused on 'lay experts' with an assumption that their way of communication would affect public participation and professional engagement both.

3. METHODS

3.1. Case Selection: Chochikukyo Club and Tatemono Ouendan

To collect data, especially focusing on the communication of lay experts, I surveyed heritage management associations in Japan with the criteria that: the association a) includes citizen staffs, b) is independent from professional (scientific, political) associations, c) continues for more than 10 years, and d) maintains a heritage building as an activity base.

Through the survey, 2 cases were picked up: 1) Chochikukyo Club and 2) Tatemono Ouendan. Each of them is based in the different modern houses built in the beginning of the 20th century.

3.1.1. CHOCHIKUKYO CLUB

Chochikukyo is a modern experimental house designed by a Japanese architect Koji Fujii (1888–1938), built in Oyamazaki-cho, Kyoto 1928 (Fig. 2). Chochikukyo Club (CC)



Fig. 2. Chochikukyo, 27 December 2019. © Junko Taguchi.

was established in 2008 by the representative director of CC, who just started renting the house and involved neighborhood residents to the association for making the house open to the public. In 2016, a Japanese construction company Takenaka Corporation took over the site and the house as its property, and CC was commissioned for the maintenance and guiding.

3.1.2. TATEMONO OUENDAN

Tatemono Ouendan (TO; the Bunkyo Link for Architectural Preservation) was established in 1996 by citizens wishing to preserve a modern Japanese-style house, the Former Kusuo Yasuda Residence built in Sendagi, Bunkyo-ku, Tokyo 1919 (Fig. 3). In that year the site and the house were donated to the Japan National Trust. Surveys, preservation proposals, cleaning, and guiding tours of the house had conducted by TO and in 2008, maintenance activities were officially entrusted to the association. TO maintains several heritage sites in Bunkyo-ku, Tokyo now.

3.2. Interview Surveys and Analysis

Semi-structured interviews were conducted with the staffs of CC and with the staffs of TO respectively.

From CC, the representative director and 7 staffs participated. 2 group interviews were conducted for 1.5 hours each. In the first group were 3 start-up staffs (male, retired, one of them was the director's contact person (CC1) and he involved his friends (CC2, CC3)). In the second group were newer

staffs (a retired woman (CC4), a couple (CC5, CC6) and a younger woman who was the secretariat (CC7)). All but the director was living in the neighborhood of Chochikukyo.

From TO, 2 staffs participated in a group interview for 2 hours (a retired woman who was a start-up staff (TO1) and another younger woman who was a newer secretariat staff (TO2)).

All the comments in the interview surveys were recorded. They were categorized according to with whom the interviewees were communicating and what kind of approach they were doing as lay experts of heritage management. The tetrahedral model was arranged according to the results.

4. RESULTS

4.1. Overviews of Interview Surveys

Interview surveys revealed that the staffs of CC and TO communicate with 4 general stakeholders: *the public, professionals, owners and communities*. Quotes and explanations follow, focusing on the approach of triangular communication between 2 general stakeholders and lay experts.

4.1.1. CO-LEARNING APPROACH: BETWEEN PROFESSIONALS, THE PUBLIC AND LAY EXPERTS

It is noticeable that lay knowledge of the staffs was continuously developing.

CC2 was a local guide after retiring his job, involved in CC by his friend CC1. In the early activities of CC, the staffs



Fig. 3. The Former Kusu Yasuda Residence (inside), © Japan National Trust.

were not expected to guide the house with longer explanations as they do today. However, CC2 looked back at his guiding history that

the visitors, they taught us everything...for example, the minus screws below the window glasses line up beautifully in the same direction... To avoid a draft, sashes have triangular shapes. In the past we had explained the wooden roof had cantilever structures, however, a professional visitor taught us there was no such structure. (Director: sometimes the accepted notions about the house were exploded. We have been developing our way of guiding according to new facts.)

We have another interesting story. The wife of Koji Fujii was Hisako Senge. We had explained 'Senke' (as usually pronounced in relation to the schools of Japanese tea ceremony like Omotesenke), but a student from Izumo came and asked us "please pronounce her surname as 'Senge' according to her family history in relation to Izumo Grand Shrine."

Because the house attracted many visitors' attention, they wanted to talk a lot about its architectural or historical flavors. The staffs were guiding and learning at the same time from the conversations with visitors.

4.1.2. MENTAL SUPPORTING APPROACH:

BETWEEN PROFESSIONALS, OWNERS AND LAY EXPERTS

While professionals understand values of the heritage and the importance of surveys and documentations, owners

are not always welcoming.

However, TO2, an architect, broadened her career in TO with more local conservation activities, explaining the importance of surveys and documentations for owners with a psychological reason.

Owners of heritage sites and buildings start consulting with us when they already face inheritance problem. Time is limited for the decision and we propose to make a survey and a documentation. It works as a practical information for professionals' value judgment. Moreover, as the staffs of Tatemono Ouendan, we can use it to appreciate owners' long-term maintenance efforts to sustain the heritage healthily. When we show the photo album of the house, the owners often say, "I cannot believe that my house is such a beautiful place". We can support owners' heart for conservation.

TO2 continued that if the building itself was to be demolished, the parts or the documentation was able to remain, which is to be the options for the owners to sustain their memories with the building. On the other hand, it was difficult at an early point to make owners conscious that their property has values.

4.1.3. COMMUNITY MANAGEMENT APPROACH:

BETWEEN COMMUNITIES, OWNERS AND LAY EXPERTS

Heritage management can be an opportunity to make local community healthier. However, it is difficult for com-



Fig. 4. Guiding by a member of Chochikukyo Club, 27 December 2019. © Junko Taguchi.

munities to make a direct connection with owners, because their relationship is too close or too far.

Although the staffs of CC were living near the heritage site, almost all of them had not seen the house itself. After opening the house, the situation changed the most when the Imperial couple visited the house in 2013.

CC4, who was a longtime resident in the area, living in a small house which was also designed by Fujii, had visited Chochikukyo when she was young. She was not a start-up staff but joined in CC because she had memories with the house and would like to do something for her communities. Afterwards she commuted almost every day to maintain the house.

CC6, the wife of the couple, had seen every morning that CC4 was cleaning around the site. After her husband CC5 joined in the activities, she decided to be involved. She felt the heritage site as "the community center in the neighborhood".

In the case of CC, most of the staffs were local communities in a rural area of Kyoto. On the other hand, TO worked as a social community. The staffs were not directly living in the neighborhood but had the same interest. For example, TO2 found the poster of the association when she moved to Tokyo. The other staff lived in Tokyo as a workplace and got interested in. The activities of TO were integrated in their urban lives.

4.1.4. HOSPITABLE APPROACH:

BETWEEN COMMUNITIES, THE PUBLIC AND LAY EXPERTS

The Interview survey with CC revealed that many of the male staffs had been in sales positions of their companies (Fig. 4).

CC5, who joined as a guiding staff after 2013, told that he was utilizing the sales skills into their guiding and was thinking first of hospitality to the visitors. He had developed

his own enterprise and when he worked, he developed his English skill. He thus remembered the skill and retrained it through guiding many visitors from abroad.

My aim is not only explaining, but also giving pleasure and smiles to the visitors using English... (Director: he always makes foreign visitors laughing. Moreover, it is amazing that he come when no visitors are here and makes a rehearsal by himself.) ... (Reactions of Japanese visitors and reactions of foreign visitors are) almost the same. There is no difference between them.

CC3 was a friend of CC1, a local volunteer after retiring his job without experience of guiding. He explained his belief of guiding like that

I think it first that the visitors paid guiding fees and brought home the 'feelings' that they were satisfied and pleasant to come here. When they got home and shared the feelings with friends, more other visitors came here. So I often told to younger guiding staff that we should establish the pleasant and comfort feelings in visitors' mind...I believe this necessary in order for the house and for the communities to last more than 100 years.

CC4 explained that she was satisfied when she felt she could share with the visitors the environment and atmosphere of her community. She confirmed a civic pride to her community in such communications.

5. DISCUSSION

5.1. Tetrahedral Model of Heritage Management

From the results, I allocate the general stakeholders (*the*

general public, professionals, owners and communities) on the vertices of the arranged tetrahedral model, putting lay experts (the staffs of CC and OT) in the center as described in (Fig. 1c). The results (4.1.1 – 4.1.4) explain 4 of 6 edges in the model, with which lay experts shape 4 new faces inside the tetrahedron and become a buffer or a catalyst for activating communication between the general stakeholders.

As the limitations of only 2 case studies in this paper, the results for explaining 2 of 6 edges (between the public and owners and between communities and professionals) are missing.

Not only the house but also public facilities would bring more results for discussing the model. Additionally, few results show specific qualities or peculiarities of modern heritage appreciation, divided from general heritage in pre-modern times. Thus, I would consider the arranged tetrahedral model doesn't specify the age and the type of heritage at least in this research.

5.2. From 'Knowledge Deficit' to 'Co-Create Experience'

The results identify that lay experts of heritage management do not necessarily have architectural expertise, but they are developing human-relation expertise indeed. In other words, their expertise is for translating heritage — which makes the public (and even professionals) feel an authority at a conscious level or at an unconscious level — into a pleasant experience. They are developing skills of communication and stress management as well.

It is not a one-way approach but bilateral, because lay experts' hospitality to visitors returned to themselves as an appreciation and a civic pride. That confirms co-create value for visitor satisfaction which Calver and Page (2013) discussed.

6. CONCLUSIONS

In this paper I discuss what "communication" of heritage management is to be rather than "education" or "enlightenment", focusing on lay experts. The tetrahedral model of science communication is possible to explain the relationships between the general stakeholders, however, only this cannot activate mutual communication as the professional-public divide exists.

I thus conclude with the arranged tetrahedral model as described in (Fig. 1c), in which lay experts become a buffer or a catalyst for activating communication between the general stakeholders. Their lay expertise consists of skills of communication and stress management, translating mere knowledge transmission into co-create experience with the public and professionals.

From such a viewpoint, I point out how a future job training of heritage management is to be shaped. In Japan, "heritage manager" job trainings are conducted by institutions of architects in respective prefectures, or by local governments. Some of them have a training course for non-pro-

fessionals, but mainly the educational contents are about heritage management systems and techniques for professional architects. More human-relation training courses will be expected for non-professionals, which is also useful for sustainable community management.

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REFERENCES

- MAIKHURI, R. K., NAUTIYAL, S., & SAXENA, K. G., "Conservation policy-people conflicts: a case study from Nanda Devi Biosphere Reserve (a World Heritage Site), India", *Forest Policy and Economics* 2, 2001, 355–365.
- CALVER, S. J., & PAGE, S. J., "Enlightened hedonism: Exploring the relationship of service value, visitor knowledge and interest, to visitor enjoyment at heritage attractions", *Tourism Management*, 39, 2013, 23–36.
- PETTERSEN, I. N., & BOKS, C., "The expert-layperson divide in design for sustainable behaviour: Related risks and the value of involvement", *Proceedings of the NordDesign 2008*, 2008, 1–10.
- BURNS, T. W., O'CONNOR, D. J., & STOCKLMAYER, S. M., "Science communication: a contemporary definition", *Public Understanding of Science*, 12, 2003, 183–202.
- DELACÔTE, G., "Foreword", STOCKLMAYER, S. M., GORE, M. M., & BRYANT, C. (eds.), *Science Communication in Theory and Practice*, Kluwer Academic Publishers, 2001, vii.
- Royal Society, *The Public Understanding of Science*, London, 1985.
- STURGIS, P., & ALLUM, N., "Science in society: re-evaluating the deficit model of public attitudes", *Public Understanding of Science*, 13, 2004, 55–74.
- PFOTENHAUER, S. M., JUHL, J., & AARDEN, E., "Challenging the 'deficit model' of innovation: the innovation imperative", *Research Policy*, 48, 2019, 895–904.
- SHORT, D. B., "The public understanding of science: 30 years of the Bodmer report", *School Science Review*, 95(350), 2013, 39–44.
- GROSS, A. G., "The roles of rhetoric in the public understanding of science", *Public Understanding of Science*, 3, 1994, 3–23.
- MILLER, S., "Public understanding of science at the crossroads", *Public Understanding of Science*, 10, 2001, 115–120.
- MYSKJA, B., "Lay expertise: Why involve the public in biobank governance?", *Genomics, Society and Policy*, 3(1), 2007, 1–16.
- LEWENSTEIN, B. V., "Models of public communication of science and technology", *Cornell University Library: eCommons*, 2003a, 1–11.
- LEWENSTEIN, B. V., "Editorial", *Public Understanding of Science*, 12, 2003b, 357–358.
- PEARSON, G., "The participation of scientists in public understanding of science activities: the policy and practice of the U.K. Research Councils", *Public Understanding of Science*, 10, 2001, 121–137.
- HAYASHI, M., KATO, K., & SAKURA, O., "Why 'Science Communication' now?" なぜいま「科学コミュニケーション」なのか? , *Iden 遺伝 (written in Japanese)*, 59(1), 2005, 30–34.

WHY CURATE AND EXHIBIT MODERN DESIGN NOW?

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ABSTRACT.

Museums have always played a fundamental role in shaping our collective identity and society. Through their collections and exhibitions, we understand the way modern design was perceived over time and how societies have valued it in each moment. First considered as an incentive to improve industrial production, then valued for its aesthetic quality, and later for its cultural significance, material innovation and new technology, modern design can boost a broad debate on social responsibility and environmental sustainability. This paper defends the need of a critical curatorial work on modern design collections with exhibitions, acquisitions and an educational programme with which museums may contribute to a real transformation of a broader public, helping to raise awareness of the ethical responsibility of individual and collective action. Rethink modern principles of innovation, utility, simplicity, rationality, durability, quality and intelligibility may assist the conscious and responsible praxis of design and aid the urgent redefinition of progress, production and consumption. A deeper approach to modern design may represent the assertion of more informed, aware and critical users, instead of produce more consumers, as a result of the reassessment of our own attitudes, values, emotions, and skills. With this approach, curate and exhibit modern design nowadays can contribute to the urgent rapprochement of art and life, aesthetics and ethics towards an effective education for citizenship and social engagement worldwide.

1. WHAT IS THE ROLE OF MUSEUMS IN TODAY'S SOCIETY?

Museums' mission goes through a deep reflection given the profound changes that have occurred both in the world geopolitics and in our daily life. Increasingly, our perception of the world, our communication and the way we socially relate are constantly changing. Education underwent also drastic changes, as a result of new learning processes, the increasing renewal of formal education structures, the notions of lifelong education or e-learning, and the ongoing digital revolution. Museums try to keep up with this dynamic, looking for new answers to globalisation, digital reality, new media, cultural tourism and entertainment industry, having yet to face a general decrease in state subsidies and the need to find their own financing. They sought to become attractive cultural centres; develop a program of temporary exhibitions with major retrospectives and blockbuster shows; use new technologies and interactive formats; promote commercial areas and social events; explore new communication and marketing techniques; activate its websites and social networks; even promote franchising strategy. During the last three decades, we have witnessed an intense critical production about the leading position museums have on the neo-liberalism economy of culture and on post-modernity urban renewal. Simultaneously, the consciousness of the political and social role of museums has been growing as the perspective of an education for citizenship.¹ We highlight Claire Bishop's analysis on a "radical" model of museum, more politicised, socially committed, experimental and participatory.² The current emphasis on participation and creative process (rather than the final product) is multidisciplinary and has as background the vanguards of the 1960s and 1970s. During these years, museology began to

give a special value to education, interpretation and decoding, which triggered the development of a parallel program of educational activities, especially for schools and children. Within the scope of the New Museology³, museums increasingly assumed their socioeconomic action, as defined in the *Declaration of Quebec — Basic Principles of a New Museology*.⁴ Therefore, museology was defended as an open, interdisciplinary, participatory and community-oriented practice, a reality that was mainly carried out in science museums, eco-museums and local museums. In the first years of the 21st century, these principles were renewed by Critical Museology, which values the action of the museum in the territory and in the community where it belongs, in interaction with other local entities. In narrative terms, closed and normative discourses were replaced by open, partial and subjective readings.⁵

Currently, the expansion of the concept and scope of museums place them at a crossroads, with new challenges and opportunities. In addition to being spaces of memory, culture and education, museums are also expected to be places of leisure. The risk is no longer so much to be a mausoleum or a warehouse, as it was once considered, but to become an amusement park that offers entertainment in an attempt to correspond to audiences, leaving behind the mission of contributing for the cultural development of each visitor and the social collective awareness. Some conflicts, misconceptions, doubts and questions we face as a society also occur in the museum as an institution. In this context, in 2019, a lively debate took place as a result of the alternative museum definition proposed by the Executive Board of ICOM. Disapproved for its political contours, the proposal for a new definition sought to enshrine the museum as an "inclusiveness" and "democratising space" that "contribute to human dignity and social justice, global equality and planetary wellbeing".⁶

2. MUSEUMS AND DESIGN DISCOURSES

The first museum dedicated to the applied arts, the Victoria and Albert Museum (V&A), opened in 1852, after the Great Universal Exhibition of 1851, with the purpose of educating the public, improving the standards of British industry and make better products to overseas exports. Henri Cole, its founding director, constitutes the museum's collection and the library's collection, as the exhibition program with a pedagogical approach.⁷ In addition to the original pieces, copies and moulds were incorporated in order to offer a broad perspective on human creativity and ingenuity.⁸ With the pieces acquired and displayed, the V&A aspired to educate designers, manufacturers and consumers in what good design was, contributing to the aesthetic awareness of the different audiences. The popular *Gallery of False Principles* (or *Chamber of Horrors*) is one example of this strategy. Programs for design schools emanated from V&A, with the principles that should guide the design and production of manufactured goods.⁹ V&A established the idea of collecting design in the second half of the 19th century and the early 20th century while its museological model was adopted by different European countries.¹⁰

The opening of the Museum of Modern Art in New York (MoMA, 1929) brought another definition of design, as influential as that of V&A and inspired so many other institutions to follow their lead. MoMA was an attempt to embody the Bauhaus ideal of uniting arts, architecture and design as different manifestations of modern movement.¹¹ Each exhibition materialized Alfred Barr's perspective on modern movement, whereupon architecture had a major relevance, as proves his diagram for *Cubism and Abstract Art* exhibition (1936). Pieces displayed were put in order to embody Barr's narrative, such as the exhibition space, idealised as a white cube. Design objects were displayed as icons of the modern movement, as they mirror its aesthetics, space concept and research into new materials. However, they were presented as if it were art, as large-scale sculpture in white spaces, decontextualized and without information regarding the manufacturing process (Fig. 1). This exhibit strategy translates Barr's formalist reading of modern architecture and design, in which he puts political, ethical and social foundations into second place, dissociating aesthetics and ideology. While Kantor¹² considers "Barr's avoidance of political, economic, or social relevance in his schematized historical development of modernism created a neutral discourse that could be filled in from any ideological point of view", Tostões¹³ underlines this meets the economical, commercial and financial reality of the United States.

MoMA's discourse remained as the main reference for museums until the opening of Tate Modern in 2000 and the white cube became the 20th century dominant exhibition ideology.¹⁴ After MoMA's pioneering gesture, many museums of modern and contemporary art recognise the meaning of design, particularly modern design, by purchasing



Fig. 1. Exhibition *Modern Classics*, MUDE — Museu do Design e da Moda, 2012. © MUDE/Luís Ferreira 2012.

relevant pieces for their collections or dedicating exhibitions to it. The Centre Pompidou or the Stedelijk Museum are two examples of this new curatorial focus. MoMA aesthetic speech on modern design and architecture will shape its historiography, theory, pedagogy and imagery in the future years.

It the mid-20th century, spaces exclusively dedicated to design began to appear. In 1979, the *Bauhaus/Archiv Museum of Design* was opened in Berlin. Ten years later, two other important institutions were created: the *Vitra Design Museum* and the *Design Museum* in London. They putted on display mass-produced pieces, single pieces and prototypes, revealing their cultural significance, material innovation and new technology. In the meantime, historical museums summon contemporary creation to dialogue with their collections. An example is the Museum für Angewandte Kunst



Fig. 2. John Angelo Benson, *Mies Lobby Trap and Red/Blue, but Clean (Corrupted Modern Classic)*, 2003, exhibition *Down the borders*, MUDE — Museu do Design e da Moda, 2016. © MUDE/Luís Ferreira 2016.

(MAK), in Vienna. The initiative that made the museum gained notoriety was the strategy to invite artists to design new installations creating dialogues between applied arts, industrial design and contemporary art.¹⁵ In the first decades of the 21st century, museums and design centres multiplied around the world, exhibiting the creative energy of this discipline and the diversity of its approaches while several historical institutions underwent large renovations or extensions.¹⁶

Design concept is becoming increasingly wide-ranging. Comprises all the objects that surround us, is being conceived above all as a project methodology. The world we live in and the changes in the philosophy and practice of design are reflected in a shift in the curatorial strategy, audience engagement and collecting practices of the museums dedicated to it, putting new challenges and opportunities. Around the world, the content of exhibitions changes, presenting critical perspectives on the western development model, consume, design perception and designer social responsibility.¹⁷ Also relevant is the change in the museum's collections development policy that privileges the acquisition of pieces that show the changing present, like the emergent participatory movements, the urban violence, the digital communication, the new forms of protest, instead of purchasing extraordinary objects due to their aesthetic or technical quality. The acquisition by V&A of the world's first 3D-printed gun, some apps and e-cigarettes is a good exam-

ple and provoked a debate on the museum responsibility to collect and care the heritage of the present to future.

3. CURATE AND EXHIBIT MODERN DESIGN NOW

Modern design was first valued as an incentive to improve industrial production, then for its aesthetic value and, later, for its cultural significance, material innovation and new technology. Now it is crucial to develop a critical rethinking about it that can boost a broad debate on social responsibility and environmental sustainability. Especially knowing that our material culture and consumer society has transformed modern design objects into appealing images widely reproduced and consumed, with a series of copies, reproductions, re-editions or reinterpretations distancing themselves from the original concept (Fig. 2). Thus, each museum must rethink the curatorial themes and speeches centering the analysis on the ideology of the modern movement and its social concerns in order to trigger an intersubjective and self-reflective participation of each visitor. Put into analysis the production system itself and the economic development model of the neoliberal capitalism, discussing even the complicity of the functionalist logic and its contribution for the problems we face in cities, environment, territory and society. Thereunto, it is important to look beyond each modern object, contextualising it and documenting it, offering relevant economy, social and environment data



Fig. 3. Otto Nassar, mobile application *Teexels = pixels which become real trees*, 2015, exhibition *New World*, MUDE — Museu do Design e da Moda, 2018. © MUDE/Luís Ferreira 2018.

that help each visitor the understanding and interpretation of recent history and the present time. More importantly, it is necessary to have a courageous debate on the usefulness utility of each object, the value we give them, their consumption, life cycle and ecological footprint in order to discuss our product-oriented society. This perspective emphasises the object polysemic dimension, assessing the plurality of narratives and different points of view that each piece unleashes, as a prism from which it is possible to know man, culture and society. More than a history of objects, it is above all a complex history where thought and philosophy, religion, politics and economics intersect. This strategy obliges, however, an active participation on the public because only so can it will be possible to decode the message, establish references, learn and question. A deeper approach to modern design may represent the assertion of more informed, aware and critical users, instead of producing more consumers, as a result of the reassessment of our own attitudes, values, emotions and skills.

We are going through a profound transformation in our global society, standing by a new economic paradigm, growing technological complexity and renewed social demands. Cities are changing, and so is the way we live, work and in-

habit, but also learn, communicate, and move. When younger's generations seek alternative process of manufacture, returning to traditional handicraft techniques and investigates new forms of recycling, countless projects show a more widely ethical consciousness and a social responsibility. Instead of continue producing countless products, we need to design new attitudes (Fig. 3). To develop systems and services with a longer life cycle. This is probably the main argument for a "return" to modern movement, placing the nature of design under observation in order to seek the necessary new answers for the changing world. Understanding modern heritage gains a wider importance. Looking at its philosophy, ethics and legacy may help us reflect on our contemporaneity and how to design a sustainable and responsible development.

To this purpose, the exhibition must be understood as a manifestation of a broader, participatory and collaborative critical process. Not as an isolated and autonomous initiative, but rather as a place of experience, production and thought, in association with conversations, meetings or debates, enhancing a horizontal network of exchange and knowledge. In other words, more than being a space for representation and interpretation, the exhibition must be con-

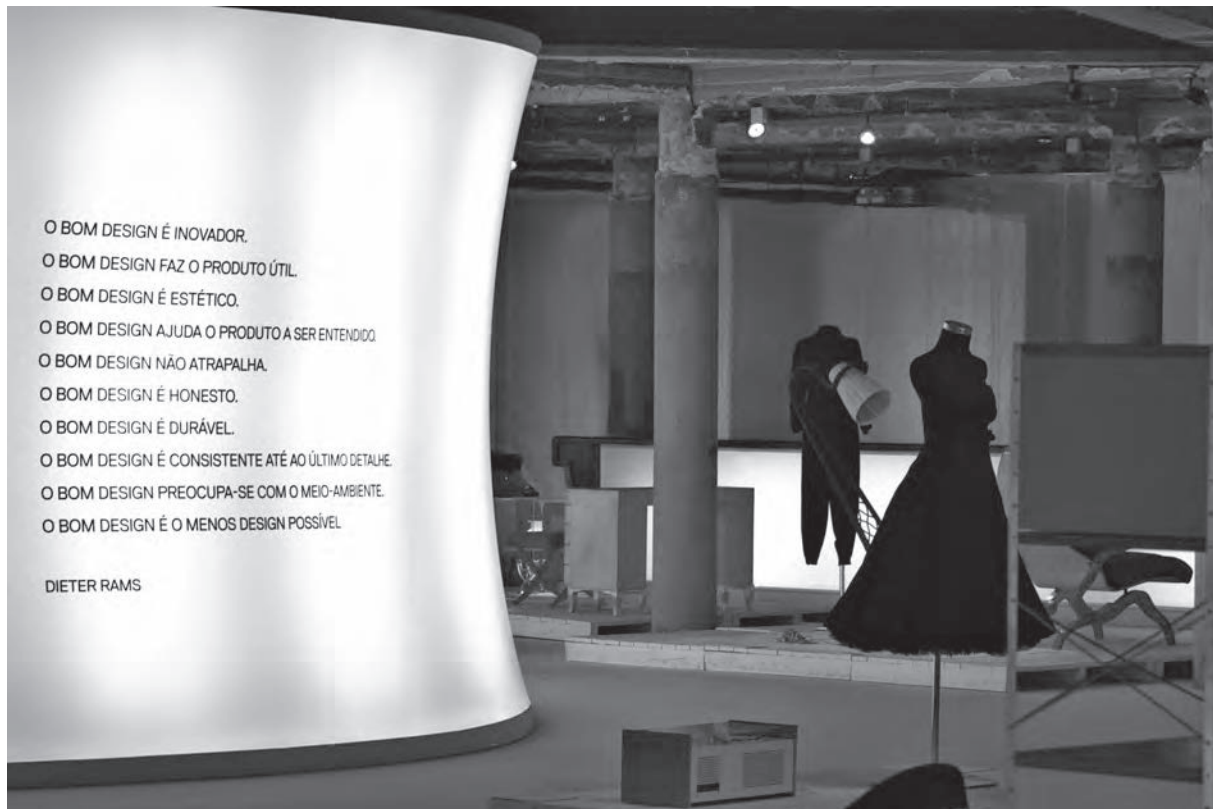


Fig. 4. Dieter Rams, *10 Commandments of Good Design*, in the center of the exhibition *Preview*, MUDE — Museu do Design e da Moda, 2009. © MUDE/Luísa Ferreira 2009.

ceived as part of a curatorial program of initiatives that takes place in parallel, not in a subsidiary way. The para-curatorial practice must assume, more and more, the same importance and meaning of the exhibition itself. Through the time, attention and deep consideration that all these moments mean, museums can arouse interest and the consciousness towards the new challenges and opportunities, helping the citizens to gain the essential capacities — think, imagine, create or criticise — and the sensibility for a subsequent and aware action in society. This means to replace the close, hierarchical, western and conclusive discourse by multiple open, encourage and empathic perspectives that raise questions. If so, 21st century museums can become a relational space, “something close to that mix of part community centre, laboratory, part academy, alongside the established showroom function that encourages disagreement, incoherence, uncertainty and unpredictable results”¹⁸.

4. A NEW DAWN, A NEW DAY, A NEW LIFE

*this old world is a new world
And a bold world*¹⁹

Curate and exhibit modern design nowadays can be a contribution to the urgent rapprochement of art and life, aesthetics and ethics towards an effective education for citizenship and social engagement worldwide. This paper considers that with a deeper and critical perspective into the philosophy, ethics and legacy of modern movement museums can work towards the necessary awareness of the real dimension of design as a transforming factor of man and society. Rethink modern principles of innovation, utility, simplicity, rationality, durability, quality and intelligibility show how valid these ideas are today, may assist the conscious and responsible praxis of design and aid the urgent redefinition of progress, production and consumption (Fig. 4). Helping finding answers to solve, better, to preclude problems as diverse as the migrations and growing of social cleavages; the humanitarian disasters and the climate change; the urban violence, lack of integration of the elderly population, illiteracy and info-exclusion; the new frontiers and the rise of nationalisms, fundamentalisms and political radicalisms. Then museums can encourage the intergenerational sharing of information and knowledge, helping shaping a world increasingly democratic, sustainable, global and humanist, looking at the planet as a common home.

NOTES

- 1 Bárbara Coutinho, "Curatorial Work Towards a New Relationship between People, Places and Things: MUDE museum action to boost the intrinsic relational value of culture" C. Morsch, A. Sachs, & T. Sieber, (eds.), *Contemporary Curating and Museum Education*, Zurich University of the Arts, Cultural Analysis, Germany, Transcript Verlag, Bielefeld, 2017, 65–74.
- 2 Claire Bishop, *Radical Museology or, What's 'Contemporary' in Museums of Contemporary Art?*, London, Koenig Books, 2013; Bishop, Claire, *Artificial Hells. Participatory Art and the Politics of Spectatorship*, London & New York, Verso, 2012.
- 3 Peter Vergo, *The New Museology*, London, Reaktion Books, 1989.
- 4 Minom-ICOM, *Declaration of Quebec — Basic Principles of a New Museology*, Sociomuseology IV, Cadernos de Sociomuseologia, Vol. 38–2010, 1984.
- 5 J. P. Lorente, "Estratégias museográficas actuais relacionadas com a museologia crítica", *Complutum*, 2015, Vol. 26 (2), 111–120, http://dx.doi.org/10.5209/rev_CMPL.2015.v26.n2.50422.
- 6 Accessed on June 2020, <https://icom.museum/en/news/icom-announces-the-alternative-museum-definition-that-will-be-subject-to-a-vote/>.
- 7 Christopher Frayling, *Henry Cole and the Chamber of Horrors. The curious origins of the Victoria and Albert Museum*, London, V&A Publishing, 2010, 89.
- 8 Anthony Burton, *Vision and Accident: The Story of the V&A*, London, V&A Publications, 1999.
- 9 Lucy Trench, V&A. *The Victoria and Albert Museum*, London, V&A Publishing, 2010.
- 10 In Portugal, in 1883, the Lisbon and Oporto Commercial and Industrial Museums were established, as a contribute for the country industrialisation and both were extinct in 1899. Bárbara Coutinho (ed.), *Museu Infinito: Joaquim de Vasconcelos (1849–1936) e o Museu Industrial e Comercial do Porto*, Lisboa, MUDE — Museu do Design e da Moda, 2019.
- 11 Gleen Lowry, Harriet Schoenholz Bee, & Michelle Elligott (eds.), *Art in our Time. A Chronicle of the Museum of Modern Art*, New York, The Museum of Modern Art, 2004, 29.
- 12 Sybil Gordon Kantor, *Alfred H. Barr, Jr. and the intellectual Origins of the Museum of Modern Art*, Cambridge / Massachusetts, MIT Press, 2002, 239.
- 13 Ana Tostões, *Cultura e Tecnologia na Arquitectura Moderna Portuguesa*, Tese de Doutoramento em Engenharia do Território, Universidade Técnica de Lisboa – Instituto Superior Técnico, 2002, 88.
- 14 Hans Ulrich Obrist, *Ways of Curating*, UK, Penguin Random House, 2015, 29.
- 15 Peter Noever, *Vienna by MAK*, Munich, Prestel Museum Guide, 2008, 4–5.
- 16 Among others, 21_21 Design Sight (2007); Triennale Design Museum in Milano (2007); Cité de la Mode et du Design (2008); MUDE — Museu do Design e da Moda (2009); *Holon Design Museum* (2010); Museu del Disseny (2015); China Design Museum (2018) or Bauhaus Museum Dessau (2019). In the case of historical museums that underwent renovations, Cooper Hewitt, National Design Museum — Smithsonian Institution reopened in 2014 and Museum für Gestaltung reopen in 2018, both after a three-year break.
- 17 *Design for the other 90%* (2007) and *Design with the other 90%: cities* (2011) both on Cooper Hewitt, National Design Museum; *Humble Masterpieces* (2004) and the online project *Design and Violence* (2013–2015) in MoMA; or *Disobedient Objects* (2014) and *The Future starts Here* (2018) in V&A, are examples of the ongoing debate.
- 18 Charles Esche quoted in Terry Smith, *Thinking Contemporary Curating*, New York, Independent Curators International, 2012, 213.
- 19 Nina Simone, *Feeling Good*, 1965 [songwriter by Leslie Bricusse / Anthony Newley].

A BRAIN NETWORK PERSPECTIVE TO APPRECIATE MODERNISM

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ABSTRACT.

This paper introduces the triple network model of brain complexity as a new way to appreciate modern architecture. The default mode network was discovered when neuroscientists recognized brain regions being suppressed when people engage a mental task, and it seems to support mind wandering or daydreaming, to include memories of the self, creativity, and visualizations of the future. The central executive network is used for attending to external stimulations. Evidence shows the default mode to be active when the central executive is not, and vice-versa. The salience network connects us to body sensations that generate feelings, and it tags information that may have critical value to life itself. The salience network drives switching between the default and the executive, meaning that we have a feeling for what is important and for when to switch between mind wandering and task execution. Speculatively, modernism has supported integration and honoring of the three networks. For example, Walter Gropius aimed to overcome the “prideful barrier” between artist and artisan, conceivably represented as imbalanced usages of the imagination of the default mode and the productivity of the executive. Perhaps the Bauhaus curriculum of Johannes Itten and others helped support brain network integration. The minimalist ethos shifts attention from the designer to end users, in alignment with the ideals of universal participation and expansion of dignity. Minimalism entices native saliences of the end users, such that modernist structures are the original “platform” technologies for human empowerment.

1. INTRODUCTION

The aim of this paper is to share from a perspective of complex systems neuroscience, why modernism matters. Toward this end, the paper introduces the “triple network model” which builds on “conceptual and methodological developments contributing to a paradigm shift in the study of brain function and dysfunction.”¹ Understanding the roles and relationships of the three large-scale brain networks may be a new way to appreciate the origins of the Bauhaus, the significance of its curriculum, and the value of the modernist legacy of minimalism.

2. THREE NETWORKS OF THE COMPLEX BRAIN

2.1. The Default Mode Network

The existence of the default mode was first recognized in 2001, after cognitive neuroscientists identified a connected network of brain regions that was active when subjects weren't being asked to perform any particular task.² This default state of the brain seems to be characterized by mind wandering, thinking about oneself and others, yet also imagination of the future. While studies soon showed how the wandering mind can be problematic for example through patterns of negative thinking that can lead to vicious cycles of maladaptive appraisal and behavior³, there is also recognition that rumination is the well-spring of creativity, such that “[o]n this view, creativity is not a special faculty possessed only by artists and inventors, but is instead the birth-right of every brain.”⁴ One can speculate that it was the default mode of Archimedes, that produced his bath-time insight about the principle of buoyancy. In modern times, the master of the default mode for science may be Albert Einstein, whose thought experiments are legendary, from travelling alongside a beam of light, to imagining a man with

various objects inside a free-falling elevator. If the default mode can bog us down in rumination, yet also be a source of genius, then what may drive the difference for going in one direction or another?

2.2. The Executive Network

A partial answer for how the default mode is regulated may rest in its relationship with the central executive network, which “is crucial for actively maintaining and manipulating information in working memory, for rule-based problem solving and for decision making in the context of goal-directed behavior.”⁵ The executive processes signals that come from both the external and internal environments, to organize information in ways that correspond to hierarchies of value, and to support direction of the body — to include speech and physical movement — for physical action. If the default mode is the student who gazes dreamily out the window, then the executive is the teacher who strikes a ruler to keep attention on drills and recitations.

The default mode and executive networks are usually active in “anti-correlated” ways, meaning that when the default mode is active, then the executive is off-line and vice-versa. It may be that executive competence for providing oversight opens the door for benefiting fully and with some abandon, from the novelty, spontaneity and free associations of mind wandering. A recent brain imaging study in 66 young adults has provided evidence to support the idea that “executive modulation of DMN [default mode network] activity optimizes creative ideation.”⁶

2.3. The Salience Network

As to whether the default or executive network is online at a given time, the main driver seems to be the salience network, which appears to be active in the presence of “almost anything a human might care about.”⁷ The salience network

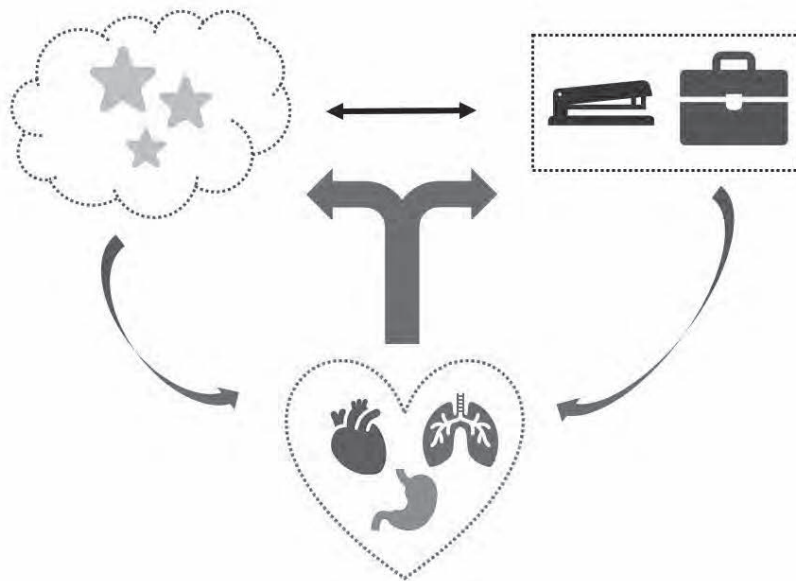


Fig. 1. Simplified depiction of three large-scale networks of the brain, after Menon¹⁰. The default mode (top left) associates with mind wandering, autobiographical memory, and visualization of the future. The central executive (top right) associates with stimulus-based task performance. The salience network (bottom) mediates body sensations related to core life maintenance. Black arrow indicates that the default mode and central executive are active at opposite times (they are shown active simultaneously in this figure for conciseness), and blue bold double-headed arrow shows that the salience network drives switching between them. Curved thin arrows indicate top-down influences on salience assignment.

appears to play a crucial role for assigning a “tag” to notable information of any kind, that comes from inside or outside the body. The essence of this tag is a body sense or an earthy feel for “reality” itself. It is the salience network that is active if we feel terror at the sight of a predator charging; disgust at a revolting behaviour; the “butterflies” of anxiety around an undetermined outcome; eagerness at the prospect of a meeting; motivation to pursue an objective; the “gut instinct”; the feeling that we are hungry or in pain; subtle awareness of changes in the functioning of our heart, liver, kidneys, or other body organs; awe of appreciating nature and its majesty; frisson of aesthetic pleasure; the attractions of sexuality; the warmth of compassion; the edges of aggression; the latent excitement of curiosity itself. As with the default mode, impairments in the salience network are shown in a wide range of disorders:

*The brain is constantly bombarded by stimuli, and the relative salience of these inputs determines which are more likely to capture attention... Emerging evidence suggests that atypical engagement of specific subdivisions of the insula within the salience network is a feature of many neuropsychiatric disorders.*⁸

A strong interpretation of the triple network model is that some sense of our body state may accompany all contents of consciousness. A feeling for a thing helps us to recognize the salience or life-value of the information, whether

to serve an immediate goal or a higher-order purpose that we might not even be fully aware of.⁹ This “directionality” for the motivation of thoughts by feelings, is sometimes called “bottom-up causation.” Yet, the power of the default mode and executive are such that they can also “go backward” to influence the way that the salience network goes on to tag information in later rounds of life experience. This process whereby freely chosen thoughts can exert “top-down causation” on our emotions is the very essence of education, as well as cultural creation and transmission. Fig. 1 shows interactions among the three networks in a cartoon form.¹⁰

3. BRAIN NETWORKS FOR ARCHITECTURE AND MODERNISM

3.1. The Integrating Brain of the Architect

The architect is an exemplar of the three networks well applied. Soon after we have met basic needs for food and water, what is more salient than to have physical shelter? The architect must have a salience network that is finely tuned, so they can attend to the endless needs and feelings that associate with a structure, from the immediate function and client preferences, to material factors, aesthetics at multiple scales of observation, and relationships to the larger community and natural environment. To an architect, virtually *everything has salience*. When it comes to seamless use of their brain networks, every architect must be an Einstein. They too must switch effortlessly between their de-

fault mode and executive worlds, applying their imaginations and free associations no less than engineering principles, regulations, and budgetary limits.

3.2. Brain Networks and The Bauhaus

3.2.1. SPECULATIONS ABOUT BRAIN NETWORK FUNCTIONS AND MODERNISM

In nineteenth century Europe, the negative consequences of early industrial revolutions were rampant. Economies based on mass production of goods by machines had created an industrial proletariat valued mainly for their ability to work at repetitive back-breaking labour in mines and factories. In England, William Morris and others produced an arts and crafts movement that took inspiration from medieval Christianity and a romantic view of unspoiled oriental aesthetics, to serve a socialist vision. Yet a rejection of the machine age was not a sustainable strategy, and ironically their fine goods came to be affordable only by the wealthy. Paraphrasing Veblen's 1902 critique of the William Morris legacy, Donald Bush wrote that

[A]ttempts to reform art in the industrial age and to inculcate aesthetic ideals must fall in line with the technological exigencies of the machine process. Otherwise, the movement can be but an inconsequential fad, an exotic in the hothouse shelter of decadent aestheticism.¹¹

In Germany the response to the industrial age took a different turn. "[W]here the Arts and Crafts workshops in England had rejected methods of machine production, Germany embraced them with open arms."¹² This spirit was exemplified by the Fagus factory of Walter Gropius and Adolf Meyer, begun in 1911, and Gropius would go on to be founding director of the Bauhaus.

In the Bauhaus Manifesto, Gropius famously criticized the "prideful barrier between craftsmen and artists," and envisioned creators of the "new building of the future that would unite every discipline."¹³ Yet what could have driven him to make such a bold claim, one that would entail the uniting of the Weimar School of Arts and Crafts with the Academy of Fine Art, to become a single institution that modelled itself on the training system of medieval guilds? I speculate that Gropius intuited, and deeply, that humanity was at a new moment, and one which demanded a whole new approach to the built environment. Nietzsche's writings had dismantled confidence in old teachings, and the experience of World War One made even more clear that the modern world would require the creation of new values. Magdalena Droste notes that even in the years before the war, there were popular movements in Germany whereby

[f]or the first time youth was taken seriously as a generation in its own right... [t]he education system saw the spread of activity-based teaching... [t]he young and middle classes discussed and practiced vegetarianism, naturism, and anti-alco-

holism.¹⁴

I speculate that Gropius recognized a kind of fracturing in the human psyche, caused by industrialization, and one expression of it was the disjunction between "fine arts" and "building things." And perhaps a dissonant state of the human who was still recovering from the shock of the industrial age, and whose healing Gropius envisioned, was the brain beset by a division of network labours. Artists commanded the default mode for realms of the imagination and used their executives to organize the finer features of their creativity, to produce "salon art", as Gropius put it in his Manifesto.¹⁵ Unlike in medieval times, craftsmen were now limited to the executive functions of task performance and being proficient at them. Was it integration of these networks, or new forms of virtuous cyclical interactions among them, that was the aim of education at the Bauhaus?

3.2.2. THE BAUHAUS AS A CRUCIBLE FOR BRAIN NETWORK INTEGRATION

I can think of no way to test the hypothesis, either that brain networks were in a state of dissonance in the aftermath of industrialization, or that Walter Gropius intuited such a state at the dawn of a new era and was thereby motivated to found the Bauhaus. Nonetheless the heuristic value of this speculation is to help us appreciate the logic of the Bauhaus curricular innovation, which has gifted us profound and continuing influences on architecture, colour theory, industrial and consumer design, typography, and other fields. A brain immersed in fine arts, that is dominantly engrossed in its mind-wandering default network, may have little impact outside itself. A brain over-focused on rule-based problem solving, dominated by a rigid executive network, may be impoverished for new thinking or transformative vision. Recovery of healthy usage of one's salience network — or a clear and authentic connection to the *feeling of feeling*, even if it's for the first time — may be critical, as the source of passion for creation itself.

If the Bauhaus aimed to produce designers with new kinds of brain functionality, then Johannes Itten was a fitting figure as its first head of curriculum. Itten led students in the use of various exercises and regimens — physical gymnastics, breathing techniques, vegetarian diet, sexual abstinence, musical training, dramatic arts — that conceivably helped knead the physical tissue of the brain into a more compliant state for remodelling, and then guided them in lessons such as the union of "intuition and method" or "subjective experience and objective recognition," to create "direction and order out of flow."¹⁶ One of Itten's mottos was "Play becomes party – party becomes work — work becomes play."¹⁷ Through its highly personal program for helping students connect to their rhythms, did the Bauhaus curriculum support an advancement of brain functional connectivity¹⁸, for new builders of new objects for a new world? Perhaps along similar lines, it has also been proposed that a contem-

porary form of art therapy may promote advantageous interactions among the three networks¹⁹, and such a hypothesis is empirically testable.

Moreover, it is tempting to read a process of network integration from the full historical trajectory of the Bauhaus curriculum. Creativity begins with the mind-wandering, playful, and loose associations of the default mode, and thus it was Johannes Itten and other expressionist masters who successfully stewarded the first stage of the school's life. Within a few years, Gropius himself had grown impatient with Itten's mysticism and rejection of commercial production, which is to say that it was time for the brain's central executive network to come "online," and the Bauhaus shifted greater attention toward trade workshops and technology. Vilmos Huszar, a critic of the expressionists, complained that "Everyone does what they feel like at the time, far removed from any strict discipline... Where is there even an attempt to create a unified work of art, a unified configuration of space, form, colour?"²⁰ Finally, it was not until the last years of the Bauhaus, under Mies van der Rohe, that Gropius' dream of a school for architecture was fulfilled. To achieve the scale and scope of his original ambition, and in the context of his times, perhaps it is entirely natural that it took as long as it did for the school he founded to produce new kinds of creators for new buildings and other objects, who would transcend disciplines. How long does it take for a new school faculty to be well integrated in their brain network connections, such that they can be outstanding supporters of students in the development of their own network connections and integrity?

3.2.3. MINIMALISM AS A WAY TO HONOR THE SALIENCES OF THE END USER

Let's consider the minimalism that is the signature legacy of Bauhaus design. The lasting value of minimalism as a design language lies in its humility, in that it shows every kind of sincere effort to erase its own existence. While it contains its own aesthetic, minimalism is also a statement of respect for the user, not the designer. Any minimalist space or structure creates a lotus-leaf platform against which every act of the user's consciousness becomes highlighted.

Today there is no more ubiquitous and powerful example of minimalist design, than the smartphone. A mere black slab when off, its pixels can come to life in an infinitude of different applications, all underpinned by the slab's intention to amplify the dignity and genius of, again, its *user and not its designer*. Though technology companies have heightened our appreciation for the power of *platforms*, we do well to appreciate the original platforms of modernity: the physical structures made possible by modernist architects.

Modernist structures have supported more people to participate in civil society, with efficiency, openness, and conscientious non-obtrusiveness that encourages looking into one's own heart for guidance — *one's own signals of salience in one's own present*, distinct from the saliences of the

past. Winston Churchill did say that "we shape our buildings; thereafter they shape us"²¹, in his desire to preserve an historical mode of party politics. In contrast, in my personal opinion, modernism can be interpreted as a movement for brain network integration, and one that entails more optimism around what we can create from new beginnings and the unknown. The modernist builds platforms, and thereafter platforms can elevate the human.

4. CONCLUDING REMARKS

Why do we find it hard to appreciate modernism? I can think of at least three reasons. In the first place, and as Wessel de Jonge has stated, "[T]he conservation of these buildings posed an ethical dilemma: they were designed by architects who held critical anti-monumental stance"²², such that excess care for these work risks contradicting the modernist spirit of change and renewal. Second, we take the modernist contributions for granted, especially their ethos or design language that integrates aesthetics with functionality and industry. Does minimalism need re-invention? The discovery of "zero" needs only happen once in the history of mathematics. Third, in many ways modernism has succeeded "too well," and perhaps the human salience network likes to appreciate the luxury of unexpected flourishes, complexities, and even inefficiencies — elements that were mostly experienced as a burden before the modern age.

At all events I contend that the modern movement, through its motivations, its means, and its legacy, may align with advancing integration of brain functionality itself. Today the world is unexpectedly partisan, such that opinions we previously expressed with civility, can become triggers for downward spirals, and expressions of salience that we can hardly admire. Unexpectedly, the ideals and universal dignities heralded by modernists may not only wilt from neglect, in some cases they are under attack. Modernists have more than earned our respect. We may do well to find new ways to express our appreciation, not out of duty to our predecessors, that they would reject in their modernism, rather because valuation is the first step for basic maintenance of the omni-potential platforms they gave us, which have physical, aesthetic, scientific, social, cultural, intellectual, and even spiritual dimensions. That we can fail to remember their contributions, and that they sometimes obscure the traces of their own existence, are awakening testaments to their very significance.

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NOTES

- 1 Vinod Menon, "Large-scale brain networks and psychopathology: a unifying triple network model", *Trends in cognitive sciences*, 15.10 (2011), 483.
- 2 Marcus E. Raichle, et al., "A default mode of brain function", *Proceedings of the National Academy of Sciences*, 98.2 (2001), 676–682.
- 3 Akansha Mohan, et al., "Focus: the aging brain: the significance of the default mode network (DMN) in neurological and neuropsychiatric disorders: a review", *The Yale journal of biology and medicine*, 89.1 (2016), 49.
- 4 Kieran CR Fox & Roger E. Beaty. "Mind-wandering as creative thinking: neural, psychological, and theoretical considerations", *Current Opinion in Behavioral Sciences* 27 (2019), 128.
- 5 Menon, 495.
- 6 Adam Sunavsky & Jordan Poppenk, "Neuroimaging predictors of creativity in healthy adults", *Neuroimage*, 206 (2020), 116292, 1.
- 7 William W. Seeley, "The salience network: a neural system for perceiving and responding to homeostatic demands", *Journal of Neuroscience*, 39.50 (2019), 9878.
- 8 Lucina Q. Uddin, "Salience processing and insular cortical function and dysfunction", *Nature Reviews Neuroscience*, 16.1 (2015), 55.
- 9 Antonio R. Damasio, *Descartes' error*, Random House, 2006.
- 10 Menon, 500.
- 11 Donald J. Bush, "Thorstein Veblen's Economic Aesthetic", *Leonardo*, 1978, 284.
- 12 Magdalena Droste, *Bauhaus, 1919–1933*, Taschen, 2010, 11.
- 13 Walter Gropius, *Bauhaus Manifesto*, 1919, accessed 11 June 2020, <https://bauhausmanifesto.com/> 14.
- 14 Droste, 14.
- 15 Gropius.
- 16 Droste, 25.
- 17 Droste, 37.
- 18 Sung W. Lee, "A Copernican approach to brain advancement: the paradigm of allostatic orchestration", *Frontiers in human neuroscience*, 13 (2019).
- 19 Vija B. Lusebrink & Lisa D. Hinz., "Cognitive and Symbolic Aspects of Art Therapy and Similarities With Large Scale Brain Networks", *Art Therapy*, 2019, 1–11.
- 20 Droste, 54.
- 21 Churchill made this statement in 1943, to argue for rebuilding of the House of Commons in its previous form, as a way to preserve the party system. accessed on 16 April, 2020, <https://api.parliament.uk/historic-hansard/commons/1943/oct/28/house-of-commons-rebuilding>.
- 22 Marieke Cornelia Kuipers & Wessel de JONGE, "Designing from heritage: Strategies for conservation and conversion", 2017, 17.

HOUSES WITH A NAME. TOWARDS AN INVISIBLE HERITAGE

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ABSTRACT.

The collection *Houses with a name*, of which two titles have already been published, demonstrates the pertinence that an editorial project such as this can have in documenting and conserving the heritage of the Modern Movement, while also highlighting the didactic potential offered by a combination of architectural research, literary writing, illustrations and graphic design.

This paper begins with a critical look at the project's antecedents in the history of architectural theory, examining both the particular interest of the houses of the Modern Movement (seen from the viewpoint of the writing of their stories, and even the rewriting of their history) and the potential that this research strategy and the subsequent dissemination of knowledge can have for conserving and revitalising the architectural heritage of this period.

The project *Houses with a name* offers a critical rereading of the History of the Modern Movement, removing some taboos and preconceptions, by recognising the artistic and human dimension of these architectures, habitually regarded as purely object-like icons. It recovers the Corbusian (and not literally mechanistic) expression of a *machine for living in*, as a metaphysical or (as Le Corbusier would say) a *spiritual* idea.

The experience acquired in the editing, publication, launch and reception of the collection by both children and adults highlights the importance of the book as an aesthetic object, itself also a form of architecture, underlining the renewed recognition that the narrated architectures reacquire through the readings of their stories and the rereading of the history of our discipline.

1. OVERTURE

When discussing the documentation and conservation of modern heritage, it is perhaps pertinent to mention a project such as the collection of illustrated children's stories, *"Casas com nome"*¹ (Houses with a name), due to its experimental nature in the context of more conventional architectural research. This editorial project is paradoxically centred around an old common place — the house. *"Let's talk about houses as people talk about their souls"*, said the poet Herberto Helder, thus using words to draw the invisible side of architecture.

Widely explored in literature, philosophy and other areas of knowledge, the theme of the house has been reduced by the mother discipline to a set of views that are either overly academic or — just as bad — images crystallised as heritage corpses with no interior life. This invisible side, evoked by Herberto Helder, is particularly interesting because it offers us clues for further consolidating the timelessness of these architectures.

It would be interesting to begin by revealing the antecedents and references that preceded our work.

Challenging the very limits of architecture as a discipline, the stories that are told in these books, besides being real ones based on documentary evidence, also contain elements of fable, novel, prose, illustration, drawing and composition. Paradoxically, the project's unequivocally experimental nature similarly has several very solid points of support grounded in tradition.

As in all architectural acts, and despite their inseparability, this project's points of support can be divided into both

theoretical and practical ones.

From the practical point of view, we have the houses and their stories, as we shall see later on. From the theoretical point of view, which is where we begin this essay, we can find some antecedents that should be considered in this context, namely some examples taken from the treatise writers, whose affinities we shall attempt to point out.

Special emphasis is given to two of these authors: Filarete and Palladio.

2. FILARETE AND THE BOOK OF ARCHITECTURE

Filarete is mentioned here because of the simple and evident correlation that exists between the pages of his treatise², written in his own hand, just like the naïve drawings that illustrate the text and afford the document an almost child-like tone, in the substantial sense of this term.

As far as these illustrations are concerned, their apparent ingenuousness derives from Filarete's choice to draw them in perspective (frequently "not a very rigorous one"). It was in this way that he sought to explain and illustrate the ideas conveyed in the text.

Or, in other words, Filarete removed all of the technical and disciplinary emphasis from his document, making it accessible to everyone (indeed, it is perhaps not by chance that *The Book of Architecture*, as Filarete liked to entitle his treatise, was written in the vernacular language — and not in Latin — so that it could be more widely understood).

Again, as far as the writing is concerned, Filarete chose to use the form of a dialogue (which came from the ancients and which Filarete recovered) between the commissioner of

the work and the architect, or, in other words, in the form of an invented conversation between the Duke of Milan, Francesco Sforza, and himself.

Above all, these dialogues have a didactic dimension that is underlined by the client's permanent doubts and by the architect's attempts to respond to his queries more clearly.

3. PALLADIO AND THE FOUR BOOKS OF ARCHITECTURE

Palladio's treatise, to which he gave the name of *The Four Books of Architecture*³, was also written in the vernacular, so that it could be read and understood by everyone, and it was accompanied by didactic illustrations (rigorously chosen and drawn), to which the text makes permanent references. Here the ideas are always constructed from the presence of the text and the images alongside one another.

Palladio, however, replaced Filarete's dialogues by placing the client himself in the short history (which can also be read as if it were a project brief) that narrates the purpose of each of his private works (we are referring, above all, to houses, whether in the form of urban palaces or in the form of rural villas).

In Palladio, the houses, whether designed or built, take the name of the clients themselves, through the author's own initiative. In the writing of the treatise, he actually highlighted this most important piece of information, underlining it through the use of capital letters, as we can see in Villa Almerico⁴, better known today as the Villa Capra (because it was later bought by the Capra brothers), or as the Villa La Rotonda (because of its centralised floor plan, a typological option that evidently reflects the fundamental premises of the design itself).

Each house, as we ourselves would say, has its own name, and they are each described and justified in the treatise, where even the project's fundamental typological and urbanistic options are discussed and, in the more interesting cases, considered from the point of view of the client's own wishes and intentions. The Villa La Rotonda, with its four iconic porticoes turned to face the four cardinal points, has been disseminated across the whole world, but that apparently objectual architecture is the result of a very intimate dialogue between the architect, the place and the client.

What we can see in the example taken from Palladio, more so than in Filarete, is the association of a name with a house as the moment when the experience of that concrete architectural object becomes more intense, or, in other words, as the theme of the project.

4. OTHER LENSES

We believe that architecture (like art) gains another meaning, another density, when it is seen through a lens that tells the history of its process.

Narrating that story therefore gains even greater impor-

tance as an essential element for the appreciation of architecture, without which the sensory and aesthetic experience of the finished object is penalised because of the merely superficial appreciation that the five senses can give us in only a limited manner.

That is why this story — precisely in its condition as History — is absolutely indispensable to the architectural experience and, because it is indispensable, it deserves to be (and must be) told. And this can be done in many different ways — either in a more documentary tone, or in a more romanticised manner, to the point where one may discuss whether, in the world of cinema, the documentary is the most appropriate cinematic genre for enabling us to see and understand architecture, when compared with films in general. Apropos of this, we could give countless examples of films that, more than any documentary register, have immortalised architectures and cities in such a way as to encapsulate their very essence.⁵ In other words, frequently by filming houses as period pieces, they enable us to see the use and effective experience of architecture by people, even if these are themselves personified by characters in a film.

And the same could be said of literary writing in general, and particularly of the novel, which, in a certain way, is immediately present in Filarete's *Book of Architecture*.

5. THE MODERN MOVEMENT EXPLAINED TO CHILDREN

The project *Houses with a name* set out to return to this line of thinking, but at the very moment when the appropriate register was found for a sensitive and didactic narrative construction that could be understood by everyone (especially non-architects), it embarked upon the path of Lyotard's *The postmodern explained to children*, a title whose formulation we have appropriated here.⁶ In other words, it was thought that the best way to tell the brief histories of the houses of the modern movement (which, in our view, and to quote yet another treatise writer from Renaissance times, "needed to be saved from extinction", as Alberti used to say about ancient architecture) would be through a book "ironically 'designed' for children"⁷ in which the illustrations, together with the text, open the doors of children's imagination, which, ultimately, we all continue to safeguard.

As far as Docomomo is concerned, the *Houses with a name* that have been chosen for this collection⁸ are always related with the Modern.

Obviously, what these houses escape is not the commonplace (which does not present a problem, as Heinrich Tessenow's small houses clearly show), but stereotyping, insofar as the negative, pre-formatted and pre-determined aspects of a house are concerned, in a child's free and open imagination.

Contrary to the way it may seem, modern houses are particularly stimulating for the purposes of storytelling. They are *machines for living in*, accordingly to the original



Fig. 1. Joana Couceiro, Mariana Rio, *A casa do senhor Malaparte* and *A casa da doutora Farnsworth*, Porto, Circo de Ideias, 2015, 2018, book covers. © Circo de Ideias and authors.

sense that have been given to the expression by Le Corbusier himself, or, in other words, in the sense of their being mechanisms for dwelling purposes. The expression *machines for living in* does nothing more than convey the dramatic intensity that endures in the brief histories associated with these houses and which we have sought to recover through this collection, as well as, perhaps, in the already-mentioned expression used by Alberti, saving them from extinction.

6. HOUSES WITH A NAME

In the formulation of their titles, *A casa do senhor Malaparte* and *A casa da doutora Farnsworth* (Fig. 1), both of which have already been published, are books that confirm the erasure of the authorship of the houses and its replacement with the name of their inhabitants.

The process of constructing these histories is always the same: first of all, research, as if it were an architectural object that needed to be dissected; then putting together all the photographic images from that period, as well as up-to-date ones, on which the effects of time and use have left their marks; and, after this, reflecting on what explains, and doesn't explain, what we can only intuit; and then, finally, writing a text to be read to (or by) a child who, in the end,

may be any one of us (Fig. 2). In this way, this writing attempts to assume the musicality that is peculiar to the nonsense poems and tongue-twisters of the oral tradition, not denying the rhyme nor ending there. It is a form of writing that seeks to use the sound of the words and their multiple meanings to emphasise both the drama and the restfulness of the stories.

(...)

*Doctor Edite is a different woman,
a 'fish out of water'
(as we usually say).*

*Mies, the architect, accepted the enormous challenge.
He invented a house that looks like an aquarium,
but without water,
for the 'fish out of water' to live in.*

*Edite liked the idea.
The 'fish out of water',
inside the aquarium without water,
was finally able to feel like a fish in water.
(...)⁹*

A casa do senhor Malaparte and *A Casa da doutora*

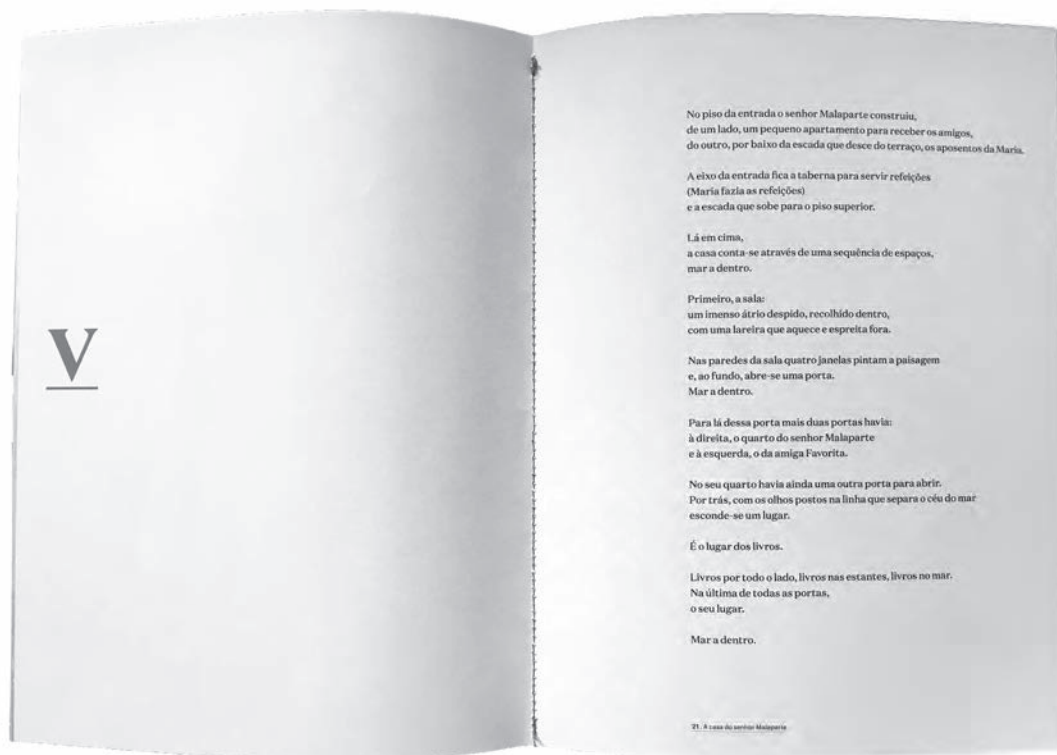


Fig. 2. Joana Couceiro, Mariana Rio, *A casa do senhor Malaparte*, Porto, Circo de Ideias, 2015, chapter 5, p.20, 21. © Circo de Ideias and authors.

Farnsworth enhance the possibilities of a very intense reading of these buildings, both from the point of view of the architectural objects and their domesticity.

They are books that, while being about architecture, seek to talk about these houses “as people talk about their souls”, linking them to the life within them: architects who are the client, clients who themselves become the architect, relationships that are built with the houses, relationships that end with them...

They are books that explore these architectures according to a literary and image-based dimension, making it possible to reach a wider audience, without any constraints, as well as to penetrate into common territories.

They are, therefore, books that cannot be categorised, filled with an interpretive intensity and an explanatory potential that can be measured by the child’s constant need to ask “why?”, when faced with the unknown.

7. TOWARDS AN INVISIBLE HERITAGE

At the various launches of the books, we witnessed this thirst for knowledge. The reading of the text aloud and the analysis of the illustrations (by the writer and the illustrator) gave rise to a number of questions, doubts and problems that, significantly, focused on the real existence of the built

houses as architectural artefacts that the authors dissected in front of the children through photographs (often records from the particular period) or that they simply invoked by thinking aloud (Figs. 3 & 4). The real short histories associated with those houses reacquired, at that moment, the utmost importance in the exegesis of the text and its illustrations. Significantly, also, the adults who accompanied the children were interested in the density that was conferred upon the chosen houses: from the gestation of these architectures (i.e. the history of the vicissitudes of their designs) to the narrative sequel that was set in motion through their appropriation by the inhabitants.

Those *Houses with a name* were (and may they continue to be) genuine living bodies, with a soul, identity and name.

The material and concrete reality of architecture is the built work, at the time, today and in the future. However, there is always an immaterial dimension to architecture that is not exhausted in its stones (which Aristotle referred to as metaphysics) and which remains in the collective space through this *little Great Oral Tradition*. This oral tradition has resonances that are recognised by the author herself, in the writing of Agustina Bessa-Luís (to take an example from Portuguese literature). It is inseparable from the very reality of things, which is, in itself, contradictory and paradoxical, always depending on people’s points of view (just as archi-

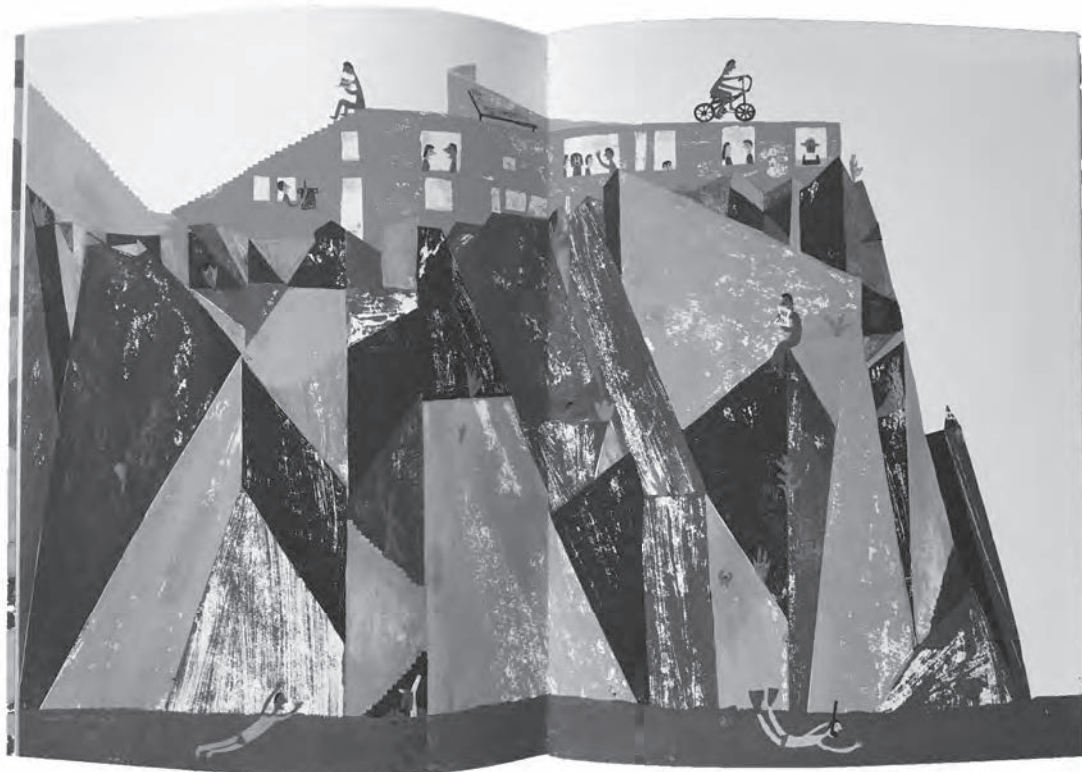


Fig. 3. Joana Couceiro, Mariana Rio, *A casa do senhor Malaparte*, Porto, Circo de Ideias, 2015, chapter 4, p.18, 19. © Circo de Ideias and authors.

tectures are: always *complex and contradictory*, as Venturi would say).

This reality could be observed in the way that the children talked about the stories of the *houses with a name* after the book launches, frequently posing absolutely pertinent questions that the story, History, indeed both of them, can never manage to completely answer. For example, in the passionate dispute between Edite Farnsworth and Mies: who, after all, was right?

8. FINALE

From everything that has been said, it can be concluded that we are in agreement with the idea that Le Corbusier expressed when he said that “rien n'est transmissible que la pensée.”¹⁰

In other words, once the question of the flood plain at the *Farnsworth* house had been dealt with, it was the past history of its permanent flooding that remained with us through the fable of the *Casa Farnsworth*, transformed into a large fish tank, which the illustration has transfigured into an icon and, in that sense, if the text represents a reference to the oral tradition, then the illustrations amount to a kind of iconography of the *Houses with a name*.

Seen from a future perspective, this collection will continue to be a documentary source of those architectures, even though, as happened to the treatise of Vitruvius, one day all the images may be lost, or, as Alberti said about *De Architectura*, the text becomes relatively incomprehensible since, in his own words, “to the Latins, it seems Greek, while to the Greeks it seems Latin.”

This essay seeks to reflect on the role that an editorial project such as this can play in conserving the fatally lost soul of these houses of our modern heritage, as well as to defend literary narrative and artistic illustration as ways of disseminating and safeguarding the history (now invisible to the naked eye) of the countless *Houses with a name* that modern architects have heroically succeeded in building.

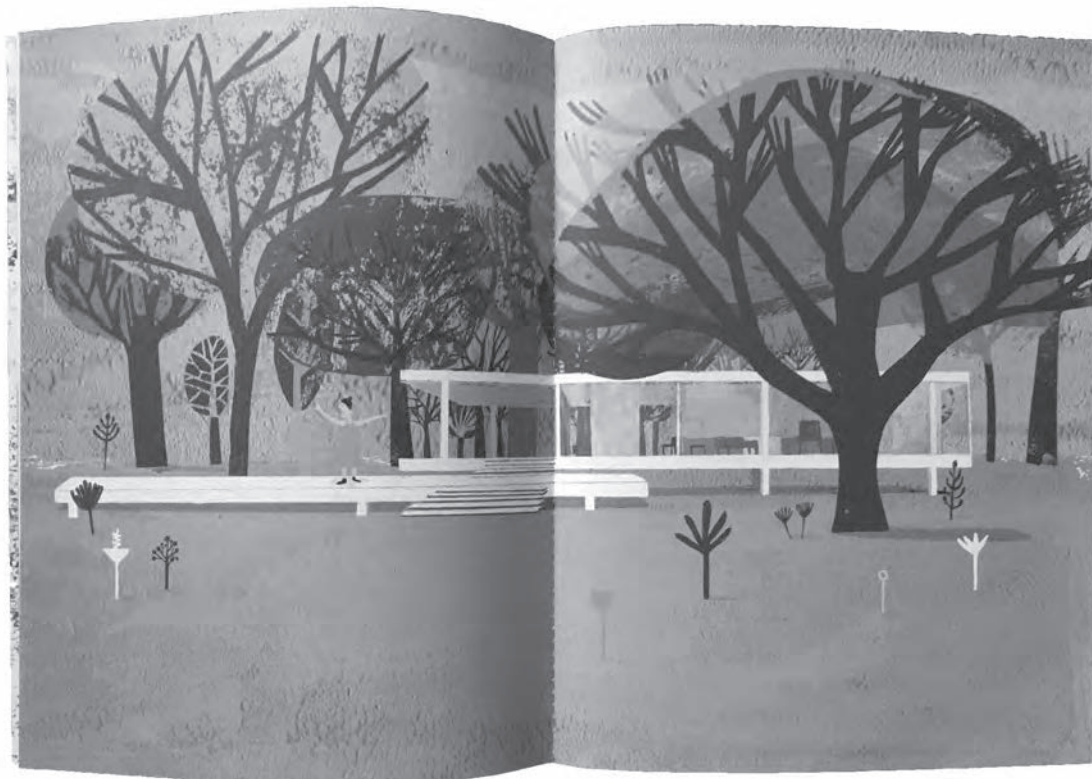


Fig. 4. Joana Couceiro, Mariana Rio, *A casa da doutora Farnsworth*, Porto, Circo de Ideias, 2018, chapter 3, p.14,15. © Circo de Ideias and authors.

NOTES

- 1 *Casas com nome* is the title of a collection published by Circo de Ideias, written by Joana Couceiro and illustrated by Mariana Rio.
- 2 Filarete, *Trattato di architettura* (2 Vols.), Milano, Il Polifilo, 1972, 1st ed., 1460–1464/5.
- 3 Palladio, [*I quattro libri dell'Architettura*] *The Four Books of Architecture*, New York, Dover, 1965, 1st ed., 1570.
- 4 Idem, 41.
- 5 We mention, by way of example, the work of the Smithsons (*the Economist Building*) in the film *Blow Up* (1966), by Michelangelo Antonioni; or the Casa Malaparte itself in Jean-Luc Godard's *Le Mépris* (1963), or even the city of Porto in *Douro, Faina Fluvial* (1931), by Manoel de Oliveira, a testimony to a Porto that now only exists in the film.
- 6 Jean-François Lyotard, *O pós-moderno explicado às crianças, correspondência 1982–1985*, Lisboa, Publicações Dom Quixote, 1987.
- 7 Jean-François Lyotard, op. cit., [a note by the French publisher], 9–10.
- 8 Although it may undergo some alterations, the plan for the collection includes the following books: *A casa do senhor Malaparte* [published], architect, Adalberto Libera, 1942; *A casa da doutora Farnsworth* [published], architect, Mies van der Rohe, 1945–51; *A casa da mãe Carlota* [in progress], architect, Le Corbusier, 1923; *A casa da avó Vanna*, architect, Robert Venturi, 1962–64; *A casa da família Muller*, architect, Adolf Loos, 1930; *A casa de férias dos Smithsons*, Alison & Peter Smithson, 1959–62.
- 9 Joana Couceiro, *A casa da doutora Farnsworth*, Porto, Circo de Ideias, 2018, 13.
- 10 Le Corbusier, *Œuvre Complète*, W. Boesiger (ed.), Zurich, Les Editions d'Architecture, 1965, Vol. 8, 168. This is a reference to the publisher's note, which accompanies the quoted title: "The following was written by Le Corbusier one month before his death. It is the last thing he ever wrote. It reads like an autobiographical monograph, like an intellectual testament, or like the dialogue of a man with himself in the act of summing up his life's work."

7

DOCUMENTATION AND DISSEMINATION

Session 7-a

MEDIATION OF ARCHITECTURE, MEANS AND EFFECTS

Richard Klein

Professor at the Faculty of Architecture and Landscape at the University of Lille, researcher at the Lacth

For several decades the history of architecture has no longer been content to examine buildings from the point of view of cultural history and material history, but has devoted itself largely to the analysis of representations of architecture and their dissemination. The press, exhibitions, expressions of opinion (users, residents, specialized critics) theoretical or doctrinal texts, images, products of institutional or popular consecration, advertising, cinema and the media in general are examined and provide information on the processes of dissemination of references, professional recognition and heritage practices. The widening of the field of study has considerably enriched the history of architecture and opened up to new interpretations. The call for papers from the 16th docomomo conference mentioned how photography and cinema in the 20th century became partners in architecture and contributed to the dissemination of models, experiences and theories of architecture in Modern movement. These different diffusions have contributed to the spread of modern ideals in society. They have also contributed in some cases to distort reality.

Voluntary and intentional the dissemination of images of modern architecture is the work of architects and all professional networks related to construction who seek to disseminate their experiments, their ideas, their products or the proofs of their know-how.

We all know of architectures whose historical importance is more the result of iconographic dissemination than concrete experiences of users or potential visitors. The importance of the images is such that certain architectures have only been consecrated from the point of view of the representations which have been disseminated. Nowadays, several famous houses are brought together under the term of «Iconic Houses» to the point of sometimes forgetting that they have a material and tangible reality.

If the dissemination of images has been a very positive

factor in the dissemination of the forms and ideals of the Modern Movement, it has at the same time caused distortions between the constructed realities and the images disseminated. Thus, the dissemination of mainly black and white images deprived early commentators and observers of modern architecture of color considerations. The retouching of the photographs sometimes removed the environments or even certain details which seemed unsightly to the designers or the persons in charge of the publications.

In some cases, the dissemination of images very positively favored the distant reception of modern architecture, while local and user receptions were particularly critical.

We can therefore easily imagine that the intensity of the diffusion of the Modern Movement has sometimes caused distortions between perception and uses, between image and reality.

Architecture, unlike other artistic objects such as literature or painting, is the object of sometimes pragmatic, utilitarian and prosaic uses. The architecture is localized. However, the dissemination of images is generally done outside the context of uses and the effects of localization. The relationships between local broadcast and reception are the source of discrepancies and sometimes explain the forgetfulness of history, differences of appreciation and conflicting heritage situations. The popularization process of modern architecture, through the dissemination of its representations, contributed to the communication of the formal principles of modern architecture to the point of sometimes making them popular. This popularization has also contributed to outrageously simplifying the doctrines, theories and architectures of the Modern Movement by reducing them to their iconic function.

Modern architecture is born and grows alongside developments in mass media, so it must take on its advantages and disadvantages.

This session concerns four countries and therefore four different situations which, however, reveal commonalities in the means and effects of the promotion of the architecture of the Modern Movement. Carol Hardwick shows how modernism was disseminated in Australia during the 1930s through the photographic documentation reproduced in publications. She underlines the importance of popular, non-professional journals in this process but also the weight of industries such as glass and the importance of study trips abroad in the dissemination of models. Àgnès Anna Sebesteyén describes how, in the Hungary of the interwar period, the power of the photographic image and its universal character are the instruments of an effective dissemination of information. Through the figure of the architect Virgil Bierbauer and the review *Tér és Forma* (Space and form), shows the importance of professional networks and personal relationships in the diffusion of international models in Hungary and the diffusion of Hungarian architectures towards other countries. Masaru Kawashima insists on the implication of several Japanese publishers and on the ef-

fects of their productions in the dissemination of the Modern Movement to a wide range of readers: construction contractors, wealthy elites, academia, cultural figures. These publications of works supported by the militant character of certain publishers had delayed positive effects on the development of territory in Japan after World War II. Pablo Arza Garaloces shows how, in the mid-1950s, Spanish architecture attracted the attention of foreign publications. The role of periodicals in popularizing Spanish modernity is fundamental, but it is only one aspect of the dissemination and promotion of architecture. Periodicals are part of a chain that includes many actors: building companies and component manufacturers such as those who use aluminum, events such as international exhibitions and awards, architects and their networks professional or interpersonal. It is from these dissemination instruments that the return effects are felt in Spain.

These presentations which inform us about national situations regarding the dissemination of Modern Movement open to questions about our contemporary situation.



DEMOCRATIZING ACCESS TO MODERN ARCHITECTURE IN THE INTERWAR ERA

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ABSTRACT.

Today's Internet-based exchange supports instant and global access to architecture's mediatized forms. During the interwar period, information about architectural production was also put into circulation, but in a different scale and technological environment. Photography and print culture prevailed, which had the potential to distribute information rather quickly and democratically. However, the dissemination of both textual and visual information still depended mainly on the human element: especially on editors, correspondents and architects, who played an active role in the mechanisms of the publication system. The final product was the printed page, which democratized the access to architectural production in a global scale.

I examine the leading Hungarian architectural journal *Tér és Forma* [*Space and Form*] with the special focus on the mechanisms of information transfer and the dynamics between different agents in the publication system. The core figure of my analysis is the architect Virgil Bierbauer, who edited *Tér és Forma* between 1928 and 1942. Bierbauer built up a global professional network, participated actively in the international architectural scene and integrated *Tér és Forma* into the international network of architectural periodicals successfully. *Tér és Forma* was referenced in journals such as *L'Architecture d'Aujourd'hui*, *Architettura* and *Kokusai Kenchiku*, among others. I underline important junctions and agents in international networks and address the problems of control over the dissemination of visual and textual information. I also analyse the dynamics of professional connections that negate concepts about "centre" and "periphery" in order to highlight patterns in accessibility.

1. INTRODUCTION

The public today has practically unlimited and instant access to architecture in its mediatized form by means of specialized digital platforms, virtual collections, social media or just simply Google. Although the media as well as the content providers significantly edit and shape the perception of architecture, the choices between different platforms are endless. During the interwar period, architectural production was also shared and disseminated globally and rather rapidly, but the mechanisms of distribution, the scale of information transfer and the technological environment were quite different from today. Photography, film, books, the printed press, exhibitions, conferences and disputes comprised the media, in which architecture was represented. The photographic image proved to be a very powerful medium as well as a universal language with its utmost potential for transferring information about architecture without the limitations that language conveys. The circulation of images and the dissemination of textual information depended on connections between individuals and participation in professional circles, but the ultimate channel was the architectural journal, which democratized the access to architectural production in an accelerating pace during the interwar era. This paper addresses the issue of access via a case study about the leading Hungarian architectural journal *Tér és Forma* [*Space and Form*] and its editor-in-chief Virgil Bierbauer's activities (Fig. 1).

2. THE ARCHITECTURAL JOURNAL AS A TOOL IN GAINING ACCESS

Tér és Forma was launched as a monthly periodical in

May 1928 under the editorship of the architects Virgil Bierbauer (also known as Virgil Borbíró, 1893–1956) and János Komor (1900–?).¹ Komor resigned in 1931, and then Bierbauer became the magazine's principal voice and content provider, who essentially shaped the subject matter and the message of the journal until 1942, when he left the magazine due to his military service. *Tér és Forma* ceased to be published a few years later in 1948. The magazine was put into circulation internationally, and it was successfully integrated into the global network of contemporary architectural journals including *The Architectural Review*, *Die Form*, *Die Baugilde*, *Byggnastaren*, *Arkkitehti*, *L'Architecture d'Aujourd'hui*, *Casa Bella* and *Kokusai Kenchiku*. It gained referential status: it became the leading and most progressive forum about the matters of contemporary architecture in Hungary, and at the same time, it emerged as the principal reference point in the international architectural scene with regards to Hungarian architecture.

In the last 1928 issue of *Tér és Forma*, the editors declared the journal's main aim, which served as its guidance from the beginning.² This statement indicated the importance of the inclusion of the international material to raise awareness to the global dissemination of modern architecture, as well as to show the best practices as reference points for Hungarian architects. At the same time, *Tér és Forma* aimed at reviewing continuously the Hungarian architectural production in order to record significant steps, provide solutions and discuss certain problems. In this way, the magazine performed an architectural transfer back and forth: the Hungarian public gained access to information from a global scale, while foreigners could also follow the developments of Hungarian architecture. It also implied



Fig. 1. Virgil Bierbauer. © HMA MPDC Hungarian Museum of Architecture, József Pécsi, late 1920s.

that Hungarian architects entered the international arena via the printed page, and thus they also acquired visibility and recognition more easily.

Bierbauer made efforts to collect relevant and poignant publication material from the international scene to provide the Hungarian public with an easy and prompt access to the latest examples of contemporary architecture. He relied on his continuously growing international network of professional connections covering Europe, the USA and Japan (as it can be traced in his extensive correspondence now held at the Hungarian Museum of Architecture), his travel experiences as well as a great number of architectural journals and other publications.³ However, it is important to note that, in general, Hungarian architects read some foreign publications, but *Tér és Forma* created an instantly comprehensible selection in Hungarian language and an interpretation given from a Hungarian point of view. Fur-

thermore, the magazine had a solid basis of non-professional local readers, who perhaps did not have such elementary interest to reach for a foreign architectural journal. To approach foreign readers, *Tér és Forma* relied on its abundant photographic material used as a universal language that had the power to cross the burdens inherent in language differences. In addition, captions, summaries and occasionally whole articles appeared in English, German, French or Italian in order to boost comprehension. These significant factors facilitated transfer without any human interaction.

3. ACTORS AND AGENTS WHO PROVIDE ACCESS

The human element, however, needs close examination since editors, correspondents, architects and other agents as well as their network shaped the ways of information transfer and the coverage in the printed page. As Bierbauer's pro-

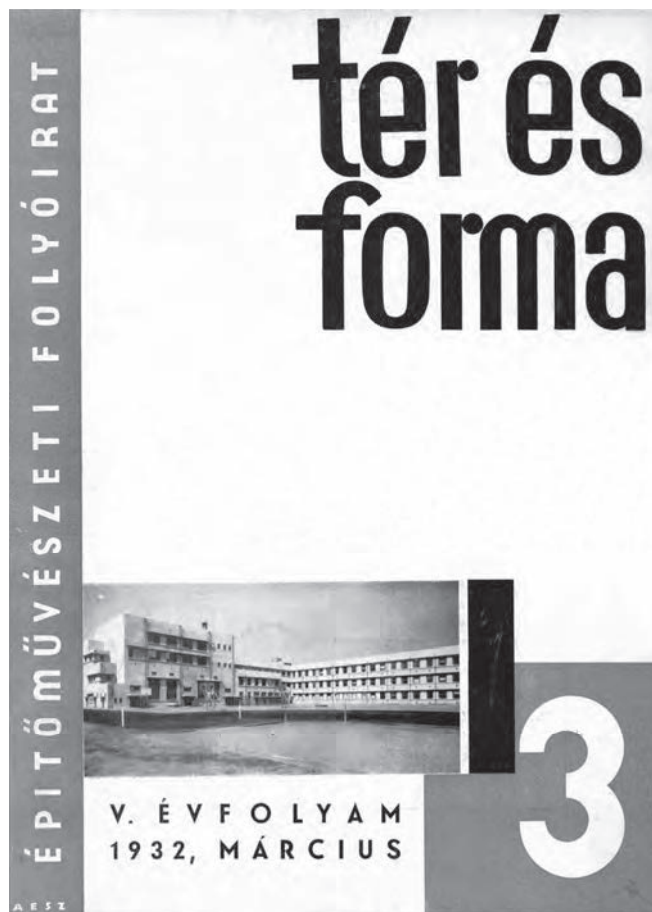


Fig. 2. The cover of the March 1932 issue of *Tér és Forma* representing the architecture of Japan. © Arcanum Digitheca.

fessional correspondence, the structure and dynamics of his network and the publication material in *Tér és Forma* testify, architects' contacts with architects defined what was published in architectural journals. Editors also relied on their personal experiences during their travels as well as the conscious study of other magazines, but as Bierbauer's case indicates the personal exchange and the human element were essential in creating content. Based on his correspondence, Bierbauer acquired publication material directly from architects such as Alvar Aalto, Uno Åhrén, Marcel Breuer, Johannes Brinkman and Leendert van der Vlugt, Wells Coates, Jan Duiker, Josef Havlíček and Karel Honzík, Heinrich Lauterbach, Richard Neutra, J. J. P. Oud and Giuseppe Terragni, among others. In this transfer, photographers had a minor role, who sometimes lost control over the dissemination of their photographs. Considering photographic credits, *Tér és Forma* was quite generous in crediting photographers, which was otherwise not a primary concern of contemporary publications and its editors in this period.⁴ Bierbauer contacted architects directly, and as editor, he was also approached to give publication material or to provide someone with contact information of other Hungarian architects. Bi-

erbauer explained the details of information transfer in the 3rd issue of *Tér és Forma* in 1935 highlighting that *Tér és Forma* followed and regularly reported on the coverage of Hungarian architects in foreign architectural magazines.⁵ As Bierbauer described, these spreads usually referred to *Tér és Forma* as the source, or the editors contacted the architects themselves after spotting something interesting in *Tér és Forma*. Bierbauer thus underlined the importance of *Tér és Forma* in this transfer declaring that its efficiency had been unprecedented until then in Hungary.

As the editor of *Tér és Forma*, Bierbauer had a dedicated role in this transfer, since he was considered an important mediator between the local and the international as well as between the professionals and the greater public. In March 1931, the Japanese architect Kazuo Maeda contacted Bierbauer as the representative of The Nippon Architects Association in order to ask for publication material on Hungarian architecture for *The Japanese Architect*, the Association's monthly magazine.⁶ Due to his connection with Maeda, Bierbauer had the chance to cover Japanese architecture in *Tér és Forma* (Fig. 2), what is more, thanks to Maeda, he became contacted with Yoshioka Yasugoro, the editor of the



Fig. 3. Virgil Bierbauer & László Králik, Budaörs Airport, Budapest, Hungary, 1936–1937, a photograph that appeared both in the journal *Kokusai Kenchiku* and *Shinkenchiku*. © HMA MPDC Hungarian Museum of Architecture, Mrs. Elemér Marsovszky, 1937.

magazine *Shinkenchiku* [New Architecture], with whom they started to exchange their respective journals regularly. *Tér és Forma* also often reviewed another Japanese architectural magazine, which promoted modern architecture: *Kokusai Kenchiku* [International Architecture]. Bierbauer was in correspondence with its editor, Masakazu Koyama, who first contacted Bierbauer in December 1933 with the intention to initiate exchange.⁷ Due to these fruitful interactions, selected publication material of *Tér és Forma* appeared in Japanese journals such as one of Bierbauer's chefs-d'oeuvre, Budaörs Airport (co-designed with László Králik, 1936–1937), which was published both in *Kokusai Kenchiku* and *Shinkenchiku* with an emphasis on the photographs, accompanied by short Japanese captions and indication of the source, *Tér és Forma* (Fig. 3).⁸ The abundant photographic coverage was crucial in this case of language burden.

Photographs are of course constructions themselves and they also distort reality to some extent, yet, these pictures were and still are elementary in transmitting visual information. The quality and editing of the image were also considered highly important by architects, who did care about how their own buildings were presented. There is a

telling case in Bierbauer's correspondence. Gábor Preisich, a leading Hungarian modernist architect, wrote a letter to Bierbauer in August 1934 and expressed his complaint about the poor quality and bad cut of the photographs of Balatonföldvár Beach (architects: Gábor Preisich, Mihály Vadász and Pál Molnár, 1934), which appeared in *Tér és Forma* without his consent.⁹ Preisich insisted on his control over the visual appearance of his design, and thus over the control of the photographs themselves.

While the role of editors and architects prevailed, another kind of agent, the correspondent is also worthy of close examination. Bierbauer and *Tér és Forma* also relied on contributors, who regularly reported on certain subjects on a steady basis. The architect Ernő Heim, for example, stayed in Sweden for an extended study tour in 1929, and thus he reported on Swedish architecture in *Tér és Forma* repeatedly. Bierbauer also had access to professional organizations and groups such as the Comité Permanent International des Architectes (CPIA), the Congrès Internationaux d'Architecture Moderne (CIAM), CIAM-Ost, the Royal Institute of British Architects (RIBA), etc., sometimes even as a participating member. These circles contributed to the broadening of Bier-



Fig. 4. József Fischer, Villa Hoffmann, Budapest, Hungary, 1933–1934. © HMA MPDC Hungarian Museum of Architecture, Olga Máté, 1934.

bauer's network and helped Bierbauer's editorial activities.¹⁰

The role of correspondents in international transfer can also be traced in the archives of a few other Hungarian architects such as József Fischer's, who was an important figure of the Hungarian Modern Movement as well as an active member of the Hungarian CIAM group. The British architectural writer, Dexter Morand spotted Fischer's buildings in the Spanish magazine *Viviendas*, and asked¹¹ publication material based presumably upon the spread entitled "Seis casas unifamiliares y de campo" [Six single-family and country houses], which appeared in *Viviendas* in 1934.¹² Morand liked Fischer's Villa Hoffmann (1933–1934) the best (Fig. 4), and concluded his letter with a request: "I wonder if you would keep my name in front of you for any material that you wish published, in England or America." Morand acted as a truly international mediator as the correspondent of several leading periodicals including *L'Architecture d'Aujourd'hui* (France), *Architettura* (Italy), *Decoration* (USA) and *Innen-Dekoration* (Germany). Villa Hoffmann was published indeed in the February 1936 issue of the journal *Decoration* as "the house of the month", the accompanying text was written by Dexter Morand himself.¹³ The line of transfer

to *Decoration* originated, of course, in *Tér és Forma*, as the director of *Viviendas* asked publication materials with reference to the Hungarian journal, where they had seen some of Fischer's other works (not including Villa Hoffmann) published.¹⁴ Interestingly, however, *Viviendas* preceded *Tér és Forma* in publishing Villa Hoffmann, which appeared in the Hungarian journal only in January 1935.¹⁵

The mediation of Hungarian architecture, of course, was not limited to *Tér és Forma*. An adequate example is the French journal *L'Architecture d'Aujourd'hui*. Pierre Vago, its long-time, Hungarian-born editor had a Hungarian network in his own right. For example, György Masirevich, a progressive architect based in Hungary, acted as a correspondent for the magazine, while Pierre Vago's father, the architect József Vágó also made contributions. Yet, *L'Architecture d'Aujourd'hui* still reviewed *Tér és Forma* continuously, and highlighted notable coverages like the one on Casa Perotti in Montevideo (1925–1930).¹⁶ Bierbauer acquired the publication material of the house directly by its designers, Octavio de los Campos, Hipólito Tournier and Milton Puente, whom Bierbauer contacted in December 1931. The architects sent the required material about the house in January 1932 in return.¹⁷

Interests and preferences, therefore, were more present in the dynamics of the publication system than preconceptions about “centre” and “periphery”. Even though Hungary was not considered an initiator in the development of the Modern Movement — aside from such pioneering émigré artists as Marcel Breuer and László Moholy-Nagy — *Tér és Forma* became and successfully remained a magazine worthy of being followed, reviewed and referenced in the international arena.

4. CONCLUSION

Even if we consider our Internet-based exchange, we must admit that communication in the 1930s was still rather quick. People replied to each other in a few days, and the given material became published in a few months. The prevailing human element, however, implies a fair amount of subjectivity in choosing platforms, highlighting certain subject matters and interpreting content. Bias was inherent in the publication system to some degree, but a well-established title still acted as a reference point.

The situation nowadays is highly determined by our digital environment, which is less dependent upon the direct interaction between people. Access is supposed to be instant and democratic from a global scale, and everyone is a potential actor/agent especially in social media. However, in the era of fake news, professional insight is still, if not more, crucial. Gaining access is immediate, but gaining the relevant information is not evident. Networking is fundamental also in our digital age to find the right channels to get and share information. Thus, facing the constant noise of information and meeting a plethora of destinations on the Internet, *docomomo*'s missions might be more essential than ever.

REFERENCES

- BAUDIN, Antoine (ed.), *Photography, Modern Architecture and Design: The Alberto Sartoris Collection — Objects from the Vitra Design Museum*, Lausanne, Ecole Polytechnique Fédérale de Lausanne Press in collaboration with the Vitra Design Museum, 2005.
- CS. PLANK, Ibolya, HAJDÚ, Virág, & RITOÓK, Pál, *Fény és Forma: Modern építészet és fotó 1927–1950 / Light and Form: Modern Architecture and Photography 1927–1950*, Budapest, Kulturális Örökségvédelmi Hivatal, 2003; 2nd edition, Budapest, Vince Kiadó, 2010.
- ELWALL, Robert, *Building with Light: The International History of Architectural Photography*, London & New York, Merrell Publishers, 2004.
- OSHIMA, Ken Tadashi, *International Architecture in Interwar Japan: Constructing Kokusai Kenchiku*, Seattle & London, University of Washington Press, 2009.
- RITOÓK, Pál, & SEBESTYÉN, Ágnes Anna, “Communicating “space and form”: The history and impact of the journal *Tér és Forma* as the Hungarian pipeline of Modernism”, *Docomomo Journal* No. 59, 2018/2, 18–25.
- SEBESTYÉN, Ágnes Anna, “Strategy and Agency in Architectural Photographs: Imaging Strategies that Shaped an Architectural Magazine in Interwar Hungary”, ALCOLEA, Rubén A., & TÁRRAGO MINGO, Jorge (eds.), *Inter Photo Arch, Congreso Internacional, inter-fotografía y arquitectura: interpretaciones; Inter Photo Arch, International Conference, inter-photography and architecture: interpretations*, Pamplona, Universidad de Navarra, 2016, 178–189.
- SEBESTYÉN, Ágnes Anna, “Media as Network: The Editor's Network as Reflected in the Journal *Tér és Forma* in Interwar Hungary”, STÖRTKUHL, Beate, & MAKALA, Rafal (eds.), *Nicht nur Bauhaus — Netzwerke der Moderne in Mitteleuropa / Not Just Bauhaus — Networks of Modernity in Central Europe*, Berlin & Boston, De Gruyter/Oldenburg, 2020, 190–210.

ZIMMERMAN, Claire, *Photographic Architecture in the Twentieth Century*, Minneapolis & London, University of Minnesota Press, 2014.

NOTES

- Being launched in 1926, *Tér és Forma* had been the illustrated appendix of the journal *Vállalkozók Lapja* [Contractors' Journal], before it became an independent monthly periodical in 1928. For more about the history and impact of *Tér és Forma*, see: Pál Ritoók & Ágnes Anna Sebestyén, “Communicating “space and form”: The history and impact of the journal *Tér és Forma* as the Hungarian pipeline of Modernism”, *Docomomo Journal*, No. 59, 2018/2, 18–25.
- A szerkesztőség [The editors], “Olvasóinkhoz!” [To our Readers!], *Tér és Forma*, 1928/8, s.p.
- Ágnes Anna Sebestyén catalogued Virgil Bierbauer's professional correspondence of ca. 900 letters in the framework of her research project funded by the National Cultural Fund of Hungary in 2015–2016 (ref. No. 101102/00444), Sebestyén's research on Virgil Bierbauer's travels was also funded by the National Cultural Fund of Hungary in 2018–2019 (ref. No. 101102/00578).
- For more on the copyright issues of architectural photographers, see: Antoine Baudin, “From Collection to Encyclopedia: Issues and Milestones of an Exemplary Undertaking”, Antoine Baudin (ed.), *Photography, Modern Architecture and Design: The Alberto Sartoris Collection — Objects from the Vitra Design Museum*, Lausanne, EPFL Press in collaboration with the Vitra Design Museum, 2005, 25–28.
- “A *Tér és Forma* hírei” [The News of *Tér és Forma*], *Tér és Forma*, 1935/3, 34.
- Kazuo Maeda's letter to Virgil Bierbauer, 13 March 1931, HMA MPDC Hungarian Museum of Architecture, Virgil Bierbauer archive, M1. The article on Hungarian architecture appeared in Japanese in the journal: *The Japanese Architect*, October 1931, 139–145.
- Masakazu Koyama's letter to Virgil Bierbauer, 20 December 1933, HMA MPDC Hungarian Museum of Architecture, Virgil Bierbauer archive, K 28.
- Shinkenichiku*, 1937/10, 407, *Kokusai Kenchiku*, 1937/10, 27–28.
- Gábor Preisich's letter to Virgil Bierbauer, 10 August 1934, HMA MPDC Hungarian Museum of Architecture, Virgil Bierbauer archive, P 67. For the publication of the beach, see: *Tér és Forma*, 1934/8, 244.
- For more on Virgil Bierbauer's network, see: Ágnes Anna Sebestyén, “Media as Network: The Editor's Network as Reflected in the Journal *Tér és Forma* in Interwar Hungary”, Beate Störckuhl & Rafal Makala (eds.), *Nicht nur Bauhaus — Netzwerke der Moderne in Mitteleuropa / Not Just Bauhaus — Networks of Modernity in Central Europe*, Berlin–Boston, De Gruyter/Oldenburg, 2020, 190–210.
- Dexter Morand's letter to József Fischer, 21 January 1935, HMA MPDC Hungarian Museum of Architecture, József Fischer archive.
- “Seis casas unifamiliares y de campo”, *Viviendas*, 1934/29, 6–17.
- Dexter Morand, “Villa Hoffmann”, *Decoration*, 1936/10, 20–22.
- Letter to József Fischer by *Viviendas*, 12 April 1934, HMA MPDC Hungarian Museum of Architecture, József Fischer archive.
- Tér és Forma*, 1935/1, 16–17.
- “Revue des revues”, *L'Architecture d'Aujourd'hui*, 1932/6, 101. Note that the city of the house is given incorrectly here: it's not Buenos Aires, but Montevideo. The original article in *Tér és Forma*: B. V. [Virgil Bierbauer], “Családi ház Montevideóban” [Family House in Montevideo], *Tér és Forma*, 1932/7, 144–145.
- Letter to Virgil Bierbauer by De Los Campos Puente Tournier (Octavio de los Campos, Hipólito Tournier, Milton Puente), 4 January 1932, HMA MPDC Hungarian Museum of Architecture, Virgil Bierbauer archive, C2.

ON ARCHITECTURAL PUBLICATION ACTIVITIES BY MODERNISTS IN PREWAR JAPAN

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ABSTRACT.

This paper investigates how pre-war Japanese modernists pursued architectural publications as one of the substantial activities of modern architectural movements by focusing on the development of publishers. Focusing on four publishers with which the era's eminent modernists, Sutemi Horiguchi and Hideto Kishida, engaged, it analyses the nature of these publishers and their publications, as well as the characteristics of their target audience.

At the dawn of Japanese modern architectural movements in the early 1920s, Horiguchi and Kishida aimed to leverage *Iwanami Shoten's* social standing to open pathways to academia. Their collaboration with *Koyosha*, the so-called department store of architectural photography books, had visually optionalized modern architectural styles for diverse clients and architectural engineers throughout the country by the mid-1920s. At *Koseisha Shobo* in the late 1920s, these modernists planned and edited architectural publications for progressive artists and cultural figures as a means of artistic expression. During the Second World War in the late 1930s, they widened their access to society by publishing books for the general public, while placing modern architecture alongside nationalistic themes, including the promotion of traditions and national land development.

Modernists leading these activities succeeded in expanding their personal networks and disseminating visual information to the academia, cultural figures, and the wealthy, because unlike in the West, their central figures were elite. Modern architecture's incorporation as a style option alongside canonical architectural styles within various photography catalogs laid the groundwork for the focus on modern architecture in postwar national land development.

1. INTRODUCTION — THE HUB OF SUTEMI HORIGUCHI AND HIDETO KISHIDA'S ARCHITECTURAL ACTIVITIES

This paper investigates how prewar Japanese modernists pursued architectural publications as one of the substantial activities of modern architectural movements by focusing on the development of publishers. It unveils an aspect of the processes in which modern architecture was promulgated as a particular architectural style in non-Western nations.

In particular, it considers the publishing trends of four publishers with which the era's eminent modernists, Sutemi Horiguchi and Hideto Kishida, engaged. It analyzes the nature of these publishers and their publications, as well as the characteristics of their target audience. Horiguchi is known as a central figure of *Bunriha Kenchiku Kai* [the Secessionist School of Architects], Japan's first modern architectural movement, as well as the first Japanese architect who published his own monographs as early as the 1920s.¹ Meanwhile, Kishida was two years behind Horiguchi at Tokyo Imperial University's Department of Architecture, and he is known as a mentor of postwar architects such as Kunio Maekawa and Kenzo Tange.

It is to be noted that some parts of this paper have been revised based on the findings and insights from my past publications, listed below.

- Masaru Kawashima, *Study on the historical development of architectural publication activities in Modern Japan: Formation of architectural publication organiza-*

tions and roles of architectural books until the war in the Showa period, 2017.

- Masaru Kawashima, Mitsuo Ohkawa, Masaki Yashiro, Shinnosuke Tadokoro, "On Hideto Kishida's Activities concerning Architectural Publication during the War", 62nd Science Lecture Meeting of the College of Science and Technology, Nihon University, 2018, 633–634.

2. PATHWAYS TO ACADEMIA — IWANAMI SHOTEN AND BUNRIHA KENCHIKU KAI

BUNRIHA Kenchiku Kai's first exhibition in 1920 was made a target of criticism from members of *Kozoha* [Advocates of Structure]², the mainstream architectural group of the time. Thus, the Japanese modern architectural movement marked its first step in history as an anti-establishment movement.

Yet it has been repeatedly suggested in a number of past investigations that *Bunriha Kenchiku Kai* turned to *Iwanami Shoten*, a publisher then rising to prominence as an authority on academic publication in Japan, to publish their exhibition catalogs.³ "After many entreaties to Shigeo Iwanami,"⁴ the founder of the aforementioned publisher, they were allowed to publish their exhibition catalogs on the stipulation that all the stocked catalogs be purchased by themselves, forcing the new graduate members to obtain enough money "from their year-end performance bonus."⁵ This testifies to their strong adherence to *Iwanami Shoten*.

Founded in 1913, *Iwanami Shoten* consolidated authority



Fig. 1. Bunriha Kenchiku Kai (ed.), *Shienso Zushu* [Illustrated Catalog of], Tokyo, Koyosha, 1927.

enough to be attributed with "Iwanami Culture, a non-governmental academia".⁶ In 1919, a year before the founding of *Bunriha Kenchiku Kai*, Iwanami Shoten published *Koji Junrei* [Pilgrimages to the Ancient Temples] by Tetsuro Watsuji, a leading figure of early Iwanami Culture.

Furthermore, it is notable that Iwanami Shoten published its first architectural publication, Banister F. Fletcher's *A History of Architecture on the Comparative Method*.⁷ One of the translators of the book was a graduate of the Department of Architecture at Tokyo Imperial University: Minoru Koda, whose tutor, Chuta Ito, contributed a foreword to the book. Here we might point out a significant aspect of the relationship between *Bunriha Kenchiku Kai* and Iwanami Shoten. Additionally, Horiguchi not only published his first single-authored publication, *Gendai Oranda Kenchiku* [Modern Dutch Architecture] (1924), and his research on tea rooms in postwar years through Iwanami Shoten, but he was also involved in Iwanami-related architectural designs, and such networks of Iwanami Culture improved Horiguchi's reputation in the architectural world.⁸

Despite members of *Bunriha Kenchiku Kai* having graduated from the Department of Architecture at Tokyo Imperial University, which was then considered to be the only academe of architectural studies in Japan, they were shunned by the mainstream, engineering-based *Kozoha*. Therefore, they tried to fortify modern architecture's sphere of influence from without, and to establish pathways to

Iwanami Shoten's "non-governmental academia". Further attesting to this claim, the names Shigeo Iwanami and Ryunosuke Akutagawa were found in the visitor's list to the school's first exhibition.⁹ Horiguchi, therefore, retained his title as a "*Bunriha Kenchiku Kai* member" who published three catalogs from the prestigious Iwanami Shoten, although the actual activity of the School was virtually dormant since the 1930s.

3. PERMEATING TO THE CATALOGS ON CANONICAL ARCHITECTURAL STYLES: KOYOSHA AND MODERN ARCHITECTURAL MOVEMENT GROUPS

The first three catalogs of *Bunriha Kenchiku Kai*'s collected works were published by Iwanami Shoten, while two monographs on Horiguchi's architectural works written by the architect himself¹⁰ — unprecedented in Japan — were published by a publisher specializing in architectural publication, Koyosha (Fig. 1). The catalogues of the last three exhibitions of *Bunriha Kenchiku Kai*, from the fifth to the seventh, were also published from Koyosha. Whereas previous publications by Iwanami Shoten had been, in reality, self-published by *Bunriha Kenchiku Kai* members, one of the *Bunriha* members noted: "some specific issues of *Koyosha*'s *Kenchiku Shincho* are reserved for *Bunriha*'s works. This has significantly improved our financial burden."¹¹

Koyosha is a leading publisher specializing in architec-

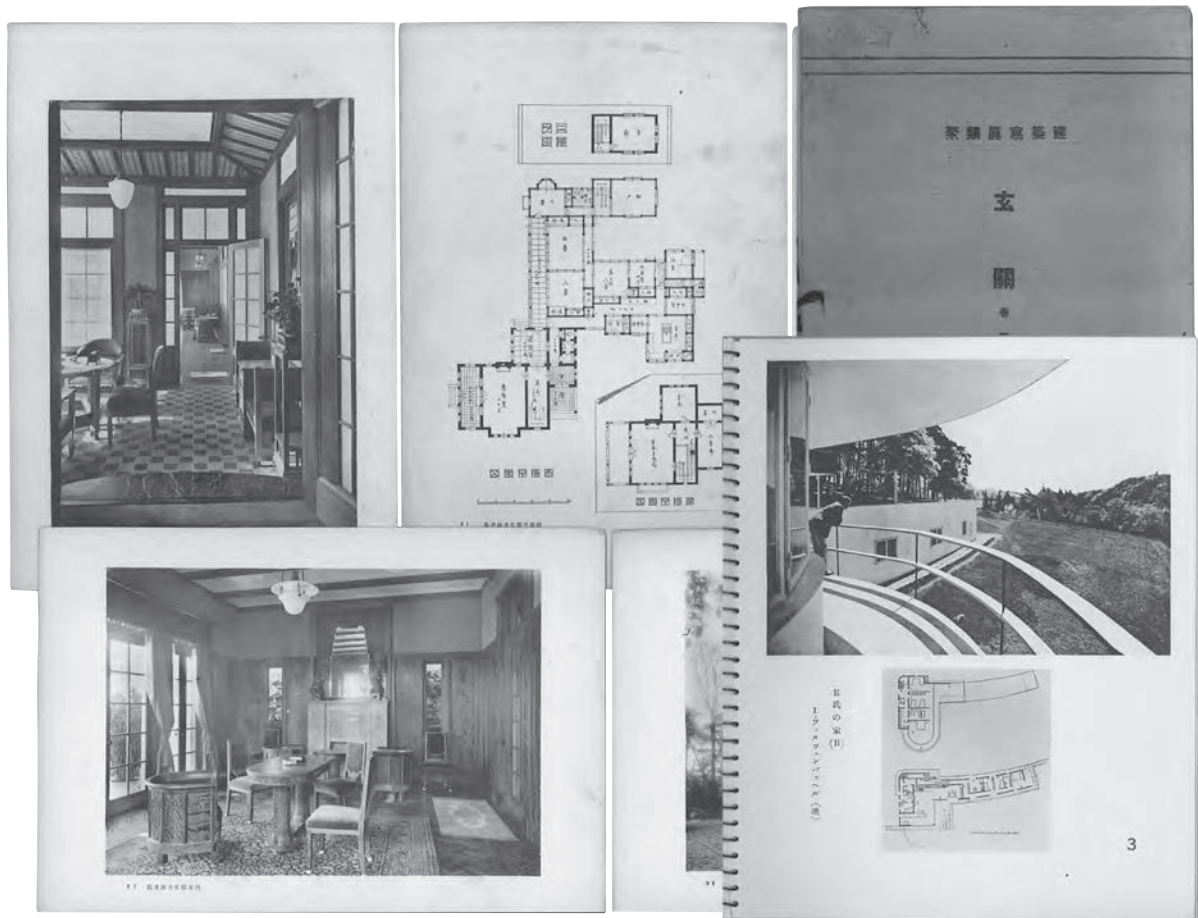


Fig. 2. *Genkan Kan'ichi* [Entrances, Volume 1], October 1915; *Bunka Jutaku Kan'ichi* [Semi-Western Residential Houses, Volume 1], July 1923; and *Sekai no Shinko Jutaku* [Emerging Residential Houses of the World], December 1932, in *Kenchiku Shashin Ruiju* [Collection of Architectural Photography], Koyosha.

ture in prewar Japan. From its founding in 1912, a year before that of *Iwanami Shoten*, the company published over 1,000 titles up to 1944. Especially known for catalogs in series publications, they published 22 series with a total of more than 600 volumes.

Furthermore, *Koyosha's* longest-running photography catalog series, *Kenchiku Shashin Ruiju* [Series of Architectural Photography Collection] (published c. 1915–1943, total 266 volumes with 15 extra volumes / Fig. 2), began featuring domestic and international modern architecture in volumes published in 1926–1927,¹² and thereafter, modern architecture was included in volumes on Western and Japanese traditional architectural styles. Intended “for the general public as a useful resource, without logical explanation”, each volume consists of 50 plates of photographs only, which was designed for designers and clients to “admire and share” as “a means to communicate intentions” for architectural designs.¹³ *Koyosha's* catalogs were disseminated to a wide range of readers throughout Japan, from building contrac-

tors to wealthy cultural elites: as evidenced by the company's catalogs being found in collections of building contractors even after the Second World War,¹⁴ and families of *Koyosha* employees testifying Denjiro Okouchi, a famous actor known for his home carpentry pastime, visited the publisher to buy these photography catalogs.

Each series title includes keywords identifying fields of interests such as “design motifs”, “*Sukiya* architecture”, and “wooden crafts”, while each volume title includes keywords classifying individual themes such as “expressionism”, “great gardens”, and “study furniture”. They are listed so readers could consult photographs that meet their taste and purpose, like an encyclopedia.

A concise publication series titled *Kenchiku Bunka So-sho* [Series of Texts on History of Western Architectural Culture] (c. 1921–1927, 121 volumes including one missing volume) were compiled under the supervision of Chuta Ito and Koichi Sato, both authorities of architectural design. Covering Western architecture from ancient Egypt to the Renais-

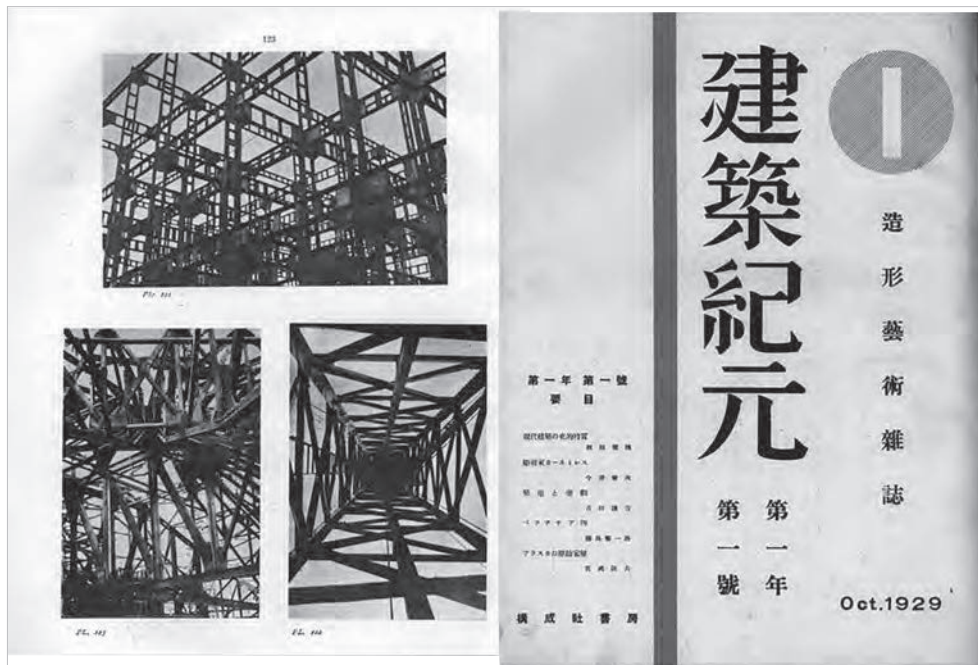


Fig. 3. Cover illustration of the October 1929 Issue, and frontispiece of the February 1930 Issue (both by Hideto Kishida), in plastic arts magazine *Kenchiku Kigen*, Koseisha Shobo.

sance, its last volume is dedicated to modern architecture.¹⁵ Published in 1924, the last volume was authored by Chikata Kurata (Hamaoka), a new member of *Bunriha Kenchiku Kai*. The following year, *Bunriha Kenchiku Kai*'s catalogs were featured in the *Kenchiku Shincho* magazine. These contexts illustrate the relationship between *Koyosha* and *Bunriha Kenchiku Kai* and provide insight into how modern architecture permeated the realm of canonical architectural styles.

In terms of sales, many volumes of *Kenchiku Shashin Ruiju* went through five to six editions. However, the *Kenchiku Shincho* magazine never made profits, which was revealed by the publisher when its publication was suspended in 1931.¹⁶ These sales performances denote that the enterprise of *Bunriha Kenchiku Kai* was supported by profit-making publications. In other words, illustrated catalogs related to practical purposes and hobbies supported avant-gardist and educational modernist publication activities. Having been represented in searchable illustrated catalogs, modern architecture came to be recognized visually in society, and was therefore propagated as a stylistic option.

4. PUBLISHING AS AN ARTISTIC EXPRESSION FOR THE CULTURED — KOSEISHA SHOBO AND SHINKO KENCHIKUKA RENMEI

Publishers in charge of Horiguchi's publications shifted from *Iwanami Shoten* to *Koyosha*, and after *Koseisha Shobo* published a book in 1931, *Koyosha* took charge again.¹⁷ Active only between 1929 and 1931, *Koseisha Shobo* is a publisher

specializing in architectural literature. The company published *Kenchiku Jicho* [Architectural Trends], a magazine that is substantially a bulletin of the first union of modern architectural movement groups in Japan, called *Shinko Kenchikuka Renmei* [the League of New Architects]. However, the union immediately disintegrated when an influential newspaper reported it as a 'communist campaign on architecture'.¹⁸ Perhaps for being perceived as taboo by the parties concerned, the union and its activities were not discussed in public even postwar.¹⁹

To attest to *Shinko Kenchikuka Renmei*'s activities, simple, A5-sized articles were filled with text in the *Kenchiku Jicho* magazine (July 1930–June 1931) to portray international architecture underpinned by sciences and technology. However, *Koseisha Shobo*'s other publications are characterized by a large-scale and visually rich format. Examples include the A4-sized art magazine, *Kenchiku Kigen* [Architectural Era] (October 1929–March 1930 / Fig. 3), marked as a "magazine of plastic arts", as well as the A3-sized photography catalog titled *Gendai Kenchiku Taikan* [Overview of Modern Architecture] (October 1929–March 1931, 17 volumes), which was celebrated as a "collection of worldwide bird's eye views" of modern architecture. Horiguchi and Kishida sat on the editing committee for both titles. *Kenchiku Kigen* had stage artist Kenkichi Yoshida as an editor, and the avant-garde poet Katsue Kitazono contributed articles twice. These denote that both publications' intent was to provide visually a wide range of pioneering artists and cultural figures with the aesthetics of modern architecture in a form of publication, rather than target the architectural world exclusively.

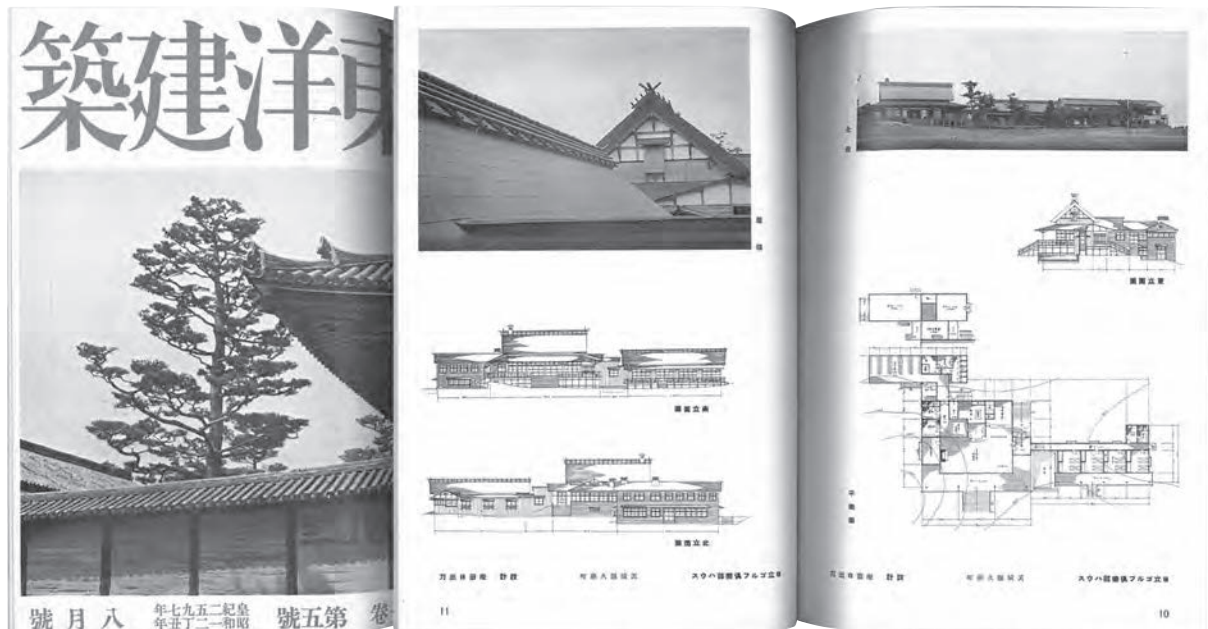


Fig. 4. *Toyo Kenchiku* [East Asian Architecture], August 1937 Issue, Tokyo, Sagami Shobo.

In addition to Horiguchi's monographs, books by modernists are exemplified by the portrayal of Japanese traditional architecture through the perspective of modernist structural aesthetics in Kishida's *Kako no Kosei* [Compositions of Traditional Japanese Architecture/the Past] (1929). The book inspired those of younger generations, such as Kenzo Tange.²⁰ Furthermore, modernists actively pursued translation of materials into Japanese, resulting in translations of the latest trends in modern architecture, including the minutes of the 2nd CIAM conference whose theme was minimal residential space, and Le Corbusier's *Towards a New Architecture* and *The Decorative Art of Today*. Whereas most Japanese translations of essays on modern architecture at the time were divided for serialized magazine articles,²¹ the publication of whole essays in a book format was unique to *Koseisha Shobo*, whose translation projects were sponsored by businesspeople. These translations embody the modernists' spirit of academic inquiry and edification.

While conventional history on modern architectural movements in prewar Japan often focused on their socialist aspect, *Koseisha Shobo*'s activities point out publishing was an artistic expression by young modernist elites directed at cultural figures.

5. AS POPULAR AND ACCESSIBLE LITERATURE IN TIME OF WAR — SAGAMI SHOBO AND HIDETO KISHIDA

Kishida's *Kako no Kosei*, originally published by *Koseisha Shobo*, was republished by *Sagami Shobo* in 1938. Found-

ed in 1936, *Sagami Shobo* published Kishida's anthology of essays the following year.

A series planned and supervised by Kishida, titled *Kenchiku Shinsho* [Pocket Edition on Architecture] (1941–1949), continued up to 16 volumes amid wartime confusion. Initially, the publisher planned to publish a stunning lineup of around a hundred volumes. The series covers a range of topics from *Karafuto Ainu no Jukyo* [Ainu Housing in Karafuto] (Volume 10, Yuko Yamamoto), *Bruno Taut* (Volume 5, Chikada Kurata), to *Nachisu Doitsu no Kenchiku* [Nazi Germany Architecture] (Volume 8, Kishida). Another publisher followed suit and released a similar series, which marked an exceptionally large amount of orders for an architectural book.²² Like Kishida's anthology of essays, readers were not limited to the architectural world but rather embraced a wider public, and therefore secured issues even during wartime.

A *Sagami Shobo* magazine titled *Toyo Kenchiku* [East Asian Architecture] (1937–38 / Fig. 4), published prior to the publication of *Kenchiku Shinsho*, featured academic papers on East Asian architecture from Japan to China. Its cover and opening pages exhibited architectural beauty photographed by researchers. Mirroring Kishida's *Kako no Kosei*, this feature combining the visual and scholarly aspects of architecture displays a sense of continuity with *Koseisha Shobo*'s publications. Essentially, *Sagami Shobo* can be said to have conveyed modern architecture in wartime by applying modern aesthetic principles to the compositional aesthetics of traditional architecture.

Sagami Shobo's architectural publication activities dis-

seminated architectural publications in the form of accessible literature to a wider range of readers, conforming to the state of affairs by ostensibly promoting traditions and national land development, yet including themes related to modern architecture. These sales were the public response that showed modernists the effectiveness of architectural publication during wartime as a means of linking architecture and society – a response hard-won through other activities of the modern architectural movement.

6. CONCLUSION — ELITIST GROUPS' CAMPAIGN TO DISSEMINATE IMAGES

This paper has focused on the nature of publishers with which Horiguchi and Kishida engaged to revisit the development of modern architecture in prewar Japan. In the early 1920s, they aimed to open pathways to academia leveraging Iwanami Shoten's social standing. When modernist architectural groups flourished in the mid-1920s, they successfully optionalized modern architecture to diverse clients and architectural engineers with Koyosha. At Koseisha Shobo, which rose and fell at the peak of prewar architectural activity in the late 1920s, these modernists produced architectural publications for artists and cultural figures as a means of artistic expression. At last, during the WWII in the late 1930s, they widened their access to society by publishing for the general public, placing modern architecture alongside themes such as traditions and national land development.

These modernists expanded their network and disseminated visual information to the academia, cultural figures, and the wealthy because unlike in the West, their core continually comprised Tokyo Imperial University-educated elites. By representing modern architecture alongside canonical architecture as stylistic options in various photography catalogues, they laid the groundwork for the focus on modern architecture in postwar national land development.

NOTES

- 1 Hiroyasu Fujikawa, *Hyogensha Horiguchi Sutemi — Sogogeiijutsu no Tankyu* [Horiguchi Sutemi, *The Expresser — In Pursuit of Multidisciplinary Art*], Tokyo, Chuokoron Bijutsu Shuppansha, 2009, 156.
- 2 Refers to a school of architectural academism that places emphasis on seismic engineering, led by Sano Toshikata. The school is considered to have formed the prevalence of engineering in the architectural world of earthquake-prone Japan.
- 3 Shoichi Inoue, *Inoue Shoichi: Gendai no Kenchikuka* [Inoue Shoichi: *The Architect of Modernity*], Tokyo, A.D.A. EDITA Tokyo, 2014, 180.
- 4 Terunobu Fujimori, *Nihon no Kindai Kenchiku Ge* [Modern Architecture in Japan, Volume 2], Tokyo, Iwanami Shinsho, 1993, 170.
- 5 Mayumi Takizawa, "Bunriha Kenchiku Kai — Sono Seigo to Jichu [The Secession School of Architects: Its Revisions and Self-Annotations]", *Kenchiku to Shakai* [Architecture and Society], December Issue, Nihon Kenchiku Kyokai, 1961, 40–41.
- 6 Takumi Sato, *Monogatari, Iwanami Shoten Hyakunenshi 2: "Kyoiku" no Jidai* [One Hundred Years' History of Iwanami Shoten Volume 2: The Era of "Education"], Tokyo, Iwanami Shoten, 2013, 10.
- 7 Original text: Banister F. Fletcher, *A History of Architecture on the Comparative Method*, 5th Edition, 1905.
- 8 Shoichi Inoue, *Inoue Shoichi: Gendai*, 180–182 (endnote 5). Horiguchi published *Rikyu no Chashitsu* [Rikyu's Tea Room] (1951) and *Rikyu no Cha* [Rikyu's Tea] (1952) through Iwanami Shoten. He designed the storehouse of Iwanami Shoten (1932), the tombstone of Shigeo Iwanami (1946), and the residence of Yujiro Iwanami, the second-generation president of Iwanami Shoten (1957).

- 9 Terunobu Fujimori, *Nihon no Kindai*, 170 (endnote 6), Shoichiro Fujii & Hiroshi Yamaguchi, (eds.), *Nihon Kenchiku*, 125 (endnote 4).
- 10 Bunriha Kenchiku Kai (ed.), *Shienso Zushu* [Illustrated Catalog of Shienso], Tokyo, Koyosha, 1927; Sutemi Horiguchi (ed.), *Jutaku Soshokyo* [Soshokyo Residential House], Tokyo, Koyosha, 1928.
- 11 Mayumi Takizawa, *Bunriha Kenchiku Kai*, 40–41 (endnote 7).
- 12 *Doitsu Kindai Jutaku* [Modern Residential Houses in Germany] (Issue 5, Number 14, 1926) features works by Erich Mendelsohn and Bruno Taut, and *Shinko Apartamento Kan'ichi* [New Apartments Volume One] (Issue 6, Number 6, 1927) features apartment buildings of Dojunkai in Daikan'yama and Aoyama.
- 13 E.g. the publisher's own advert on the back cover of *Kenchiku Shincho*, February 1927 Issue.
- 14 E.g. found in the collections of building contractors in Bunkyo-ku, Tokyo, as of 1996, and Ishioka City, Ibaraki, as of 2019.
- 15 *Kindai Kenchiku Shicho* [The Theoretical Trend of Modern Architecture], Volume 12. The 9th volume of the series seems to have been left unpublished.
- 16 *Kyukan no Kotoba* [Words on the suspension of publication], *Kenchiku Shincho*, August 1931 Issue, Tokyo, Koyosha, 23.
- 17 Sutemi Horiguchi (ed.), *Ichu Konkurito Jutaku* [A Concrete Residential House], Tokyo, Koseisha Shobo, 1930; Sutemi Horiguchi, *Ichu Jutaku to Sono Teien* [A Residential House and Its Garden], Tokyo, Koyosha, 1936.
- 18 *Kenchiku de 'Aka' no Senden — Arayuru Homen ni Hirogaru Nappu no Katsudo* [Communist Propaganda in Architecture — The Campaigns of NAPF Disseminating to Various Directions], Tokyo, Yomiuri Shimbun, November 12, 1930.
- 19 Architectural Institute of Japan's 70th Anniversary Symposium — "Kenchiku Janarizumu no Ugoki wo Tadoru — Kankeishi Nijunen no Ayumi [Following the Trends in Architectural Journalism — The 20-Year History of Related Periodicals]", *Kenchiku Zasshi* [Journal of Architecture and Building Science (AIJ)], April 1956 Issue, 64.
- 20 Kishida Hideto Sensei Kinen Shuppan Jigyokai, *Kishida Hideto Jokan*, Tokyo, Sagami Shobo, 1972, 205–206.
- 21 E.g. Koyosha's magazine *Kenchiku Kogei Ai Shi Oru* [Architectural Crafts: I See All].
- 22 Horyuji *Kenchiku* [Architecture of Horyu-ji Temple] (Hirotaro Ota, 1943), *Shokokusha's series Toa Kenchiku Sensho* [Selected East Asian Architecture] (1942–1944), was "the bestseller for an architectural book from its launch" and received orders of 9,000 copies (*Shokokusha Soritsu Goujushunnen*, Tokyo, Shokokusha, 1982, 88).

THE DISSEMINATION OF MODERNISM IN THE AUSTRALIAN BUILDING JOURNALS IN THE 1930s

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ABSTRACT.

This paper discusses how Modernism was disseminated through documentation, specifically it examines dissemination in printed Australian publications in the 1930s. These included both the professional journals, those of the Royal Australian Institute of Architects, *Architecture* and the *Royal Victorian Institute of Architects Journal*, and those published in the interest of builders, home builders and decorators, namely the popular building journals, including *The Australian Home Beautiful*, *Building* and *Decoration and Glass*.

Reportage of modernism occurred through the visual, photographic and drawing documentation, and the written, significantly the published reports of NSW travelling scholars. Both means generated subsequent discussion of Modernism. This paper will argue that Modernism in the 1930s, with a highlight on 1935, received arguably equally if possibly not more coverage, supportive discussion, photographic documentation and credibility in the popular home building and cultural journals than was evident in the professional journals.

The social and political tenets of Modernism were not always the focus of dissemination in Australia. Rather, often the global modernities of the new materials and the new forms of construction interested Australian architects and in the local context how could brick-work be used as a modern material and the construction of flat roofs.

Significant was that contemporary discussion and coverage of Modernism in Australia, named Australian architects as Modernists and their work as Modern projects. Consequently, they themselves became disseminators of Modernism in Australia. Arguably, the choices of which modernist buildings were documented in the 1930s contributed to their resilience and assisted assessment of significant buildings.

1. INTRODUCTION

This paper examines the dissemination of Modernism in Australia through documentation in the Australian journals including both the visual and the written. It will present that Modernism in the 1930s, received arguably equal, if indeed not more coverage, supportive discussion, photographic documentation and credibility in the popular home building journals as in the professional journals. The popular journals included *The Australian Home Beautiful*, *Decoration and Glass*, and *Building* whose articles on Modernism concentrated on materials and construction, as these were engaging to its audience. Modernism was encouraged and disseminated in cultured journals championing the new, *The Home* and *Art in Australia*, unfortunately outside scope of this paper.

Importantly it was not only through documentation that Modernism was disseminated in Australia. Critically there was the experiential of European and American Modernism through first hand travel. Intertwined with this was the role of the United Kingdom and particularly the Architectural Association, London. The latter played a pivotal role, providing, education, lectures, professional introductions and contacts for employment and importantly suggested buildings to visit in Europe. There was also dissemination through international journals, including the widely read *British Architectural Review*. However, this focus is dissemination through published documentation which was widespread, particularly from Germany and Holland. Arguably,

the choices of which modernist buildings were documented in the 1930s contributed to their resilience and assisted assessment of significant buildings.

2. CONTEXT OF MELBOURNE 1930S /ARCHITECTURAL COMPETITIONS

Why focus on the mid 1930s? The social/economic and political context is central to the dissemination of Modernism in Australia. 1934 was the Centenary of Victoria of European settlement. The Great Depression was severe in Australia, new building work markedly decreased from 1927 to 1933, architects who could travelled overseas in the hope of finding work. It has been estimated that at any one time 20% of the profession were travelling and working overseas.¹ State Governments, financially supported many building projects to give an impetus to the industry and provide unemployment work schemes.²

Design competitions stimulated the building industry. Notable were, the 1933 design competition for Melbourne Girls' High School, the Ideal Home Competition 1934, The Centenary and Concrete Home 1934, and Timber House Competitions 1938.

These all received wide coverage in the building publications; and significantly the winning designs were "Modern".³ They presented an optimistic view of the future and demonstrated widespread professional support for Modernism. In the early 1930s architects returned to Australia and several significant modern buildings were completed by 1934, Mew-

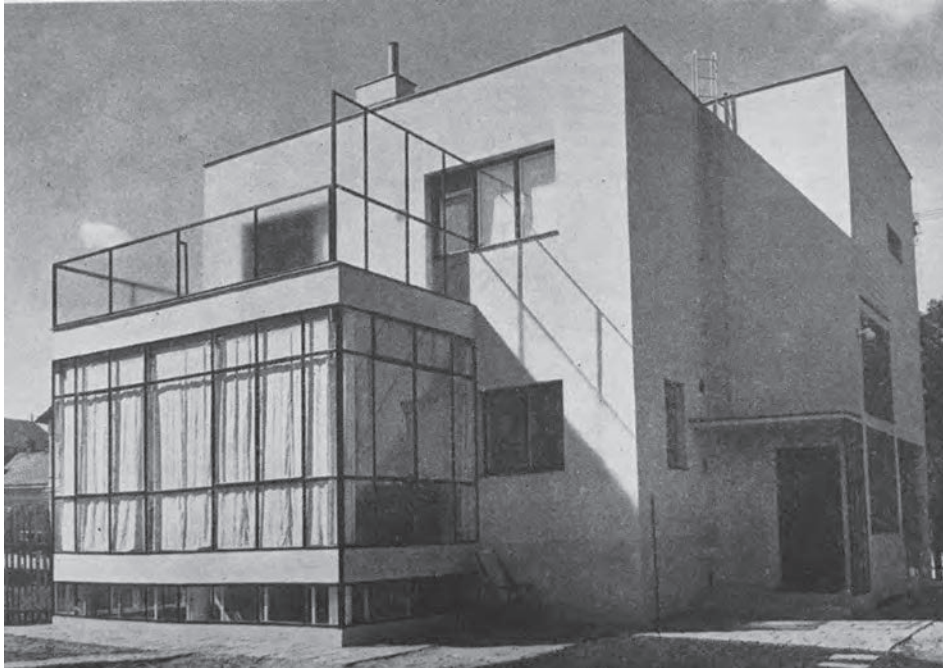


Fig. 1. A Country House in Vyshehov "Modernism in Czechoslovakia", *The Australian Home Beautiful*, March 1936.



Fig. 2. Lois Weizenbacher, House Rosenbauer, Austria, *Architecture* June 1935 from "The Modern Home".

ton and Grounds, and Yuncken, Freeman and Freeman, and Norman Seabrook's MacRobertson Girls' High School, 1934. This work was documented and discussed in the popular magazines with pivotal articles, such as "1935" in *The Australian Home Beautiful* which broadened the discussion of modernism beyond the profession. The global social and political

tenets of Modernism were not always the focus of discussion, rather Australian architects were often concerned with the new materials and innovative forms of construction, in particular flat roofs and how brickwork could be used in the local Australian context as a modernist material.⁴



Fig. 3. Stephenson, Meldrum and Turner 1935/36 Gloucester House, Royal Prince Alfred Hospital, Sydney, Australia, *Architecture*, October 1936.

3. DISSEMINATION- DOCUMENTATION/PHOTOGRAPHY

3.1. Dissemination by Photography

What role did photography play in the dissemination of Modernism in the Australian journals? 1920s and 1930s architectural photography's modern aesthetic, essentially black and white, employing high contrast, hard edges and silhouettes became an agent for modernism. Tony Fry described the fusion between architecture and photography during this period as "photomodern".⁵

Many photographs of modern international buildings were documented in the Australian journals. The Australian Institute of Architects *Architecture* held many international journals for borrowing, including the German *Innen Dekoraten*. *Architecture* published a list of these and republished examples, including, House from Czechoslovakia (Fig. 1), House Rosenbauer, Austria, architect Lois Weizenbacher, (a photo-modern / Fig. 2).

3.1.1. GLOUCESTER HOUSE, ROYAL PRINCE ALFRED HOSPITAL 1935/ ARCHITECTURE 1936

The stunning black and white photographs, with their silhouettes and stark contrast, of Gloucester House, Royal Prince Alfred Hospital, Sydney, Stephenson Meldrum and Turner, 1935/6 are Australian photomodern examples (Fig. 3). One given a full page, *Architecture*, October 1936, highlighted the curved cantilevered reinforced concrete balconies and by its inclusion *Architecture* announced its support for Modernism and the photographs became disseminators of Modernism.⁶ The photographer was unacknowledged and their positioning offset the rather dense text articles.

3.1.2. WILLEM MARINUS DUDOK / MODERN ARCHITECTURE HOLLAND

The architecture of the Dutch modernist Willem M Dudok was a favourite for Australians and was disseminated widely by text and photographs in the Australian journals. Photographs of his architecture taken at Hilversum, by travelling scholars were black and white and these could not disseminate the De Stijl colour of Dutch modernism. Architects chose to disseminate this through detailed descriptions of the coloured glazed tilework and brickwork; a dilemma reported several times, including in 1932, by Sydney Ancher.

"I admire immensely the work of the Dutch architect W. M. Dudok No illustration could possibly do justice to these buildings as colour plays so important part in their design".⁷ Photography of Dutch modernism was a decision maker for Australian architects. Travelling scholar, S Hirst, in his report in *Architecture* acknowledged this. "This summer I decided to travel fairly extensively in Holland having heard such fine reports, and also having seen such numerous reproductions of the work done there."⁸

4. DISSEMINATION— DOCUMENTATION/TEXT

4.1. NSW Travelling Scholars/Germany

Architecture published the illustrated bi-annual reports of the NSW Travelling Scholars, (Granted by the New South Wales Board of Architects) in full. They, together with articles republished from overseas journals were the main disseminators by text of Modernism. Travelling scholars often remained overseas for 5–6 years, and Eric Andrew typified their dedication. He travelled through Europe, Denmark, Sweden, Holland and Germany, on bicycle, only with the essentials, maps, camera, and a change of clothing.⁹

Architecture, July 1934, was dedicated completely to Modern German Architecture and was structured around Eric Garthside's, report "The Lessons from Modern German Architecture." He argued that Modern German Architecture was well known because of its prominence in the journals. Garthside raised a critical question about dissemination; which buildings are documented and thus selected to become disseminators, and from which countries.¹⁰ Significantly for this conference how that influenced resilience

and conservation. In the 1930s German, Dutch and Scandinavian examples were favourite disseminators for Australians, as demonstrated by Garthside's feature article itself.

"Architecture in Germany A design suitable for Australia" in *The Australian Home Beautiful*, September 1935, argued that German modern architecture was indeed suitable for Australia citing an example of a house at Teplitz-Schonan, architect, Kurt Spielman, with its flat roof and large areas of glass and included photographs reproduced from *Innen Dekoraten*. The author was confident that the specifics of a site and orientation would enable the translocation of this building from the Northern to Southern hemispheres.¹¹

Morton Herman's report of 1934 included his visit to Eric Mendelshon's buildings in Stuttgart and Berlin, and the exhibition of Walter Gropius's work at the RIBA, including the Bauhaus, Dessau, which he described as an "extraordinary fine building"¹² This was an example of multi layered dissemination. Gropius and his Bauhaus building disseminated first via England, through his relocation there in 1934 and an exhibition of his work viewed by Australians in England disseminated by travelling scholars through their reports documented in *Architecture*, an Australian professional journal.

4.2. Book Reviews

Book reviews in the Australian journals enabled readers to keep abreast of the latest publications, for example, Walter Gropius's *The New Architecture and the Bauhaus* reviewed in *Architecture*, October 1935. A review of *Twentieth-Century Houses* in *Architecture*, authored by important Australian architect Raymond McGrath resident in London, illustrated an initial carefulness towards Modernism, alongside a sense of loyalty, perhaps reflecting the NSW's chapter of the RAIA,

a preliminary survey of this book will probably irritate those who are not fully in sympathy with the new movement in Art, Architecture, Literature and Music; but upon closer analysis the very logic and the careful thought, ...are sure to appeal to even the most conservative.

The reviewer quoted from McGrath to support Modernism citing "the office building of Walter Gropius and Adolf Meyer and the glass — house by Bruno Taut."¹³ *Architecture*, a professional journal, acknowledged architects' and building names, a marked difference from the home building journals who often did not.

4.3. Mewton and Grounds Architecture

Significant dissemination of Modernism was the documentation of the 1930s domestic architecture 1930s of Mewton and Grounds. It received wide coverage in *The Australian Home Beautiful*, often illustrated with full page photographs (Fig. 4). Geoffrey Mewton's articulated modernist stance documented in the *Journal of the Royal Victorian Institute of Architects*, 1940, was notably several years after their seminal houses were completed. Mewton desired func-

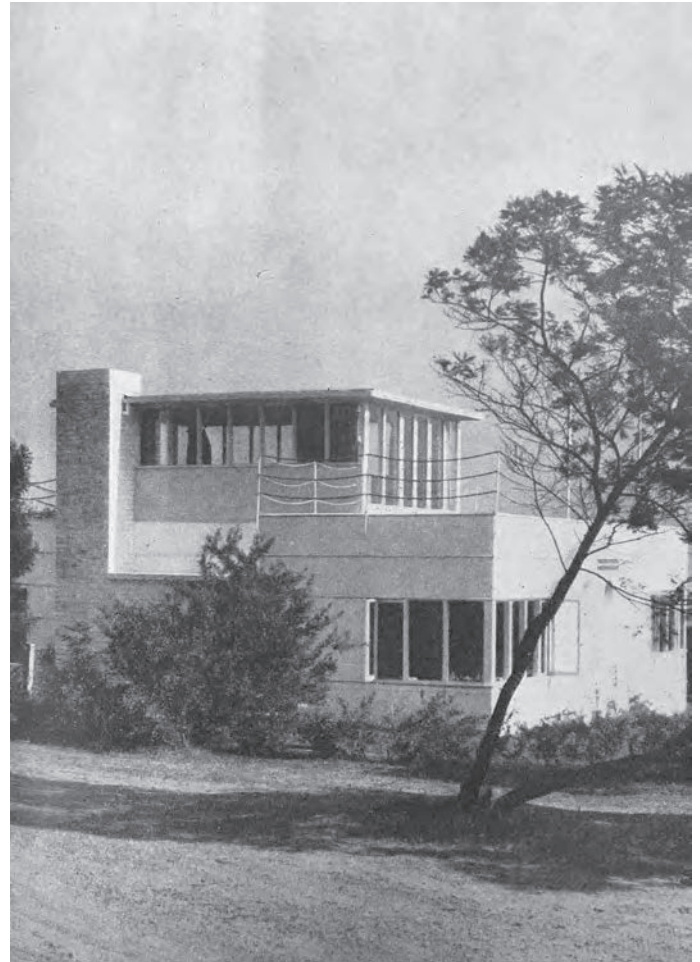


Fig. 4. Roy Grounds, Mewton and Grounds, House in Ranelagh Estate, Mt Martha Melbourne, Australia, 1933–34. *The Australian Home Beautiful*, May 1936.

tionalism in planning, the importance of solar access, and the need for healthy buildings. "One of the most important rooms in many houses today is the sun room, a room largely of glass, with the correct aspects to trap the sunlight and forming a link between the house and the garden".¹⁴

5. DISSEMINATION— DOCUMENTATION / MATERIALS AND CONSTRUCTION

5.1. Brickwork/ Building August 1935

Building, August 1935, reported on the RIBA Medal, subtitled "Modern Design Favoured Medal to Sir John Burnet, Tait & Lorne" for the design of the Royal Masonic Hospital at Ravenscourt Park, London, and in their documentation the construction and materials were emphasised.¹⁵

All the buildings are of steel frame construction with reinforced concrete foundation and hollow tile and reinforced

concrete floors and roof. The buildings are faced with 2 inch red bricks, in Flemish garden bond with wide joints,

Complimentary on the opposite page was "Modernism in Brickwork" featuring a black and white photograph of MacRobertson's Girls' High School, likewise the accompanying text documented the materials. "The façade is of cream bricks, and Wunderlich blue bricks were used on the mullions, sills and trim to entrance doorway and piers, About 15,000 blue bricks were used."¹⁶

5.2. Glass

5.2.1. DECORATION AND GLASS

Decoration and Glass played a significant role. It championed glass as a modern material, introducing innovative decorative and structural glass. Their accompanying advertisements deployed moderne graphics and it favoured Moderne projects over Modernism.

5.2.2. GLASS / BUILDING

The conservative *Building* also documented glass as a modern material. "Walls of glass can still be said to describe modern building, but they are placed on their sides instead of on their ends, for horizontality."¹⁷ Herman in his description of Gropius's Bauhaus "... has demonstrated the inherent beauty in glass as a building material, and he gives it what might be termed a structural beauty."¹⁸

6. DISSEMINATION-DOCUMENTATION/ COMPETITIONS AND THEIR DOCUMENTATION IN THE JOURNALS

6.1. MacRobertson Girls' High School Melbourne Competition 1933

The school named after the competition patron, the chocolate manufacturer, Macpherson Robertson, was to be completed in 1934 and opened by the Duke of York as part of his Melbourne Centenary visit. It was documented across journals, *The Australian Home Beautiful*, *Royal Victorian Institute of Architects Journal* and *Building*, in photographs and text all emphasised the modern brickwork. It generated discussion of Modernism which was broadened beyond the profession to the general public. A full page photograph of the school was used to illustrate John Scarborough's article "Domestic Design and Progress The Case for Modernism in Australia" and suggested that if architects did not explore the innovative and experimental that they would be failing in its duty to the public.¹⁹

6.1.1. NORMAN HUGH SEABROOK

Seabrook after completing his studies travelled to the United Kingdom where he worked in both Birmingham and London, including for Sir John Burnet, Tait and Lorne, whose projects received considerable photographic documentation, in the Australian journals. As early as 1929 *Architect*

featured an external photograph and floor plans of one of their houses, at Silver End Garden Village, Essex. Seabrook returned to Melbourne in 1933 submitted his winning design.

6.1.2. THE AUSTRALIAN HOME BEAUTIFUL:

SEABROOK AND THE DEBATE ABOUT MODERNISM

Robin Boyd in his seminal book *Victorian Modern*, 1947, described MacRobertson Girls' High School as the advent of the "revolution of modern Architecture in Australia."²⁰ Twelve years earlier, in *The Australian Home Beautiful*, June 1935, Seabrook declared the school as modern. The text, including words by Seabrook generated enthused discussion about Modernism in the *Australian Home Beautiful*, dominating the letters to the editor for the next four issues. It should be said that not all correspondents were in favour of Modernism. The editor had no doubt that Seabrook was a modernist, "but let Mr Seabrook, than whom no more earnest and sincere exponent of modernism exists, explain his views on the subject"²¹ and his own recently completed building MacRobertson's Girls' High School demonstrates all these points.²² Seabrook championed Modernism in "1935", in architecture we see honesty, beauty of expression and further, "To appreciate the spirit of modernism, or produce truly modern work, one must eat, drink, live, play, work, think and talk modernism."²³ The Education Department also advocated Modernism. "Today no extraneous, useless decoration, economic design in plan and finish, and above all an attempt to build in harmony with the surrounding park and in beauty."²⁴

However, in the documented discussion of the building, the clear precedent, Dudok's Hilversum Town Hall, which Seabrook had seen on his travels was not mentioned. Dudok's massing, brickwork, and colours, are all there. Was the audience of "1935" published in *The Australian Home Beautiful*, a popular journal, the reason for this?

6.1.3. EWAN LAIRD

Ewan Laird, a Victorian architect, was not so taken by the building, "I didn't think that they did it terribly well and when I went to Holland I did not think that they got the feeling in it that Dudok did."²⁵ In Laird's address to the Victorian architecture students in 1935, reported in the student section of *Journal of the Royal Victorian Institute of Architects*, he distinguished between the modernism of Germany, which Laird saw as "purely functional" and the more romantic and individual work of Dudok "there was no romance in Germany... pure functionalism under Professor Gropius of Dessau — but plenty of it in the Dutch school led by Dudok."²⁶

What lessons can be learned from this? Eric Garthside made a critical observation when he spoke about Gropius's work and reflected on which architecture is represented in the journals. The question around dissemination and documentation of which buildings, is a familiar question; whose culture? The knowledge of buildings from documentation

forms a critical part of cultural assessment and their subsequent listing or not. The buildings discussed in this paper are all today considered significant modern buildings in Australia.

7. CONCLUSION

This paper has presented one way that Global Modernism was disseminated locally in Australia, namely through photography and text in the Australian journals. Concluding it presents that ongoing resilience of buildings and their cultural significance was undoubtedly assisted by their local documentation. Importantly it proposes that Australian architects themselves became disseminators of Modernism in a local context. Seabrook is only one case study of this dissemination journey. His travels and work overseas set the precedents of his Modernist work in Melbourne, aided by the social context and importantly the publication of his buildings and tenets enabled a public articulation of modernism enhanced by the high public visibility of MacRobertsons Girls' High School.

REFERENCES

- ANCHER, Sydney, "Reports of Travelling Scholar of the Board of Architects of NSW", *Architecture*, Sydney, January 1932, 155.
- , "Architecture in Germany A design suitable for Australia," Melbourne, *The Australian Home Beautiful*, September 1935, 16–17.
- BOYD, Robin, *Victorian Modern 111 Years of Modern Architecture in the State of Victoria*, Melbourne, Victorian Architectural Students Society, 1947.
- HARDWICK, Carol, "The Dissemination and Influence of Willem M Dudok's Work in Modern Architecture in Australia 1930–1955", PhD Thesis University of Sydney, 1998.
- HARRISON, W. E. J., "Real Modernism The Home of Mrs Norman Seabrook", *The Australian Home Beautiful*, July 1935, Melbourne, 6–11; Letters to the Editor, *The Australian Home Beautiful*, July 1935, 5, 6–11; August 1935, 14; September 1935, 37; October 1935, 43.
- MORTON, Herman, "The Trend of Modern Architecture its Achievements in England", *Architecture*, July 1935, Sydney, 133.
- MEWTON, Geoffrey, "A Plea for Modernism in Architecture", *The Australian Home Beautiful*, August 1937, Melbourne, 10–11.
- SCARBOROUGH, John, "Domestic Design and Progress", *The Australian Home Beautiful*, January 1935, Melbourne, 6–7.
- SEABROOK, Norman, "1935", *The Australian Home Beautiful*, June 1935, Melbourne, 21–23.
- STONE, Benjamin, "Board of Architects of New South Wales: Report of Travelling Scholar", *Architecture*, Vol. 24, Sydney, 1935, 91–94.

NOTES

- 1 D. Saunders, "So I decided to go overseas," *Architecture Australia*, February–March 1977, 22–28.
- 2 Establishment of Building Industry Congress 1931 by Victorian Government, Chairman, Leighton Irwin President RAIA.
- 3 "Echoes of the Centenary Homes Exhibition," *The Australian Home Beautiful*, Vol. 13, No. 1, Jan. 1935, 15–19, Competition stated "a preference will be given to designs exemplifying the modern trend in architecture".
- 4 See Leonard Bullen's series of articles in *The Australian Home Beautiful*, "Modern Trends in Entrance and Porches," April 1935, 12–13, "The Problem of the Flat Roof," May 1935, 18–19.
- 5 T Fry, "The Photo-Modern", *Transition*, 3, 1987, 3–7.
- 6 H. J. Tribe, "A Modern Hospital Is Built", *Architecture*, October 1936, 240–243.
- 7 S. Ancher, *Architecture*, March 1932, 155.
- 8 S. Hirst, *Architecture*, July 1937, 159.
- 9 Eric Andrew, "Report", *Architecture*, October 1938.
- 10 Eric Garthside, "Lessons from Modern German Architecture", *Architecture*, July 1934, 145–166.

- 11 "Architecture in Germany A design suitable for Australia", *The Australian Home Beautiful*, September 1935, 16–17.
- 12 Morton Herman, "The Trend of Modern Architecture its Achievements in England", *Architecture*, July 1935, 132–147; ref Gropius, 132–33.
- 13 Book Review, *Twentieth Century Houses*, London, Faber and Faber 1934, *Architecture*, June 1935, 127.
- 14 Geoffrey Mewton, "Our domestic architecture", *Journal of the Royal Victorian Institute of Architects*, Vol. 38, 1940, 100.
- 15 *Building*, August 1935, 18.
- 16 Loc. cit., 19.
- 17 *Building*, March 1936, 18.
- 18 Herman Morton, Loc cit., 133.
- 19 John Scarborough, "Domestic Design and Progress The Case for Modernism", 7.
- 20 Robin Boyd, *Victorian Modern*, Melbourne, Royal Victorian Institute of Architects, 1947.
- 21 Norman Seabrook, "1935", Australian home Beautiful (ed.), *The Australian Home Beautiful*, June 1935, 21.
- 22 Ibid.
- 23 Ibid.
- 24 Report on MacRobertson Girls' High School, Education Department of Victoria, 1934.
- 25 Written correspondence between C. Hardwick & E. Laird, March 1991.
- 26 Ewan Laird, *Journal of the Royal Victorian Institute of Architects*, June 1935, 42.

JOURNALS AND THE POPULARISATION OF SPANISH MODERNITY IN THE 1960s

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ABSTRACT.

In the 1960s, periodicals were a well-established platform in the architectural field, with such journals as *Architectural Review*, *Domus* or *Baumeister* as prominent examples. After WWII, new journals were created which competed against the more traditional ones, but both the newer and the older journals, moving beyond the first stages of post-war reconstruction, started to give voice, from a variety of perspectives, to the new directions in architecture, not only with a local, but with an international focus.

In this context Spain was basically unknown to the rest of the world. For a long time it was absent from the *avant-garde* architectural trends and from the pages of international journals. In the mid 1950s, however, Spain started to awaken interest in foreign periodicals. The most remarkable aspect of this development is that this international attention went deeper than the usual attraction to anything new or exotic and that it would consolidate in the following decade. This period witnessed the publication of the first special journal issues devoted to Spanish architecture in different countries.

Starting from these facts, this article attempts to analyse the role played by these special issues in the rapid popularisation throughout the 1960s of Spanish architectural modernity, which was virtually unknown before that period.

1. INTRODUCTION

*It is actually the emerging systems of communication that came to define the twentieth century culture — the mass media — that are the true site within which modern architecture is produced and with which directly engages.*¹

The role that journals played throughout the 20th century is such that it almost feels unnecessary to highlight. As presented by Beatriz Colomina, the role of mass media in the development of modern architecture is very well known, and other authors have referred to its “key role as a source of information and as a reference point for emulation” and have highlighted its role as a “vehicle for the transmission of news, for the exchange of opinions, and its role in the popularisation of successive trends, languages and slogans”.² Hélène Janniére states: “in architecture, the illustrated magazine is unquestionably the type of publication that symbolises modernity, comparable to the treatise for the classical era”.³

During the 1960s, periodicals were already a consolidated genre within architecture, something we can see in publications such as *Architectural Review*, *L'Architecture d'Aujourd'hui*, *Domus* or *Baumeister*. After WWII new titles had appeared on the market, and they began to compete with already established publications. In general terms, both sets of magazines, after overcoming the most orthodox modernity and the first phases of post-war reconstruction, began to present, from a variety of perspectives, the new trajectories architecture was starting to embark on, focusing not only on local contexts, but also international ones. For example, from 1960 onwards *Architectural Review* began to include a new “World” section within each of its issues which showcased recent buildings from different countries. Another example comes from the German magazine *Baumeister*,

which from 1964 onwards “had become more international and the individual issues had a stronger focus on selected topics”.⁴

In Spain, the second half of the 20th century was marked by the Civil War (1936–1939), which resulted in the establishment of a dictatorial regime until 1975, events which had an effect on the development of modern architecture in the country. In the first instance, war put a halt to the budding modernity which had begun to develop in the 1920s. The establishment of the dictatorship was viewed with suspicion by the rest of European democracies, which up until the 1950s kept Spain subject to strict economic and political isolation. But at the same time, in architecture, the 1950s brought with them the beginning of “the interesting adventure undertaken by a brilliant generation that rushed to develop a modernity that had up until then been denied to them”.⁵ Some of their work then garnered attention and started to be recognised by the international architectural scene. It was during this process when architectural magazines played a vital role, as they became a vehicle through which Spanish modernity was communicated and made known to the outside world.

2. SPANISH ARCHITECTURE IN INTERNATIONAL JOURNALS, SOME FACTS

After the halt caused by the Spanish Civil War, it wasn't until 1949 that Spanish architecture would reappear in the pages of international magazines. In that year, Gio Ponti, director of *Domus*, presented the work of Cordech and Valls in the magazine's 240th issue. The Italian editor had met the Catalan architects at the V National Architectural Assembly, which in that year had been held in Barcelona, and was impressed by their work, which from then onwards made frequent appearances in his magazine, sparking international

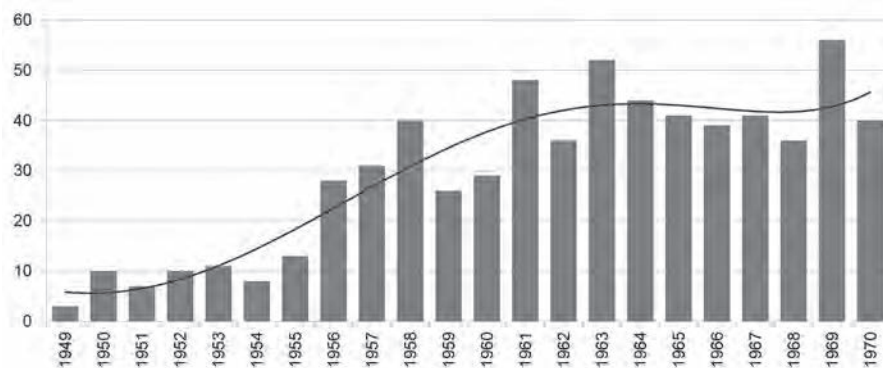


Fig. 1. Number of articles about Spanish architecture in international journals. © Pablo Arza.

interest in those architects. As Claude Parent and Patrice Goulet, editors of *Aujourd'hui, Art et Architecture*, point out, "before the discovery of Cordech and Valls around 1950, Spanish architecture was known abroad only through the work of one deceased architect, Antonio Gaudí, and that of two engineer-architects: Félix Candela and Eduardo Torroja".⁶

If we observe the chart (Fig. 1), we can see that from 1950 onwards references to Spain began to grow, a tendency which consolidated in the next decade in a remarkable way. If during the 1950s we see 195 articles in 64 magazines, in the 1960s we can see 447 articles in 82 magazines from 19 countries.⁷

This sudden interest in Spanish architecture was surprising. In addition to Gio Ponti's discovery as a triggering factor, two significant events that took place in the late 1950s help explain the increased attention paid to Spanish architecture by foreign critics.

The first event happened in 1957, the year that the canteen building for the SEAT factory, designed by César Ortiz Echagüe, Rafael de la Joya and Manuel Barbero, was recognised with the Reynolds Prize. The second event took place a year later, in 1958, when the pavilion which Spain presented to the International Exhibition in Brussels, designed by José Antonio Corrales and Ramón Vázquez Molezún, won the gold medal.

Throughout the decade, Spanish architecture had successfully participated in other international competitions such as the Milan Triennials (1951, 1954 and 1957). However, the relevance of the two buildings mentioned previously lies not only in their intrinsic quality, but in the fact that they participated in events of considerable international relevance and visibility. This led to both the canteen building and the Spanish pavilion being published in a large number of international magazines.⁸ They were therefore conduits for the awakening of the interest of critics and editors in Spanish architecture. As we can see in the chart (Fig. 1), from then onwards articles on Spain started to increase. In this sense, several critics remarked on the "surprise generated by

Spanish architecture" and, in reference to the Brussels Pavilion, "the general interest that it awoke".⁹

3. THE PROLIFERATION OF SPECIAL EDITIONS

In light of these results, we can say that the 1960s consolidated Spanish architecture in international journals. During this decade, the number of articles referencing Spain grew considerably, and most importantly, up to 12 special editions dedicated to Spanish architecture were published in a variety of magazines of considerable prestige and from a diversity of places such as Japan, Argentina, USA, Germany, Switzerland, France etc. (Fig. 2).

These publications were relevant in the publicising of Spanish architecture for a variety of reasons. In first place, they were a clear sign of progressive discovery and later growing interest in regards to Spain by international critics. From the Spanish perspective, they also generated a positive effect on national professionals, who saw their work published in magazines they admired, which they subscribed to and which in many cases were a source of inspiration.

In second place, because of the nature of these special editions, they had a larger impact and visibility, which in turn increased the interest of other critics for Spanish architecture. For example, after the publication of the special edition published by *Zodiac*, both *Architectural Design* and *Deutsche Bauzeitung* included some of the same buildings in their own editions, referencing the Italian magazine. In this sense, we can also see that *Baumeister*, when publishing a special edition on Spain in 1967 referred to the previous publications by *Werk* (1962) and *Zodiac* (1965) which served as references.

And finally, these special editions would showcase more than conventional articles would. This is quite relevant, because as they were longer, they could present wider and more detailed studies of Spanish architecture. In the presentation of *Zodiac's* special edition on Spain, its editor Vittorio Gregotti explained the reason of publication as being the need for "a frame of reference within which to place [Span-

Year	Nº	Journal	Country	Title
1962	6	<i>Werk</i>	Switzerland	Spanische Architektur und Kunst
1962	25	<i>Bouwkundig Weekblad</i>	Netherlands	
1963	3	<i>Kokusai-Kentiku</i>	Japan	
1963	15	<i>Tijdschrift voor architectuur en beeldende kunsten. Katholiek bouwblad</i>	Netherlands	Spaanse architecten
1964	3	<i>Program</i>	United States	
1965	15	<i>Zodiac</i>	Italy	España
1966	52	<i>Aujourd'hui Art et Architecture</i>	France	Espagne
1967	6	<i>Baumeister</i>	Germany	Spanien
1969	22	<i>Cuadernos Summa Nueva Visión</i>	Argentina	España
1969	107	<i>Arquitectura (Lisbon)</i>	Portugal	Arquitectura na Costa Catala
1970	149	<i>L'Architecture d'Aujourd'hui</i>	France	Espagne. Madrid Barcelone
1970	115	<i>Arquitectura (Lisbon)</i>	Portugal	Pessimismo e imaginação na arquitectura espanhola de hoje

Fig. 2. Special issues dedicated to Spain published by international magazines during the 1960s. © Pablo Arza.

ish] works which we have seen here and there in different publications".¹⁰ These special editions gave readers a contextualised vision, which included a historical perspective on Spanish architecture. As Gregotti hinted, up until then Spanish architecture was known mainly through disperse articles which had been published in different magazines, and references to Spain in architectural history did not, at most, go much further than Gaudí. Therefore, in the context of the 1960s, these monographs became references for architectural literature in reference to Spain, and they defined the vision the outside world would have of Spanish architecture, contributing to its increase in value.

4. THE ROLE OF SPANISH ARCHITECTS IN SPECIAL ISSUES

One element which has emerged after analysing these special editions is the role that some Spanish architects played in their creation. Foreign editors had no references or previous research to go on, and faced with a reality they knew little about, they either travelled to Spain or established contact with Spanish architects, who helped with the selection of content and provided the key ideas with which to understand the current situation Spanish architecture was in. This was clearly reflected in the thank you notes dedicated to them by the editors of these special issues. For example, in their 1967 edition, *Baumeister* alluded to "the cordial support, advice and hospitality"¹¹ provided in the creation of the issue by Spanish architects. In *Zodiac*, Gregotti also thanked "above all, the courage and intelligence of the group of Spanish architects who built this is-

sue".¹²

But, as well as this work, some Spanish architects had a larger role in the creation of some of these editions. The case of César Ortiz-Echagüe, one of the authors of the previously mentioned SEAT canteen building, is significant. His role, as José Manuel Pozo has studied, was essential in the first special issue on Spain published in *Werk* magazine in 1962. Ortiz-Echagüe himself explained that, after winning the Reynolds Prize because of his SEAT canteen building, and seeing the lack coverage from *Werk* magazine — which he was a reader of and where he had seen the competition notice in March 1957 — decided to send a letter to the editors, accompanied by a set of photographs and texts on the recognised work.¹³ This would then be published in August 1958. As well as this, the magazine suggested he write a longer-form article to describe the current Spanish architectural scene. This proposal would lead Ortiz-Echagüe to select works and write a text, which explained the current context within which Spanish architecture was developed, for the 1962 special issue. Another example is *Kokusai-Kentiku*, which was created after the exhibition "Thirty years of Spanish architecture (1930–1960)", which students of the School of Madrid took to Japan in 1962 and in which Carlos de Miguel¹⁴ collaborated actively.

As well as this, Spanish architects authored many of the texts that accompanied the works presented in these special issues. In them, they would offer a historical perspective of Spanish architecture or would cover issues closer to the current situation of the profession, such as how to exert their role, the challenges they were facing etc. This can be seen in the issues published by *Zodiac*, *L'Architecture d'Aujourd'hui*,

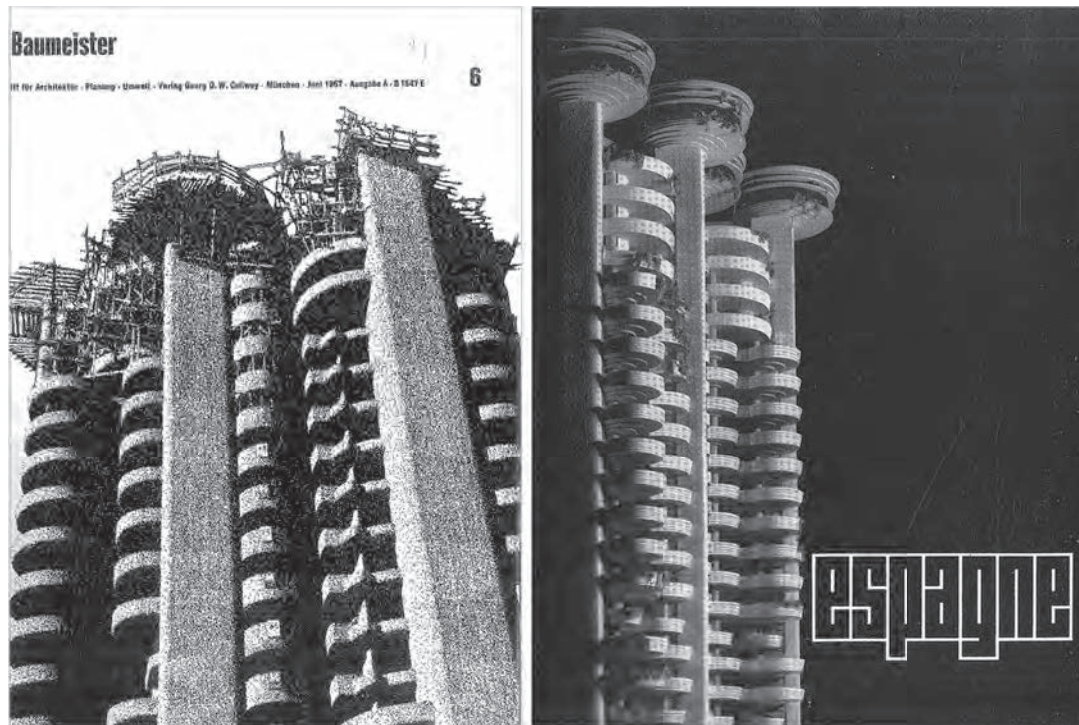


Fig. 3. Torres Blancas (Sources: *Baumeister* 6, 1967 (cover) and *Aujourd'hui Art et Architecture* 52, 1966 (back cover)).

Baumeister, *Aujourd'hui Art et Architecture*, *Architecture* (Lisbon), *Cuadernos Summa Nueva Visión*, *Kokusai-Kentiku*, amongst others.

Thus, all of this communication work is a clear symptom of the interest that a good number of Spanish architects had for their architecture — or at least the knowledge of it — to reach further afield than their own country. As Ortiz-Echagüe explained in 1965, his communication work in *Werk* was born of the “firm objective of trying to spread the knowledge of all the good work that had been done in architecture in Spain”.¹⁵

And finally, we must remark that for the Spaniards, this sudden international interest in their work confirmed to them that they were doing things well in their path towards modernity, which they had started after the Civil War. As Hélène Lipstadt has stated, architecture magazines have been “authorities of distinction for architects (...), validating their designers’ status as architects”.¹⁶

5. “EXPERIMENTING FURIOUSLY”

In their 1962 special issue, the directives of *Werk* presented Spanish architects as “a generation that reconnects with our times”.¹⁷ As we have pointed out, Spanish architecture was a total discovery in the international sphere. However, we must reflect on this interest that Spain garnered

and whether the works produced by its architects were enough in themselves to have a special edition printed practically every year during the 1960s.

In total, around 12 editions covered around 765 pages dedicated to Spanish architecture. In them we find up to 130 different buildings and only around 26% of them are repeated in more than one issue. These numbers show the high production values that Spanish architects had, who, in the words of J. M. Richards, director of *Architectural Review*, were “experimenting furiously”.¹⁸ Experimentation which led each architect down their own path, marked by a variety of influences — organicism or rationalism, amongst others —¹⁹ but adapting them to the Spanish reality, which was conditioned by place, climate, materials, technique and the economy. The portraits that these special editions offered of Spanish architecture reflected the eclecticism of the moment, in which practice imposed itself on theory and, in consequence, photography imposed itself over words. This is shown most notably in specific issues such as *Bouwkundig Weekblad*’s 1962 monograph, which only showed 9 Spanish works. Each of them was illustrated with abundant high-quality images which stood in contrast with the laconic and brief texts that came with them.

In regard to the types of work presented, the large majority of buildings (75%) were residential constructions. This is a reflection of the context of the 1960s, when research on

housing and new urban developments, as a result of city growth, was a common preoccupation of many architects. As pointed out previously, there were few repeated works in these editions. However, there were two which make frequent appearances, Caño Roto, building by Íñiguez de Onzoño and Vázquez de Castro, and the Torres Blancas building by Fco. Javier Sáenz de Oiza.²⁰ Caño Roto is a reference point for Madrilénian social housing, and the more than 1,600 homes it houses are distributed amongst the different typologies of a clearly rationalist architecture. On the other hand, Torres Blancas, despite appearing in fewer monographs due to its later construction, generated interest from international spheres from the very beginning. It appears in *Zodiac* (1965) even when just in its project phase, *Aujourd'hui Art et Architecture* (1966) published a photo of the model on its back cover and *Baumeister* (1967) showed it on its cover (Fig. 3). The building would become the emblem of Spanish Organicism. As Ana Esteban points out, Torres Blancas would "express the eclosion of Spanish modernity more clearly".²¹ This building, which appeared in a variety of articles in different international magazines, would become the most widely publicised building amongst all of the Spanish creations.²²

After the 1960s, Spanish architecture continues to maintain its relevance in international magazines. But as we have seen, the sixties were a key moment in the process. During this decade, through these special issues, Spain would manage to consolidate its international presence in barely a decade.

I would like to end by emphasising that one of this paper's goals has been to illustrate, through the case of Spain, that periodical publications can be a very useful methodological tool. Their recurring nature, their focus on current trends, and their ability to generate networks and to connect distant poles, make magazines a most valuable resource for the historical study of central episodes in modern architecture.

REFERENCES

- COLOMINA, Beatriz, *Privacy and Publicity: Modern Architecture as a Mass Media*, Cambridge, The MIT Press, 1994.
- CORTÉS, Juan Antonio, "El segundo desarrollo moderno: los años cincuenta", *Arquitectura del siglo XX: España*, Madrid, Tanais, 2000, 140–167.
- ESTEBAN MALUENDA, Ana, "Una experimentación furiosa: el papel de la fotografía en la creación de una imagen canónica para la arquitectura moderna española", *Anales del IAA*, 19, 2015, 39–54.
- JANNIÈRE, Hélène, *Revues d'architecture dans les années 1960 et 1970. Fragments d'une histoire événementielle, intellectuelle et matérielle*, Montréal, IRHA, 2008.
- LIPSTADT, Hélène, "Publications, concours et expositions d'architecture", *L'Architecture et son image. Quatre siècles de représentation architecturale*, Montréal, Centre Canadien d'Architecture, 1989, 109–115.
- ORTIZ-ECHAGÜE, César, *La arquitectura española actual*, Madrid, Rialp, 1965.
- OTXOTORENA, Juan Miguel, "Arquitectura y Revistas, Modernidad y Publicística", *Las revistas de arquitectura (1900–1975): crónicas, manifestos, propaganda*, Pamplona, T6 Ediciones, 2012, 9–10.
- POZO, José Manuel, *Werk 6/62. Un retrato de España*, Pamplona, T6 Ediciones, 2012.
- SCHMIEDEKNECHT, Torsten, "Postwar editorial conversations in Germany", *Modernism and the professional architecture journal*, New York, Routledge, 2019, 32–55.

NOTES

- 1 Beatriz Colomina, *Privacy and Publicity: Modern Architecture as a Mass Media*, Cambridge, The MIT Press, 1994, 14.
- 2 Juan Miguel Otxotorena, "Arquitectura y Revistas, Modernidad y Publicística", *Las revistas de arquitectura (1900–1975): crónicas, manifestos, propaganda*, Pamplona, T6 Ediciones, 2012, 9.
- 3 Hélène Jannièrre, "Architectural Magazines as Historical Source or Object? A Methodological Essay", *Revues d'architecture dans les années 1960 et 1970. Fragments d'une histoire événementielle, intellectuelle et matérielle*, Montréal, IRHA, 2008, 41.
- 4 Torsten Schmiedeknecht, "Postwar editorial conversations in Germany", *Modernism and the professional architecture journal*, New York, Routledge, 2019, 49.
- 5 Juan Antonio Cortés, "El segundo desarrollo moderno: los años cincuenta", *Arquitectura del siglo XX: España*, Madrid, Tanais, 2000, 149.
- 6 Claude Parent & Patrice Goulet, "Architecture en Espagne", *Aujourd'hui Art et Architecture*, 52, 1966, 10.
- 7 This article is the result of a wider research project, in which I analyse the diffusion of Spanish architecture within the international context through foreign architectural periodicals during the second half of the 20th century. The analysis is based on the study of around 180 architecture magazines.
- 8 The canteen appeared in 16 magazines and the pavilion in 19, which explains the twos on the chart (Fig. 1) for the years 1957 and 1958.
- 9 Claude Parent & Patrice Goulet, "Architecture en Espagne", *Aujourd'hui Art et Architecture*, 52, 1966, 10.
- 10 Vittorio Gregotti, "Premisa", *Zodiac*, 15, 1965, 3.
- 11 Von Dieter v. Schwarze, "Spanische Architektur seit Gaudí", *Baumeister*, 6, 1967, 701.
- 12 Vittorio Gregotti, "Premisa", *Zodiac*, 15, 1965, 3.
- 13 José Manuel Pozo, *Werk 6/62. Un retrato de España*, Pamplona, T6 Ediciones, 2012, IX–XIX.
- 14 He was the editor of *Arquitectura*, an important Spanish journal.
- 15 César Ortiz-Echagüe, *La arquitectura española actual*, Madrid, Rialp, 1965, 9.
- 16 Hélène Lipstadt, "Publications, concours et expositions d'architecture", *L'Architecture et son image. Quatre siècles de représentation architecturale*, Montréal, Centre Canadien d'Architecture, 1989, 111.
- 17 "Spanische Architektur", *Werk*, 6, 1962, 185.
- 18 James M. Richards, "The Spain of Carlos Flores", *Architectural Review*, 781, 1962, 187–189.
- 19 To gain a deeper understanding of Spanish architecture during this period I suggest the reading of: Gabriel Ruiz Cabrero, *The Modern in Spain: Architecture after 1948*, MIT Press Ltd, 2001.
- 20 Caño Roto (1956) was published in 9 of the 12 monographs and Torres Blancas (1961) in 5.
- 21 Ana Esteban Maluenda, "Una experimentación furiosa: el papel de la fotografía en la creación de una imagen canónica para la arquitectura moderna española", *Anales del IAA*, 19, 2015, 54.
- 22 For more information, consult: Pablo Arza Garaloces, "Exportando Torres Blancas. La recepción de la obra de Sáenz de Oiza en la prensa arquitectónica internacional", *Rita*, 10, 2018, 154–161.

Session 7-b

DIVERSE EVALUATION AND GENERALIZATION OF MODERN MOVEMENT OF ARCHITECTURE

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The Session 7-b focuses the theme on documentation of modern movement in architecture and its dissemination to reassess its diverse value and significance.

The values of modern architecture are related deeply to its ideals and visions, the architects described and realized through their works, which were documented in several ways and diffused into the modern society.

In this session, we can discuss the various forms of media and mass communication: publishing of books and magazines, newspapers, exhibitions, television and internet as well, and they will show diverse guideposts to rethink the modern architecture.

These media also provide the key to reassess the values of modern architecture for non-professional viewers.

To analyze the process of documenting and popularizing modern architecture is indispensable to rediscover the way of dissemination and understanding especially in the standpoints of general viewers.

The features of documentation and dissemination will be discussed in this session with the activities of architects who tried to promote and propagate the modern movement of architecture.

We will find finally how the media has benefit architecture in relation to the modern society.

At the conference, the following points of view will be discussed regarding the theme of "Documentation and Dissemination".

1) Diverse evaluation:

In order to make documentations in some form on a specific building, you will estimate its value in several views. For the extended understanding of modern movement of architecture, it must be needed to reevaluate it in diverse ways, e.g., historically, social-economically or from the perspective of everyday life. In terms of documentation and dissemination, the way and base to

evaluate the significance of individual buildings should be one of the important issues to discuss.

2) Dissemination and generalization of architectural value:

It is also required to expand the value of modern architecture to broader circle of the society, especially to general people other than the experts in architecture. With this view, you may have to cooperate with the non-professional powers outside the architectural field. It will be expected to argue how to talk to people as to the attractiveness of modern architecture.

3) Possibilities of documentation and its media:

In addition, we need to think of various forms of documentation for the coming period through the specific and appropriate cases. We will focus on the phases and methods to document the characteristics of modern architecture, which reveals the possibilities of media in contemporary society.

Session 7-b consists of 5 papers and their titles and issues are the following.

Hannah Lewi's paper "Cultivating a Resilient Future for Modernism in Australia" reveals the changing process of modern architecture in Australia through her book *Australia Modern: Architecture, Landscape and Design*, which shows the legacy and the enlightening subjects in the history of Australian modern architecture. It is impressive that the issues suggest the possibilities to shift debates on the conservation of the modern heritage of architecture, inspecting the way to communicate to a broader general audience.

Martin Zaiček's paper "ABANDONED (RE)CREATION The Slovak Spa Experience" presents the activities the Slovak art group Abandoned (re)creation, established in 2011, which the author takes part in. The various activities of this group are creating up the possibilities of "social openness" through media and social events, movies, publishing books

and a pocket guide. In the paper, it is mentioned that the modern society sought to acquire “integrant architecture of humanism” in the beginning of 20th century and now has been misunderstood and forgotten, and the forgotten stories of modern architecture could be “a potential for ‘new’ challenge”.

Aleksandar Staničić’s “Documenting the Destruction of Modern Heritage: Semantic Data Modelling” tries to take a new turn of the methods of documentation, “dual methodology” dealings with both documenting and “semantic data models” that seek to “expose hidden relationships between different actors”. There must be a great possibility in the proposition that the “semantic data models” could be an interactive platform or a new protocol through a “communication strategy” that is open to not only the professional community but the general citizens.

Ana Neiva’s “Deutsche Architektur Museum’s “Architektur im 20. Jahrhundert” exhibition cycle. A synthesis on Modern European architecture at the edge of the new Mil-

lennium.” analyses the new scheme to reassess the modern architecture in 20th century in terms of a specific exhibition. There must be a great possibility in the proposition that the exhibition depicts the pluralism of architecture and “high diversity of functional programmes” beyond local conditions. Also the author refers to the “richness of the theoretical frame”, which would be the basis of dissemination and recognition of the values in modern architecture.

Raffaella Maddaluno’s “Fernando Tavora and the experience of the 1960 Tokyo World Design Conference” focuses on the Fernando Tavora’s critical view to contemporary architecture in 60’s and the architectural tradition in Japan as well, which was idealized in terms of “timeless modernity” as mentioned. Especially the idea of “model of universal ethics” to clarify the Tavora’s architectural identity criticizes the western culture, regarding the spread of cars and secretaries as a principle of new modernized society after the world war II.



CULTIVATING A RESILIENT FUTURE FOR MODERNISM IN AUSTRALIA

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ABSTRACT.

The pervasive presence of Modernism is inescapable in Australia. Boosted by the need to reconstruct society after World War I and II, and a very significant immigration scheme since the 1950s, Modern design ideas and building techniques quickly swept away a 19th century legacy of historical and colonial obligation. Modernism provided the toolkit for building infrastructure projects across the vast continent; for re-conceiving the design of public institutions and places of work like hospitals, campuses and factories; new places of culture, consumption and leisure; and for re-thinking ways people lived and where they were housed. The book *Australia Modern: Architecture, Landscape and Design*, edited by Hannah Lewi and Philip Goad and published by Thames & Hudson press vividly capture this Modern legacy of change in Australia, and aims to cultivate a deeper and broader awareness of and appreciation for the architects, site and buildings that increasingly constitute the heritage of today and tomorrow.

This paper presents the motivations for and outcomes of this ambitious publishing project realised through the collaboration and input of Docomomo networks throughout Australia, with authors and contributors drawn from academia, conservation and design practice. Through this reflection on the challenges of producing the book, the paper seeks to demonstrate how traditional print media can still today be an important way to communicate to a broad audience the recent history of twentieth century buildings and places, therefore contributing the remaking of cultural identity. Furthermore, in line with the conference themes, we see the production of the book as an opportunity to chart how social and cultural attitudes to the Modern have transformed over time.

1. DEFINING THE AUSTRALIAN MODERN

*Australian Modernism developed — in all its guises — as a radical circuit-breaker in design and architecture: it provided a set of compelling and exhilarating aesthetic, social and cultural motivations for change in the twentieth century.*¹

Discussions among longtime members of Docomomo Australia had, for many years, evolved around the idea of publishing a significant, beautiful and enduring hard copy book for a specialist and general readership. Docomomo Australia has developed a very strong online presence with digitised fiches, a database and mapped guide to significant Australian sites. However we felt that a published book would have a more substantial impact and legacy. Challenges, including finding resources to fund the endeavour and a good quality international publisher, were obvious but not insurmountable. This paper outlines the journey to fruition of the edited book *Australia Modern: Architecture, Landscape and Design*, published in 2019, its reception and intended heritage impact (Fig. 1).

As Barry Bergdoll has written in the preface to *Australia Modern*:

*Few countries are as associated with a single — and singular — modern building as is Australia. The expressive form of Jørn Utzon's Sydney Opera House not only transformed overnight the skyline of Sydney, but equally the image of the country.*²

Alongside international icons like the Sydney Opera House, Modernism in this book has been defined as those buildings, interiors, furniture, artworks and landscapes,

which epitomize a design approach that embraced truth to function and technical innovation, visions of social equity and the trajectory of progressive aesthetics. The selection of exemplars in the book shows Modernism's increasing diversity and humanizing tendency after World War II, as well as its distinctive adaptations, multiple interpretations and local inventions. As has been captured, Australian Modernism developed — in all its guises — as a radical circuit-breaker in design and architecture: it provided a set of compelling and exhilarating aesthetic, social and cultural motivations for change in the twentieth century. Established historical and stylistic languages were incrementally rejected in favour of newness and a direct response to function in education and in practice, and diverse influences from other parts of the world were absorbed and adapted into Australian contexts across the pre and post-World War II decades (Fig. 2).

Australia Modern follows in a productive line of active architecture, design and conservation research culture in Australia. Given its size and reach, a relatively large number of influential survey books, monographs, journals and critical exhibitions have been produced on various influential Australian Modernists and their legacy over the last twenty years. These have included the seminal book by Jennifer Taylor *Australian Architecture Since 1960* (1986); the symposium *Fibro house: Opera House: conserving mid-twentieth century heritage* convened by Sheridan Burke in 1999 at the Museum of Sydney; Fran Stropin and Susan Marsden's *Twentieth century heritage: marking the recent past* (2001); the 'Unloved Modern' ICOMOS conference, Sydney (2009), a series of exhibitions and books on key twentieth century architects produced by the University of Western Australia from 1992, the 'Keeping the Past Public' symposium, University of Melbourne (2009), and the State Library of Queens-

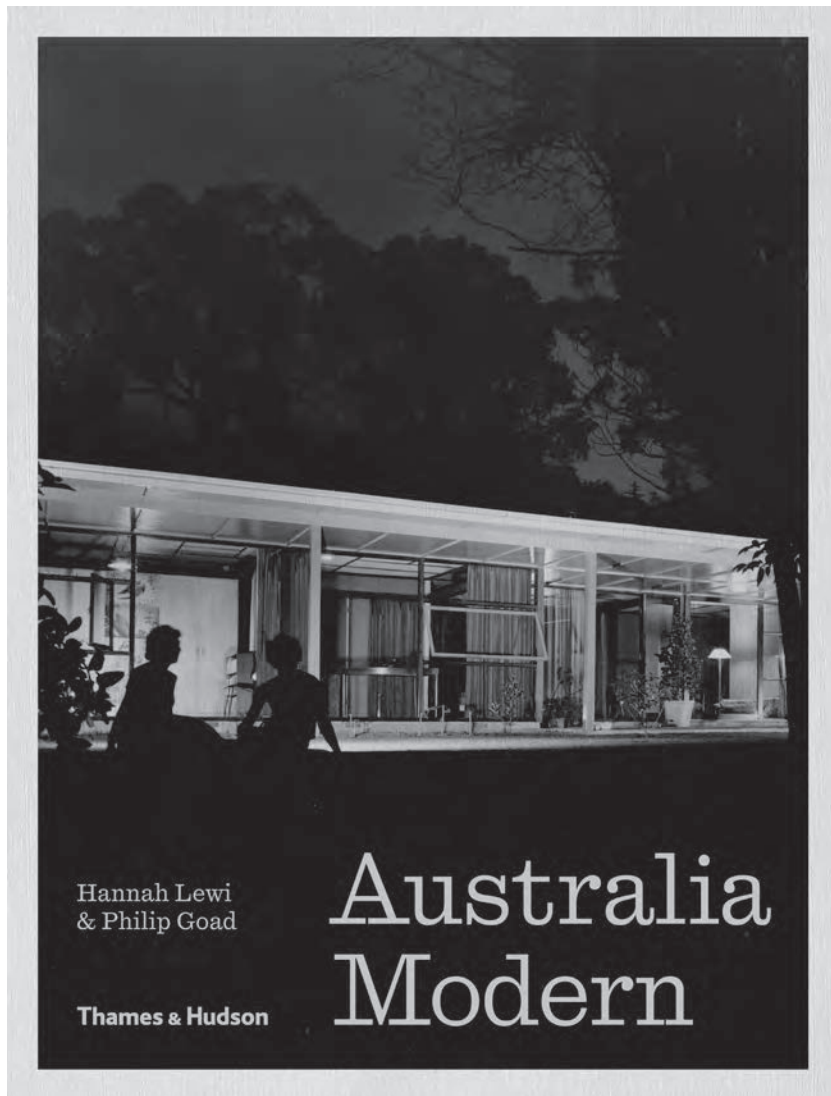


Fig. 1. Cover of *Australia Modern*. © Thames & Hudson, 2019.

land's *Hot Modernism* exhibition (2014), website and book (2015), amongst many others.³ Most recently, Harry Margalit's *Australia: Modern Architectures in History* was published in 2019. However, in general, publishing on architecture in Australia has still been somewhat hampered by lack of international opportunities and interest — not being perceived as a centre of 20th century global cultural production — and a dwindling financial incentive to produce and distribute hard copy books for a relatively small global market.

Inspiration for the publication has also been drawn from a recent resurgent interest in producing books, online resource and exhibitions on Modernism and in particular Brutalism, from many regions of the world, with a good number enabled by the work of Docomomo's international reach. These include the recent examples 'The Brutalist Play-

ground' at the RIBA London (2017); 'Toward a Concrete Utopia: Architecture in Yugoslavia, 1948–1980', MOMA New York (2018); the Venice Architecture Biennale (2016) theme of 'Absorbing Modernity, 1914–2014'; and *SOS Brutalism*, a substantial travelling exhibition, book (2017) and conference in Berlin (2012) produced by the Deutsches Architekturmuseum in Frankfurt and the Wüstenrot Foundation, all of which have furthered understanding of the global variations of concrete expressive architecture and Brutalism from the 1960s and 1970s.⁴

From the outset, our founding motivations also guided key decisions on the composition and content of the book which will be outlined here.

Australia Modern spans the fifty year period between 1925 and 1975. It is always difficult to determine a neatly



Fig. 2. Sydney Opera House under construction. © Photographer M. A. Lewi, date unknown.

bookended historical period however we felt that it was important to include both the pre — and post — World War II decades to fully illustrate the development of Modernism. The early decades are often omitted from surveys about Australian design, yet 1925 marks the completion of the Sydney Harbour Bridge, and includes some of the American architect Walter Burley Griffin's work in Australia. We end the survey at 1975 which marks a social and political watershed with the removal of the Federal Labour government, and a stylistic shift into later Brutalism and early Post Modernism. To help readers put this timeframe into national and international perspective the book includes an illustrated timeline that situates Australian historical and cultural events alongside eclectic and significant moments in Australian and international design history. To take just one example, 1931 highlights the charting of the Antarctic by Douglas Mawson plus the launch of the iconic range of furniture by Fred Ward in Melbourne.

In deciding what exemplars to include within the fifty

year timespan, we were from the outset determined to include places and buildings that are still extant. Ultimately a range of 100 sites were selected, chosen partly from the Docomomo Australia Register, and partly in consultation with architects, historians and experts who have also written many of the 100 building entries. While it cannot be encyclopaedic and cannot hope to compete with official registers of government heritage agencies, local area conservation studies and listings by bodies such as the National Trust of Australia, a balance was sought between different regions, states and capital cities across the country. Also a representation of diverse building types from private houses and public housing, to public buildings for health, work, worship, leisure and so on are included. The book's 100 entries therefore document the best of what remains of Australian Modernism. Just a few examples include the inventive tensile structure of the MacRobertson Girls School inspired by Willem Dudock (Seabrook & Fildes, 1933–34), Sidney Myer Music Bowl (Yuncken Freeman, 1956–59), and the

courtyard Boyd House (Robin Boyd, 1957–58) in Melbourne; the Australian Academy of Science, concrete dome (Grounds, Romberg and Boyd, 1956–59) and the off-form concrete Dickson District Library (Enrico Taglietti, 1968) in Canberra; and the expressive concrete block Marsala House (Iwan Iwaon-off, 1974–76) in Western Australia (Fig. 3).

The 100 building entries are complemented by sixteen typologically-based essays written by expert authors, many of whom are also Docomomo members.⁵ These are interspersed throughout the book and reflect the broader themes of Modernism's claim across all aspects of living, working, health and worship, wartime, recreation, artistic expression, interior design alongside building technology and landscape. The longer discursive essays also offer an opportunity to include many sites that have been lost or detrimentally altered over time and to explore different ways of documenting and re-thinking themes.

The promotion and reception of Modernism was in Australia, as elsewhere in the world, facilitated through the medium of commercial art, graphic design and above all, photography. Indeed, as many historians have discussed, photography was instrumental in Modernism's dissemination and reception. The book therefore also aims to document and celebrate the rise and shifting character of Modernism through the eyes of some of the country's most notable architectural photographers. Figures such as Max Dupain, Wolfgang Sievers, Mark Strizic, David Moore, Fritz Kos, Richard Stringer and John Gollings amongst others are all represented in the volume. Their work at the time was cast across the full spectrum of the popular and professional press. For example Max Dupain's 1935 photograph, *Silos through windscreen*, is symptomatic: a view from behind a car's steering wheel over a smartly austere dashboard and looking towards a series of high-rise concrete silos with a rear vision mirror showing the reflection of a polychrome brick factory of the nineteenth century: the past has been left behind. The inclusion of a wide range of colour and black and white photographs was crucial to the successful reception of *Australia Modern*. As well as including the best of archival photographs and images, another strategic decision was made early on in the planning and production to commission, where possible, new and current colour photographs of buildings and sites covered in the selected 100 sites. To this aim, a number of young architectural photographers have been included.

2. HERITAGE RECOGNITION OF THE MODERN IN AUSTRALIA

There is no doubt that Modernism was intrinsic to the successful development of Australia as an independent nation in the twentieth century, however its social and aesthetic altruism sometimes came with a cost and eventually, a critique. From the 1950s onwards, the modern mindset also brought with it wholesale demolition and erasure of what



Fig. 3. MacRobertson Girls High School. © Photographer C. Francis, 2017.

had come before. Nineteenth century buildings in Australian cities and towns were swept away, often with little pause for sentimental reflection, in favour of higher density commercial centres, infrastructure and government-sponsored social housing developments. Voracious resource extraction through mining across Australia's remote regions, and the imposition of an unfamiliar architectural language of abstraction especially when explored through social housing did not always bring support and praise. Negative reactions towards Modernism from the mid-1970s was, as elsewhere in the world, gradual but decisive.⁶ The last essays of the *Australia Modern* collection therefore focus on the changing fortunes of Modern design in terms of heritage recognition and protection, charting some of the wins and losses, and many of the challenges of conservation that are by and large not particular to Australia, although environmental and climatic extremes add to the burden of preservation



Fig. 4. Demonstration to save at Sirius Housing. © Photographer Ben Guthrie, 2016.

and adaptive reuse.

While there has been no decisive moment identified or mythologised in retrospect as the defining moment of Modernism's demise in Australia — as in the UK with the Ronan Point tower collapse in East London in 1968 or in the USA, with the demolition of the Pruitt-Igoe public housing development in St Louis, Missouri in 1972 — there were various pointers to its eventual fall from grace.⁷ For example between the cessation of the Victorian Housing Commission's tower block building program after 1970 and the fatal 1987 fire at the High-Tech all-concrete Jika Jika wing (1980) at Pentridge Prison in Coburg, VIC, there were, across the country, buildings and events that conspired to imprint a negative stamp on Modernism.

From the early 1970s onwards, Modernism was recast as an aggressor, and from this standpoint, the conservation of the Modern seemed nonsensical. The irony is of course that those same planning and heritage controls that were brought in to counter unchecked development and insensitive urban clearance are now being used to protect the best examples of Modernism. Iconic examples like Australia Square in Sydney by Harry Seidler and the former BHP House in Melbourne by Yuncken Freeman are now listed historic buildings.

Broad acceptance of the historical significance of a wider range of examples of Modern design and places has been growing slowly in the last three decades in Australia, as elsewhere. For example, at the national level, in Australia there

are currently around 119 listed places on the Australian National Heritage List (2007 onward) and approximately 15 date from after 1914. While in Melbourne a series of listings in the 1980s have protected other key sites like the Victorian Arts Centre's National Gallery Victoria, which was registered 1982; Newburn and Caringal Flats were both registered 1984; Sanitarium Health Food Company in 1986; Heide II in 1988; and ICI House, registered in 1990. As of 2018, there are 2333 objects (buildings, landscapes, artworks etc.) listed on the Victorian Heritage Register, and of these, approximately 60 are from the post-World War II period. In NSW, there are approximately 1700 items on the NSW State Heritage Register, with around 90 currently from the Post-World War II period including the Rose Seidler House (Harry Seidler). There have also been many losses, including a number of cases of imminent threat of demolition such as the Sirius public housing building in The Rocks areas of Sydney designed by Tao Golfers and completed in 1980 which are also highlighted (Fig. 4).

Therefore a strong motivation for creating the *Australia Modern* book was to document and add further support to this awareness and appreciation, with a defining moment being the acceptance of the Sydney Opera House onto the UNESCO World Heritage List in 2007, as the youngest cultural site to be successfully included as "one of the indisputable masterpieces of human creativity, not only in the twentieth century but in the history of humankind".⁸ Other successful heritage and restoration projects included are the Council House building in Perth, Western Australia (1962,

Arch.: Howlett & Bailey), and at the University of Melbourne the Beaurepaire Centre (1955–7, Arch.: Eggleston, Macdonald & Secomb), both of which have been sensitively renovated. However the protection of twentieth century architecture still generates charged debate in Australia as it does elsewhere in the world. And as Docomomo members are very aware the conservation of Modernism does not come without significant challenges that are both practical and ideological. The closing chapters in the *Australia Modern* collection by Hannah Lewi and Philip Goad, Susan Macdonald and Peter Lovell highlight these challenges. For many buildings and sites that have been valued for their role in constructing revolutionary functions and new building types to suit modern ways of living, working and waging war, these functional-values are key, as Susan Macdonald has commented in the final essay of the book:

*The tight fit between the form and function of modern buildings has been identified as a barrier to conservation, but there are increasingly good examples of successful projects that demonstrate the ongoing utility of modern buildings. In Australia, adaptive reuse has always been part of the conservation toolkit; bringing new creative responses to the buildings of the modern era demonstrates the benefits of sustaining modern heritage.*⁹

3. RECEPTION AND IMPACT OF AUSTRALIA MODERN

Barry Bergdoll makes the claim about the aims of *Australia Modern* in his preface:

*This compendium is as compellingly urgent for the national protection of modern heritage as it is a starting point for an international recognition of a much fuller roster of contributions by Australian architects to explorations of the materials, building programs, and urban and landscape planning of modernity.*¹⁰

We hope that the lasting value of a book like *Australia Modern* is not only to inform and arouse interest but also to shift debates surrounding the conservation and heritage of modern twentieth century sites so that they might sit squarely in the radar of the design professions' current and future concerns, and most importantly so that more places might become cherished by everyday Australian communities. The book's aim therefore reflects Docomomo's charter of communicating the pressing need to engage with our remaining twentieth century creative works and building stock — both iconic and ordinary — in imaginative and sensitive ways.

To date the reception of *Australia Modern* has indeed been very positive, with it topping the Thames & Hudson best-sellers in Australia for 2019. It has been nominated, awarded and short-listed for a number of publication and design awards, due in no small part to the quality of the graphic design of the volume by Stuart Geddes of Mel-

bourne. It has sparked an exhibition, a series of radio podcasts and interviews on the national public broadcaster ABC radio, and keynote lectures at various heritage events past and planned for 2020. The book has been released in the UK in January 2020. This is all encouraging, and paves the way for more publications both in Australia and internationally, that aim to document and foster a wider appreciation for and responsible stewardship of all the myriad of buildings, landscapes, infrastructure and urban areas that represent the legacy of Modern design.

NOTES

- 1 Philip Goad & Hannah Lewi, *Australia Modern: Architecture, Landscape and Design*, Melbourne, Thames & Hudson, 2019, 22.
- 2 Barry Bergdoll, "Australian Idiom" *Australia Modern*, 2019, 12.
- 3 Philip Goad, "Unloved, over-loved or just misunderstood? Modern architecture: the problem child of heritage", *Historic Environment*, 25, 1, 2013, 12–30.
- 4 *SOS Brutalism: A Global Survey*, resulting from a collaboration by the Deutsches Architekturmuseum and the Wüstenrot Foundation, Oliver Elser, Philip Kurz, & Peter Cachola Schmal (eds.), Zurich, Park Books, 2017.
- 5 The DOCOMOMO Australia Register by Buildings List can be found at <http://docomomoaustralia.com.au/dcmm/buildings-register/register-by-buildings-list/>. Accessed on Jan. 10, 2021.
- 6 See Jennifer Taylor's "Pleasures of Architecture" and "Conclusion" in the first edition of *Australian Architecture since 1960*, Sydney, Law Book Co., 1986, 192–220.
- 7 For discussion of these sites in relation to their marking as endpoints or symbols of the failure of Modernism, see Elaine Harwood, *Space, Hope and Brutalism: English Architecture, 1945–1975*, New Haven, CT, Yale University Press, 2015; Katharine G Bristol, "The Pruitt-Igoe Myth", *Journal of Architectural Education*, 44, 3, 1991, 163–171. Pruitt-Igoe was famously discussed and pictured by Charles Jencks in *The Language of Post-Modern Architecture*, New York, Rizzoli, 1977.
- 8 International Council Report on Monuments and Sites to the World Heritage Committee, accessed Jan. 10, 2021, <https://www.sydneypoperahouse.com/our-story/world-heritage.html>.
- 9 Susan Macdonald, "Conserving twentieth-century heritage", *Australia Modern*, 2019, 298.
- 10 Barry Bergdoll, "Australian Idiom", *Australia Modern*, 2019, 12.

ABANDONED (RE)CREATION: THE SLOVAK SPA EXPERIENCE

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ABSTRACT.

The paper is introducing the activities of the Slovak art group Abandoned (re)creation which was established in 2011 in the spa town of Trenčianske Teplice by photographer Andrea Kalinová and architect Martin Zaiček. Since then, Abandoned (re)creation have developed a successful range of activities in the field of architectural dissemination in Slovakia. Namely: Movie documentary *Off Season*, the book *Off Season, C20* — series of the pocket guide to the architecture and a recently published book *Architektúra starostlivosti (Architecture of Care — Slovak healing spas in the period of 1948–1989)*.

At the very beginning of the project Abandoned (re)creation, there was a shy aim to focus the local public attention to the unknown modern movement architectural heritage of the spa town of Trenčianske Teplice. Authors of the project here realized the importance and the need of the further and wider public dissemination. Since 2014, their work is concentrated on the one abandoned and ruined monument — the Machnáč curative house designed by architect Jaromír Krejcar in 1932 — the most precise Bauhaus style example of the Czechoslovak architecture which is decaying since 2002.

The paper is presenting the steps taken by Abandoned (re)creation towards raising of the media value of the Machnáč curative house. These steps might be inspiring to other activities in other parts of the world. The fight for protection and preservation of the modern movement monuments is still actual global need.

1. ABANDONED (RE)CREATION: THE SLOVAK SPA EXPERIENCE

The latest decade was a time of intensified discussion on the 20th century architecture in Slovakia. After a period of social and economic transformation, which preoccupied two decades after the fall of the communist regimes in Central Europe, there was suddenly time to look back. The 20th century has now become distant and appeared to be a finished story — history. Architecture as a tangible image of this period has remained misunderstood in many aspects.

Slovakia is abundant in mineral water sources, thanks to which many towns were in the 20th century transformed into spa zones with this specific regime and architectural typology. Here, deep in the Carpathian mountains, far from urban areas was created many outbreking architectural structures which deserve public recognition.

But how to save an precious architecture which is fading away because of its economical inefficiency and outdated design? It is an actual social phenomena, which employ many young artists and activists in Slovakia. Architectural heritage of modern movement is permanently in danger. Reasons are purely economic and political, but not social nor environmental. Example of Abandoned (re)creation project originally formed in the spa town of Trenčianske Teplice shows how one building can be not a shelter for community but the part of the community itself. This project also draw down still actual problem of the public spaces and buildings build in modern movement era. Young generation born after 1980 is depoliticized from the communist past and is socially open. The aim of the Slovak art group Abandoned (re)creation is to draw, revive and activate attention and interest of local residents as well as visitors to “abandoned” architecture of the spa resorts, by means of artistic interventions or

projects situated directly in town. Using a language of contemporary art the project tries to reflect an alarming state of the local monuments of modern architecture. Furthermore it tries to contribute to their preservation for the next generations as well as connect art with activism. The name of the group refers to its main interest — following the birth and faith of architecture created for recreational function. The “abandoned” state of these buildings and architectural concepts does not necessarily refers to it physical decay, it may also refers to its social, cultural or economical perception.

2. OFF SEASON (RE)CREATION

An art initiative started in 2011, founded by the photographer Andrea Kalinová and the architect Martin Zaiček. The Abandoned (re)Creation transforms the local phenomenon of relaxation and the physical condition of decaying architecture in their artistic way. The artistic project of the Abandoned (re)Creation is the only civil initiative aimed at the architecture in the specific region of Trenčianske Teplice, which is located 140km from the capital of Slovakia-Bratislava. The rural town is the periphery of cultural and social life, however, in the period of pre-war Czechoslovakia, it was a popular recreation location to many Prague leading personalities. Nowadays, architects and architecture students are more aware of its value than its residents or spa guests. And it was students, who started the project of the Abandoned (Re)Creation in 2011. Namely the students of the Academy of Fine Arts and Design in Bratislava who were overwhelmed by the unfavorable fate of extraordinary modern monument of the Machnáč sanatorium.

The project set its initial goals which sounded immensely: to activate the lay local public to such an extent, they would actively become guardians of the value of local archi-



Fig. 1. Jaromír Krejcar, Machnáč Sanatorium, Spa town of Trenčianske Teplice. © Peter Kuzmin, 2014.

texture, above all the Machnáč sanatorium. In-between 2012–2013 initiated lectures on the 20th century architecture within the frame of one week festival, targeted at the local public and spa guests. During these two years, invitations were accepted by various guests from the field of art, architecture, cultural anthropology, who confronted the local lay public with current trends of architectural restoration or with various forms of activism in the public space. Commented guided architectural tours were common and widely visited. Unfortunately, the impact of such activities, due to the limited local population was not as efficient. The group transformed the way of artistic activism.

Young students and graduates from the Academy of Art and Design in Bratislava responded to the condition of local architecture, which they presented in their artistic interventions directly in the area of the town, mostly as site specific installations. Thanks to these outputs of the project, the attention of nationwide print and electronic media was engaged several times and raised public awareness of the important architectural heritage on national level.

3. PERFORMATIVE PROTECTION OF THE MONUMENT

The main feature of the activities of the art group be-

came an abandoned sanatorium Machnáč, built by architect Jaromir Krejcar in 1932. This building is considered a "Pearl of European Functionalism". Machnáč is not a mere building, it is a manifesto of architect Jaromír Krejcar's architecture. His political conviction got transformed into the form of the house. A ramp enables every visitor to access the day area for entertainment and boarding stimulates social interaction. Small rooms open to the endless outside space are large enough for physical regeneration and relaxation. And finally, sunny terraces covering the whole roof, providing solar therapy to nude visitors, are free from the social norms of the surrounding world. The entire house carries signs of the aesthetics of cruise ships and steamers. Machnáč is a celebration of technical and social development, a substantiation of the author's humanistic vision. The author embodied here his ideas of progress, not only technical, but mainly social — and constructed a symbol of a modern society. Nowadays: it is a modernist ruin of utopia. Cruise ships that sank in spa park (Fig. 1).

The former curative house/sanatorium Machnáč is out of function since 2002. This National monument site listed since 1995 had changed owners seven times in recent 18 years and is currently sank in the complicated web of unclear ownership. The Monument Board of the Slovak Repub-



Fig. 2. Room 106: reconstruction of one room in the Machnáč sanatorium according to original photograph from 1932 by Abandoned (re)creation. © Andrea Kalinová and Marcin Zaiček, © Photo Credits: Peter Kuzmin, 2014.

lic has lost the direct contact with the owner and is not able to reclaim the orders resulting from the legislative Act on the protection of monument and historical sites.

The Machnáč sanatorium motivated many artistic activities of Abandoned (re)creation. The first one took place in spring 2013 and was called "Internazionale Putzbrigade". A group of young artists and architects from Slovakia and 20 guests from Vienna, mainly cultural workers and students of architecture of Universität für angewandte Kunst Wien, entered the sanatorium building in order to clean up its interior and give it at least some apparent shine of care.

The spirit of cleaning and restoration from 'below' marked the creation of the performance work: "Room 106". The authors of the project reconstructed one of the 65 rooms fully into its original arrangement from 1932. The detailed exploration of the nooks and crannies of the sanatorium made the authors even more linked to the unfortunate fate of the building.

A particular form of dialogue appeared, where the architecture stayed silent but kept inspiring at the same time. This parallel of 'architecture personification' is obvious in the project 'Postcards to the Machnáč'. The authors and friends of Abandoned (Re)Creation would send postcards from their journeys, always including the salutation 'Dear Machnáč, to its unused address.

Another summer "season" years they involve young choreographer, visual artists and filmmakers to invent a dance site specific performance in different spaces of sanatorium. Result from this cooperation is short minimalistic dance movie and site specific exhibition in the dining room. Out of artistic intervention Abandoned (re)creation organized several public excursions in Machnáč (Fig. 2).

Publishing books became naturally the next step, to effect wider publicity. The first published book was a small pocket guide to local 20th century architectural heritage in Trenčianske Teplice. The publication was named C20 and has recently spread to another 5 localities in Slovakia. In

2017 the group published a book "Off Season"¹, which is a testimony to abandoned Machnáč sanatorium. The book links facts about architecture and contemporary life of the building, its transformation and imminent decay. Photographers Andrea Kalinová and Peter Kuzmin reflect its current condition reacting to its previous purity and modernist form. The book also includes memories of a doctor who spent most of her professional life as the chief Doctor in Machnáč sanatorium and describes i.a. the importance of the relationship between a architecture, doctor and a patient (Fig. 3).

4. A DOCUMENTARY MOVIE "PO SEZÓNE" / OFF SEASON

The aim to point wider media attention on the Machnáč issue was realized by a documentary movie, *Po sezóne* (Off season) directed and created by Andrea Kalinová, produced by Archimera NGO. The main character of the film *Off season* is an abandoned sanatorium in a small spa town in middle of Central Europe. Constructivist building, a celebration of technical and social development, a substantiation of the architect's humanistic vision. The owners have no interest to take care of the building, which is not profitable. Therefore this unique monument is decaying. The walls are covered by mould, the glasses and ceramics thrashed, and the metal parts of interior were stolen and sold for pences. The film portrays the relationship between the building and the people who are connect with it. The artistic activist group *Abandoned (re)creation* upon discovering the building, started to make alternative forms of protest (happenings, artistic interventions), reflecting its alarming condition. But is art in our society so strong that could save the unique building for the next generations? Are the authorities willing to help? Do ordinary people from small town care about cultural heritage? What about the former employees and guests — do they miss the genius loci of the building? What would be worse: the reconstruction disregarding architect's concept



Fig. 3. **Book Off Season.** © Magdaléna Scheryová, 2017.

or the destruction itself? And the final question is: What is truly dysfunctional? The building, the architecture or the society?

5. "ARCHITECTURE OF CARE" BOOK

The focus of Abandoned (re)creation on spa architecture naturally spread of the town of Trenčianske Teplice to other Slovak spa localities. They were providing since 2014 detailed research on postmodern transformation of the Slovak spa localities. The outcomes was recently published in the book *ARCHITECTURE OF CARE*.² The book is a reaction to the wider international interest on phenomenon of postmodern transformation of the originally modern recreational sites of the Eastern block.³ Architecture of care is a rich visual collage and critical reflection of the present Slovak spas. Photographers Andrea Kalinová and Peter Kuzmin reflect the current condition of the spa buildings with accretions and layers reacting to the previous purity or modernist forms. They also capture seemingly trivial details and unimportant nooks, where they find traces and reflections of today's attitude to the spa phenomenon in Slovakia, its unique aesthetics, and the comic tragedy of some business plans. and its past life and present situation raise many que-

ries concerning the current political and social day-to-day life, as well as our bodies and their future. Besides of detailed research about the socialist spa apparatus in Slovakia, the book consists of several critical studies which goes beyond the architecture. Studies are seeking the connection between the specific spa environment and the utopian visions of the after-work society, the relation of capitalist society to illness, its efforts to normalize our bodies and expect their productivity. The book also reflects the historic relationship between water and architecture, and reports on the broad theoretical and philosophical setting of this topic.

6. RECREATION WITHOUT RECREATIONISTS

The architecture of the Machnác sanatorium is not only a space for the community, but rather a trigger and the member of the community itself. Thanks to the architectural (artistic) values which the sanatorium represents, and also its pitiable condition, it has become a place where a community is formed from below. The educational program, integration of children and temporary artistic interventions created links among strangers in the town, sharing a common goal: to save the abandoned sanatorium.

The project needs to include a variety of people and pro-

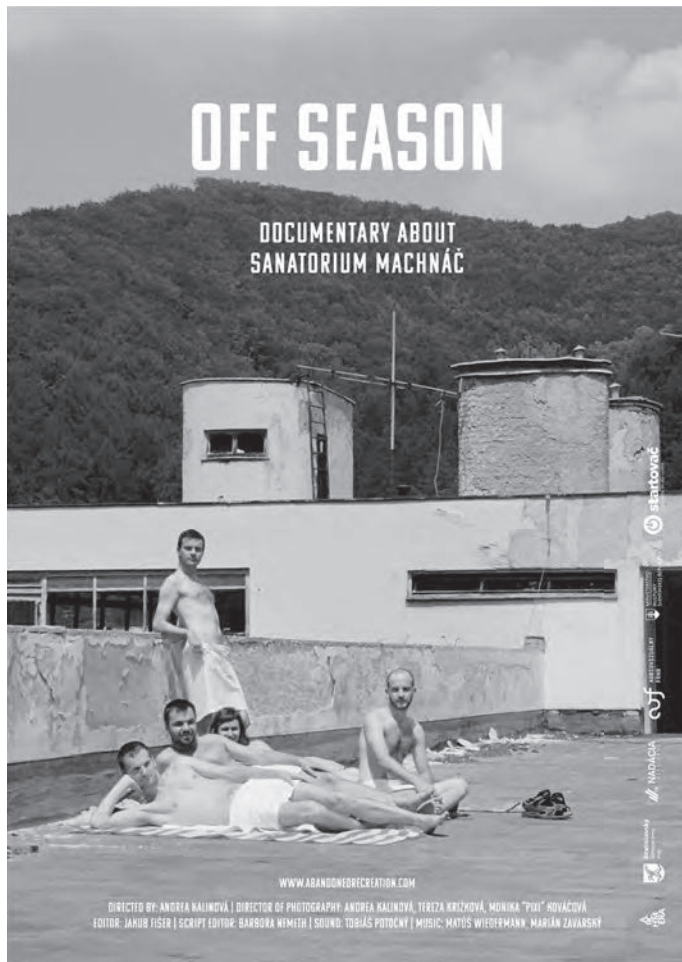


Fig. 4. Poster to the documentary movie “Po Sezóne” (Off Season), directed by Andrea Kalinová. © Magdaléna Scheryová, 2018.

fessions. Its goal is still to physically save the building, or at least to slow down its decay. The building is significant enough to attract the attention of experts in Slovakia and in the Czech Republic. This suggests an inevitable step — involving universities and colleges in the region in cooperation with experts for cultural heritage of the 20th century restoration. Slovakia is a country where this discourse is far too foggy, especially compared to the Czech Republic, where public awareness of the 20th century architecture is raised thanks to heritage sites such as Vila Tugendhat in Brno.⁴

In results of the activities of Abandoned (re)creation, in 2019 ICOMOS titled former Sanatorium Machnáč as the Endangered heritage site of 2018 and in the same time Abandoned (Re)creation was nominated for the ICOMOS Prize in the category “Outstanding activity leading to raising public awareness of cultural heritage values”. In the same year, the documentary movie “Po sezóne” was awarded by the National Prize of the magazine “Pamiatky a múzeá” (Heritage and Museums) which lifted further public interest on the

faith of this architectural monument. As consequence of all this events, members of Abandoned (re)creation together with several influential personalities of Slovak academic sphere established the new organization named Jaromír Krejcar Society, which only aim is the preservation and renovation of the architectural monument of former Sanatorium Machnáč in Trenčianske Teplice. To realize this aim, the organization will in the upcoming time provide all needed political steps to become an owner of the monument (Fig. 4).

7. INTEGRANT ARCHITECTURE OF HUMANISM

Many people perceive architecture as a shelter for human activities. This questionable definition of architecture creates the impression of architecture being a mere formal physical property, which is purely utilitarian. The attitude to architecture as a reflection of human creativity and idea representation, or an idea as such, is dichotomously opposed to the function of architecture. The Machnáč sanatorium in Trenčianske Teplice, as a ruin of the image of mod-

ern future, is now without its utilitarian purpose. Nevertheless, it is a catalyst for social events. The Abandoned (re)creation project is far from an action attracting masses, it does not create activities which would overcrowd the city squares. However, it is an example of a marginal trend in today's society based on economic pragmatism, which draws attention to misunderstood or forgotten visions of humanism of the 1st half of the 20th century.

We are currently confronted with an ecological (un)sustainability and permanent social crisis — also in the form of a demographic recession. The socialist heritage of the spa, embodied in its architectural and social concepts, must therefore be accepted and its solid foundations must become the base for the development of the Slovak (European) balneology, which, thanks to its infinite source of healing power and energy, can provide solutions to many today's issues.

Modernism of the 20th century in Slovakia brought many realizations which are now forgotten or misunderstood. Their development potential remains unused. Today, it appears that the quality of architectural space is not defined by the architectural style, but rather by the activities and social openness concerning local and global relationships. Example of Machnáč sanatorium, abandoned by its owners due to its “uneconomical” features shows how our contemporary society is giving up of the concept of humanism. Spaciousness of public and community areas, under-sized “un-salable” accommodation units, not profitable entrance ramps and roof gardens has become redundant for the building. The architect's idea, appreciating these areas as places of social interaction among spa guests, digresses into the attitude of the owner, who sees them as unnecessary elements of the building. It was the disagreement with this attitude, which became the inner sparkle for the emergence of the Abandoned (re)creation community. They understood that the architectural stories of modernism are a potential for ‘new’ challenges of creating a modern, socially integrant architectural environment. They can thus contribute to the discussion on linking the social elements of architecture with recent formation of architecture. Architects of the 20th century created many places in our environment, whose use is determined by the state of society.

REFERENCES

- ZAIČEK, Martin, KALINOVÁ Andrea, & HLAVÁČKOVÁ Petra (eds.), *Architektúra starostlivosti: Slovenské kúpele v druhej polovici 20. storočia*, Bratislava, Archimera, 2019, 344.
- KALINOVÁ, Andrea, HLAVÁČKOVÁ, Petra, & ZAIČEK, Martin (eds.), *Off Season*, Bratislava, Archimera, 2017, 196.
- BEYER, Elke, HAGEMANN, Anke, & ZINGANEL, Michael (eds.), *Holidays after the fall: Seaside architecture and Urbanism in Bulgaria and Croatia*, Berlin, Jovis Verlag, 2013.
- Website: Abandoned (re)creation official Website, accessed on June 20th, 2021, <https://abandonedrecreation.com>.

NOTES

- 1 Andrea Kalinová, Petra Hlaváčková, & Martin Zaiček (eds.), *Off Season*, Bratislava, Archimera, 2017, 196.
- 2 Martin Zaiček, Andrea Kalinová, & Petra Hlaváčková (eds.), *Architektúra starostlivosti: Slovenské kúpele v druhej polovici 20. storočia*, Bratislava, Archimera, 2019, 344.
- 3 see the book *Holidays After the Fall*, discussing the environment of seaside recreation in popular summer resorts at the Adriatic and the Black Sea. Elke Beyer, Anke Hagemann, & Michael Zinganel (eds.), *Holidays after the fall: Seaside architecture and Urbanism in Bulgaria and Croatia*, Berlin, Jovis Verlag, 2013.
- 4 Vila Tugendhat in Brno designed by the architect Mies Van der Rohe, built in 1929 is a UNESCO Heritage Site since 2001.

DOCUMENTING THE DESTRUCTION OF MODERN HERITAGE: SEMANTIC DATA MODELLING

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ABSTRACT.

The past few decades have witnessed destruction of the modern architecture and heritage, especially in post-socialist countries torn by various active or passive conflicts, on an unprecedented scale. In former Yugoslavia, for example, the damaged modernist architecture fell into a vortex of ideological and semantic battles, hasty privatizations, biased media coverage, and the deeply polarized public opinion — all of which caused for some buildings to remain in ruinous state up until today. The distinctive symptoms of this process — contested ownership, private takeover of communal resources and unbridled investment plans — reflect in the urban sphere through appropriation of public spaces, erasure of historical architectural styles, or even failure to produce (re)construction at all. Failing to understand and address these phenomena may lead to irreparable devastation of modern architecture that has already been severely damaged in an act of calculated violence.

Complex investigation into modalities in which transitional processes influence the transformation of cities requires new methods of documenting and cross-referencing multiple architectural sources and histories. My paper will focus on the dual methodology I implement in my research: documentation of big data sets collected through a digital web-platform, and development of “semantic data models,” designed to expose hidden relationships between different actors that participate in the transformation and destruction of modernist heritage. The main objectives of this research project are (1) to develop new research scenarios for management and interpretation of the big collections of architectural documents, (2) to expand the value of modern architecture to broader circles of the society, especially to general people other than the experts in architecture, and (3) to re-examine existing and develop new interdisciplinary protocols whose goal is to impede the continued destruction of modern architecture.

1. INTRODUCTION

Today it is safe to say that the calculated targeting of art and architecture became the hallmark of contemporary wars. However, the destruction of built environment is only rarely the final act of ‘urbicide’ — the killing of the city. The emerging field of studies on urban conflicts brought instant popularity to this concept. In an avalanche of texts, the understanding of urbicide became increasingly flexible, encompassing a wide range of damaging actions directed against the built environment. Attempts to systemize urbidal discourses focused primarily on motives and political goals of urban destruction. To date, however, scarce attention has been dedicated to the systematic examination of post-conflict urban reconstructions in transition societies that often are more sophisticated and more comprehensive forms of urbicide. In these intense processes, the city is often drastically redefined and recalibrated to fit new political, social and economic realities. The distinctive symptoms of this process — contested ownership, private takeover of communal resources and unbridled investment plans — reflect in the urban sphere through appropriation of public spaces, erasure of historical architectural styles, or even failure to produce (re)construction at all. In addition, in conflicted and divisive societies, post-war reconstruction is usually interpreted as a continuation of the conflict by other means that is equally detrimental to urban fabric. Failing to understand and address these phenomena may lead to irreparable

devastation of architecture that has already been severely damaged in an act of calculated violence.

My research remedies this gap by analysing the neglected, yet revealing case of Belgrade after the 1999 NATO bombing. The 78-day conflict marked the beginning of the end of the long process of dissolution of socialist Yugoslavia followed by, what was expected to be, a thorough economic, social and cultural transition into a democratic and capitalist society. However, after the democratic uprising in 2000 which formally ended socialism in Yugoslavia, the damaged modernist buildings fell into a vortex of ideological and semantic battles, hasty privatizations as instant solution for neoliberal economy, selective placement of information in the media and the deeply polarized public opinion — all of which caused for some buildings to remain in ruinous state up until today. Contemporary Serbian architecture and its institutions blended into these destructive processes and lost the power to be the driving force in post-war transformation of the society. In retrospect, the violent conflict was just a trigger for continuous devastation of unwanted modern (and mostly socialist) architectural heritage, whose maltreatment after the war even became a way for recreating national identity.

Complex investigation into modalities in which war and post-war violence, as well as post-socialist transition, influence the transformation of cities requires new methods of documenting and cross-referencing multiple architectural sources and histories. Taking into account the vast array of

E. Work Packages

Milestones

- MS1 Decision on Procedure 23 Dec 2019
- MS2 Decision on Project Setup, Involved Partners, etc 23 Dec 2019
- ...

Assumptions

- Basis assumptions must be clarified
 - Project Coordination / Project Lead?
 - Data Collection Team?
 - Data Modelling Team?
 - Data Transformation Team (ETL)?
 - Platform Implementation Team?
- Deliverables
 - expectations by the funding body
 - expectations by the team members
 - Not doing
- Financing
- Imprint

Requirements

#	Work Package	Related Issues, Tasks	Priority	Who	Notes
WP0	Project Setup		Must Have		*
WP1	Project Documentation	- Research Question - Methodological Approach - Collected Data (to be)	Must Have	@staničic	
WP3	Conceptual Modelling	- Define Entities, Types, Relations to be used - Define General Semantic Model - Modeling all Entities and Relations - Deliver Documentation (human-readable, machine-readable)	Must Have	Conceptual Modeling Team	4 FTE / person months
WP4	Data Transformation (ETL-Processes)	- define ETL processes to be used - define tech stack to be used - design and implement all ETL-Processes - Extract, Transform, and Load Data (ETL) - documentation	Must Have		2-3 FTE / person months
WP5	Implementation Design	- what hardware? - what Platform - who is in charge?	Must Have	TU Delft	- is expertise available? - cheic @Aleksandar Staničic 23 Dec 2019
WP5	Infrastructure Setup	- provide Hardware - provide Platform - provide backup solutions - provide Licensing	Must Have	TU Delft	
WP6	Platform Implementation and Integration	- research platform installation - research platform setup - implementation fields and forms - application pages, static pages - implementation of data - backup - accessibility			4 FTE / person months
WP7	Documentation and Dissemination	- provide accessibility to website - provide accessibility to data?	Must Have	all	- accessibility to data needed? - long term

Fig. 1. Work packages for the secondment phase at gta Digital lab, ETH Zurich, 2020. Project: *Transurbicide*, available at <https://workspace.digitale-diathek.net/confluence/display/GDT/E.+Work+Packages>. © Aleksandar Staničić.

actors, across different time layers (before, during, and after the conflict) generates various perspectives for academic research. My project “Transurbicide”, funded by the European Commission Marie Curie Individual Fellowship (Grant Agreement No. 798115) proposes innovative methodology for this kind of multi-layered research on destruction of modernist architectural heritage.¹

2. SEMANTIC DATA MODELLING

First of all, it is worth acknowledging that the interdisci-

plinary sources (such as architectural and urban projects, zoning and protection laws, corporate internal documentation, newspaper articles, TV video material) that would enable the investigation of the ‘transition’ processes are not documented in ‘standard’ archives due to their novelty and ‘ongoing’ nature. Therefore, the first step in this project is to develop an online web-platform that relies on interactive public participation in collection of various architectural documents. Using data collected in this way, the main objective of this project is to explain architectural engagements with violent transformation of urban morphology within

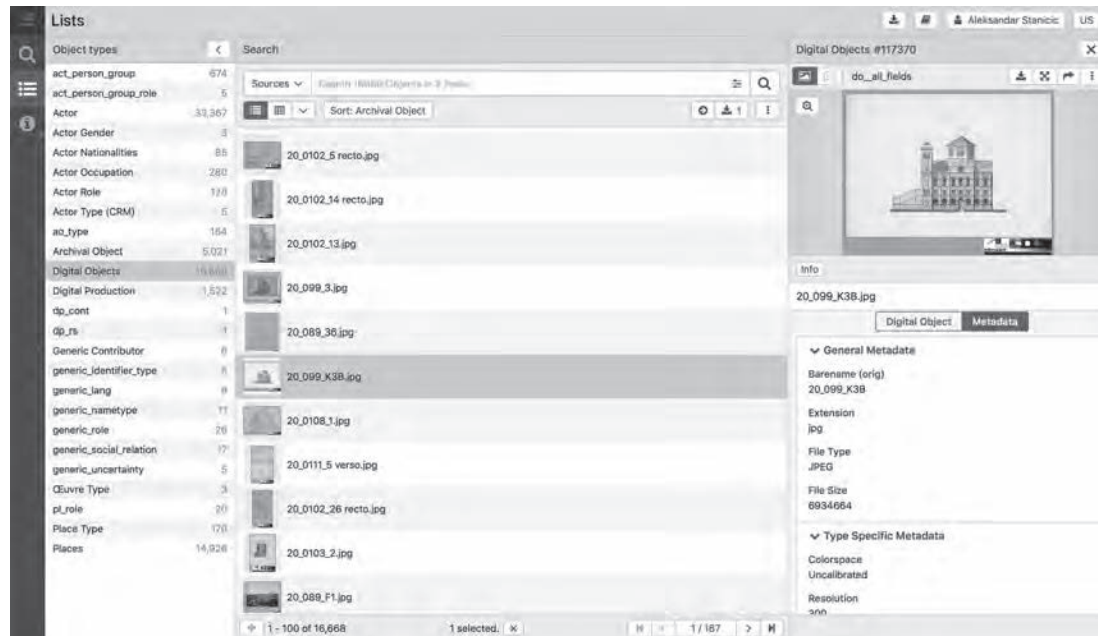


Fig. 2. Digital catalogue at gta Digital lab, ETH Zurich, 2020. Project: *Transurbicide*, available at <https://collections.gta.arch.ethz.ch/lists/do>. © Aleksandar Staničić.

the broader framework of urban geopolitics and post-war recovery in post-socialist societies. My project does this by constructing a *histoire croisée* of continuous deconstruction of Belgrade after the 1999 NATO bombing from the standpoints of multiple city actors. This revealing case is a missing link for understanding the post-war urban and social transformation of socialist Yugoslavia, whose experience can serve as a harbinger for expected reconstructions of active conflict zones, particularly in contested, transition societies. Actors of interest include architects, city planners, private investors, institutes for protection of cultural heritage, government departments and mass media involved in the reconstruction of selected specimens of damaged socialist modern architecture in Belgrade.

The secondary objective is to develop new research protocols for management and interpretation of the big collections of architectural documents using the sophisticated automatized systems for big architectural data digitalizing and processing, namely, Semantic Data Modelling (CI-DOC-CRM). This part of the project is being done at ETH's gta Digital lab under the supervision of Prof. Maarten Delbeke and Thomas Hänsli.² The "Semantic Data Modelling" phase consists of the following work packages: (1) Project documentation, (2) Conceptual modelling using CI-DOC-CRM, (3) Data transformation — EPL processes, (4) Implementation Design, (5) Infrastructure setup, (6) Platform implementation and interpretation, and (7) Dissemination and communication (Fig. 1). I will now briefly explain each of these steps.

2.1. Project Documentation

The quality of every digital archive relies strongly on the quality and quantity on available data and metadata. Since I already pointed out that this particular case study has not been documented in standard archives, one of my first tasks was collecting documents from different sources (architects, urban planners, investors, institutes for protection of architectural heritage, media institutions, museums, private archives) and ascribing data and metadata to those documents.³ The right approach in this painstaking work was to start from the research question, which in my case was

What are the hierarchies between different power players that are steering the postwar reconstruction of Belgrade after 1999 NATO bombing? Who is making decisions and what is the position of architects in those processes?

Understanding this allowed me to come up with categories/taxonomies which would help me answer this question, such as "destruction of socialist modern heritage", "political/economic transition from socialism to capitalism", "Investor's urbanism", "role of professional and public institutions", "rise of nationalism", "media influence", "memorialization of conflict", etc. Next step was to determine indexes and parameters that define these categories, and for the sake of accuracy and standardization, I used the Getty Thesaurus of art and architectural terms.⁴

It is important to note here that all kinds of decisions and selections had to be made in this phase that are crucial for the success of the project, but that also potentially carry

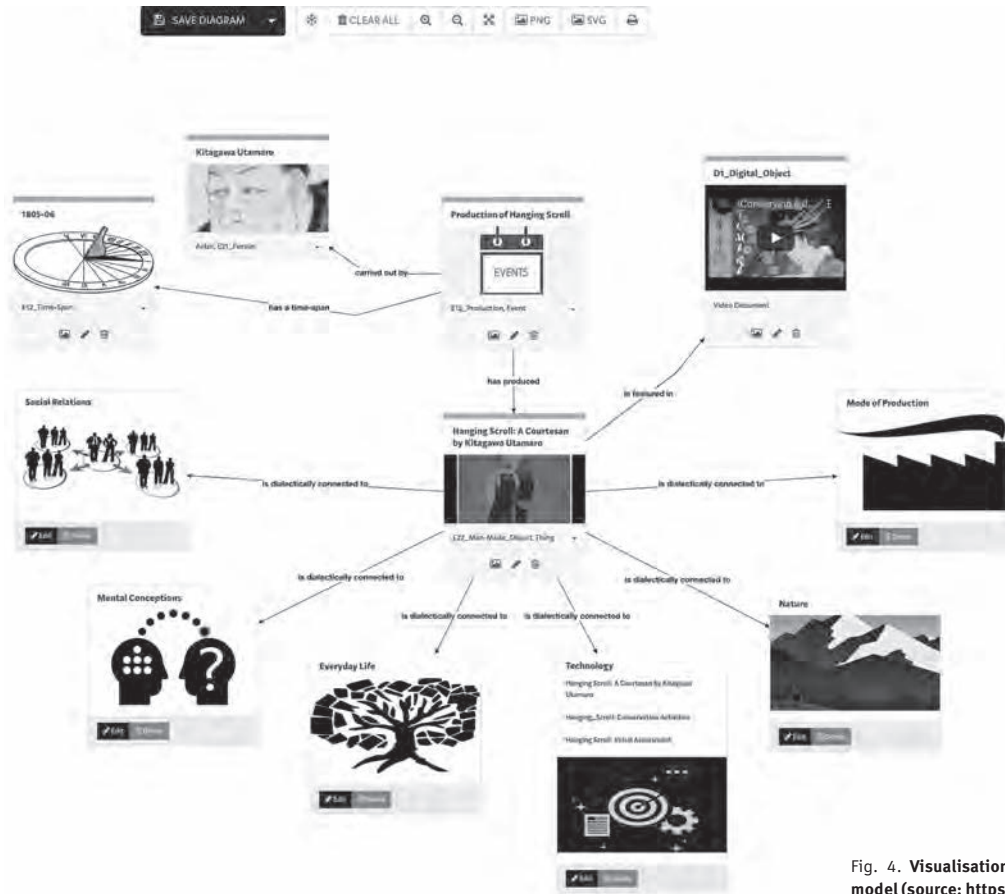


Fig. 4. Visualisation diagram of a CIDOC CRM model (source: <https://www.researchspace.org>).

(CRMba) is an ontology developed to encode metadata about the documentation of built works in order to identify the evolution of the building throughout the centuries and to record the relationships between each of the building components among them and with the building as a whole. The CRMdig extension was developed to encode metadata about the steps and methods of production ("provenance") of digital products and synthetic digital representations such as 2D, 3D created with different technologies. The CIDOC-CRM modelling, in few simple steps, goes as follows: first, the object/document stored in the archive is defined through the set of entities, types, relations and events. Those attributes are not selected randomly, but from the predefined list that can be found in the standardized and publicly available manual.¹⁰ Multiple objects modelled together, with all entities and relations, will define a rough sketch of a General CIDOC-CRM Semantic Model, example of which can be seen on Fig. 3. Next step then is transforming this documentation into a set of data that is both human-readable and machine-readable.

2.3. Data Transformation — ETL processes

Data transformation will be done in parallel with the

Conceptual data modelling phase. The ETL abbreviation stands for Extract, Transform and Load data, which basically means translating the Semantic model into a set of codes that is machine (i. e. computer) readable. As there are multiple ways to do it, a decision has to be made on the specific ETL processes to be used, as well as tech platform. Code at the end looks close to the .xml format. This is, of course, a painstaking amount of work that requires a very specific expertise and knowledge of various software. At ETH I have both Conceptual modelling and data transformation teams of experts that are helping me achieve this in the least amount of time possible.

2.4. Data Interpretation and Visualization (implementation)

Final research output is data interpretation and visualisation, which is very important because it is the interface of the entire project. If done well, good visualisation can attract many interested parties and make the whole project accessible to general audience. For this project, I decided to go with platform developed by the British Museum, called Research Space (Fig. 4).¹¹ Out of all platforms available, this one offers best visuals, and it is easily integrated with the Semantic model through ETL data coding. The beta version

of the *Transurbicide* digital archive and research portal is now available online.¹²

2.5. Dissemination and Communication

Dissemination of the research results aims to encourage wide set of users from architecture, geopolitics, conflict, media and related studies to engage with the web platform and proposed methods for their own professional interests. Research results will be disseminated mostly through an interactive web platform that supports craft databases, as well as peer-reviewed journals, architectural exhibitions on war/postwar urban materiality, social networks, TV/radio shows, and participation in conferences and architecture festivals focusing on the city, data and architectural heritage — such as this. Communication strategy is tailored to: inspire collaboration on national, regional and international level; raise awareness of damaging tendencies in urban renewal and planning in transitional, postwar societies; open dialogue and active participation of citizens and the scientific community that will ultimately lead to making informed decisions and concrete action in the form of new policy-making.

3. CONCLUSION

Through architecture, conflict and automatized data analysis, the project *Transurbicide* investigates urban space as a battleground for various displays of power and influence among multiple actors — state institutions, private capital and citizens — in the complex context of postwar, transitional society. It seeks to build unique architectural knowledge needed for post-conflict reconstruction of urban environments, which is a pioneering approach in architectural research, theory and practice. To the existing academic literature on post-disaster urban renewal that today mainly focuses on main-stream issues such as memory, semiology, and many aspects of urban resilience, my research adds fresh perspective of city-rebuilding in the atmosphere of political (from socialism to democracy) and economic (from controlled to liberal market) transition of Serbian society already traumatized by violence and war. As such, the project will be a welcome contribution to emerging studies of urban conflicts on a global scale, and most necessary contribution to practically non-existing academic discourse on a local intellectual scene.

Finally, the project will develop new research protocols for architectural historiography of contested cities and offer new set of much needed guidelines for protection of endangered modernist heritage that, hopefully, will shape the research of transformation of cities in the coming years. Personally, I would like to see this project move from the theoretical sphere into the ground and tested in practice, which can be achieved through establishment of professional connections with local communities, activists, and stakeholders.

REFERENCES

ICOM/CIDOC Documentation Standards Group, CRM Special Interest Group, Current Main Editors: LE BOEUF, Patrick, DOERR, Martin, ORE, Christian Emil, & STEAD, Stephen, *Volume A: Definition of the CIDOC Conceptual Reference Model*, October 2019, Version 6.2.7.
PAOLA, Ronzino, NICCOLUCCI, Franco, FELICETTI, Achille, & DOERR, Martin, 2016, “CRMba a CRM Extension for the Documentation of Standing Buildings”, *International Journal on Digital Libraries* 17 (1), Springer Verlag, 71–78. doi:10.1007/s00799-015-0160-4.

NOTES

- 1 This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 798115, Project benefactor: Delft University of Technology. Principle Investigator (PI): Dr Aleksandar Staničić (TU Delft), Project supervisors: Prof. Tom Avermaete, Prof. Maarten Delbeke, & Thomas Thomas Hänsli (ETH Zurich).
- 2 ETH Zurich, “gta Digital— About Us”, accessed on June 14, 2021, <https://digital.gta.arch.ethz.ch/about/about-us>.
- 3 This phase also included dealing with legal and ethical issues, that had to be resolved at the very beginning of the project. Import of data from Serbia (which is not part of the EU) to the Netherlands (which is), but also conducting the secondment phase in Switzerland, produced all sorts of authorship/ownership contestations. Consent forms were made in which authors and owners of the rights were asked to temporarily lend their publishing rights to the benefactor of the project, which for some participants was a step too far.
- 4 Art & Architecture Thesaurus (Getty Research Institute), accessed on June 14, 2021, <https://www.getty.edu/research/tools/vocabularies/aat/index.html>.
- 5 The gta Digital Lab online catalogue, accessed on June 14, 2021, <https://collections.gta.arch.ethz.ch/lists/do>.
- 6 The CIDOC Conceptual Reference Model, accessed on June 14, 2021, <http://www.cidoc-crm.org>.
- 7 ARIADNEplus, accessed on June 14, 2021, <https://ariadne-infrastructure.eu/>.
- 8 PARTHENOS, accessed on June 14, 2021, <http://www.parthenos-project.eu/>.
- 9 Paola Ronzino, Franco Niccolucci, Achille Felicetti, & Martin Doerr, “CRMba a CRM Extension for the Documentation of Standing Buildings”, *International Journal on Digital Libraries*, 17 (1), Springer Verlag, 2016, 71–78, doi:10.1007/s00799-015-0160-4.
- 10 The latest iteration of the manual: ICOM/CIDOC Documentation Standards Group, CRM Special Interest Group, Current Main Editors: Patrick Le Boeuf, Martin Doerr, Christian Emil Ore, & Stephen Stead, *Volume A: Definition of the CIDOC Conceptual Reference Model*, October 2019, Version 6.2.7.
- 11 ResearchSpace, accessed on June 14, 2021, <https://www.researchspace.org/>.
- 12 The *Transurbicide* research portal, accessed on June 14, 2021, <https://transurbicide.gta.arch.ethz.ch/>.

DEUTSCHES ARCHITEKTURMUSEUM'S "ARCHITEKTUR IM 20. JAHRHUNDERT" EXHIBITION CYCLE. A SYNTHESIS ON MODERN EUROPEAN ARCHITECTURE AT THE EDGE OF THE NEW MILLENNIUM

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ABSTRACT.

This paper examines the relevance of the "Architektur im 20. Jahrhundert" exhibition series for the investigation, production and international dissemination of Modern architecture. Under the leadership of Wilfried Wang, the Deutsches ArchitekturMuseum in Frankfurt presented, from 1995 to 2000, a series of exhibitions reflecting on twentieth-century architecture across Europe. The nine national representations — Austria, Ireland, Portugal, Sweden, Switzerland, Greece, Finland, Germany, and Spain — promoted the divulgation of the broader architecture production and produced a significant synthesis on the history of Modern architecture in Europe.

A full century of architecture, from Romanticism to Contemporaneity, was addressed through the definition of different time-frames, based on social and political transformations that accounted for key transformations in architectural form, programme or construction systems. Moreover, reassessing the buildings, as part of an eclectic and extensive selection, reflected the pluralism that characterised architecture across the last century, and the local conditions of Modern architecture, in particular.

Focussed on the Portuguese participation in this cycle, this paper explores the relevance of this ambitious overview of a full century of architectural activity, through the means of exhibition and publication. The research-based nature of the show, the integral exhibition of original documents; and finally, the richness of the theoretical frame raised by the edition of the catalogue, are central contributions to the making and dissemination of the history of European Modern architecture at the edge of the new millennium.

1. THE EXHIBITION CYCLE

Under the leadership of Wilfried Wang, the Deutsches ArchitekturMuseum in Frankfurt presented, from 1995 to 2000, a series of exhibitions reflecting on twentieth-century architecture across Europe. In a close association with Frankfurt Book Fair (Frankfurter Buchmesse, FBM) and as a strategy to face the financial crisis the DAM was undergoing,¹ nine countries were invited to present their architectural and urban realisations from the last century.

The concept was to document significant architectural and urban developments, "in order to contribute to a better understanding of architecture in general,"² with no other important requirement than the presentation of original drawings. Rather than exclusively presenting national authors, the selection was to feature significant buildings that embodied each country's specific issues. Wang's brief allowed for further enquiries on the contemporary history of architecture beyond physical or political borders. Reassessing the author architecture by inserting the buildings within an eclectic and extensive selection, not exclusively "modern" architecture, aimed to reflect the pluralism that characterised architecture across the twentieth-century.

The starting point of Wang's programme emerged from the proximity to Dietmar Steiner who was the director of the Architekturzentrum Wien (AZW) at the time that Austria was FBM's focus country. The record four-months timing to produce the exhibition and related catalogue proved that, "A. it was possible; B. it was intellectually a challenge; C. it would be a kind of organisational impulse for the respec-

tive country."³

The subsequent exhibitions would mostly rest on this partnership between DAM and FBM. Portugal, as well as Austria, Ireland, and Switzerland, were annual Book Fair focus countries,⁴ whereas the other five featured nations — Sweden, Greece, Finland, Germany, and Spain — were exclusively Wang's choice. All of them funded their own participation.

After the successful early editions, the international appeal of being part of this divulgation platform led to the production of two shows per year, including participants other than the FBM guest countries. Indeed, Wang would directly invite Sweden, Greece, and Finland, leading to the enrolment of Germany and Spain; conversely, Hungary and Poland, focus countries in 1999 and 2000, would not be featured in the series.

Wang was "interested in documenting the work of less known countries."⁵ Nevertheless, the selection of better known architecture producers, such as Sweden or Finland, was admittedly due to his personal interests and contacts.

1.1. Portugal

The Portuguese participation in the DAM cycle was directly related to the invitation to be the guest-of-honour at the 49th Frankfurter Buchmesse. Furthermore, it was also part of an international *cultural advertisement* campaign related to the forthcoming World Expo '98. The national presence in Frankfurt, under the shared theme "Portugal: Pathways into the World" was thematically and institutionally connected to Expo '98: "The Oceans, a Heritage for the

Future.⁶

Though the world's oldest and largest Book Fair only lasted five days, from 15 to 20 October 1997, it was obviously the centre of all the programmes, reflecting the attention increasingly given to the book industry and literature. Yet it can be assumed that this was mostly a *pretext* to present a larger agenda that extended for the duration of the fair. The parallel events — art exhibitions, conferences, conversations, concerts, cinema, dance and theatre performances, in addition to gastronomic experiences — were staged throughout October, while the exhibition at DAM stayed until 4 January 1998.

1.2. Curatorial Strategies

Unlike some of the other curators directly invited by Wang on behalf of their association with architecture institutions,⁷ Ana Tostões, who had recently finished her Master in History of Contemporary Art on Portuguese architecture of the 1950s,⁸ was appointed to lead the research and making of the Portuguese representation.

Tostões curatorial strategy relied on the definition of an extended cartesian matrix that integrated a complex programmatic variety into a chronological sequence, highlighting the political, social, and cultural transformations across the century, which framed the selected buildings and the dominant programmes. The double-entry structure (I. Chronologies, and II. Themes) was in fact common to many of the national exhibitions, though adjusted to each country's historical specificity and particular architectural issues. Although Wang affirms he did not interfere in the curatorial choices of the different countries, there was a common method — thematic versus chronological — in every country's selection.

For the Portuguese presentation Ana Tostões defined seven different moments, expressively distinct in duration: from the short period of two years coinciding with the democratic revolution and the consequent deep social transformations (1974–75) to the intense end of the century, condensed within a periodisation of twenty years of "Convergences, Divergences and Level Crossings." To better contextualize and support the selection of the presented works, each one of these entries was introduced with commissioned texts by a highly regarded group of specialists, reflecting the two main directions of the matrix. This criss-cross organisation was particularly visible in the catalogue, thought to be a "critical balance of the XX century in Portugal and a work of reference in the establishment of a heterodox synthesis of our contemporaneity."⁹

As the exhibition exclusively featured architectural process materials such as original drawings, from sketches to presentation sheets or construction details, period photographs and models, the existing material on each building, particularly in terms of original drawings and photographs, was highly relevant to Tostões selection. The impossibility of finding or collecting the drawings, or in cases where there

was doubt about the authorship, compromised the presence of some projects in the final selection,¹⁰ following Wang's original idea:

To counteract the tendency to reduce architecture to images, signs and signatures. (...) The selected buildings are not subjected to a standardized image, but presented in their original creative individuality (...) this can only be done with sketches, work drawings, construction site photographs (...) which pursues one goal in the overall heterogeneous presentation: to give the viewer a glimpse into the world of the creation of architecture.

The aforementioned binary methodology — the time categorisation in addition to the emphasis on the major urban and architectonic themes — is at the basis of the distinct curatorial narratives. Likewise, it is also important to note that, even if the central focus was not on national architects but rather on salient building activity within the countries, which included works by foreign designers, the issue of architectural identity was foregrounded by many of the countries.

To better understand the variety of curatorial approaches it is necessary to look at other national examples: Austria,¹¹ the first country to experiment with Wang's programme; Switzerland,¹² also an FBM guest country, and Spain,¹³ Portugal's neighbour and the last of the participants in the DAM cycle, will be our analysis sample.

In the opening text of the Austrian catalogue the main goals for the cycle were introduced alongside Dietmar Steiner's curatorial choices. Steiner focused on "contemporary works, although examples of the great architectural achievements from all decades of the century [were also] present,"¹⁴ due to a conviction that the major early modernist architects were already widely known. Dividing the presented selection according to a thematic triad — landscape, heritage, housing — Austria advanced as its most remarkable characteristic, its "widespread quality":

Although Vienna is often the focus of attention, buildings in the regions are of a quality that cannot be found in other countries. (...) Austria is perhaps the paradigm of European cultural development (...) there is widespread awareness of its excellent architecture."¹⁵

Switzerland, on the other hand, put forward its cultural diversity, and the capacity to interpret codified typologies such as the "Swiss chalet"; in other words, its contribution consisted "above all, in the mediation":

The Swiss are honest and hard-working and their architecture is, accordingly, well built and carefully detailed. The long democratic tradition, the political principle of concordance and the correspondingly highly developed culture of compromise find their counterpart in architecture in decent and unspec-



Fig. 1. "Architektur im 20. Jahrhundert: Portugal" installation at DAM, Frankfurt, Germany, 1997. © Jornal Arquitectos, No. 185, August 1997, 7.

*taculantly solid solutions. The buildings are (...) above all practical and efficient: their "good shape" can be described in a similar way to that of a Swiss Army knife.*¹⁶

Both catalogue and exhibition followed different structures, since "the research for interesting artefacts in the archives was parallel to the production of the book".

*The decision to follow in the exhibition a different order than in the book had for consequence, that different objects have come to mind. Sometimes we wanted to show an interesting and spectacular object and we searched for projects and artefacts around it.*¹⁷

Besides the very tight schedule of four months for the making of the book and the show, both pursued different

purposes: while the exhibition adopted a freer installation, the catalogue followed a thematic logic — "territory and infrastructure, village and periphery, city, alpine buildings, national exhibitions, but also building purposes as school buildings, churches, industry, houses..."¹⁸

Indeed, the complexity of a full century of building activity led the curators to advance a schematisation of crucial moments and transformations. Spain, for example, settled the thematic and stylistic aspects in a peculiar way. Considering exclusively existing buildings while excluding urban planning projects, interior design and heritage interventions, the selection highlighted "the great variety of the stylistic trends" across the century. Hence, more than asserting a correspondence between a dominant trend and a specific period, parallel chapters underlined opposing, though coetaneous, tendencies. Conversely, and following the Portuguese strategy, the catalogue also reproduced the structure of the exhibition, complementing it with a compilation of essays by recognised experts in the field.

Portugal, in its turn, asserted *context* as a fundamental issue in the definition of Portuguese architecture. Along with predicates such as *originality* and *specificity*, the *pragmatism* or sensitive response to reality, needs, and circumstance, were principal characteristics that pervaded a full century of Portuguese architecture activity:

*an architecture based on "real things", built from the response to the multiple implications of programmes, budgets and places, as well as the wills of creators and commissioners, which constitutes a true tradition of pragmatism, sometimes more decisive than the cultural traditions itself (...) the universe is that of architecture extended to the city and not reduced to the object.*¹⁹

The building selection relied, as well, on a diverse programmatic typology categorisation that came along in the reinforcement of the main narrative, by the definition of seven different themes. Besides, an extensive programmatic analysis, pervading all the historical divisions, particularly highlighted buildings with significant influence in the Portuguese landscape. Simultaneously, the curated texts came together to convey a cohesive image of Portuguese architectural identity, firmly based on the historical continuity and on the "understanding of the site (...) 'the spirit of the place'" as underscored by Raquel Henriques da Silva.²⁰ Both characteristics were pointed out as the constant background throughout the century.

1.3. Display Options

The Portuguese exhibition installation reflected this narrative. Despite the panoramic and retrospective nature of the show, along with the significant quantity of featured projects and buildings, a particular challenge concerned readability: the display of seven chronological organised nuclei, directly related to the historical periodisation, attempt-



Fig. 2. Ana Tostões with Manuel Maria Carrilho, Minister of Culture at "Portugal, Arquitectura do Século XX" opening, CCB, Lisbon, Portugal, 1997. © Arquivo AMCCB.



Fig. 3. "Architektur im 20. Jahrhundert: Schweiz" installation at DAM, Frankfurt, Germany, 1998. © Martin Tschanz.

ed to engage the visitor to Portuguese history (Fig. 1).

Each building was autonomously presented by a composition of selected drawings and photographs, inserted in identical light, thin wooden frames, in addition to scale models. The selection privileged the variety and aesthetic

quality of the drawings, even when these did not explain the spatial or programmatic organisation of the buildings; nevertheless, the models, as well as the photographs, introduced additional information while emphasising the integration of the building in its context (Fig. 2).



Fig. 4. "Architektur im 20. Jahrhundert: Schweiz" installation at DAM, Frankfurt, Germany, 1998. © Martin Tschanz.

Switzerland, by contrast, "freely arranged [the drawings] around key models, according to the possibilities of the very different spaces in the museum" (Fig. 3), and foremost, exploring their impressiveness, as affirmed by Martin Tschanz:

*Sometimes we wanted to show an interesting and spectacular object and we searched for projects and artefacts around it. For example, we showed an enormous, spectacular relief of a mountain, accompanied with Taut's Alpine Architektur, some alpine shelters, touristic infrastructure etc.*²¹ (Fig. 4).

2. THE AFTERMATH

Though space constraints do not allow me to give a comprehensive outline of the critical reception of these exhibitions, nevertheless some outcomes can be adduced as evidence of their legacy.

After being presented in Frankfurt, the Portuguese exhibition was hosted, months later, at the CCB (Centro Cultural de Belém) in Lisbon, from 25 June to 25 August 1998, motivating a new moment of recognition in the press; while a section from the show travelled to Madrid. More relevant, the collected material was thought to be an embryo of the central collection for a future national architecture museum. However, as it did not happen, the drawings were returned to their respective origins.

The Austrian exhibition content became the original nucleus of a forthcoming collection, later a permanent exhibition at the Architektur Zentrum Wien,²² while "Pro Helvetia (the Swiss Confederation's cultural promotion institution)

had [also] the intention to produce a second smaller 'digital' exhibition to be shown at different places all over the world. [However] this exhibition was never realized."²³

Taking the Portuguese experience as a central example of 'Architektur im 20. Jahrhundert' cycle relevance, other aspects should be noted. The extension and integral exhibition of original documents was an innovative approach within architecture group shows in Portugal. Furthermore, as a research-based show, it implied the constitution of an investigative team for the selection and collection of nearly one thousand documents to represent more than one hundred featured buildings, being simultaneously an exhibition on the history of Portuguese architectural drawing. The edition of the catalogue contributed to stabilising a disciplinary balance at the edge of the new century while, together with the exhibition, allowing for the divulgation of the broader unknown production of Portuguese architecture.

Wang's invitation created an opportunity for a panoramic survey, balancing the relative importance of the different periods before and after Modernism. Moreover, no other show held in Portugal had such extensive covering of a high diversity of functional programmes.

*The major exhibition on architecture in Portugal, in the twentieth century, welcomed by the Museum of Architecture of [Frankfurt], showed, after all, the country is not a dwarf in the context of European nations, contrarily, [Portugal] achieved similar interest levels, behind the prestige of certain contemporary architects, but rather recently, because everything else was virtually unknown to an international audience.*²⁴

REFERENCES

- MILHEIRO, Ana Vaz, "As sete idades da arquitectura", *Jornal Público*, 10 October 1997, 24–25.
 MILHEIRO, Ana Vaz, & SALMEA, Isabel, "Contra as peças excepcionais", *Jornal Público*, 10 October 1997, 25.
 TOSTÕES, Ana, *Os Verdes Anos na Arquitectura Portuguesa dos Anos 50*, Porto, FAUP, 1997.
 TOUJSSANT, Michel, "Frankfurt". *Jornal Arquitectos*, No. 185, August 1997.
 WANG, Wilfried & CAPITEL, Anton, *Architektur im 20. Jahrhundert: Spanien*. München — New York, Prestel, 2000.
 WANG, Wilfried, STEINER, Dietmar, & BECKER, Annette, *Architektur im 20. Jahrhundert: Österreich*, München–New York, Prestel, 1995.
 WANG, Wilfried, TOSTÕES, Ana, & BECKER, Annette, *Architektur im 20. Jahrhundert: Portugal*, München & New York, Prestel, 1997.
 WANG, Wilfried, TSCHANZ, Martin, & MESEURE, Anna, *Architektur im 20. Jahrhundert: Schweiz*, München & New York, Prestel, 1998.

NOTES

- 1 Due to a government measure that allowed for special taxes to companies that invested in East Germany, after the reunification, Frankfurt institutions funding dropped dramatically. Wilfried Wang, interviewed by the author, Berlin, 4 January 2019.
- 2 Wilfried Wang, Dietmar Steiner, & Annette Becker, *Architektur im 20. Jahrhundert: Österreich*, München & New York, Prestel, 1995, 9.
- 3 Wilfried Wang, interviewed by the author.
- 4 The Frankfurt Book Fair has invited, since 1976, an annual guest of honour — a country or a region — or focus on a specific thematic interest. From 1995 to 2000, the period coincident with DAM's Wang leadership, the invited countries were Austria (1995), Ireland (1996), Portugal (1997), Switzerland (1998), Hungary (1999) and Poland (2000).
- 5 Wilfried Wang, interviewed by the author.
- 6 To organise the national presence the Portuguese state, namely the Culture and Economy Ministers, along with Parque Expo 98 S. A., Comissão dos Descobrimentos, ICEP and APEL created a joint-stock company — Portugal-Frankfurt 97, that would coordinate all the initiatives.
- 7 The Austrian curator, Dietmar Steiner, was the director of Austrian Architekturzentrum in Wien; Marja-Riitta Norri, the Finnish participation coordinator, was the head of Museum of Finnish Architecture, for example.
- 8 Cf. Ana Tostões, *Os Verdes Anos na Arquitectura Portuguesa dos Anos 50*, Porto, FAUP, 1997.
- 9 Ana Tostões, Wilfried Wang, & Annett Becker, *Architektur im 20. Jahrhundert: Portugal*, München & New York, Prestel, 1995, 11–12.
- 10 Ibidem.
- 11 Austria's exhibition was displayed at the DAM from 14 October 1995 to 14 January 1996.
- 12 Martin Tschanz curated the Swiss exhibition, staged from 26 September to 29 November 1998.
- 13 The Spanish show was conceived by Anton Capitel and staged from 23 September to 13 December 2000.
- 14 Wilfried Wang, Dietmar Steiner, & Annette Becker, op. cit., 9.
- 15 Ibidem.
- 16 Wilfried Wang, Martin Tschanz, & Anna Meseure, *Architektur im 20. Jahrhundert: Schweiz*, München–New York, Prestel, 1998, 11–12.
- 17 Martin Tschanz, personal communication, January 2020.
- 18 Ibidem.
- 19 Wilfried Wang, Ana Tostões, & Annett Becker, op. cit., 11.
- 20 Raquel Henriques da Silva, "A 'Casa Portuguesa' e os Novos Programas, 1900–1920", Wilfried Wang, Ana Tostões, & Annett Becker, op. cit., 15–22.
- 21 Martin Tschanz, personal communication.
- 22 Wilfried Wang, Dietmar Steiner, & Annette Becker, op. cit., 10.
- 23 Martin Tschanz, personal communication.
- 24 Michel Toussaint, "Frankfurt", *Jornal dos Arquitectos*, No. 185, August 1997, 7.

FERNANDO TÁVORA AND THE EXPERIENCE OF THE 1960 TOKYO WORLD DESIGN CONFERENCE

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ABSTRACT.

The call for the “Study Scholarship — Higher Technical Secondary Education: Science, Literature and Art”, subsequently awarded to Távora, was made by the Calouste Gulbenkian Foundation on 19 March 1959. Távora applied for the scholarship on 27 April 1959, indicating the objectives of his trip and the universities that he intended to visit. Initially, the scholarship requested was to cover a period of four months in order to visit the United States. However, a letter in the Gulbenkian archive in Lisbon shows that Távora had also received an invitation to attend the World Design Conference (WoDeCo) to be held in Tokyo from 11–17 May 1960.

The request to participate was also accompanied by a letter of recommendation from Professor Carlos Ramos dated 9 January 1960. In the letter, addressed to the Director of the Fine Arts Service of the Gulbenkian Foundation Maria José de Mendonça, we can read how contemporary Japanese architecture had established itself in Western society, to the point of awarding Japanese architects with the greatest prizes in international competitions.

Drawing on the writings of Fernando Távora, this paper aims to show the importance of this event and in general the consequences that the journey to Japan had on his mentality.

1. JAPAN: A CHANGE OF PLANS

The document dated 15 January 1960 states that the President of the Calouste Gulbenkian Foundation in Lisbon granted an additional scholarship to allow the architect Fernando Távora to travel to Japan, acknowledging the interest of this trip and the progress that this country had achieved in the field of architecture. This concession was made provided that the architect did not compromise the duration of the trip to the United States or the objectives proposed in the application for the scholarship. In return, the president asks Távora to give two lectures in Lisbon and Porto, on the results of his studies. In a letter dated 9 January 1960 addressed to the Director Maria José de Mendonça of the Fine Arts Service of the Gulbenkian Foundation, Carlos Ramos (1897–1969) wishes to specify that long before the architect Távora applied for the scholarship, a group of Portuguese architects already intended to apply for funding from Gulbenkian that would allow them to participate in the World Design Conference in Japan.¹ Carlos Ramos's strategic clarification aimed to underscore the importance and necessity of approaching Japanese architectural culture given its growing international recognition. Among the architects interested in participating in the conference, Ramos himself mentions Alfredo Viana de Lima (1913–1991), himself, Távora, who were all the most important exponents of architectural expression in Porto at the time. He concluded his request by noting how important Japanese architecture had become, to the point that in recent years it had won the most coveted awards in international architectural competitions. For example, the Pan-Pacific Architecture Award, founded by American Architects, won in 1958 by Kenzo Tange, professor of architecture at the University of Tokyo, and coincidentally one of the organisers of the conference.

The subject that would be discussed at the congress,

“WHAT CONTRIBUTION ARCHITECTS CAN MAKE TO THE WORLD OF TOMORROW”, actually involved the whole spectrum of knowledge related to architectural culture. In fact, the “WORLD DESIGN CONFERENCE”, contrary to what might be inferred from its name, Ramos emphasised, included more specifically the most profound and obscure topics of architecture, and not a simple review of graphic design.

The letter concluded by saying that if other Portuguese architects could not go to Japan to attend the conference, entrusting the task of representing Portugal to the architect Távora would be an excellent choice. In reality, as Director Mendonça pointed out in a response to Ramos dated 13 January 1960, while the ideal scenario would have been to grant funding to all the aspiring participants mentioned by Ramos, the award of the subsidy to the architect Távora was in fact the least expensive solution for the foundation as it entailed simply paying the difference in the cost of the travels to Lisbon/New York/San Francisco/Tokyo/Lisbon instead of Lisbon/New York/Lisbon.²

In reality, the choice of Távora was not simply a choice to save money, but we know that Távora was officially invited to participate in this conference as a representative of Portugal, because he was a member of CIAM, as can be seen from a letter he sent to the Foundation, dated 26 November 1959.³ It was Távora himself who pointed out in this letter how useless it would be to stress the absolute importance of Portugal being represented at an event of such international significance, proving this by attaching to the letter a copy of a magazine on the latest Japanese architecture mentioning the architect Tange.⁴

2. WODECO: TOPICS AND ORGANISATION

Going back through the documents in the archive of the

Gulbenkian Foundation, we find a letter, dated 18 September 1959, sent by the WODECO organising committee on behalf of Takasbi Asada, to which is attached the second circular relating to the congress. The committee had previously sent about 300 invitations worldwide to participate in the event in June of the same year. Attached to the letter were the circulars providing information on the conference's structure: I. Conference Program; II. Conference Tours: The Traditionals and the Moderns in Japan; III. Conference Theme: Our Century: The Total Image; IV. Conference Display: Our vision: My Works and My Images.

The circular also listed visits to places of Japanese culture: *Japanese Traditionals in textiles, ceramics, crafts, graphic arts, architectures and gardens in the classic cities, Kyoto, Nara and Osaka.*

This information is useful because it allows us to understand how Távora organised his stay in Japan, divided between active participation in the conference and learning more about the culture of the place. Unfortunately, the limited space of this text does not allow a detailed description of Távora's visits, but we can understand his attitude towards the conference. The choice of the images, dedicated to the places he visited, aims to compensate for this lack of depth, perhaps the best way to demonstrate the allure that these places had for Távora.

The general organisation consisted of morning plenary meetings followed in the afternoon by smaller groups to discuss various topics. The subject discussed by the nine groups was OUR CENTURY: THE TOTAL IMAGE. Each group was moderated by a chair. The nine groups were divided into three Cycles. *Cycle 1: Personality — Design comes from and goes into*, in turn divided into: INDIVIDUALITY / LOCALITY / UNIVERSALITY to discuss the topic "What the personality in design is. How personality in design will be resonant with the above three". *Cycle 2: Practicability — Design acts and leads*, divided into: ENVIRONMENT / PRODUCTION / COMMUNICATION, discussing the following topic: "What the role of design is in the human environment, mass-production, mass-communication, etc. How practicability of design works with the above three". *Cycle 3: Possibilities — Design steps forwards with*, divided into: SOCIETY / TECHNOLOGY / PHILOSOPHY, discussing: "What possibility in design is expected in the future. How design will progress with economics, politics, science, technology, philosophy and art in the coming age". Távora had been selected to participate in group C: "Universality, Communication e Philosophy". In reality, it is clear from the pages of his journal that he opted to participate in other topics and discussion groups. From the complete list of participants in the conference, divided in alphabetical order, Távora's name is placed above the letter "T", almost as if he had been added later.⁵ This is highly likely given that the confirmation of the change in itinerary by Gulbenkian arrived practically on the eve of the trip that began in February 1960.

3. A TWO-SPEED EXPERIENCE

I believe that intelligence, beauty and manners have never penetrated so densely into all strata of the population as they have in Japan. If the country has good judgement — that is, if it frees itself from the American yoke and does not fall into Russian hands — if it continues to be Japan — it is destined to have an extraordinary future (Távora, 28 May 1960).

Távora's experience in Japan can be interpreted in two speeds, like his visit to the US.⁶ On the one hand the speed of the future, which the conference promised he would experience through the presentation of topics related to design. On the other hand, the slowness of the tradition that Japan offers him in the spaces of gardens, temples, ceremonies and rituals such as the one for tea. Throughout the duration of the congress this dual way of perceiving time kept him divided and struggling between a sense of duty and responsibility to participate in an international event as agreed with the Foundation and the desire to explore a country that had always fascinated him and that would influence him so much in his future professional life.

In his diary (wrote during the journey) we find few references to the conference, probably also because the WoDeCo organisation had planned to deliver a daily report with summaries and main topics of the discussions. Moreover, there are some papers in the archive on which Távora wrote some notes and reflections during the conference.⁷

In the afternoon of 12 May he changed groups and decided to attend the topic "Regionality" instead of "Universality" of design. One of the participants was Ralph Erskine (1914–2005), who specified how regionalism in design is a direct consequence of geographical conditioning.⁸ His interest in this session was inevitably linked to his previous involvement in *Inquerito da arquitetura popular*, published in 1961. During Yamasaki's afternoon presentation he noted that the reason why people produced different regionalisms lay in the different philosophical approach that each of them had.

Reading his diary one gets the impression that Távora does not emphasise any of the aspects related to the conference, yet reading between the lines we realise the importance of the meetings he had during the event. He listed them in an almost familiar form. This attitude actually conceals a character trait that those who study and who knew Távora recognise: his ability to give importance to any life event, and to recognise the value of things and people regardless of their social status or function. For him, every experience was transformed into a cultural fact but never cultic. We are talking about personalities like Peter and Alison Smithson (1923–2003 / 1949), Louis Kahn (1901–1974), Paul Rudolph (1918–1997) and Kenzo Tange (1913–2005), or Friend Tange as Távora calls him.

In the Diary, much more space is devoted to moments spent with others or to highlight the captivating beauty of Japanese women, using the term "enchanted", much more



Fig. 1. Kyoto — Nijo Palace, Audience Chamber (FIMS/FT/VKiooto-0011).

suitable than “beautiful” to define a comeliness made of permanent smiles and a sweetness of expression (Távora, 2012: 308).

Already on the second day his impatience with participation in the conference intensified, but not because of the little interest in the topics covered, but rather because of the feeling that he was missing the chance to get to know Japan, whose physical and human landscape was more important to him than all the theories presented at the congress, however extraordinary. He compared conferences to operas, where the music and performances are already known but the public continues to see them all the same. Of the sessions on 13 May he was impressed by the presentations of the films of Saul Bass (1920–1996) and the speech of Tunnard (1900–1921). He underscored the quality of Paul Rudolph’s intervention, whose work had left an impression on him during his stay in the United States. The main topic discussed was transversal to all the interventions. As he wrote in his diary, the need to create a bridge between man and technology through form was not just a design problem. A possible solution, according to him, could be the order and harmony of ancient civilisations to counter the modern chaos in forms (Távora, 2012: 309).

On the last day of the conference, Saturday, 14 May, he decided not to participate in the morning session, preferring to go shopping in a photography shop together with the architects German Samper (1926), Balkrishna Doshi (1927) and Charles Correa (1930–2015). Then in the afternoon he participated in the PHILOSOPHY panel, where Louis Kahn held a seminar, the same he had attended at the university in Waseda. On Sunday he participated in an excursion organised by the students of Waseda University, the theme of the visit being contemporary architecture.⁹ He laconically commented on the architecture he visited, merely highlighting their fragility and poor state of conservation, as in the case

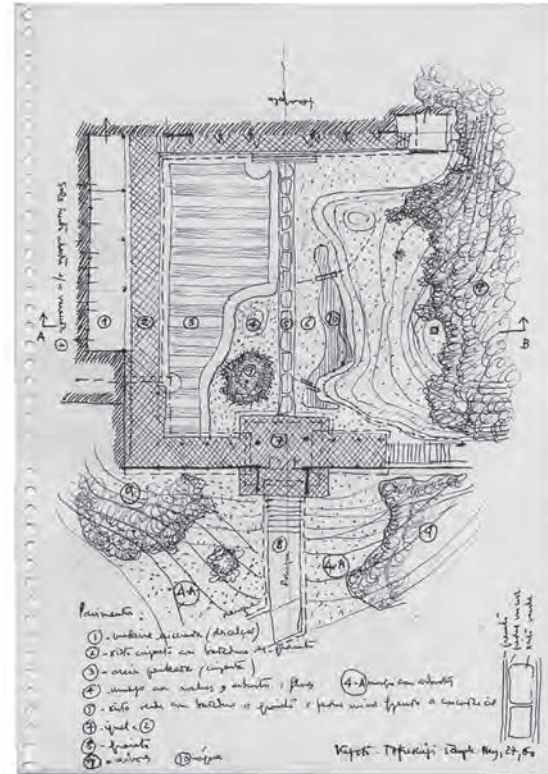


Fig. 2. Kyoto — Tofukuji Temple (FIMS/FT/VKiooto-0009).

of the Harumi Apartments in Maekava, as well as Frank Lloyd Wright’s Imperial Hotel, whose degraded stonework made it look like a modern ruin. Due to their weak impact, these buildings, he noted, are destined to lose any quality and quickly turn into ruins (Távora, 2012: 311).

In his diary the contemporaneity of the architecture is conveyed through blunt comments, clear assessments and opinions without any shadow of uncertainty. In contrast, he dedicates detailed descriptions to events such as a Sumo show that fascinates him with its ritual aspect. In general, he was fascinated by the synchronisms and harmony of the gestures of the tea ritual, in which he recognised the authentic spirit of Japan (Távora, 2012: 316 / Fig. 1).

This wisdom in managing time through cadenced and repeated movements led Távora to admit that there is an evolutionary delay in Western civilisation (we are small savages), because we have lost the concept of “rite”.

We have lost the value of symbols, we have forgotten how to hold a cup of tea, we do not know how to bow, nor recognise the sequence of foods, we no longer know how to sustain a conversation, and we are always immersed in the problems of everyday life, a condition that does not allow us to elevate the spirit to a state of purity that allows us to sip tea (Fig. 2).

The conference, and especially an exhibition associated

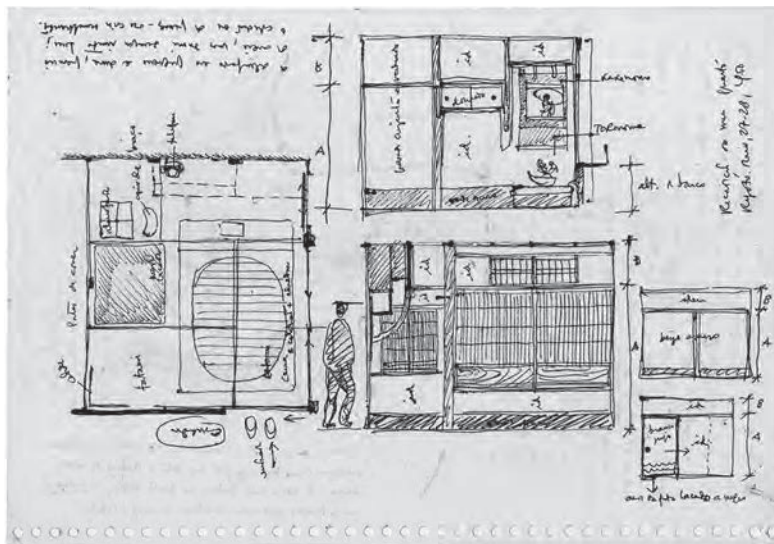


Fig. 3. Kioto — “Recriação do meu quarto” (FIMS/FT/VKioto-0005).



Fig. 4. Kioto — Vila Imperial de Katsura (FIMS/FT/VKioto-0016).

with the conference, help him reflect on the characteristics of design.¹⁰ In his diary he noted that design in Japan, as in the rest of the world, offered three types of products: those that are genuinely popular (chopsticks, tea cups, boxes, etc.); those carefully made by skilled hands that re-propose ancient traditions; those produced based on popular experience without any kind of quality. However, he noted that there was a conflict that would never be resolved, between the tea cup, which preserves ancient wisdom in its form, and the motorcycle, which due to its recent global use required shapes that are not the expression of a place but rather of a universal need. The same thing happens in architecture, where on the one hand there is the private home that generally retraces a sense of tradition, and on the other the de-

partment store or the monorail of Tokyo that must respond to global characteristics (Távora, 2012: 318).

The comments he made when visiting the Ryoanji Temple were quite different. As he drew them he understood from the arrangement of the pillars how much Japanese architecture lives not of modular rigidity, as mistakenly believed, but rather of “continuous transgressions of the modules”. In reality nothing is random, let alone the result of a mistake, but everything becomes part of an equilibrium that reserves surprises for those who approach it (Fig. 3).

A certain melancholy is perceived in the diary’s comments whenever contemporaneity is referred to. The present, with its desire to launch into the future, loses against the past of old Japan, says Távora. In 20 or 30 years’ time will

remain little more than the language, eyes and temples (which in the meantime will have become monuments). Katsura, for example, did not disappoint him, because in it he saw a universality and harmony that does not belong to our concept of a palace (Fig. 4).

It is a jewel, and in the spaces he recognised the timeless modernity that inspired Mies, Le Corbusier, Wright (Távora, 2012: 330).

He remained in Japan until 28 May, making many visits and describing in detail many experiences, but what is clear is that he saw a model of universal ethics in that country. After visiting the United States and with his experience in Japan, the contrast he felt between Western and Eastern models of behaviour was even more pronounced. He was struck by Japan's manners, which does not mean servility or opportunism, but something that made the Japanese human, unlike the machine men he had met in the United States, men who reacted depending on the button he pushed (24 May). Now Japan, he continued, while it was not exempt from producing modernity, from travelling by jet, from drinking Coca-Cola and from dancing the mambo, that is, despite being an appetising showcase of contemporary civilisation, at the same time it also had — still and for how long — a thousand small/great qualities of the men of the past.

4. CONCLUSION

The trip to Japan allowed Távora to experience wonder. A wonder that did not take him by surprise, but that he was somehow prepared to encounter. The part of the trip to the United States contributed to a deeper appreciation of the Japanese experience, which presented itself as a solution or an alternative to the culture of the car and secretaries or of bureaucracy. In the ancient buildings and the rituals of tradition he found a universal wisdom, the same that should drive one to produce good architecture.¹¹

REFERENCES

- Various authors, *Fernando Távora*, Lisbon, Editorial Blau, 1993.
 ESPOSITO, A., & LEONI, G., *Fernando Távora, opera completa*, Milan, Mondadori Electa, 2005.
 TÁVORA, Fernando, *Fernando Távora Diário de "Bordo". Estabelecimento de texto*, Rita Marnoto (ed.), Vols. 1 & 2, Porto, Associação Casa da Arquitetura, 2012.
 GONÇALVES, J. F., *A viagem na arquitectura portuguesa do século XX*, www.resdomus.blogspot.com.
 KRUNTORAD, P., *L'orizzonte ampliato. Viaggio in Italia come paradigma*, Lotus, No. 68, Milan, 1991, 122–128.
 MADDALUNO, R., "Estratti dal diario di viaggio", ESPOSITO, A., & LEONI, G. (eds.), *Fernando Távora — opera completa*, Milan, Electa, 2005, 302–303.
 MESQUITA, A. R. C., *O melhor de dois mundos a viagem do arquitecto Távora aos EUA e Japão — diário 1960*, Dissertação de Mestrado em Arquitectura Território e Memória.
 TÁVORA, F., *Da organização do espaço*, Porto, 1st ed., Edições Curso de Arquitectura da ESBAP, 1962.

NOTES

- 1 As mentioned, it was the World Design Conference (WoDeCo, 11–16 May 1960). Held a year after the last CIAM in Otterlo, the conference bore the title *Our Century: the Total Image — What Designers Can Contribute to the Human Environment of the Coming Age* and saw the participation of dozens of architects from 26 different countries. The Metabolism Manifesto of Kiyonori Kikutake, Kisho Kurokawa, Masaoto Otaka and Fumihiko Maki was also presented during the conference. See World Design Conference 1960 in Tokyo, Tokyo, 1961.
- 2 In reality, Távora's interest in Japan pre-dated the conference. He arrived in Japan already prepared on who he would meet and what he was interested in visiting.
- 3 Távora had participated in the CIAM of 1959 which had been held in Otterlo.
- 4 In the Gulbenkian archive there is a copy of a magazine article written by Yuichiro Kojiro, "Japanese Architecture in 1958. New Vitality".
- 5 A document at AFIM (A. Mesquita, op. cit., 150–151) contains the complete type-written list of all participants in the conference, organised in alphabetical order and specifying their origin, profession and language for communications.
- 6 Raffaella Maddaluno, "Fernando Távora and The United States: Travel as a Teaching Practice", *Education, Design and Practice — Understanding skills in a Complex World*, New York, 2019.
- 7 A. Mesquita, 153.
- 8 Fernando Távora, Notes taken during the sessions of the WoDeCo, *TARDE 12/5/60*, A.A.F.T.
- 9 Organised by the Zako Group of Waseda University, according to a typewritten list published in A. Mesquita, op. cit., 160, the tour included visits to the following buildings: Kunio Maekawa, Harumi Apartments, 1956–1958, demolished 1997; Yoshinobu Ashihara (1918–2003), Nikko Hotel, 1959; Togo Murano (1891–1984), Sogo Department Store, 1935; K. Tange, Tokyo City Hall, 1952–1957, now demolished, in its place stands the Tokyo International Forum (1986–1996) also by Tange; K. Maekawa, Tokyo Opera House, 1957–1961; Le Corbusier, National Western Museum, 1959; Seiichi Shirai (1905–1983), Zenshōji Temple Main Hall, 1957; Takamasa Yosizaka (1917–1980), Hiroshi Ohe, Hosei University, 1953–1958; K. Tange, Sogetsu Kaikan Art Center, 1955–1958 (in 1977 replaced by a new building, also by Tange); K. Maekawa, Setagaya Community Center, 1959; K. Tange, Rikkyo University Library, 1959–1961; K. Maekawa, Gakushuin University, 1958–1960; Kanshio, 15th-century villa with a room for the tea ceremony originally from Hinda and reconstructed (1952) inside Waseda University's Okuma Gardens thanks to the donation of the alumnus Fusaguro.
- 10 *Japan design house. Permanent Exhibition of All Industries*. The exhibition was held at the Kokusai Kanko Kaikan Building in Tokyo. AFIMS holds the catalogue signed and dated by Távora on 16 May 1960: The FIMS archive has the following catalogue: *Nature and thought in Japanese Design*, Publicity Committee, The World Design Conference Organizations, Tokyo, 1960.
- 11 This work is financed by national funding from FCT — Foundation for Science and Technology under the Project UIDB/04026/2020.

Session 7-c

MEDIA POWER

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Documentation and dissemination of the legacy of the Modern Movement has been one of DOCOMOMO's focus points since its foundation. DOCOMOMO has promoted the development of pioneering documentation knowledge supporting research, practice and education. It has also registered and disseminated modern works worldwide through its ISC / R — International Specialist Committee on Register. However, this issue still deserves to be reviewed in the context of the current profound social, cultural and technological changes.

Modern Movement produced its own ways of representing and communicating ideas in architecture, urban planning and landscape. Unlike other types of heritage, modern architecture was registered in numerous publications and was part of individual and / or group exhibitions at the time of its realization. It is also characterized by the incorporation of photography and cinema to record the construction processes of modern cities and buildings. The documentation and dissemination criteria developed by modern architects expressed the emergence of new aesthetics and ways of materializing projects. But especially, they were instruments to account for the political and social role of modernity to improve the life of society.

In this sense, delving into these issues is of great potential. On the one hand, the documentary study allows us to discover more aspects of the theory and practice of such a recent heritage. It is worth mentioning that in all countries, material is still being donated and archives are kept to preserve modern documents — plans, models, photographs, letters, books, films. On the other hand, documenting, re-documenting and disseminating modern architecture makes it possible to value it and implement actions for its care and protection. This involves both government, academic and professional institutions and the community at large. Likewise, Documentation is the indispensable concep-

tual and technical support to carry out appropriate Conservation strategies in the buildings, sites and neighborhoods of the Modern Movement: urban renewal, adaptive reuse, technological adaptation.

Furthermore, the current context characterized by globalization, the diversification of communication systems and the exponential technological advance introduces new scenarios that expand the traditional ways of knowing modern heritage. The documents that initially served to represent modern discourse today can be easily digitized, reproduced and disseminated through the internet. Online platforms and virtual reality systems allow us to experience not only existing works but also those that have been unfortunately demolished. A new paradigm emerges that modifies the notions of space, time and user: modern cyberspace.

The four papers presented in this session propose an interesting balance between, on the one hand, evaluating the various ways in which modern architecture documented and disseminated its concepts. And, on the other hand, to ask oneself about what are the contemporary challenges on the matter.

Firstly, Claudia Costa Cabral reflects on photography as an instrument to document the life, obsolescence and renovation of the Hotel Imperial (Rio de Janeiro, 1968) designed by Oscar Niemeyer. She exposes the paradox of modern ruin, that is, modern infrastructures or buildings that have been abandoned and doomed to decay. And it discusses the power of visual registers both to consecrate modernity and to denounce and promote its preservation.

Secondly, Yutaka Mizukami, Akira Hizawa, Koichiro Nakayama, Tsuyoshi Kishigami, Haruka Miyazaki, Kozo Kakita, Yuko Nakano and Takeshi Nakagawa reveal the potential of VR (virtual reality) use and preservation of buildings. It is described how this new technology was applied to the case of the former Imperial Hotel designed by Frank Lloyd

Wright.

Thirdly, Eduardo Augusto Costa addresses the role of printed photographs — books, magazines — to create a visual identity in modern architecture in Brazil. Understanding this social and political context is crucial for a renewal of history and architectural preservation.

Finally, Marianna Cardoso examines architectural exhibitions as a vehicle to disseminate modern architecture worldwide. It focuses on the unique and pioneering case of the

traveling exhibitions “Brazil Builds” organized by MoMA and its cultural transfers.

In conclusion, the production and updating of knowledge in the field of Documentation and dissemination of modern architecture brings new perspectives on the past. In turn, this critical review promotes better strategies for valuing and preserving the modern legacy for contemporary and future societies.



MODERN RUINS. LIFE AND DECAY AND REBIRTH OF THE HOTEL NACIONAL

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ABSTRACT.

Designed by Oscar Niemeyer in 1968 as a striking 45-story cylindrical tower facing the beach of San Conrado (Rio de Janeiro, Brasil), the Hotel Nacional was meant to be the expression of modern techniques. In its futuristic appeal, it was perhaps closer to Kiyonori Kikutake's tower-shaped cities from 1958, than to Niemeyer's own former slab-form hotels, like Brasília Palace (1957) or Quitandinha (1953). After a life of glamour (which coincided both with the development of São Conrado and Barra da Tijuca beachfront as upper-class residential areas and the spread of the favela communities over the next hills), the Hotel Nacional closed its doors in 1995. By the end of the decade, it was a modern ruin. In 2011, the derelict state of the hotel was extensively documented by the work of German conceptual artist Olaf Nicolai, who took a series of photographs throughout the complex showing it as a modern ruin. Yet, the 2016 Olympic games in Rio would provide it a second chance. The hotel underwent a complete restoration and was reopened under the flag of the Spanish Meliá group in December 2016. However, in March 2018 it was closed again. Nowadays, as shot by Brazilian architectural photographer Leonardo Finotti, the Hotel Nacional does not look like a ruin, but as a fully recovered structure. Nevertheless, depicting a (perhaps evanescent) state of unblemished beauty, the still-life quality of these stunning photographs also exposes the uncertainty of the hotel's future.

1. INTRODUCTION

"Modern ruins" is a coined expression to define the ruins of architectural and urban structures constructed in the recent past. It refers to modern infrastructures or buildings that have been abandoned and doomed to decay. As a contemporary cultural theme, the "modern ruins" idea has attracted not just architects and urban planners, but photographers and artists, generating a growing body of visual work. Usually provocative, grounded on the paradoxical contradiction between "modern" and "ruin", addressed to larger audiences (beyond the borders of architecture's academic and professional milieu), this body of work has produced and disseminated evidences on the current state of threatened modern heritage. Such was the fate of Niemeyer's Hotel Nacional (Rio de Janeiro, 1968), photographed as a modern ruin by German conceptual artist Olaf Nicolai in September 2011.¹

This session on the documentation and dissemination of the architecture of the modern movement is based on the premise that modern architecture can be virtually experienced. As Beatriz Colomina recalled, Reyner Banham once noticed that the modern movement was the first movement in the history of art grounded on photographic evidence rather than on personal experience. As she argued, the site of architectural production was "displaced into the rather immaterial sites of architectural publications, exhibitions, journals," and, paradoxically, those "much more ephemeral media than the building" have proved perhaps "more permanent: they secure a place for an architecture in history."²

Colomina's insightful comments invite to reconsider architectural buildings, which might be understood as having a life as both physical objects and as images. It poses some interesting questions. The life of buildings as physical objects is bound to the passing of time. Building's age, decay,

and eventually disappear. But the life of a building through its systems of representation confronts chronological time. Olaf's photographs of the Hotel Nacional as a modern ruin exist simultaneously with the futuristic images of its glorious past or with Finotti's photographs of the building after restoration in 2016. The paper wishes to review the history of the Hotel Nacional through its representations. Are the narratives associated to these different lives — and their opposed concepts of temporality — actually independent one from another? How much is the existence of a building, the chronological narrative of its physical life cycle, influenced by the non-chronological image-narrative of this life?

2. THE GLORIOUS PAST

By the end of the sixties José Tjurs, the son of Russian Jewish immigrants in Argentina, commissioned Niemeyer to design a large modern hotel facing the still placid beach of São Conrado in Rio. Tjurs was a self-made entrepreneur, who went from cabaret owner to tycoon of the Brazilian hotel industry. Founder of the Horsa hotel chain, he had worked with the best architects of São Paulo, such as Rino Levi in the Hotel Excelsior (1941) and Jacques Pilon and Franz Heep in the Hotel Jaraguá (1946).³

Horsa's venture in Rio would follow that standard. Tjurs must have sensed the coming shift in the hotel market. The creation of Embratur (Brazilian Tourism Company) in 1966 put in place the mechanisms to the implementation of a national tourism policy targeted to attract foreign tourists. In the context of the so-called "Brazilian economical miracle", Embratur granted tax incentives and financing for the construction of hotel facilities. During the seventies, Brazil saw the arrival of big international hotel chains. The Hilton opened in São Paulo in 1971, followed by Sheraton in Rio in 1975.⁴ A flagship hotel designed by the worldwide known ar-

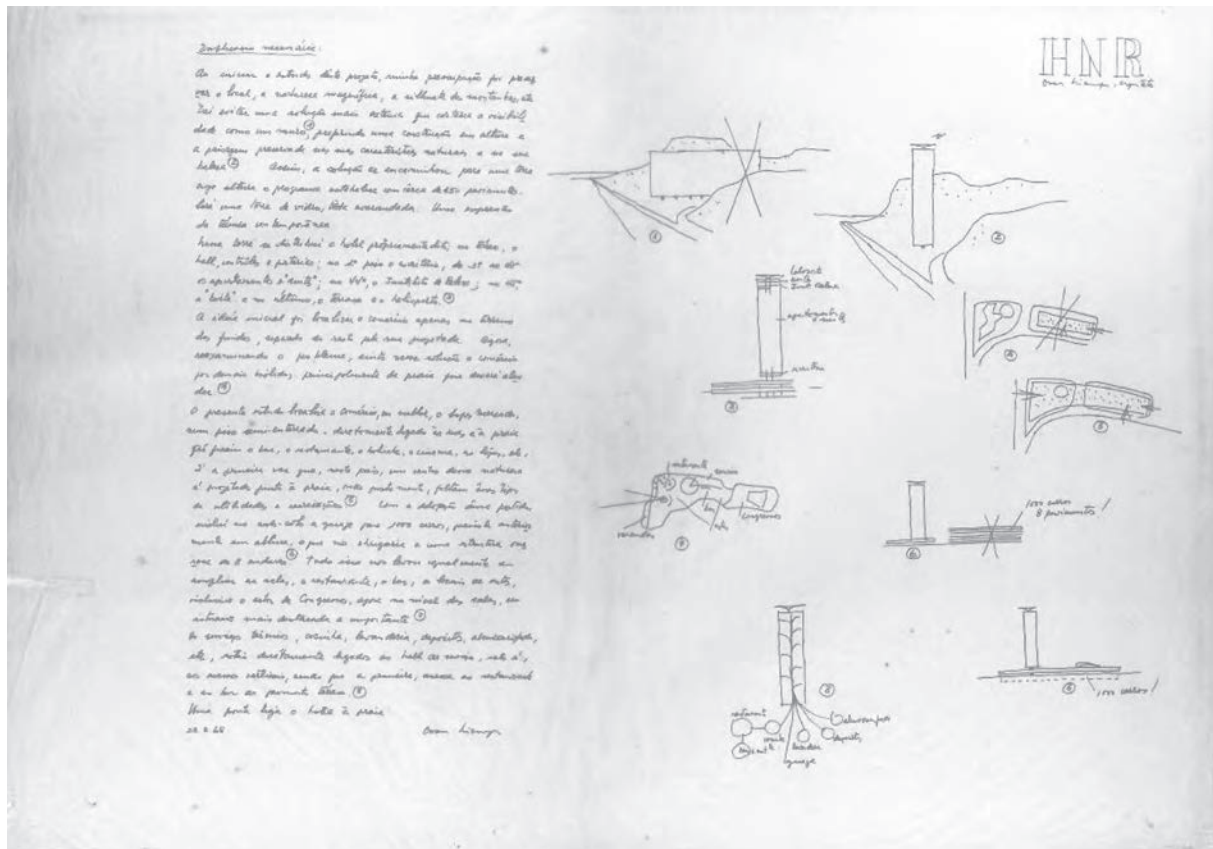


Fig. 1. Oscar Niemeyer, Hotel Nacional, Rio de Janeiro, Brazil, 1968. © Collection Oscar Niemeyer.

chitect of Brasília, whose international career was on the rise, was certainly a good move for Horsa in this new global market.

2.1. Niemeyer's Drawings

The first available representations of the hotel belong to Niemeyer's preliminary study, a handwritten document eight pages long dated from February 1968.⁵ As usual in his work, Niemeyer structures the study like a storyboard, where his architectural decisions are introduced through a group of sketches organized serially and directly related to the development of the narrative (Fig. 1). These notes show that Niemeyer's approach of the problem was primarily based on the landscape structure of the area.

The hotel was to be constructed on a flat terrain on the seafront, filling a corner formed by the pathway along the seashore and a neighbourhood street by the foot of the hills. The two first drawings presented by him to defend his "architectural party" oppose two current modern architectural typologies for collective housing: the slab and the tower. He decides for the tower because it might help "preserving the place, the magnificent nature, the silhouette of the mountains." Instead of the slab stretched in front of the moun-

tains — described as the "extensive solution" that "would cut visibility like a wall" — he proposes a striking 45-story cylindrical glass tower overlooking the sea and Rio's stunning geography.⁶ The third sketch is a section; the tower stands over a built platform, and comprises in its body all the hotel rooms, with a terrace and heliport at the top.

The next drawings show the building's relationship to the ground plane. The scale of the tower relates to the grandiose landscape, but the scale of the base relates to the immediate vicinity. Niemeyer explains that he slipped into the basement a huge underground parking area, avoiding the construction of the 8-story structure that would be otherwise necessary, considering the required number of parking slots. It allowed him to have an interconnected, continuous flat base extending horizontally throughout the site. Public facilities as restaurants and shops, as well as the convention center, are arranged on that 3-story base and directly connected to the streets and the beach. The concise, clearly outlined shape of the tower stands out against the relaxed, ambiguous shape of the horizontal base, defined by concrete slabs which seems to empirically follow the contours of the site, sometimes reaching urban alignments, sometimes retreating to let the sun in.⁷

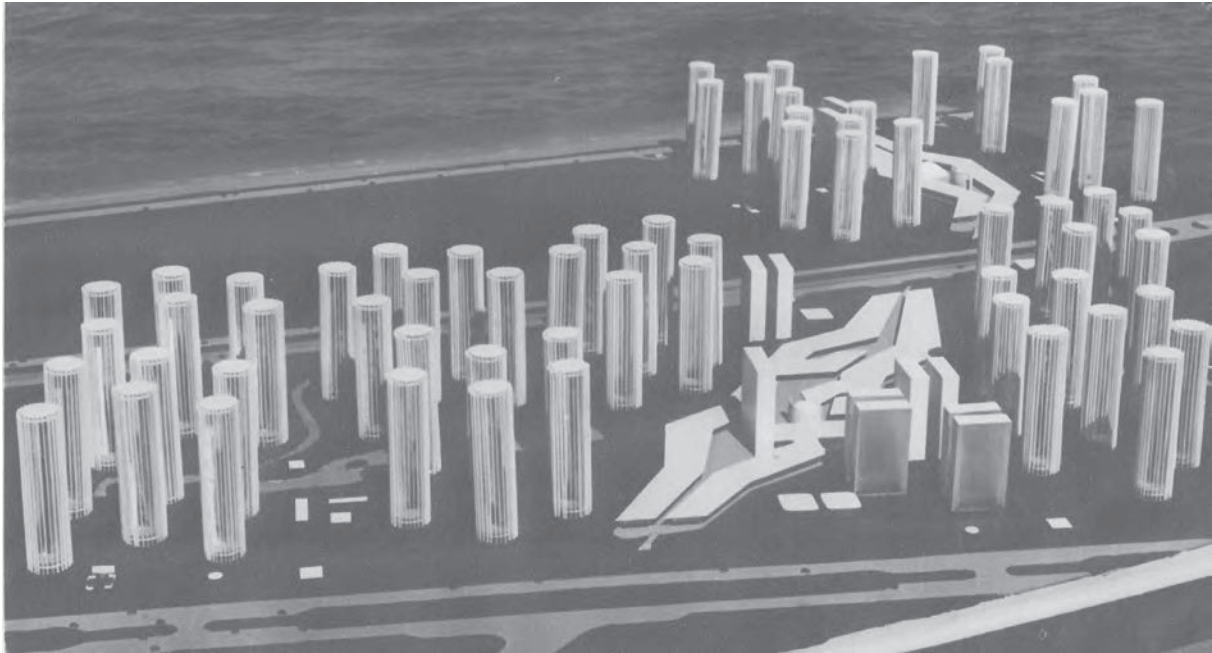


Fig. 2. Oscar Niemeyer, Barra Center, Rio de Janeiro, Brazil, 1969. © *Brazil Herald*, September 13, 1970, *Paraíso Ocupado*.

2.2. The Life of Glamour

The Hotel Nacional opened in February 1972, with some floors less (its final height was 34 storeys) but without any prejudice of the generous collective spaces, Burle Marx' gardens and transparent luxury rooms with spectacular sea and mountain views. In December 1972, Chagas Freitas, the governor of the Guanabara state, ceremonially opened the Lagoa-Barra Highway, linking the wealthy South Zone (Copacabana, Ipanema, etc.) to São Conrado and Barra da Tijuca.

Besides regular paid advertisement, the Hotel Nacional was in the news even before its opening, either with Tjurs putting pressure on the governor to execute basic sewage works in São Conrado, or inviting a military minister to visit the hotel under construction.⁸ As a media subject, the Hotel Nacional was the very incarnation of modernity, providing the utmost level of convenience and facilities. During its heyday, it would even surpass the iconic Copacabana Palace in the legendary Copacabana beach, with its mosaic sidewalks and *bossa-nova* clubs from the fifties. Distinguished guests and international events would keep the hotel in the news during the seventies.

The Hotel Nacional was meant to be a "statement on contemporary techniques", as Niemeyer wrote in his notes. Besides the never built cylindrical hotel he had designed for a tourist resort (Algarve, 1965), in its futuristic appeal, the Hotel Nacional was perhaps closer to Japanese Kiyonori Kikutake's tower-shaped cities from 1958, than to Niemeyer's own former slab-form hotels of the fifties, like the Brasília

Palace (1957) or the Quitandinha (1953).

Moreover, Niemeyer's design for the Nacional anticipated the components of his 1969 Barra Center project, carried out in the framework of Lúcio Costa's Pilot Plan for Barra da Tijuca. To speak in contemporary terms, Costa's plan was primarily concerned with the balance between urban development and long-term ecological sustainability for the region. As he explained, blocked by massifs, Barra da Tijuca had been "preserved *in natura* while the city poured like a liquid through the North Zone and was compressed between the valleys and the beaches of the South Zone."⁹ He argued that what was at stake was not just the urbanization of a new tourist neighbourhood, but "the very definitive urban structuring of the city-state". Nevertheless, he valued the Barra's "harsh and washed" atmosphere, "the beaches and dunes that seem to have no end", and the "feeling of being in an untouched, primitive world."¹⁰ Since the conventional land parcelling would imply the suppression of these features, Costa advocated for the modern urban pattern of freestanding tall buildings, significantly spaced apart and surrounded by natural landscape. In the same spirit, Niemeyer master plan for a residential area located by the sea comprehended 75 cylindrical towers 30-story high organized in clusters amidst wild nature and Burle Marx's gardens (Fig. 2).¹¹

The life of glamour of the Hotel Nacional coincided both with the development of São Conrado and Barra da Tijuca's beachfront as an upper-class residential area and the spread of the favela communities over the next hills. During the



Fig. 3. Hotel Nacional, Rio de Janeiro, Brazil, 2011. © Olaf Nicolai, *Hotel Nacional Rio*, Zürich, Rollo Press, 2017.

seventies, Barra da Tijuca was systematically promoted in the media as the new “South Zone”, and sold as the place of the future. Architecture became an important element of this narrative, which successively explored the belief that Brazil’s best-known architects, Niemeyer, Costa and Burle Marx, would be in charge of the making of the so-called “new Rio”, as it had been the case in Brasília.¹² As reported in the press of the time, in Niemeyer’s “Spacial City” of cylindrical towers “all the rooms of the apartments are face to the street and 75% of the total area consists of parks, squares and gardens.”¹³

Costa’s plan was not followed up and he step aside. Since the 1980s, a few large real estate companies would convert Barra da Tijuca in the so-called “little Miami” that it is today, intensely — and extensively — occupied by shopping malls and large residential condominiums conceived as gated communities, so much criticized by urban scholars as appreciated by the general public.¹⁴ As for Niemeyer’s Barra

Center, only two of the cylindrical towers actually left the paper.

3. THE MODERN RUIN

Following financial difficulties faced by Horsa, the Hotel Nacional closed its doors in 1995. By the end of the decade it was a modern ruin. The derelict state of the hotel was documented by the work of German conceptual artist Olaf Nicolai. In September 2011, Nicolai took a series of photographs throughout the hotel’s dependencies, including the outside leisure areas, showing the whole complex as a modern ruin (Fig. 3). Nicolai’s essay actually portrays the consequences of 20 years of abandonment, in which the hotel had passed through auctions and different owners. The listing on the municipal heritage register in 1998 did not prevent it to be vandalized and condemned to the condition of “phantom building” or “pompous carcass”, as the press referred to it.¹⁵



Fig. 4. Oscar Niemeyer, Hotel Nacional, Rio de Janeiro, Brazil, 2020. Print screen, advertising video for a tourism website. © Trivago Magazine.

Nicolai's photos were gathered in a book named *Hotel Nacional Rio*, with no text except for a brief explanation of the situation of the hotel. Instead of the glossy paper usually used either on architectural or photography publications, Nicolai printed his book in newsprint paper. Full-page photographs of wrecked rooms and broken stuff, with no captions, are relentlessly presented over one hundred and fifty pages. Nicolai's visual narrative is impressive by its extent, by its painful repetition of ruined spaces, whose relationship to each other cannot be grasped. Everything seems out of place. Although overabundant, Nicolai's photos do not match the typical surveying use of photography within preservation, which aims to visually reconstruct the building. Photographs are not taken from the detached visual point of view of architectural photography, meant to frame the whole building within an image. On the contrary, the building is always showed through shattered fragments. Nicolai chooses a pedestrian point of view, which emotionally places the subject into the scene, as if he was experiencing the ruin. This images contrast to a few white pages randomly inserted into the sequence, with Niemeyer's former drawings and photos of the hotel at its heyday.

Perhaps it is worth noticing the coincidence between the decay of the Hotel Nacional as a physical object and its fall from grace as a historiographical subject in the international milieu. Underwood's monograph on Niemeyer, published in 1994, regards it as an example of "an imposing aesthetic unity" that "whitewashes" social conflicts.¹⁶ The life of

the hotel as a modern ruin coexisted with the development of a simplifying narrative in which modern urbanism was to be blamed for what had happened in Barra da Tijuca, while modern architecture was to be blamed for its confidence in a universal language. "The seek façade of this imposing cylindrical building" — says Underwood — "with its Miesian black-tinted glass and steel mullions, would seem more at home in a European or North American City than in the tropical fringes of coastal Rio."¹⁷

4. STILL-LIFE

The Hotel Nacional eventually rose again (Fig. 4). It was considered for renovation for the Brazilian World Cup in 2014 but it did not prosper. The 2016 Olympic Games in Rio provided a second opportunity. The hotel underwent a complete restoration, conducted by architects Marcos Leite Bastos and Eduardo Manzano (Studio VOA), and was reopened in December 2016, managed by the Spanish Meliá chain. But in March 2018 it was already closed. Reportedly, Meliá's decision was due to the end of the contract with the owners of the building and to the lacking of the convention centre.

In September 2019, the Hotel Nacional reopened again, under the management of the Brazilian group WAM. The group's strategies to face the competition — particularly of the newer, cheaper and uglier hotels at Barra da Tijuca — is to reduce rates and open the convention center.¹⁸

Nowadays, as shot by Brazilian architectural photogra-

pher Leonardo Finotti, the Hotel Nacional looks as a fully recovered structure. Nevertheless, depicting a (perhaps evanescent) state of unblemished beauty, the still-life quality of these stunning photographs also exposes the uncertainty of the hotel's future. Susan Sontag said that photography "both loots and preserves, denounces and consecrate".¹⁹ As a media subject, the Hotel Nacional has been enjoying a long life, ranging from tourist postcards to architectural photography sites, from newspapers' images to artistic activism. It may not have shaped the development of the city's coastal expansion in the way Costa and Niemeyer imagined, but, whichever as a material building or a paper and digital image, it still has a significant role in the dissemination of modern values to a broader audience, outside the architectural circles.

REFERENCES

- COLOMINA, Beatriz, *Privacy and Publicity. Modern Architecture as Mass Media*, Cambridge, The MIT Press, 1996, 14–15.
 COSTA, Lucio, *Plano Piloto para urbanização da baixada compreendida entre a Barra da Tijuca, o Pontal de Sernambetiba e Jacarepaguá*, Rio de Janeiro, 1969.
 NICOLAI, Olaf, *Hotel Nacional Rio*, Zürich, Rollo Press, 2014.
 NIEMEYER, Oscar, HNR, Foundation Oscar Niemeyer, 1968.
 NIEMEYER, Oscar, Centro da Barra, Foundation Oscar Niemeyer, 1969.
 PARAÍSO OCUPADO, Arquivo do Projeto Paraíso Ocupado, accessed on January 2020, <http://paraisocupado.com>.

NOTES

- 1 Olaf Nicolai, *Hotel Nacional Rio*, Zürich, Rollo Press, 2014.
- 2 Beatriz Colomina, *Privacy and Publicity. Modern Architecture as Mass Media*, Cambridge, The MIT Press, 1996, 14–15.
- 3 Raul Lores, "Fechado por 20 anos, hotel projetado por Oscar Niemeyer é reaberto no Rio", *Folha de São Paulo*, December 19, 2016.
- 4 Alexandre Falcão (ed.), *História da hotelaria no Brasil*, Rio de Janeiro, ABIH, 2007, 49.
- 5 Oscar Niemeyer, HNR, Foundation Oscar Niemeyer, 1968, accessed January 2020. <http://www.niemeyer.org.br>.
- 6 Niemeyer, op. cit., 1.
- 7 On Niemeyer's use of "expanded bases" see: COMAS, Carlos Eduardo, "Questões de base e situação: arquitetura moderna e edifícios de escritórios, Rio de Janeiro, 1936–1945, *Arquitextos*, n.078.00, November 2006, accessed on January 2020. http://www.vitruvius.com.br/arquitextos/arq078/arq078_00.
- 8 "Trabalhos modificam São Conrado", *Correio da Manhã*, April 15, 1971, "Turismo", *Correio da Manhã*, April 12, 1971.
- 9 Lucio Costa, *Plano Piloto para urbanização da baixada compreendida entre a Barra da Tijuca, o Pontal de Sernambetiba e Jacarepaguá*, Rio de Janeiro, 1969, 3.
- 10 Lucio Costa, op. cit., 7, 8.
- 11 Oscar Niemeyer, Centro da Barra — Athaydeville, July 23, 1969, Foundation Oscar Niemeyer.
- 12 A Ponce De Leon, "Niemeyer, Lucio Costa e Burle Marx projetam um novo Rio", *O Cruzeiro*, Rio de Janeiro, December 18, 1969, 44–47.
- 13 "Barra da Tijuca — Niemeyer's Spacial City, Times of Brazil, *Brazil Herald*, September 13, 1970.
- 14 Vera Rezende, & Gerônimo Leitão, "Lúcio Costa e o Plano Piloto para a Barra da Tijuca: A vida é mais rica e mais selvagem que os planos urbanísticos", *Urbana*, Vol. 6, No. 8, June 2014, 673–693, Lawrence Herzog, "Barra da Tijuca. The Political Economy of a Global Suburb in Rio de Janeiro, Brazil", *Latin American Perspectives*, Issue 189, Vol. 40, No. 2, March 2013, 118–134.
- 15 Raul Lores, op. cit., Luis Nassif, "Investigações do leilão do hotel nacional", *Época*, May 2012.
- 16 David Underwood, *Oscar Niemeyer and the Architecture of Brazil*, New York, Rizzoli, 1994, 182.
- 17 Ibidem, 184.
- 18 Luana Meneghetti, "O Hotel Nacional continua lindo", *Isto é Dinheiro*, January 2020.
- 19 Susan Sontag, *On Photography*, New York, RosettaBooks, 2005, 50.

POTENTIALS OF VR FOR PRESERVATION AND PRACTICAL USE OF BUILDINGS — THROUGH UTILIZATION ANALYSES OF SOME RESOURCES OF THE IMPERIAL HOTEL DESIGNED BY FLW

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ABSTRACT.

The purpose of this paper is to consider the possibility of VR (virtual reality) for preservation and practical use of buildings through utilization analyses of two resources of the former Imperial Hotel designed by Frank Lloyd Wright. One of the resources is the Imperial Hotel Lobby relocated from original site to the Museum Meiji-Mura. The other is recently produced 3DCG Reproduction Project of the Imperial Hotel.

The Imperial Hotel designed by Wright was opened to the public in 1923 and had fulfilled its role as a flagship hotel in Japan. But it was demolished because of constructive and functional issues in 1967. At this time, however, two resources were left. One is the detailed record based on the measurement survey by Shindo Akashi laboratory of Waseda University, and it published as a book in 1972. The other is the Imperial Hotel Lobby as previously noted. These were discrete results until recent years.

In 2016, Toppan Virtual Reality started the “Imperial Hotel Tokyo VR Reproduction Project.” It is produced based on these resources and provides the whole experience of former Imperial Hotel by moving in 3D image of VR. It was tentatively completed by 2019. Now it is open for public at the VR theatre room in Imperial Hotel Lobby in Meiji-Mura. It is notable that this project connects VR and Reality. Reality exists in the replaced part and the whole is experienced in VR. The effects, the possibility, and the problem produced by such relationship will be called into question.

1. BACKGROUND

The latest Information and Communications Technology is rapidly bringing about the revolution in the field of architecture. It has changed hand-written measurement drawings into CAD, and evolved 3D-CAD into Building Information Modeling, or BIM. And the objectives of these developments are the comprehensive management of scheme, plan, design, execution, and usage of architecture. In addition, the introduction of VR, or VR has made it possible to mix the consciousness of human beings into digital space. And AR (augmented reality), and MR (mixed reality) have made the boundary between real space and cyber space ambiguous. The relationship between people in digital twin era, when they can come and go through the dual space, and architecture has come to be a focus of questions to solve. Architectural Institute of Japan also held “Perspective of VR/MR technology in buildings and cities”, Research Council of the Research Committee on Information Systems Technology in 2019¹, where there were a variety of discussions over the research, development, and introduction of these technology. The advancement of Information Technology also helped to devise “digital archives” through which digitized

information of cultural properties such as shape, colour, texture, and material is preserved and utilized.

Two Resources of Imperial Hotel Left

Since the completion in 1923, IHW had played a role as a Japanese flagship hotel, but in 1967, it was decided to be demolished owing to structural and functional problems, and in 1968 it was dismantled. There are, however, two remnants of the hotel: the detailed record about the hotel and the parts of the actual things which were determined to be relocated and preserved. Each of the resources played respective roles.

IHW VR reproduction project by Toppan Printing Co. is the project that allows VR to revive the whole IHW by making the best of the two resources above. What the project put an emphasis on is the relationship between Reality and Virtual Reality. What effect will be made by combining the actual parts which was reconstructed with the whole image of the hotel created through VR? How will the project be developed? What problem will the project encounter? They are the questions that the study deals with.



Fig. 1. Home page of Imperial Hotel VR Project website. © Toppan Printing Co., Ltd.

2. IMPERIAL HOTEL VR PROJECT

Toppan Printing Co. has been conducting digital archives of precious cultural properties while it has also been introducing new technologies such as three-dimensional shape measurement and colour measurement by applying techniques of processing high resolution digital images and of colour management, both of which have been developed through the printing technique.

Since 1997, the company has been developing “Toppan Virtual Reality System” as one of ways of using and publicizing the data. The company has also made more than 50 VR productions featuring cultural properties such as remains, construction of temples and shrines, castles, traditional crafts, swords, earthen figures, and paintings in cooperation with cultural properties holders including museums, research institutions, municipalities, temples and shrines. The VR project of IHW, which the paper deals with, is one of the challenges to expand the influence of Toppan VR that is adjusted to modern architecture that is fading out (Fig. 1).

The process of VR reproduction in this project is divided into main two parts: digital archives and CG making. It constructs CG space by using 3D CG software based on digitized information of the actual things or blueprints.

2.1. Archiving

The digital archiving has roughly three main subjects: “Measured drawings of Imperial Hotel” owned by Central Library of Waseda University, “the Main Lobby of Imperial Hotel” in Meiji-Mura, and “archived materials of former Im-

perial Hotel” owned by INAX Live Museum.

2.1.1. “MEASURED DRAWINGS OF IMPERIAL HOTEL” OWNED BY WASEDA UNIVERSITY LIBRARY

Waseda University Library has approximately 100 measured drawings by Akashi Sindo Laboratory.² This time 27 main drawings of them were scanned by Orthoscanner, which the company has been developed for the purpose of conducting digital archives of cultural properties. Orthoscanner has telecentric lenses that can cancel the perspectives that general cameras or flat scanners cause, which means that even if the distance between a subject and a lens changes, the size of an image is fixed. This enables the company to acquire the precise information of the image. This also prevents the precious cultural properties from being damaged; general cameras or scanners requires a subject to be flat in order not to generate perspectives due to unevenness. Besides, one of Orthoscanner's characteristics, insusceptible to specular gloss, was suitable for this archiving (Fig. 2). Since the measured drawings were covered with transparent and unremovable film to prevent them from being exacerbated or damaged, normal ways to scan may have caused light reflection owing to the luster.

2.1.2. “THE MAIN LOBBY OF IMPERIAL HOTEL” IN MEIJI-MURA

Texture photography of inside and outside appearance, panoramic radiograph of inside appearance, and three-dimensional measuring of both outside and inside appearance were accomplished. And photogrammetry of outside appearance was also accomplished by using UAV (unmanned aerial

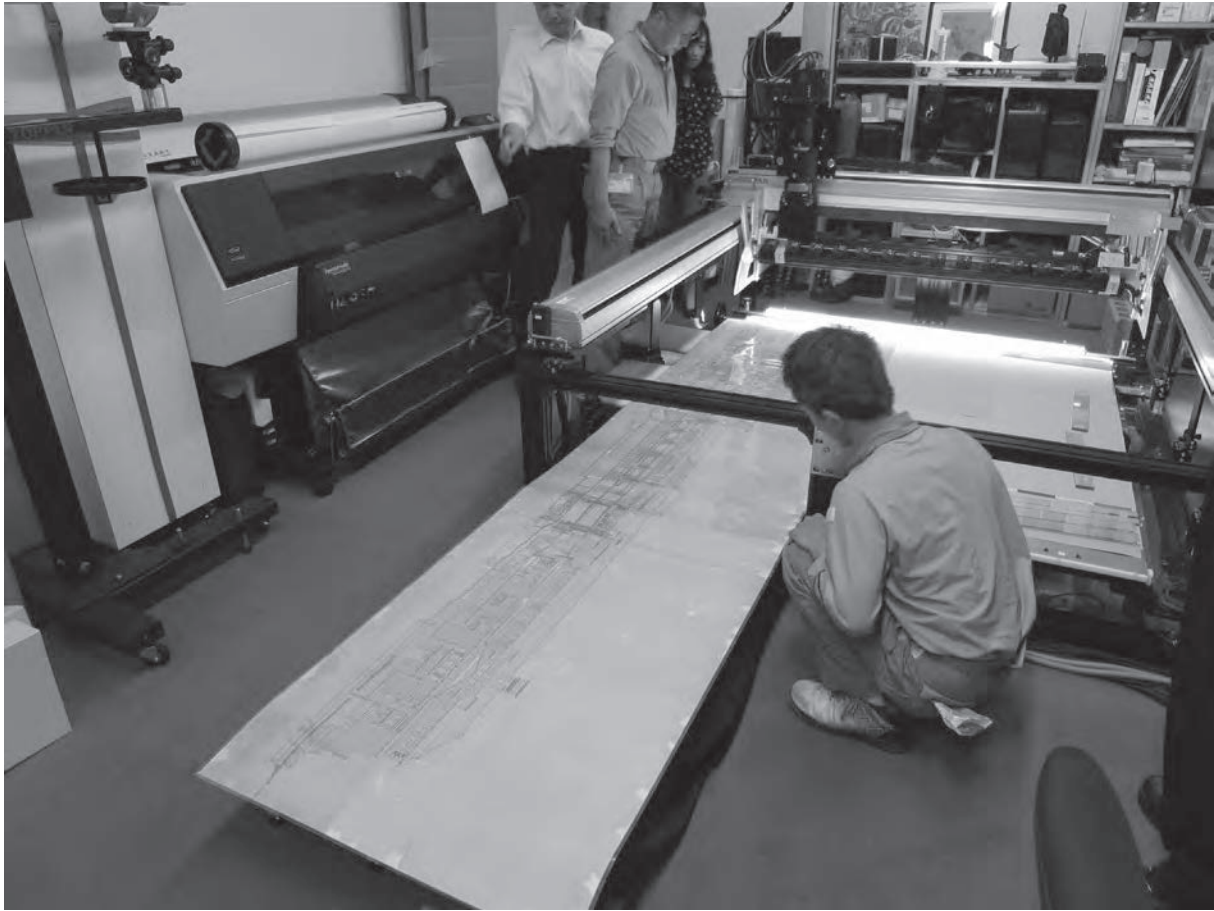


Fig. 2. Scanning using orthoscanner. © Toppan Printing Co., Ltd.

vehicle). In order to reproduce IHW in 4KVR, the company aimed at 100 dpi display resolution by setting NikonD800E, a single lens reflex camera, with a telephoto lens on a robotic tripod head called GigaPan and conducted auto partition texture photography of both the inside and the outside. Utensils like chairs and tables were photographed by the hand-held camera from more than 8 viewpoints. The number of the photographs is as follows: 378 outside, 417 inside, and 12 panoramas. The measurement from 32, 19, and 3 points of each the first, the second, and the third floor of the inside and 17 points of porte-cochere entrance, 71 points in total, was done just within a day. Three-dimensional measurements were conducted by applying photogrammetry technology through a UAV called DJI-S-1000 loaded with a single-lens camera called CanonEoS5D-SR. Just 779 images out of the total 3,558 were regarded as usable, but they contain enough information to make the Main Lobby of IHW reproduced in 3D.

2.1.3. "ARCHIVED MATERIALS OF FORMER IMPERIAL HOTEL" OWNED BY INAX LIVE MUSEUM

In INAX Live Museum, a plethora of data concerning

IHW are preserved. Texture photography and three-dimensional measurements of pillar in the dining hall which have borrowed from Meiji-Mura, terra cotta, pillars combined with light called "Pillars of Light" which had been reconstructed for the rotating exhibit of Wright, and outer walls through which water runs were undertaken. The method of texture photography was the same as that of utensils in Meiji-Mura whereas the method of three-dimensional measurements was different in respect of the use of a handy 3D scanner called Artec3D Spider because the subjects were relatively small.

2.1.4. ORAL HISTORY ARCHIVES

In addition to the information about the building, the company also tried interviewing the former employees who have experience working at IHW as archives of people's memory. The company asked the memorable events or episodes to Service Manager and housekeeper of Imperial Hotel, Tokyo, while enjoying the contents of VR which had been at work. The information, such as the one that the Lobby was slightly dimmer, is useful enough to be able to offer



Fig. 3. Sunlight simulation on VR. © Toppan Printing Co., Ltd.

the more real VR experience. A part of the interview is publicized on the website which introduces the project.

2.2. CG Product

The following sentences explain the process of the reproduction of IHW on CG space from the archiving data. Referring to both the basic information obtained from archiving data of the Main Lobby left in Meiji-Mura and the measured drawings, the project started with the expansion of the image into what had been dismantled. The whole shape was reproduced on the 3D CG software referring to the measured drawings, since what the Main lobby which had been reconstructed in Meiji-Mura was not the same as the original one in Hibiya in respect of things like the level of the third floor of the lobby. Old photographs were used to supplement the shape of the hotel on measurement drawings which was too vague to read by plotting the place where the photos had been taken on the drawings. There were many things, especially equipment and utensils, that were not drawn on the measurement drawings even though they were vital to reproduce the atmosphere of the era.

In this way, while the whole building was being shaped, the detail and the texture were also being reproduced. Especially, Oya stone and scratched brick, both of which were the typical materials used in IHW, were reproduced by using the data gained from three-dimensional measurements and the texture data for the sake of achieving more realistic texture.

Enhancing the presence of and the immersion in VR is indispensable in order to make people enjoy IHW which was in operation. To do that, it is of importance to represent the feelings or texture that the original materials had and to reproduce the impression and brightness of the space exactly when archived data are displayed as VR contents. The dearth of information is compensated by guessing and running simulations on a base of the information left.

The company also tried simulating a beam of light on VR because it had been impressing when conducting digital archives in Meiji-Mura. Once simulating a beam of light on condition that the date was June 8, the birthday of Wright, 1933, ten years after the commencement and calculating the solar altitude and direction based on the data of the latitude and the longitude of the hotel, it turned out that in the din-

ing room, which the company guessed from the old photos had had a lot of sunlight, can get rising sunlight from 5:30 to 7:00 in morning as well as setting sunlight in evening. It was verified through the VR that Wright, also called a magician of light, had made the dining room effectively by taking sunlight into consideration (Fig. 3).

2.3. Background Research

In reconstructing buildings, to decide the age is of great importance. If the amount of data is limited, however, so is the era to reproduce. IHW received devastating damage due to Bombing of Tokyo, 1945. The ceiling of the Banquet room was collapsed and repaired in different design from the original one. When relocating it in Meiji-Mura, in honour of the original, the ceiling of pre-war was chosen. On the other hand, originals are not always better because one of purposes of reconstruction is to make visitors experience what the past people relating to the buildings have gone through. Then, the company adopted the hotel 10 years after the commencement, when Oya stone that had been tinged with blue at first gradually started becoming less obtrusive, as the age of reconstruction. Subsequently, the details of the hotel in the 1930s, such as lighting and material, which had been used both the inside and the outside of the hotel, had to be verified. Whether or not a revolving door at the main entrance of which no evidence showed the existence was decided to reconstruct after a long duration of consideration.

3. IMPERIAL HOTEL VR + R PROJECT

VR reproduction of IHW was completed after the completion of the Banquet room and the Guest room in the Spring of 2019. The process of the work had been actively publicized. For example, in addition to “Japan in Architecture: Genealogies of Its Transformation” at Mori Art Museum and the event for readers of CasaBRUTUS, sesquicentennial anniversary of Wright was held at Jiyu Gakuen Myonichikan in September 2017.

3.1. The Introduction of VR in Museum Meiji-Mura

Meiji-Mura is a representative of open-air museums

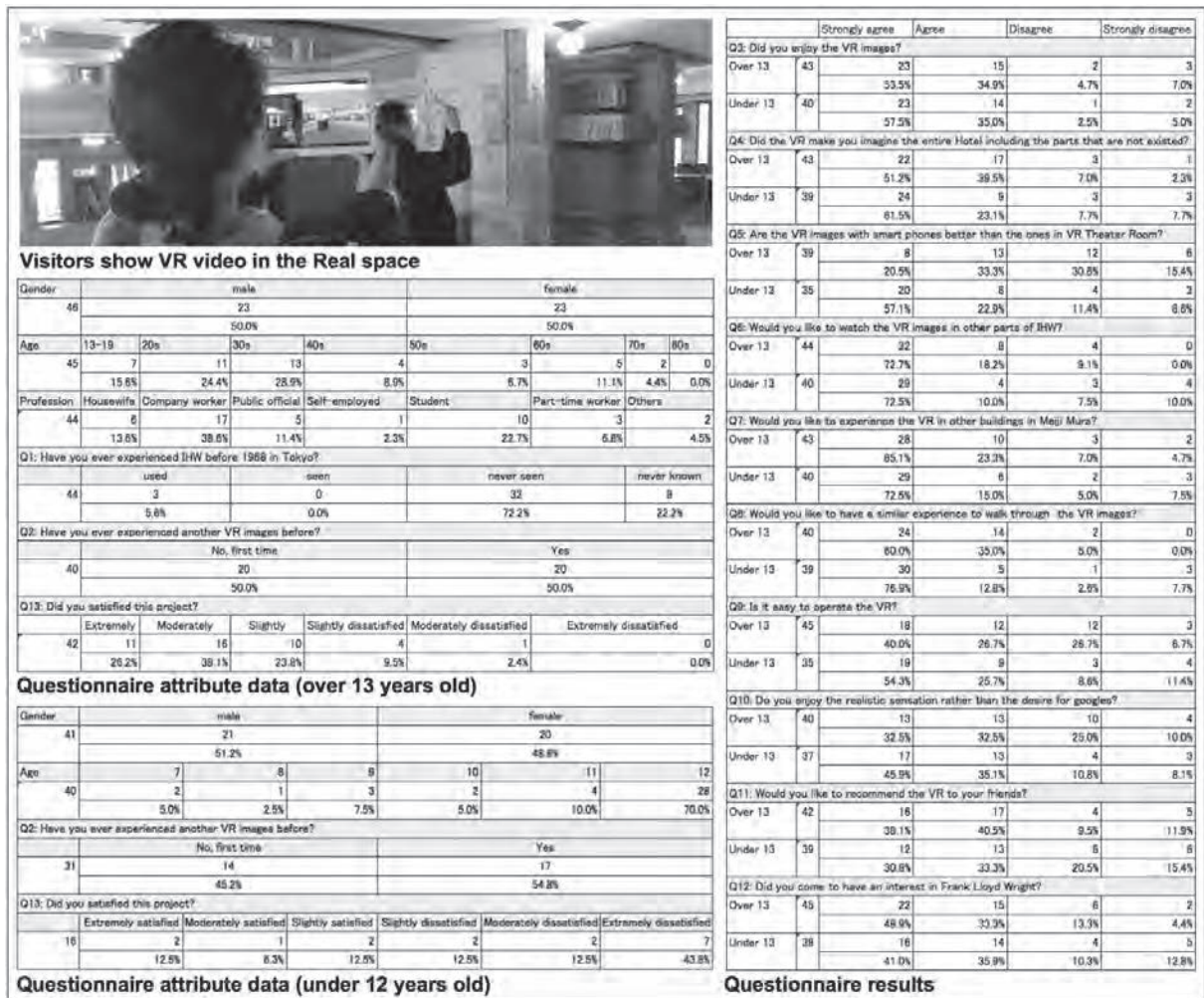


Fig. 4. Questionnaire attribute data and results. © MUSEUM MEIJI-MURA.

opened in March 1965. Despite its one-sixth volume, the completely relocated Main Lobby overwhelms viewers and attracts many visitors. However, not every visitor is interested in architecture nor knows about Wright and his works. In order to gain support for the large-scale repair conducted in the near future, Meiji-Mura wants as many citizens as possible to know the fascination of IHW. These days, few people have an experience in which they saw the original IHW, and therefore understand the fact that the Main Lobby of IHW in Meiji-Mura is nothing but a part of the whole building. Under such circumstances that it is difficult to experience the space of the original IHW which is complicated and unique, the archives of the hotel and the VR reproduction project started in 2016 by Toppan Printing Co. The release of the record of the VR on a big screen navigated by Mizukami Yutaka in the event commemorating sesquicentennial anniversary of Wright implied the possibility of VR. Although the introduction of the equivalent system to Meiji-Mura

was considered, too, there were no other choice but to despair for a financial reason.

Then, with the help of Toppan Printing Co., the museum created a video, which introduces not just the Main Lobby and the Dining room of IHW, but also the transition of the space caused by light. The explanation of the history of IHW and the interview of Nakagawa Takeshi, the current director of the museum, talking about the impression and the fascination of the original IHW are also added to the video as an introduction. The Home Theater Room whose size is 15m² is established in the south-west side of the building that is divided from other areas in order not to make the atmosphere of the building itself spoiled. The size of the monitor is 80 inches. The video starts if a viewer operates a touch screen fixed on the side wall. Even though the impression of the video more or less depends on whether viewers have already visited the buildings, after watching, they generally evaluate of the video highly because it tells them where they should

visit.

3.2. VR + V Project: Responses and Problems

The project, begun in the autumn of 2019. The museum built QR code stations, which, if a visitor reads them, show the visitor VR videos. At the beginning, QR cords are located in three places: front face of the lobby for the video of the Dining room; right side of the lobby for the Guest room; left side of the lobby for the building for guests.

The question items and the results of the questionnaire are shown in Fig. 4. The total number of received questionnaires was 46 for adults and 42 for children, for a total of 88. There are 10 items to ask for evaluation (Q3–Q13). In all items, the positive evaluations of *strongly agree* and *agree* exceeded 50%, and the satisfaction level (Q13) reached almost 90%. Therefore, the project was generally received favourably. The survey shows the demand of knowing more about the building as well as the satisfaction with VR telling visitors about the parts of the building which have not been reconstructed. On the other hand, opinions with a positive evaluation of 70% or less are Q5 (53.8%), Q9 (66.7%), Q10 (65%) for adults and Q11 (64.1%) for children. Q5 is the evaluation of the smartphone video of this time against the conventional VTR video, and 57.1% of children rated *strongly agree* (80% of positive evaluation). The response to the new visual style was contrasted between adults and children. The same tendency was observed in Q9, which is an evaluation of VR device operability. Q8, which is the expectation for the development of VR experiences, was highly rated 60% for children, and this is the highest value for them. On the other hand, Q11, which is the relative evaluation as event of interest, is low for children (64.1%) and high for adults (78.6%). The children's wide interest and responsiveness to the new system has emerged. In the free description section, "It was good that it was easy to see on the web instead of an app" (Female; 20s) "I want to see it on a bigger screen" (Female; 30s) "VR experience is not-so-great without dedicated goggles" (Female; 20s) and others show the evaluation and agenda of this project. Regarding the relationship between VR and R, the formation of the whole image of IHW was highly evaluated in Q4 (90.7% for adults, 84.6% for children), but opinions such as "I want an overall plan" (Male; 60s) indicates future action assignments.

4. CONCLUSION

This VR + R trial contributes to enhancing and supplementing the value of partially preserved cultural properties. The comment that "I would like to see VR for only partially relocated buildings such as Kanazawa Prison" (Female; 20s) explains it. It proved to be very interesting not only for adults but also for younger generations. This time, there were three respondents who had used the IHW before the relocation. They said, "I strongly want to see other areas of the IHW" (60s man) "I came with four families 40 years ago. I

am now a parent and came with six family members." The effectiveness of the project is clear.

The agendas concerning about VR images revealed this time are improvement of texture accuracy and expansion of the target coverage. These are issues that can be technically addressed. On the other hand, when it comes to the VR experience style, in addition to technology, we have to deal with budget issues, taking into account the differences between generations and the presence of assistants.

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REFERENCES

- AKASHI, Shindo, *Frank Lloyd Wright in Imperial Hotel*, Toukohdo Shuppan, 1972.
- JAMES, Cary, *The Imperial Hotel: Frank Lloyd Wright and the Architecture of Unity*, Charles E. Tuttle Company, Inc., 1968.
- IMPERIAL HOTEL, *A Legend in Pictures*, Imperial Hotel Ltd., 2003.
- IMPERIAL HOTEL TOKYO VR REPRODUCTION PROJECT, accessed on March 14, 2020, <https://vrstory.jp>.

NOTES

- 1 Tomohiro Fukuda (ed.), *Perspective of VR/MR Technology in Buildings and Cities*, Research Council of the Research Committee on Information Systems Technology, Architectural Institute of Japan, 2019.
- 2 Shiro Ouchida, Jin Motohashi, & Takeshi Nakagawa, "A Study of the Process behind the Preservation movement and the Record Materials from surveys Thereafter, A Study on Relocating and Reconstruction the Former Imperial Hotel (2)," *All Journal of Technology and Design*, Vol. 52, No. 59, Feb., 2019, 473–476.

PRINTED PHOTOGRAPHS: BRAZILIAN ARCHITECTURE AS IT SEEMS

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ABSTRACT.

Brazilian modern architecture had its glorious moment between the late 1930s and the 1950s. This prestige was directly related to the circulation of photographs or, more precisely, to the printed photographs. The books dedicated to Brazilian architecture were central in the dissemination of a commemorative narrative. *Brazil Builds*, and *Modern Architecture in Brazil* are some of the most iconic books published about Brazilian architecture during that period. This paper focuses on two aspects that deserve historians' attention not only concerning the Brazilian modernism. A first point to consider is the fact that these books brought large sets of photographs. As it turns out, these books functioned not only as an inaugural narrative, but also as a matrix from which it was possible to photograph the images printed on their pages to be reprinted in other publications, especially magazines. A second aspect discussed in this paper concerns the pictorial quality of the printed photographs. This fact relocates these books not only as the turning point of the narrative, but also as luxurious works of great imagery in the local visual architectural culture. This paper deals with the nature of print — on the books and magazines — and the role they have played in organizing a positive visual discourse for Brazilian modern architecture. By discussing its technological and pictorial aspects, we intend to qualify the dissemination of a visibility linked to modern architecture.

The perception of what architecture is has been expanding in recent years. If previously well framed and referenced by its materiality, today, there is a consensus that its definition goes through severely extended limits. It is not a question of rejecting design, tectonics, and spatial characteristics. The turning point of the new historiography is the recognition that architecture includes more complex issues and that it is inherent to some cultural values. A good example is to say that an architectural historian in Tokyo could recognize, organize, and debate the architecture produced in Brazil without leaving Japan.

In another direction, many advocates that nothing could replace the experience of moving through the spaces of a building, understanding its relations with the surroundings, being right in front or inside the building. Surprises or disappointments are not uncommon in these experiences. In Brazil, the classic case in which architect and designer Max Bill shouted against the irrationality of the celebrated Brazilian architecture of Oscar Niemeyer is well known.¹ His criticism was more than astonishment upon the different perceptions between the photographs and the buildings. It was also about different ways of seeing and thinking architecture. However, the photographs that he saw in Europe were far from what he experienced in Brazil. In order to continue this dialogue with images, we can remember the projection archived by the small *Pavillon de L'Esprit Nouveau* designed by Le Corbusier on the border of the *Exposition des Arts Décoratifs*, in Paris. An irrelevant pavilion to astonished visitors in front of the unique official buildings, which immediately caught their attention. What would be the destiny of Le Corbusier's pavilion if it had not been publicized in magazines, postcards, and so many other visual aids that built an aura around it? We conclude that such surprises say more about an outdated understanding of architecture than it is.

This brief introduction opens space for the recognition of an architectural culture that organizes discourses and narratives much important for the buildings' materiality. Therefore, it is crucial to recognize what has been configured intellectually since the 1990s, resulting in a new theoretical understanding of what architecture is. An example of this change appears expressed in the perspective of Kester Rattentbury published in her book *This Is Not Architecture*:

*Architecture is discussed, explained and identified almost entirely through its representations. Indeed, these representations are often treated as though they were architecture itself. Huge status is given to the imaginary project, the authentic set of photographs or the eminent critical account. This is a paradox. Architecture is fundamentally concerned with physical reality, yet we discuss and even define architecture (as opposed to building) through an elaborate construct of media representations: photography, journalism, criticism, exhibition, history, books, films, television and critical theory.*²

An essential part of how the meanings associated with architecture are constructed, organized, controlled, disseminated, consumed, and erased goes through visual artifacts such as newspapers, magazines, photographs, maps, films, and also archives, collections, and exhibitions. Therefore, architecture is not reduced to its materiality or even to the direct users' experience. It is necessary to consider the culture and artifacts that permeate that architecture. The work of an architectural historian is identified in this way in contemporary times.

Beatriz Colomina's book, already a classic between historians, is a seminal work in this way. In *Privacy and Publicity*³, the professor at Princeton University argues that modern architecture is, first and foremost, a media apparatus. It carries visibility devices that seek to organize meanings about

the materiality, about the tectonics. However, it is also through the universe of artifacts that represent architecture — drawings, films, and photographs — that the meanings associated with it are composed and stabilized. It must be considered, therefore, that the understanding of a particular architecture — especially from modernity — is the result of mass culture, where the modes and meanings established through the artifacts that represent it are decisive for the formation of our perception, of the values that will be linked to it.

The ways of making and thinking about history have entirely changed in the last few decades. The mobilized artifacts, the questions and the new problems provided a renewal in teaching, contributing to the emergence of new post-graduate programs, laboratories, and, consequently, to the transformation of the theoretical production. The architecture itself — in its material and tectonic sense — is no longer sufficient to define our understanding of architecture or city. Not least, plenty of books are being published on the correlation between architecture and photography, cinema, curatorship, publishing, and new digital media. Specialized publishers have increasingly given space to such themes, understanding that the intellectual production of the field is an unfolding of such relationships. This movement has also presented the emergence of architectural archives and museums from the end of the 1970s. David Preyleré, director of the City of Architecture and Heritage in Paris, presents this new condition:

They [The historians and critics of architecture] have not been using the document to study a historical event or artefact leading to the creation of said document; instead they have been focusing on the conditions under which the document itself was birthed. Researchers are becoming inventors, organizers of archives.⁴

The place of the formulation and theoretical production is found today among historians and critics of architecture in the handling of visual documents. In a very similar way, we recognize it in the practice agendas of architects and urbanists. We are dealing with an architectural culture, above all, in which material, technique, and space are no longer limited to the domains of stones, concretes, steels, or glasses. We also have to deal with books, magazines, papers, transparencies, paints, inks, graphic technologies, and other visual devices since they are defining how we access, interpret, or produce culture — architecture after all.

The past associated with a particular architecture is, therefore, the result of a set of media artifacts that constitute values and assign meanings. It is up to historians to look at such documents and understand how these values were constructed or determined. We could argue that what is being done today is cultural history of architecture. For no other reason, archives and collections have gained a political dimension, explaining battles between ministers of culture,

ambassadors, and diplomats. To have archives is to have power. In this scenario, we could identify one documentary support as the one that best expresses the dimension of what it becomes and how architecture is managed nowadays: photography.

Many photographs and architecture historians have already dealt with this relationship, mobilizing elementary aspects, which made it a perfect match for the first experiences in the 19th century. We can remember the imbricated relationship between photography and architecture in the achievement of *The Heliographic Mission* in 1851 at the very beginning of photography's history. Nevertheless, historians have also dealt with more sophisticated elaborations, which have proved to be central for post-modernism in architecture.

Between photography and architecture, there is so much to understand. Among the countless characteristics that could be placed as essential elements, reproducibility seems to be one of the most important. Although this is recognized as an implacable value to the photographic nature — as Walter Benjamin points out⁵ — it is at the moment when technical problems associated with its printing are solved that photography becomes a radically strong language in the definition of modern mass culture. The technical solution is, therefore, the result of a process of massification. The scale of reproduction of a photographic image imposed by the industrial production of paper in the late 19th century, and the development of graphic arts established new boundaries of circulation and consumption of high definition and quality. That was how specialized magazines multiplied at the beginning of the 20th century by expanding the circulation of drawings, projects, and ideas.

Theoretical debate around circulation of photography is one of the critical points for intellectual renewal anchored in the fields of visual culture. Elizabeth Edwards and Janice Hart make this point clear by stating that photography is not only a two-dimensional image, but also a three-dimensional artifact.⁶ They argue that there is need for a break in the domination of image content. On the other hand, they defend that there is need for evaluation of its physical attributes as intrinsic elements to the values that are manifest in what is being represented. Thinking about photography presupposes dealing with material meanings intrinsic in the image, as well as the ways in which they circulate and are used by consumers, the architects in general. Thus, if “circulation is a fundamental condition of modernity”⁷, printed photography was a vital instrument in the diffusion and consolidation of modern architecture.

The importance of reproducibility and circulation of photography in printed material could be well addressed by the trajectory of modern architecture in Brazil. The architecture presented during the 1920s had a significant impact on the Brazilian architectural culture, but nothing compared with what happened next. One of the major differences over these dynamics has to do with the institutional structure,

associated with each of them. The images representing the work of Gregori Warchavchik and Flávio de Carvalho were delimited by a restricted social circuit. Despite the emergence of illustrated magazines, printed images were an exceptional event, and the circulation of their work was slightly restricted.

What happened in Brazil in the following decade was a radical shift over industrialization associated with a massive campaign to build an ideal national narrative. The Federal Government created the *Departamento de Imprensa e Propaganda* (Department of Press and Propaganda) responsible for spreading the achievements, but also for censoring and preventing the projection of dissonant narratives. In the same way, it strengthened the *Imprensa Oficial* (Official Press) — accountable for the printing and diffusion of national results. In this context, the government took architecture as an intrinsic element of its promotion and made the works of Oscar Niemeyer and Affonso Eduardo Reidy two of its best expressions. The architecture of the *carioca school* (from Rio de Janeiro) was thus raised to cultural expression and started to occupy a central part of the visual construction in the new cultural agenda. Therefore, the works of these architects were designated to represent the government in the pages of international books and magazines.

The history of books like *Brazil Builds*⁸, *Modern Architecture in Brazil*⁹, and international magazines in the diffusion of Brazilian modern architecture is well known. However, it is worth emphasizing that the government played an active role in defining which architectures should occupy the pages of such publications. Governmental power was placed in many domains like the reception of foreign curators, architects, and photographers, as well as in the participation of its ambassadors in Europe and the United States. Through this domain, they defined what should be displayed. This performance was central in determining what would be disseminated next. Here is where the problem of printing techniques has arisen. In the case of the cited publications, the applied printing techniques were *offset* and *flexography*, which in Brazil, in the 1930s, were only at the beginning of their implementation. Such technologies contributed to some consumption dynamics over photographs, as well as defining certain pictorial qualities.

Especially in the case of *offset*, a page composition provides the assembly of a matrix, which is composed of texts, images, and graphic elements. Such assembly allows usage of plans and drawings, as well as placement of new items quite freely, without the rigidity imposed by a typographic process. This freedom is improved by photography itself, which allows the reproduction of an image before being printed in a book, and then its publishing in a new edition. To have books with printed photographs was, therefore, a decisive factor in organizing reference — a visual collection — that could be reused in other editions. Printed photography was not only a key vehicle in the dissemination of a specific subject but also a kind of matrix for another editorial

project. Not least, many of these editorial projects of great expression in modern culture have carried hundreds of photographs. It made possible for some photographs to be reassembled exhaustively, especially such well-known buildings like Pampulha or the Ministry of Education and Health. It is not because photographers were called about copyright use repeatedly, but because their works were reproduced from the pages of existing books.

A second relevant aspect that deserves attention is the quality of the printed photographs. During the 1930s and the 1950s, the Brazilian government made great efforts to produce books of high quality by mobilizing print shops and new printing technologies. However, the mastery of these technologies and their implementation was still in the initial stages of learning. There are a few books printed in Brazil during the first half of the 20th century that have reached a reasonable minimum quality like the ones that circulated among architects internationally. In general, the books printed in Brazil contained a few images and, for the most part, had poor finishes. The used papers were acid, with swift deterioration. Many of the books were still edited with typographic elements for lack of option. Moreover, the used photographic clichés bordered on handicrafts. Such characteristics appear in the book from 1952 by architect Lúcio Costa, with photographs by the well-known photographer Marcel Gautherot, and published by the Ministry of Education and Health.¹⁰ Despite a careful composition of the typographic elements, the photographs are poorly printed, faded, and poorly finished. Even at the beginning of the second half of the 20th century, problems were not solved yet.

The editorial condition highlighted here puts in evidence the international production regarding Brazilian architecture. In *Brazil Builds*, for example, we could identify a coated dust jacket, a cover with special graphic design, and more than three hundred photographs carefully printed in *flexography*. In the case of *Modern Architecture in Brazil*, in addition to being published in three languages in a deluxe edition even for international standards, with more photographs than its predecessor, it was printed in offset at a Dutch printing company. In both cases, the authority instituted by the quality of the book gained a new layer, since their pictorial superiority gave a unique tone to the object. High-quality printing was not only used to contribute to the diffusion of photographs, but also added value to the discourse that one wanted to give to what was being presented: Brazilian architecture. The value of architecture cannot be summarized, therefore, only by the building, but needs to be considered in relation to a whole set of artifacts — such as a book and its papers, quality of image, stitching, binding, weight, color, texture of cover, design, size and color balance, choice of fonts, inks. This is how values related to a particular architecture are balanced since we consume it mostly through images.

The perspective presented here is crucial for theoretical renewal of the history of architecture, as it reorganizes the

senses and dynamics of apprehension of a given work. If we are talking about architectural culture, we need to recognize where the authority and the power of things are. It is necessary to identify books, photographs, maps, drawings, letters, notebooks, and many other artifacts that contribute to the formulation of meanings about a given work. In this sense, it is not only the ways of thinking and producing history that deserve a reevaluation. The preservation of modern architecture also needs to be rethought in light of such perspective. If the meanings attributed to a unique architecture depend on this assortment of artifacts, why not preserve them? It is true that a building by itself has a unique value. However, what the methods of historical approach state today are also new challenges for preservation. It is necessary to preserve the documents that built the values associated with a given building. That is precisely why the archives and collections, museums, and institutions dedicated to architecture have gained such prominence in recent decades.

REFERENCES

- TAVARES, André, *Matéria-Prima: Um olhar sobre o Arquivo de Álvaro Siza*, Porto, Fundação Serralves, 2017.
 COHEN, Jean-Louis, *O futuro da arquitetura desde 1900*, São Paulo, Cosac Naify, 2013.
 BALTER, Nanni, & STIERLI, Martino (eds.), *Before Publication: Montage in art, architecture and book design*, Zürich, Park Books, 2016.
 DECKKER, Zilah Quezado, *Brazil Built: the architecture of the modern movement in Brazil*, London & New York, Spon Press — Taylor & Francis Group, 2001.

NOTES

- 1 Max Bill, "The architect, the architecture and the society", *Architectural Review*. Vol.1156, No. 694, Oct. 1954, 238–239.
- 2 Kester Rattenbury, *This is not architecture*. London, Rutledge, 2002, p.i.
- 3 Beatriz Colomina, *Privacy and Publicity: Modern Architecture as Mass Media*, Cambridge, Massachusetts, The MIT Press, 1996.
- 4 David Preyzeré, "Mapping a brave new world", *Architecture and Digital Archives*, Paris, Éditions Infolio, 2008, 20.
- 5 Walter Benjamin. "A obra de arte na era de sua reprodutibilidade técnica", *Sobre arte, técnica, linguagem e política*, Lisboa, Relógio d'água, 1992.
- 6 Elizabeth Edwards, & Janice Hart (eds.), *Photographs Objects Histories: On the Materiality of Images*, London, Routledge, 2004.
- 7 Mari Lending, "Circulation", Thordis Arrhenius, Mari Lending, Wallis Miller, & Jérémie Michael McGowan (eds.), *Place and Displacement: Exhibiting Architecture*, Zurich, Lars Müller Publishers, 2014, 188.
- 8 Philip L. Goodwin, *Brazil Builds: architecture new and old, 1652–1942, Photographs by G. E. Kidder Smith*, New York, Museum of Modern Art, 1943, 1st ed.
- 9 Henrique E. Mindlin, *Modern Architecture in Brazil*, Rio de Janeiro, Amsterdam, Colibris, 1956.
- 10 Lúcio Costa, *Arquitetura Brasileira*, Rio de Janeiro, Ministério da Educação e Saúde, 1952.

ARCHITECTURAL EXHIBITIONS, DISSEMINATION AND CULTURAL TRANSFERS

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ABSTRACT.

Architectural exhibitions were an important vehicle of disseminating modern architecture worldwide. The Department of Circulating Exhibitions at the Museum of Modern Art (MoMA) in New York was a major promoter of this diffusion. This article aims to discuss the role of circulating exhibitions in the diffusion of modern architecture and seek to show a pioneer, unique and specific case of dissemination of the modern movement: the “Brazil Builds” traveling exhibitions. On January 13, 1943 MoMA inaugurated the Brazilian exhibition. After the inaugural exhibition, MoMA prepared versions of “Brazil Builds” for circulation in American institutions and other countries. Even with the difficulties of war it was exposed in American cities, Mexico, Canada, England and Brazil. This research uses mainly the primary sources extracted from the MoMA archive and sources from local press. In conclusion, we can see that the transnational transfers caused by the circulating exhibitions have transformed the meaning of the Brazilian exhibition and the modern Latin American architecture itself.

1. INTRODUCTION

*SINCE March 1932, the Museum of Modern Art has been circulating exhibitions of paintings, sculpture, architecture, industrial art, theatre art, folk art, color reproductions, murals, posters, book illustrations and book bindings. During this five-year period forty-three traveling exhibitions arranged by the museum have been show 448 times in 142 different cities in this country and Canada.*¹

The Museum of Modern Art in New York, founded in 1929 by American intellectuals and admirers of art and modernity at the time, had as its main guideline to promote modern visual arts in the USA. From an early date, the institution's intention was to popularize new artistic paradigms and establish itself as a reference for modern expressions in the world. Its various departments organized important exhibitions and were active agents in defining the discourses that shaped the different notions of modernity in the arts.

And to ensure the export of MoMA's vision of modern art, the museum created Department of Circulating Exhibitions. This department thus started to organize the presentation of MoMA's exhibitions in multiple American and international institutions.

This article aims to present a specific case study within the Department of Circulating Exhibitions: the traveling exhibitions of “Brazil Builds” (1943–46). this research revealed that, in the context of World War II, the exhibition served as an element of diplomatic policy among allied countries, mainly in Brazil-USA relations.

2. THE DEPARTMENT OF CIRCULATING EXHIBITIONS AS A MEDIA FOR THE DISSEMINATION OF MODERN ARTS

In 1932 the Museum hosted the first exhibition on modern architecture: *Modern Architecture, International Exhibition*.² The role of this exhibition went beyond the pioneering

proposal to define modern global architecture. The show was the first to leave the museum's physical borders and began to circulate in several American cities. According to The Bulletin of the Museum of Modern Art “the circulation of exhibitions was one of the few activities of the Museum which was not foreseen in the original plans but grew out of demand.”³

The Department of Circulating Exhibitions was officially established in 1933 after the itinerant experiences of *Modern Architecture, International Exhibition* and *A Brief Survey of Modern Painting*.⁴ It should be noted that in the early 1930s and in the subsequent decade, modernism was unknown to the American general public. In this sense, the work of the Department of Circulating Exhibitions was instrumental in promoting the new visual culture. The Department worked in partnership with other institutions, mainly other museums and universities. It also often produced smaller versions of the original exhibitions, as well as organizing slidetalks and teaching portfolios for almost five decades.

If we analyse the period of foundation of the department until the exhibitions elaborated at the end of the World War II, we see that the most recurrent themes are linked to housing, urban planning and architectural programs of the new modern aesthetics. However, considering the five exhibitions that have travelled the most, it is noteworthy in the list that the fourth exhibition in the ranking was “Brazil Builds” — an architectural monograph dedicated to an “underdeveloped” and “exotic” country. In the scenario of the spread of an essentially European / American modernity, why did the Brazilian show circulate so much?

3. BRAZIL BUILDS

There are several reasons for the popularity of “Brazil Builds”. In short, MoMA had already invested in Latin American themes.⁵ In 1942, within the feeling of Pan-Americanism in the context of World War II, the project for the Brazilian

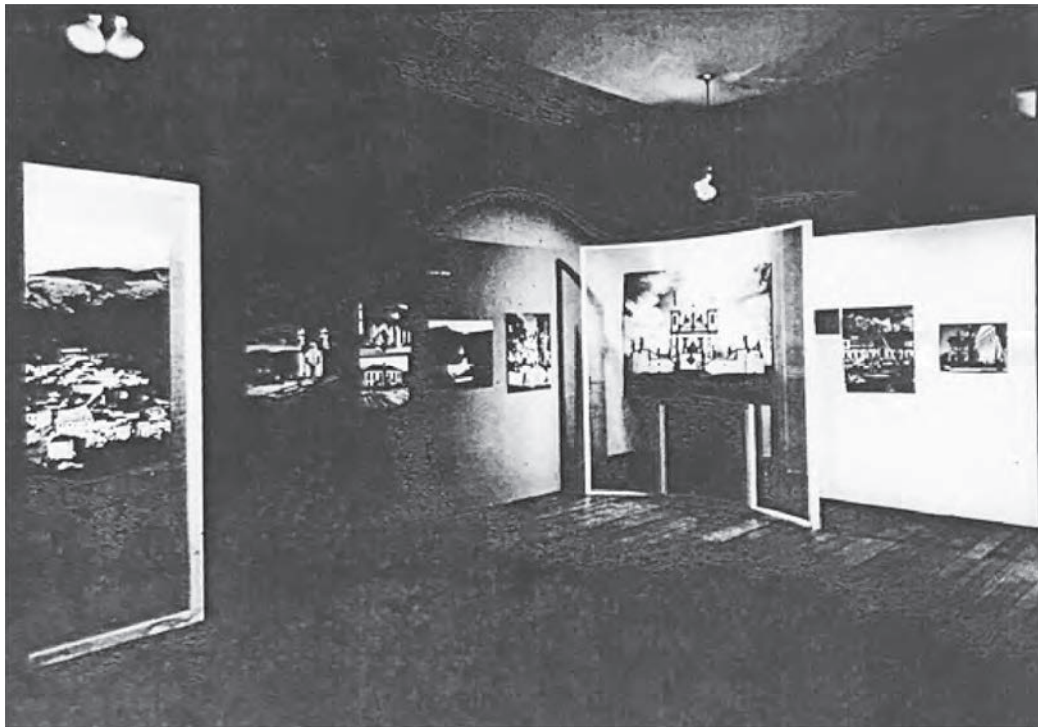


Fig. 1. **Brazil Builds**
in Boston, 1943.
© MoMA Archives.

architecture exhibition was launched by MoMA with support from the Coordinator of Inter-American Affairs and the American Institute of Architects. The idea was to follow the model of a previous exhibition, *Stockholm Builds*.⁶ The Department of Architecture of MoMA thus designated Philip L. Goodwin and George Everard Kidder Smith to go on an expedition to Brazil and collect information about local architecture.

On January 13, 1943, the Museum opened the "Brazil Builds" exhibition. The show occupied the main entrance and the entire first floor of the museum. 300 photographs of new and old buildings from different regions of Brazil and three large models were exhibited.

So far nothing too unusual for an institution that had organized more than sixty architectural and design exhibitions in a decade. The exceptionality of the Brazilian exhibition, however, goes beyond the excellent quality of material exhibition. It also has a great symbolic character. "Brazil Builds" had immense pioneering value. It was the first exhibition of Brazilian architecture in the form of architectural *longue durée*. There has never been a proposal that covered such a long-time span (1652 to the 1940s). Following a stylistic approach — from colonial to modern — "Brazil Builds" was also the first exhibition of Latin American modern architecture at MoMA.

Furthermore, its representativeness goes beyond the history of architecture. In the context of World War II, the initiative transcended MoMA's cultural interests in exhibit-

ing another country's architecture. The event had explicitly political outlines, as we can confirm in the first sentence of the exhibition catalogue, where Goodwin says: "The Museum of Modern Art, New York, and the American Institute of Architects in the spring of 1942 were both anxious to have closer relations with Brazil, a country which was to be our future ally".⁷

In this way, the show was used as a support tool for Franklin Delano Roosevelt's Good Neighbor Policy. "Brazil Builds" was proposed to evoke not only the architecture of a distant country, but a Pan-American and continental union feeling. After the inaugural exhibition, MoMA developed versions for circulation in American institutions and other countries.

4. BRAZIL BUILDS TRAVELS

The interest in acquiring itinerant material on Brazilian architecture began even before the official exhibition was opened. On July 16, 1942, Agnes Mongan⁸ wrote to Monroe Wheeler⁹: "We have heard of Philip Goodwin's Goodwin's expedition in Brazil. (...) We would like to have an exhibition of baroque architecture of Brazil either in November or February".¹⁰

On March 14, 1943, the exhibition required by Mongan was opened to the public in Boston under the auspices of the Pan-America Society of Massachusetts and the Boston Fine Arts Museum (Fig. 1). On the 27th of the same month, a



Fig. 2. Visitor at the exhibition **Brazil Builds, Mexico, 1943**. © MoMA Archives.

symposium called Brazilian Architecture was held in Boston. There were lectures by Robert Chester Smith (Library of Congress), Phillip Goodwin (curator), architects Paul Lester Wiener and Bernard Rudofsky and sociologist Hernane Tavares de Sá. Color films from ancient Brazilian cities were also shown, accompanied by tea and music. Approximately 300 people attended this day, including Walter Gropius.

In fact, MoMA had prepared two versions for traveling tours. The most complete version was presented in Boston, Poughkeepsie, Pittsburg, Philadelphia, Rochester, Andover, St. Louis, Toledo, Minneapolis, Kansas City, Colorado Springs, San Francisco, Seattle and Cleveland. The smallest version was exhibited in seventeen more locations.

The Canadian exhibition of "Brazil Builds" was commissioned by The T. Eaton Company Limited, a well-known department store at the time. The Merchandise Display Department contacted MoMA in February 1943 and was only able to schedule the show for the following year from March 20 to April 10, 1944. In a letter from February 9, 1944, The T. Eaton Co. justified that

(...) this exhibit will be an interesting one for Toronto owing to

the fact that we have recently held here a Town Planning exhibition as applied to Toronto. By the looks of things we can stand a few ideas from other countries and the Brazil Build exhibit may help do a trick.¹¹

Later, a slide show took place from October 1 to 8, 1944 at the University of Manitoba, Winnipeg, Canada. In a document in the museum's archives, an unknown individual probably linked to the University, reports that: "Obviously, the young students of architecture find the modern work in Brazil fascinating".¹²

On April 27, 1943, the architect Carlos Obregon Santacilia wrote to Goodwin in a friendly tone, reporting his interest in receiving the exhibition in Mexico. He said: "have already arranged everything; the University of Mexico will address the Museum of Modern Art in New York asking for the show".¹³ Santacilia also said that the Mexican University would pay for the exhibition.

The exhibition took place between July 15 and August 15, 1943 at the *Palacio de Bellas Artes*, organized by the *Sociedad de Arquitectos Mexicanos* (Fig. 2). It was the same long version presented in American cities.



Fig. 3. Brazil Builds in London, 1944. © Jornal A Manhã.

The organization also has the assistance of John McAndrew. McAndrew worked at MoMA between 1937 and 1941, being responsible for important exhibitions and publications. A scholar also on Mexican themes, he was willing to assist in the editing. On June 11 of the same year, Elodie Courter sent a letter to McAndrew stating: "I couldn't be more delighted at the news that my suggestion of asking you to do the Brazilian exhibition in Mexico has borne fruit".¹⁴

On August 10, John McAndrew gave a lecture on modern architecture at the exhibition and five days later "Brazil Builds" returned to be exhibited at the Philadelphia Museum of Art.

While the two versions circulated in the USA, Canada and Mexico, a third version was prepared to be presented in London. There were 162 photographs to be exhibited at the Royal Academy of Arts (Fig. 3).

The negotiation involved the Brazilian Embassy in Washington and was produced by The British Council and lent by the Anglo-Brazilian Society. The photographs were auctioned to the R.A.F. Benevolent Fund.

5. "BRAZIL" BUILDS

On February 25, 1943 an unsigned letter addressed to Elizabeth Mock said: "the treat to send Brazil Builds to Brazil horrifies me ordering those pictures all over again might well be just one nightmare too many".¹⁵ This sentence shows that the negotiations to take the exhibition to Brazil were started at the time of the original exhibition. It is also no-

ticed that a version was specially prepared for the South American country.

The Brazilian "Brazil Builds" was received with great enthusiasm by modern local architects. Politicians and representatives of the Americans attended the openings in various cities.

The production of MoMA travelled Brazil for three years. From November 23 to December 30, 1943, the exhibition took place in Rio de Janeiro in the iconic modern building of the Ministry of Health Education. In 1944 three exhibitions were held: Belo Horizonte, in the Mariana Building (February 18 to 29), São Paulo, at the Prestes Maia Gallery (from March 16 to April 10), and in Santos at the Santos Engineers Association (from April 29 to May 7). In 1945, on February 21, it went to the Campinas Municipal Theatre. Later, according to MoMA, it travels through Curitiba, Florianópolis and Porto Alegre. On October 24, 1945 it arrives in Jundiaí and is presented in the Hall of the Reading Office Ruy Barbosa. In 1946 it appears in February in Ribeirão Preto and Franca, where it is exhibited from 14 to 24 July.

There is no evidence of who financed the Brazilian exhibition. The archives show an articulation of the Coordinator of Inter-American Affairs with the Institute of Architects of Brazil and city halls (Fig. 4). However, it is known that the work of the Coordinator of Inter-American Affairs was intense. Memorandums reporting the events of the exhibitions were constantly sent from the Brazilian Office to Washington and Nelson Rockefeller, Coordinator of Inter-American Affairs. In the context of the war, the exhibition denoted an ideological alignment, as we can see in the



Fig. 4. Photograph taken at the opening in Sao Paulo. Left to right: Carleton Sprague Smith, Arnold Tschudy (Coordination Committee for Brazil), British Consul General Smallbones, Portuguese Consul General Julio Augusto Borges dos Santos, American Consul General Cross, Federal Interventor Fernando Costa, Mayor Prestes Maia, Dr. J. A. Marrey (Secretary of Justice), Dr. Jorge Americano (Dean of the University of Sao Paulo). © MoMA Archives.

speech by Eduardo Kneese de Mello, São Paulo Delegate of the Institute of Architects of Brazil:

*The São Paulo office of the Institute of Architects of Brazil wishes to thank you for the presentation in this city of the exhibit BRAZIL BUILDS, expressing the belief that demonstration of North American friendship will further contribute to fostering of Brazilian American Relations.*¹⁶

6. IN CONCLUSION

The “Brazil Builds” exhibitions had a wider spread than expected, leading the ranking of MoMA’s traveling exhibitions in those years. They enhance the good reception of the original exhibition and spread the catalogue throughout the places where it passed. The architectural expression of Brazil started to gain the pages of the most important international magazines. In light of the euphoria of the reception, Mindlin proclaimed: “it is suddenly the glory, all the greater because it comes from outside”.¹⁷

The dissemination of the exhibition in allied countries allowed the diffusion of Brazilian modernity and served as a diplomatic platform in the years of World War II, especially in Brazil-USA relations. Cultural transfer was latent in this case since this concept is characterized as any passage of a cultural object from one context to another which results in a “transformation of its meaning, a dynamic of resemantisation, which can only be fully recognized by taking into account the historical vectors of the passage”.¹⁸

Finally, the changing meaning of the exhibition in the immediate post-war period transformed “Brazil Builds” into a landmark. The successful experience of the Brazilian exhibition led MoMA to invest in a Latin American architectural project. In 1955, the Latin American architecture since 1945 exhibition brought the architectural production of the Latin region of the continent back onto the scene. The author of the catalogue, Henry-Russell Hitchcock recalled that MoMA through Brazil Builds “presented the Brazilian achievement to the world at large. Nowhere was the achievement more of an inspiration than in the other countries of Latin America”.¹⁹

REFERENCES

- BERGDOLL, Barry, COMAS, Carlos, Eduardo, Dias, & LIERNUR, Jorge Francisco, *Latin America in construction architecture 1955–1980*, New York (N.Y.), The Museum of Modern Art, 2015.
- DECKKER, Zilah Quezado, *Brazil Built: the architecture of the modern movement in Brazil*, London and New York, Spon Press — Taylor & Francis Group, 2001.
- GOODWIN, Philip, *Brazil Builds — Architecture New and Old 1652–1942*, New York, Museum of Modern Art, MoMa, 1943.
- HITCHCOCK, Henry Russel, “Book Review: Brazil Builds, Architecture New and Old, 1652–1942 by Philip L. Goodwin; G. E. Kidder Smith”, *The Art Bulletin*, Vol. 25, No. 4, Dec. 1943, 383–385.
- LIERNUR, Jorge F., “The South American Way. O milagre brasileiro, os Estados Unidos e a Segunda Guerra Mundial — 1939–1943”, GUERRA, Abilio (org.), *Textos fundamentais sobre história da arquitetura moderna brasileira*, v. 2, São Paulo, Romano Guerra, 2010 [1999].
- REAL, Patricio del, *Building a Continent: The Idea of Latin American Architecture in the Early Postwar*, PhD Dissertation, Columbia University, 2012.
- SEGAWA, Hugo, *Arquiteturas no Brasil: 1900–1990*, 3^a ed, São Paulo, Edusp, 2010.

NOTES

- 1 Elodie Courter, Sending modern art to all parts of the nation. October 3, *The New York Times*, Art, 1937, 9.
- 2 Exhibition presented on February 9–March 23, 1932.
- 3 *The Bulletin of the Museum of Modern Art*, Vol. 21, No. 3/4, Circulating Exhibitions 1931–1954 (Summer, 1954), 4.
- 4 Exhibition presented on July 20–October 5, 1932.
- 5 Patricio del Real, *Building a Continent: The Idea of Latin American Architecture in the Early Postwar*, PhD Dissertation, Columbia University, 2012.
- 6 Exhibition presented on August 4–September 8, 1941.
- 7 Philip Goodwin, *Brazil Builds — Architecture New and Old 1652–1942*. New York: Museum of Modern Art, MoMa, 1943, 7.
- 8 Foog Museum of Art, Massachusetts.
- 9 Director of Exhibitions and Publications.
- 10 Letter from Agnes Mongan to Monroe Wheeler, July 16, 1942, MoMa Archives, 213.5.
- 11 Letter from Merchandise Display Department to Elodie Courter, February 9, 1944, MoMa Archives, CE II.I.41.5.2.
- 12 Comments, MoMa archives.
- 13 Letter Santacilia to Goodwin, March 27 1943, MoMA Archives 213.3.
- 14 Letter to John McAndrew June 11, 1943. CE II.I.41.5.2.
- 15 Letter to Elisabeth Mock, Feb 25 1943, MoMA Archives 213.5.
- 16 Message sent on March 20, 1944 to Mr. Arnold Tschudy, representative of the Coordinator of Inter-American Affairs of São Paulo. Source: Report from the Sao Paulo Office sent to The Coordinator in Washington on March 22, 1944, MoMA Archives.
- 17 Henrique Mindlin, *Arquitetura Moderna no Brasil – Presente, Passada e Futura*, 1969, YOSHIDA, Celia Ballario. *Henrique Ephim Mindlin: O homem e o arquiteto*, São Paulo: Instituto Roberto Simonsen, 1975, 173.
- 18 Michel Espagne, “La notion de transfert culturel”, *Revue Sciences/Lettres*, 1/2013, online May 1st 2012. URL : <http://journals.openedition.org/rls/219>.
- 19 Henry-Russell Hitchcock, *Latin American Architecture since 1945*, New York: Museum of Modern Art, 1955, 12.

Session 7-d

ON WHAT BASIS CAN WE TALK ABOUT ARCHITECTURE

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Needless to say, documentation is a central concept in Docomomo's activities — documentation and conservation of buildings, sites and neighborhoods. In order to conserve a building, it is necessary to identify its value and to explain that value to the public. Documentation and dissemination are therefore essential processes for the purpose of preservation.

So what is documented in the documentation of buildings, sites and neighborhoods? There are documents that were produced in the past when the buildings or sites were created. These are commonly referred to as historical materials. Thorough scientific procedures concerning historical criticism, these materials reveal the value of the buildings or sites. This is just what historians generally do.

As a matter of course, the object of architecture is a three-dimensional spatial expanse, with interior and exterior. We do not have a single viewpoint to see the whole building. Naturally, building cannot move from their location, nor can they be housed in a museum. For this reason, drawings and models have been emphasized in the creation of architecture, and photographs, mediums such as magazines, books of works, and exhibitions have played an important role in the dissemination of architectural works. Architecture is represented by complementary mediums such as drawings, photographs, and models. In the communication concerning architecture, these alternative representations can be much more significant than the experience of visiting the building in situ.

When we take up the issue of documents in architecture and landscape, we need to pay attention to the nature of the document. Who does produce the document? For what purpose was the document created? For whom was the document prepared? What kind of medium does the document consist of? In this session, we will also ask what kind of document each of us relies on, or what kind of documentation

we are doing through our researches.

Chronological introduction will reveal the development of the relationship between documentation and architectural achievement.

In his report, Dr. Okamura proves the importance of models in Japanese modern architecture. Models provide a unique spatial experience that cannot be experienced in buildings in site.

Often we think of the experience of actually visiting a building as being particularly authentic. However, through the examples of Antonin Raymond and Sutei Horiguchi, it becomes clear that the appreciation and experience of architecture is composed of multiple mediums.

Dr. Triandis's discussion is also concerning architecture on medium, which is different from real architecture and city.

The subject here is modern architecture and modern cities created as scenography in films of a French cineast Jacques Tati. Architecture and cities shown in Tati's two films of the mid-20th century serve as a critique of real architecture and cities of Modern movement.

Dr. Danielle discusses three exhibitions organized by the IAUS in the 1970s and 1980s to show how Japanese architecture of the same period was received in the U.S. This is a serious archival research based on the documentation of the period preserved in the CCA collection.

Although the above three uploads had different attitudes toward documents, they all drew their value from the expressions and intentions of their authors, architects, cineast, and historians. Drs. Haenraets, Saniga and Cengiz take a thematic approach, focusing on the landscape. They report on the current status of Docomomo's approach to landscape, relying on its official documents. It suggests that Docomomo's documentation activities have already become a huge corpus to explore the fertile ground of modern move-

ments.

How can we relate these four presentations in terms of documentation and dissemination?

Both Raymond and Horiguchi, as well as the young Japanese architects in the 1970s–80s, took the opportunity of overseas exchange to develop a variety of visual works.

This is linked to the traditional notion of the artist's "intention" in the work-author relationship, but their reception may not be contained within their own intentions.

First of all, the interpretation is open to the recipient, and that interpretation depends on the context to which the recipient belongs.

Out of several Japanese architects who did not form a single trend, a few were selected and connected to the inter-

national context by western critics.

In the medium used to disseminate the works, the artist tries to convey his intentions better, but sometimes the experience on the medium can be more excessive than the actual architectural experience. This is similar to the way that real cities show their characteristics more clearly in films.

The same can be said of the many documentation and dissemination efforts that Docomomo has accumulated over the years. In Japanese society, for example, the preservation of buildings and landscapes remains a local issue. Documentation of Docomomo will reveal issues that have not been addressed in the past and their contours would be defined.



FROM MODERN ARCHITECTURE TO THE MODERN CITY: LESSONS FROM CINEMA

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ABSTRACT.

This paper focuses on the interface between cinema and modern architecture. It is particularly concerned with the ways in which cities and their architecture are represented in movies, based on the premise that these representations can help us to understand how cities and their architecture become a set of symbolic artifacts.

A scenario built specifically for a movie is seen as a fictional space, a space of imagination filled with symbolic representations. This differs from the non-fictional space built by architects, builders, and interior designers, conceived with specific use and transformed by the individuals who occupy it daily. Thus, scenography is part of an imaginary universe, while architecture is part of real life. One is temporary, the other, supposedly, lasting. What influence does one have on the other? Could fictional space transcend the role of mere scenario?

In this sense, scenography has multiple functions. First, it has a didactic function introduced through shapes, form, colour, objects, and style; second, a time-related function: as it shows historical epoch with objects from other times and place, seasons, or times of day; and finally, it reveals the cultural identity of place as the material anchors of narratives.

This paper takes into account these categories of analysis, and is organized as follows: 1) an introduction; 2) characteristics of the Modern Movement as an aesthetic expression; 3) a critique of modern architecture; 4) a critique of the modern city; and 5) a conclusion.

1. PRELUDE: ARCHITECTURE, CITY AND CINEMA

The modern metropolis and cinema appeared practically at the same time. Its juxtaposition provides several key points about the aesthetics through which we experience the city, not only as a psychic space but also as a visual culture. The trajectory and representation of this interface is extensive, and the city's fascination is present in sensitive urban images in the work of several filmmakers, such as: Berlin: Symphony of a Metropolis (Ruttman, 1928), Man with a Movie Camera (Vertov, 1929), Que Viva México! (Eisenstein, 1932), The Naked City (Dassin, 1948), Manhattan (Woody Allen, 1979), What Have I Done to Deserve This? (Almodovar, 1984), Wings of Desire (Wenders, 1987) and Lisbon Story (Wenders, 1994).

One of the first movies to inspire commentary from intellectuals and become a key element in the process of accepting cinema as a new and independent art form is The Cabinet of Dr. Caligari (Wiene, 1919). From Virginia Woolf to Adolf Loos, many expressed their ideas about the film. Woolf, for example, brings up two of the most frequent opinions about the possible interfaces between architecture and cinema in the 1920s, stating that the new art of making films could, more than any other medium, show life in the modern city and, at the same time, represent the world of dreams, fantasies and thoughts.¹ Perhaps the most significant moment in the history of modern architecture when connections between architecture and cinema were most enthusiastically discussed was in the Republic of Weimar, Germany — a place of intense modern artistic and architectural production, and of constant struggle to maintain them, in opposition to the conservatism which would come to take power in the country and in other parts of Europe.²

In the Weimar culture, the idea defended was that only in movies, the designer would be able to create the so-called “total environment” for a particular character, that is, the idea of *Gesamtkunstwerk* (“total work of art”) in its purest sense. In this sense, the designer would not only be required to invent cities, buildings and spaces, but also to provide the latter with a story, in order to connect them to the film's narrative, strengthening its meaning. The character of novelty and progressive thinking, inherent to architecture and the modern city; as well as the manipulation of spatial elements; light, and movement, facilitate the approximation between these two fields and are fundamental factors for cinema's attraction to this art.³

In his analysis of films, David Harvey argues that location is important, almost vital, for the definition of objects, events and existing relationships to describe the world in which we live, and if space is an imperative condition for the *experience of living*, it must also be imperative for the *representation of living* and for the construction of the narrative.⁴

The experience of living is the space experienced in a physical reality, the real city. The perceived space, according to Harvey, refers to how a “real” image can be reported and understood. The representation of space also means how planners, architects and scientists conceptualize space; and the *space of representation*, is the imagined, characterized by mental conventions, codes, signs, imaginary landscapes, which portray new meanings or possibilities for spatial practices. Imagination appropriates and changes real space.

The cinematic experience and the impact of movies on the spectator, movies and particularly cinematic spaces are the result of the interaction of these above-mentioned aspects. In other words, the city of cinema can be at the same

time the “real” city where the narrative develops (set location) and movie characters act, the perceived city by spectators (understanding of the city’s representation through movies), and the imagined city (designed by art directors and filmmakers based on a real city, memories or lived experiences). The space of the three cities: real, perceived, and representation are connected.

In several films the scenic presence (real, represented and/or imaginary city) is so strong that it seems the city acts almost as a “movie character”, and not only as a mere location for the narrative. This fictional space then becomes very effective in communicating messages and the interfaces between city, cinema and modern architecture. The ways in which these features are represented in movies can help us to understand how the city and its architecture become a set of symbolic artifacts.

The architect Josep Maria Montaner⁵ points out that the essence of cities is not rooted only in its functional, productive or technocratic factors. They are made of different materials, and among them: representation, symbols, memory, wishes and dreams, and in the interpretation and representation of such symbols, memories, wishes and dreams, few instruments have been as effective as cinema.

Thus, this paper builds on Harvey’s experience and representation of living as well as Montaner above statement, and addresses not only a reflection of the physical city itself, built by nature, by architects, by builders, and so on, and transformed by its inhabitants but also, the city of imagination, symbols, memory, wishes and dreams, and the different ways that cities and their architecture have been represented in movies. Finally, this paper takes into account the role played by the scenography in the film’s narrative that could transcend the role of mere set design.

2. MODERN MOVEMENT AS AN AESTHETIC EXPRESSION IN MOVIES

The aesthetics of modernism took off in the immediate aftermath of WWI, continued into the post-WWII era, and encompassed everything from art, industrial design, and architecture to urban planning. In the context of architecture, it implied the desire to break with the past, have faith in and explore new materials and methods of construction with a focus on rational forms, absence of ornaments, and the adoption of Le Corbusier’s slogan “a house is a machine for living in”. On the other hand, in the urban context “The Athens Charter”⁶ published in 1933 served as a legitimation for a number of urban projects around the world.

The militancy and doctrinal determination of Modernist architects who promoted their theories through the CIAMs (*Congres Internationaux d’Architecture Moderne*) for nearly thirty years were essential in the process of disseminating modernist ideals and had a tremendous influence on the shape of cities around the world.

The aesthetics of modern architecture and the modern

city that has been both admired and questioned has shaped urban and domestic ways of life and many filmmakers have repeatedly explored not only both antagonists’ aspects, but also the functionalist and impersonal modern city in contrast to the spontaneously or unplanned cities. These two ways of understanding urban design and architecture are represented in film and many filmmakers have explored both aspects, including Jean-Luc Godard (*Alphaville*, 1965), François Truffaut (*Fahrenheit 451*, 1967) and Jacques Tati (*Mon Oncle*, 1958 and *Playtime*, 1967).

Scenario design includes all visual elements that help to establish the atmosphere of a place, compose the narrative and tell a story. For example, lighting, costumes, furniture, objects, colours, textures and other visual elements help shape a scenographic image. A scenario built for a movie is seen as a fictional space, a space of imagination filled with symbolic representations. This differs from the non-fictional space built by architects, builders, and interior designers, conceived with specific use and transformed by the individuals who occupy it daily. Thus, scenography is part of an imaginary universe, while architecture is part of real life. One is temporary, the other, supposedly, lasting.

Modern architecture, and the modern lifestyle represented in the cinematographic language, has a strong connection to the people who occupy it, and, just like in real life, can represent their personality, identity, tastes, dreams and desires. In this sense, scenography has multiple functions: 1) a didactic function introduced through shapes, objects, and colours, identifying who is the character and/or how he lives; 2) a psychological function, when it suggests different emotions of this character, such as sadness, melancholy, loneliness, obsession, joy and fantasy; 3) time-related function: as it shows historical epoch with objects from other times and place, seasons, or times of day; and 4) it reveals the cultural identity of place as material anchors in the development of narratives.

Several directors have been exploring these possibilities in their films. Modern architecture in general is portrayed as synonymous with sophistication and wealth (e.g. *LA Confidential*, 1997), in futuristic films with a more sterile language (e.g. *Gattaca*, 1997) or to emphasize the emotions of the movie character, such as sadness, melancholy, loneliness (e.g. *A Single Man*, 2009). The Martin Burney’s house in “Sleeping with the Enemy” (Joseph Ruben, 1991) seems to reflect the obsessive psychological side of the character, his coldness, and obsessive behavior.

The analysis developed below through two films by Jacques Tati (*Mon Oncle*, 1958 and *Playtime*, 1967), as well as the selection of films itself, takes into account these aspects — modern architecture, and the modern city represented in the cinematographic language with a strong connection to the people who occupy it, and focuses on investigating cinema as a vehicle for interpretation and sociological criticism of the modern city and modern architecture. Criticism that often manifests itself by contrast between the modern and



Fig. 1. The Arpel's house. "Mon Oncle" film by Jacques Tati, Paris, France, 1958. The sets for the film, designed by Jacques Lagrange, were built in 1956 at Victorine Studios (now known as Studios Riviera), and torn down after filming was complete. © cropped image from "Mon Oncle" film.

non-modern, where the modern is manifested through skyscrapers in a big metropolis, and as opposed to, the non-modern, represented through the informal and picturesque, place that is almost oblivious to progress in the suburb or traditional neighborhood.

3. ARPEL HOUSE: A CRITIQUE OF MODERN ARCHITECTURE

Jacques Tati made "Mon Oncle" in 1958, an emblematic film where modern architecture is the main character. The narrative focuses on Mr. Hulot's relationship with the Arpel's family (his sister, brother-in-law and nephew) and the contrast between the modern architecture of the Arpel's house with the non-modern and cluttered apartment located in a traditional Parisian suburb — a picturesque and informal place, almost oblivious to the progress developing where M. Hulot lives.

Tati's movie shows the contrast between these two

worlds: rationalism and order in contrast to visual and spatial disorder. The modern world in contrast with the past. Two ways of living and understanding the city and architecture in the late 1950s that are represented on three scales: the character, the house and the surroundings neighborhood.

The modern neighborhood where the Arpel family lives is represented through the archetypes of modern urbanism: houses in series, pure white forms, a car and garage, etc. By contrast, the Parisian suburb is portrayed with everything that is typical in a traditional community: animals and children playing in a street, little stores, everyone seems to know and greet each other. There is even a donkey cart on the street instead of a car. The streets are bursting with life; a representation of the archaic world.

The modern house, built and assembled in 1956 at the *La Victorine* Studios, is a faithful representation of what should be the dreamed modernity — rational and pure form, flat roof, a break with the past (Fig. 1). "Efficiency" seems to be



Fig. 2. Representation of the Modern City. "Playtime" film by Jacques Tati, Paris, France. 1967 © Slant Magazine. Retrieved from: <https://www.slantmagazine.com/film/the-criterion-collection-112-playtime/>, on January 26th, 2020.

the word that best defines this house. Everything is clean and organized. Modern hi-tech electronic appliances are displayed in the kitchen as a portrait of the new wave of industrial modernization and consumerism. On the other hand, Mr Hulot's apartment is cluttered, confusing, chaotic, noisy, messy and surrounded by others units in the same building as confused as his own. The place is a portrait of his personality.

Mr. Hulot's bizarre interaction when visiting the 'modern' Arpel house emphasizes this contrast between the character's lifestyle, the different way they live and an understanding of modernity. For example, the scene in the Arpel's kitchen — a space representative of the modernity — white, clean, organized, impersonal, shows Mr. Hulot trying to open a cabinet, pressing several buttons, without understanding how the amazing and mechanized cabinets and appliances worked.

The scene reflects in Tati's vision the absurdity of modernity and mechanization. In another scene, Mrs. Arpel shows the interior of her house to a neighbor and emphasizes that 'all the spaces in the house communicate and they all have air conditioning'. It is interesting to note that her friend sits on the visibly very uncomfortable sofa, but the inconvenience imposed by modern design is ignored. The furniture is designed to reveal the absurdity embedded in modern life. These jokes reveal a world where the modern obsession with technology, planning, and geometric rationality override commonsense. It is an ironic criticism of modern life.

These domestic scenes also show how modernism is reflected in the everyday practice of social life through conceptions of time, the sophisticated, and the impersonal, with an emphasis on material possessions — a car, an electronic appliance, a television, and a lawn.

4. TATIVILLE: A CRITIQUE OF THE MODERN CITY

"Playtime", also directed by Jacques Tati (1967), is a representative and emblematic example to illustrate the sociological critique of the modern city in cinema (Fig. 2). A city that exemplifies the standardization of rationally planned buildings, skyscrapers of concrete, steel and glass.

Paris through Tati's lens, along with the narrative and the characters, acquires a new meaning. A public space is a mirror of society and the imagined city is a metaphor for the condition of life in the modern world.

The narrative focuses on a series of events that take place around a businessman, Mr. Hulot, who on a visit to Paris, is faced with a group of American tourists. Tati's film is particularly interested in the humorous criticism of modern postulates, the impact of the modern city on everyday life, at a time when the living machine was the symbol. The film questions the mistaken idea of the perfection of architecture and the modern city.

Some scenes are caricatures, but clearly critical. One of the firsts scenes shows the arrival of Mr. Hulot in the modern city. These scenes were filmed at the *Grand Ensemble*



Fig. 3. **Identical apartments, identical lifestyle.** This image stresses the feeling that the apartment windows become like TVs that both the audience and the passers-by on the street are watching. “Playtime” film by Jacques Tati, Paris, France, 1967. © Slant Magazine. Retrieved from: <https://www.slantmagazine.com/film/the-criterion-collection-112-playtime/>, on January 26th, 2020.

Paris Sarcelles — the large-scale high-rise housing, the first of the large housing estates built north of central Paris in 1954, buildings built in rows with about 20 thousand inhabitants. The complex was created to solve the problem of the post-war housing crisis. According to Lamas, Sarcelles was the great battlefield against *grands ensembles* and modern urbanizations, a reference to what should not be done, exemplifying the social and psychological results of modern operational urbanism: repetitive and residual urban spaces.⁷ It's not a coincidence that this is the location of this film.

In this public space, the large-scale high-rise housing complex, huge horizontal bars are located, separated from each other by a large urban void. The rationality and lack of historical context of modern architecture. This model of urbanism and modern architecture could be anywhere in the world, as the cities are anonymous and with very poor resemblance. It turns out that it is Paris, when in the momentary reflections of an open glass door some of the urban icons of the traditional city appears: notably, Sacré Coeur, Arc de Triomphe and the Tour Eiffel. This similarity between cities is evident in the travel agency where, in two posters, the advertisements for the cities of Mexico and London present exactly the same image of modern skyscrapers (Fig. 3).

This criticism of urban housing standardization — the living machine — is revealed in Mr. Hulot's visit to a friend. Each apartment in the building appears as a large window shop, an impersonal environment with little furniture, clean

décor, where everyone dresses the same way (the scene at the bus stop illustrates this aspect well), and everyone has the same daily habits such as getting home and watching TV (Fig. 4). This standardization is showcased ironically throughout the film, for example through the invasion of modern appliances, mechanisms and customs; and the presence of chaotic traffic, where cars are stuck in a *rond-point*, unable to get out — the perfect metaphor for being subsumed by modern life.

The movie, with an emphasis on representations of modernity, reveals that the locus, instead of being a mere place, acquires meaning, it is not just a direct reflected image of reality. It is a movie in which spatial and temporal systems come to the forefront and share with the narrative the role of structuring the film.

5. CONCLUDING THOUGHTS

Cities are fascinating and stimulating, a mixture of contradictions, ethnicities, cultures, social classes, and many religions. They are constantly changing and, as Joseph Rykwert⁸ points out, they are also fragmentary, full of contrasts and conflicts and, consequently, have many faces and it is this condition that makes cities so inviting and attractive. The cinematic city is a reflection of these cultural representations and reveals a lot about the world it represents, which is the “real and original” city. It is a narrative of this



Fig. 4. Posters of some of the most iconic places in the world all featuring the exact same modern building. “Playtime” film by Jacques Tati, Paris, France, 1967. © Slant Magazine. Retrieved from: <https://www.slantmagazine.com/film/the-criterion-collection-112-playtime/>, on January 26th, 2020.

city, acquires meaning, influences reality, the way in which we perceive or experience the urban. More than a form of artistic expression, cinema moves beyond reproducing mere images, and helps to create symbolic meaning.

REFERENCES

- ALBRECHT, Donald, *Designing Dreams. Modern architecture in the movies*, Santa Monica, Hennessey + Ingalls, 2000.
- GEDULD, Harry M., *Authors on film*, Bloomington & London, Indiana University Press, 1972.
- HARVEY, David, *Justice, nature & the geography of difference*, Oxford, Blackwell Publishers, 1996.
- LAMAS, José M., & GARCIA, R., *Morfologia urbana e desenho da cidade*, Lisboa, Fundação Calouste Gulbenkian/Fundação para a Ciência e a tecnologia, 2000.
- LE CORBUSIER, *The Athens Charter*, New York, Grossman, 1973.
- MONTANER, Josep Maria, *A Modernidade superada*, Barcelona, GG, 2001.
- RYKWERT, Joseph, *The Seduction of Place: The History and Future of Cities*, New York, Vintage, 2004.
- WILLETT, John, *The Weimar Years, A culture cut short*, Great Britain, Thames and Hudson, 1984.
- WOLF, Michel, *“Tativille”, visions urbains: villes d’Europe à l’écran*, Paris, Centre Georges Pompidou, 1994.

NOTES

- 1 Harry M. Geduld, *Authors on film*, Bloomington and London, Indiana University Press, 1972.
- 2 John Willett, *The Weimar Years, A culture cut short*, Great Britain, Thames and Hudson, 1984.
- 3 Donald Albrecht, *Designing Dreams. Modern architecture in the movies*, Santa Monica, Hennessey + Ingalls, 2000.
- 4 David Harvey, *Justice, nature & the geography of difference*, Oxford, Blackwell Publishers, 1996.

- 5 Josep Maria Montaner, *A Modernidade superada*, Barcelona, GG, 2001.
- 6 Le Corbusier, *The Athens Charter*, New York, Grossman, 1973.
- 7 José M. Lamas & R. Garcia, *Morfologia urbana e desenho da cidade*, Lisboa, Fundação Calouste Gulbenkian/Fundação para a Ciência e a tecnologia, 2000.
- 8 Joseph Rykwert, *The Seduction of Place: The History and Future of Cities*, New York, Vintage, 2004.

ENHANCING THE PRESENCE AND VISIBILITY OF LANDSCAPES IN DOCOMOMO

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ABSTRACT.

Landscape themed initiatives, presentations and publications have become regular occurrences in docomomo International and its chapters. A general impression remains that docomomo predominately focusses on architecture, and that there is work to be done to elevate the importance of 'landscape', a significant task being to define and clarify the breadth of sites that are characteristic of the modern landscape in a range of contexts, geographically and typologically.

While its activities remain modest, the Specialist Committee on Urbanism and Landscape (ISC/U+L) has taken up the role as a point of contact for landscape advice to chapters along with organising themed events. In 2018 the ISC/U+L proceeded to develop a thematic book on designed landscapes of the Modern Movement based on submissions from docomomo chapters. The initiative had several objectives based upon broadening knowledge and appreciation of salient issues to do with modern landscapes worldwide. With the book, docomomo and the ISC/U+L could potentially enhance the presence and visibility of landscapes in the broader field of mid 20th century historical and theoretical research and beyond to heritage and conservation more generally.

This paper clarifies — within the context of the evolution of the conservation of landscapes of the Modern Movement and the status of landscape activities in docomomo — the method and process followed to gather the submissions from the chapters. Key findings from an analysis of the process to engage the chapters and the submitted sites lead to thoughts on potential future actions.

1. INTRODUCTION

During the Modern Movement design approaches and attitudes to the city explored optimistic, ecologically connected, and multidisciplinary visions. For instance, the new challenges of a post-WWII era saw the built environment professions in a state of flux, jostling for position, being delivered new types of work or going through sometimes troubling periods of redefinition. A new appreciation for the value of 'landscape' played a fundamental role in contributing to quality of lifestyles, environmental well-being, and the social and cultural identities of our cities. The Twentieth century saw as a result the development of a vast number of designed landscapes, the evolution of the professional discipline of landscape architecture, and the expansion of the typology of designed landscapes.

As formulated in the Mission Statement of docomomo International, towards "the end of the 1980s, many modern masterpieces had already been demolished or had changed beyond recognition"¹ and initiatives that championed safeguarding of architectural heritage from this era began to emerge. In 1988 docomomo International was established with its *Eindhoven Statement* published in 1990², underlining the need to "Identify and promote the recording of works of the modern movement", and "Bring the significance of the Modern Movement to the attention of the public, the authorities, the professions and the educational community."³

The 1990s did see a wave of new initiatives on Twentieth century architecture and heritage⁴, and the first significant conferences that emphasized the recognition and conservation of landscapes, such as the 1995 *Preserving Modern*

Landscape Architecture Conference at Wave Hill, New York⁵, and 1998 conference on the theory of post-war gardens and landscapes in the United Kingdom.⁶ docomomo International and its chapters also regularly launched events and publications, and started the development of its own registers.⁷ docomomo also launched its International Specialist Committee on Gardens and Landscapes⁸, which would evolve into the International Specialist Committee on Urbanism and Landscape (ISC/U+L). docomomo's bi-annual international conferences and its journal would also start to feature occasional landscape themed papers.

The ISC/U+L's activities illustrate that efforts were being made to increase awareness of the significance of landscapes and urban planning but its initiatives remain modest. The ISC/U+L has taken up the role as a point of contact for landscape advice to international chapters and to respond to inquiries from outside the docomomo membership, and occasionally organized themed events, such as the 2011 *Landscapes of the Recent Future* conference.⁹

Nevertheless, in the 2000s the momentum seemed to stagnate globally to champion and safeguard landscapes of the Modern Movement.¹⁰ Samples of commendable progress can be seen in the work by The Cultural Landscape Foundation in the United States, while the *Approaches for the Conservation of Twentieth-Century Architectural Heritage: Madrid Document 2014*, and its developing committee, the International Council on Monuments and Sites (ICOMOS) International Scientific Committee on 20th Century Heritage, still illustrate how landscape architecture remains largely overlooked and side-lined.¹¹

The general impression remains in docomomo that its fo-

Geographical representation by region (continent)		Asia	Africa	Europe	Latin America & Caribbean	North America	Oceania			
% of global population (United Nations, 2015)		60%	16%	10%	9%	5%	0.50%			
Chapters and non-chapters by region (74 total)		19	5	31	14	3	2			
% of chapters and non-chapters by region of 74		26.38%	6.76%	41.89%	18.91%	4.05%	2.70%			
Participating chapters by region of 38		9	1	17	7	3	1			
% of all 38 participating chapters		23.68%	2.63%	44.74%	18.42%	7.89%	2.63%			
% of participating chapters by region		47.36%	20%	54.84%	50%	100%	50%			
Submitted sites by region of 88		20	2	46	14	3	3			
% of 88 submitted sites from the region		22.73%	2.27%	52.27%	15.91%	3.41%	3.41%			
Landscape typologies	Domestic + Residential	Transport	Industrial + Farming	Commercial	Institutional	Military	Public Amenity + Urbanism	Leisure	Conservation + Ecological	Other
% of listed typologies	12.90%	3.23%	6.45%	2.42%	12.10%	3.23%	39.52%	12.10%	5.65%	2.42%
Earliest period of development	1900s	1910s	1920s	1930s	1940s	1950s	1960s	1970s	1980s	1990s
% of all 88 sites	1.19%	1.19%	9.52%	15.48%	8.33%	20.24%	25.00%	11.90%	2.38%	4.76%

Fig. 1. Overview of the geographical spread of the submitted sites by region, with the number of participating docomomo chapters and non-chapters, the frequency of the listed typologies and the representative periods of first developments at the sites. © Authors, 2020.

cus is predominately on architecture and that there is still much work to be done to elevate the importance of 'landscape', a significant task being to define and clarify the breadth of sites that are characteristic of the modern landscape in a range of contexts, geographically and typologically.

In a bid to broaden appreciation of modern landscape architecture, as a discipline and profession, it was realized that the weight of a major landscape publication would enable understanding and importantly, comparative analysis, both within the book and in terms of future research. In January 2018 the ISC/U+L formally proceeded to develop a thematic book on designed landscapes of the Modern Movement based on submissions from docomomo chapters.¹² The initiative had several objectives based upon broadening knowledge and appreciation of salient issues to do with modern landscapes worldwide: identification, documentation, categorisation, conservation, management and dissemination. With such a book docomomo and the ISC/U+L could potentially enhance the presence and visibility of landscapes in the broader field of mid 20th century historical and theoretical research and beyond to heritage and conservation more generally.

This paper clarifies — within the context of the evolution of the conservation of landscapes of the modern movement since the 1980s and the status of landscape activities in docomomo — the method and process followed to gather the submissions from the chapters. Key findings from an analysis of the process to engage the chapters and the submitted sites lead to thoughts on potential future actions.

2. THE SUBMISSIONS: GEOGRAPHIC RANGE AND PERIOD

The ISC/U+L's formal call for submissions was developed in 2018 with all docomomo chapters being contacted in Janu-

ary 2019. The ISC/U+L requested up to three landscape sites of the 'Modern Movement era' that could represent a range of types and be defined by function, style, regional expression, or context in the broadest sense (climatic, technical, fragility, management, etc.). Attention was drawn to places that may previously have been marginally understood — 'invisible' in a sense — and thus worthy of being appreciated in new ways.

The call for submissions went out to docomomo International's 71 international chapters but this number eventually increased to 74 including some countries that previously had not had a docomomo chapter.¹³ The 74 countries were initially considered in terms of the six geographic regions that the United Nations employs in its world population models.¹⁴ The geographical spread was: 19 from Asia (26.38 percent), 5 from Africa (6.76 percent), 31 from Europe (41.89 percent), 3 from North America (4.05 percent), 14 from Latin America and the Caribbean (18.91 percent), and 2 from Oceania (2.70 percent). This does not take into account whether a chapter is indeed active, nor does it correspond directly with the population numbers for regions, with for instance Asia having about 60 percent of the world's population, while only just over a quarter of docomomo's chapters are found in the region. In addition, some geographic regions have more countries than other. However, the data reinforces docomomo's prominence in Europe, with some representation in Asia and America, while Africa and Oceania are less well represented.

By May 2019 the first entries were received from 16 chapters, representing a participation rate of 21.62 percent, with variable numbers of sites being entered by each chapter. The editors observed that the quality of the submissions greatly varied despite the requirements and expectations laid out in the call for submissions. For example, some of the submissions lacked a landscape focus while others lacked mid 20th century significance. A second call for submissions was is-

sued whilst initial editorial work could start and the first-round feedback could be given. By September a total of 24 chapters (32 percent participation) and 66 sites (averaging 2.75 sites per chapter) had been submitted. The editors identified themes and developed a draft structure for the publication, generating an iterative process that enabled editing and seeking further participation that would 'backfill' and broaden the data set. By January 2020 entries from 38 chapters had been received, representing a participation rate of about 51 percent (Fig. 1), with 88 sites submitted, a result that was deemed workable.¹⁵

In terms of geographic representation Europe predominated in absolute numbers of sites and as a proportion of responses. This bias is significant because as the entries were subject to comparative analysis it became clear that as mid 20th century European landscapes the impacts of socio-political change related to WWII were often critical to how a site was defined. Clearly other parts of the world were also influenced by WWII, indirectly as a result of the post-war development boom, but the scale of change often played out more centrally in the 'fate' of sites in the European context. A notable example was the impacts of communism and the Soviet Union where landscapes often became a canvas for expressing social engineering and reform.

In this sense, period became an important factor. Several of the submitted sites went through extended periods of design and construction, often transgressing multiple periods of social, political and cultural change, or upheaval. The highest number of received entries were under the 1930s, 1950s, with the 1960s as the most represented period (Fig. 1). The fact that some sites from the 1990s and later were submitted offered the opportunity to increase awareness of what some chapters defined as 'modern', providing the opportunity to illustrate a level of continuity and reinvention through time.

3. THEMATIC REPRESENTATION AND TYPES

Past publication by *docomomo* such as *The Modern Movement in Architecture: Selections from the Docomomo Registers* (2000, 32 participating chapters),¹⁶ and *Other Modernisms: A Selection from the Docomomo Registers* (2007, 34 participating chapters),¹⁷ organized submitted sites by countries. Through dissemination of the information these publications helped raise awareness of sites of the modern movement, while contributing towards the documentation of sites and widening theoretical understanding. In this landscape publication it was decided to take a thematic approach, with the objective to assist documentation and dissemination while raising aspects of conservation challenges, and allowing comparisons across types.

Within the call for submissions a list of typologies of designed landscapes was distributed. This list included ten overarching types of landscapes, with examples given for each general type. The authors of the submissions were asked to list for their landscape up to three applicable types.

The number of times that a typology was mentioned across each of the ten types demonstrates that sites with certain typologies were frequently submitted, while other typologies were hardly present (Fig. 1). It was decided to group the entries under themes reflective of some of these types, with an additional theme on continuity and reinvention created for post-1990 sites.

Over one-third of the submitted sites listed as one of their typologies the public amenity and urbanism category. These submissions revealed the prevalence of new ways of planning urban environments, with visionary projects such as Tapiola Garden City in Finland, La Butte Rouge in Chatenay-Malabry, France, and ICI House in East Melbourne, Australia. Often these projects enabled new roles for landscape architects and were inextricably linked to the emergence of the profession in countries such as Australia. New trends in residential and domestic landscapes resulted in the inclusion of sites such as the Gomis House in Barcelona, Spain or Roberto Burle Marx' design for the garden of the De Schultness residence in Havana, Cuba.

The post-WWII era saw the expansion of spaces for recreation and leisure — 'lifestyle' was linked to the demands of the development boom at one level, while aesthetically being expressed in, for example, the linking of architectural space and gardens to achieve an integrative effect. This boom is illustrated by the large number of new public parks and sports facilities that were explored, such as the Gulbenkian Foundation Gardens in Lisbon, Portugal and the Park Andreja Hlinku in Bratislava, Slovakia and Burle Marx' Parque do Flamengo, Rio de Janeiro, Brazil (Fig. 2) and Parque del Este in Caracas, Venezuela.

Landscape design made a major contribution towards the new waves of holidaying, illustrated by sites such as Mamaia Seaside Resort in Constanța, Romania and the rooftop gardens at the Hotel Bonaventure in Montréal, Québec, Canada. The increasing mobility during the era saw infrastructural developments that reinvented environments of movement, such as in the case of the Italian section of the motorway between Verona and Brenner, and the landscape of Nicosia International Airport in Lefkosia, Cyprus.

In bids to take control of expansion, many countries formed new institutions that correspondingly had pressing physical requirements. In attempts to find distinction from more traditional forms of, say, university campuses, the past was at best used selectively for symbolic purpose — in for example, the 'quad' — but often centuries-old traditions wavered completely when taken to the far-flung margins of a city's suburbia that were often at the mercy of the car. The new campuses of the University of Ghana and the Nathan Campus at Griffith University in Queensland, Australia (Fig. 3) sought to innovate in different ways, and facilitated the emergence of educational reform and institutionalisation. Foundations for governance and health emerged resulting in new developments and landscapes at the Guatemala City Civic Center, the Hospital del Distrito in Ponce, Puerto Rico,



Fig. 2. Roberto Burle Marx, Parque do Flamengo, Rio de Janeiro, Brazil, 1961–65, the Praça Pistóia at the Museu de Arte Moderna do Rio de Janeiro. © Jan Haenraets, 2005.



Fig. 3. Griffith University in Queensland, Australia, the formative years of the campus were the 1970s and saw extensive conservation of the site's indigenous landscape in 'flora reserves' and the like, whilst also developing campus infrastructure in a manner that promoted a strong visual connection between indigenous vegetation and built form. © Centre for Environmental Studies, 'Landscape Development, Griffith University', *Landscape Australia: An Exhibition*, The University of Melbourne, Melbourne University Archives, 1982.

or Le Corbusier's Mill Owner's Association in Ahmedabad, India. A small number of entries only were listed under the typology of commercial developments, while in reality many sites were closely associated with the economics of commerce and business.

The prominence of landscape developments during the era that evoke remembrance and identity could be found in sites like the Memorial Complex of Kaunas Ninth Fort in Lithuania, the Founders of the Bulgarian State Monument, the National Cultural Monument Ležáky in the Czech Republic, Azadi Square in Tehran, Iran, and the new commemorative features at Bannockburn Battlefield in Stirling, Scot-

land. These sites occurred worldwide and consisted of both associative landscapes, where events had unfolded *in situ*, and other sites programmed specifically for the purpose of commemoration. The reinvention of places of internment was a common theme in the 20th century with significant developments at Turku Cemetery in Finland, for the Underground Pantheons of the Cemetery of Chacarita, in Buenos Aires, Argentina, the Rab Memorial Cemetery in Croatia and Žale Cemetery in Ljubljana, Slovenia.

The designs at such sites often led to creative provocations and experiments in the avant-garde, which also could be traced in sites such as at Ian Hamilton Finlay's Little



Fig. 4. Ian Hamilton Finlay, *Little Sparta*, Dunsyre, Scotland, 1967–c.1997, showing the art work 'The Present Order', as a reflection on society. © Jan Haenraets, 2006.

Sparta in Scotland (Fig. 4), in Oscar Niemeyer work at the Rachid Karamah International Fair in Tripoli, Lebanon, the Mostra d'Oltremare, the Overseas Exhibition in Naples, Italy, and transformation at the Forest of Culture of Chiba in Japan. Often highly symbolic, the union between site conditions such as topography and vegetation emerged.

The demands of energy, supply and agricultural land often sparked ecologically controversial initiatives like in the case of Kaunas Hydroelectric Power Plant in Lithuania, the Amiandos Mine Town in Cyprus, and the Hydro System Danube-Tisa-Danube in Serbia, which involved major degrees of land reclamation, as was the case at Noordoost Polder in the Netherlands. Landscape architects delivered work via symbiotic professional relationships that came with the need for engineers to sell large-scale projects — capable of depreciating the value of natural landscapes — to increasingly environmentally conscious communities. The Kibbutz Alonim in the Jezreel Valley, Israel and Atatürk Forest Farm in Turkey indicated changing directions. Movements towards recovering ecology and sustainability can be found at Lumpini Park in Bangkok, Thailand, the Parc André Malraux in Nanterre, France, the Pavilion at Trofonio in Viotia, Greece, and the more recent example of Herons Mangrove in Belém, Brazil.

4. AWARENESS AND PARTICIPATION

The project has acted as a catalyst in raising interest in landscapes amongst docomomo chapters. In general correspondence, it has emerged that the project has sparked dialogue and action, with, for example, the Israel chapter organising in March 2018 the conference on Landscapes of the Modern Movement to increase awareness and assist in the development of the submissions.¹⁸ Furthermore, a number of countries previously not associated with docomomo have

participated in the initiative. It also appears that the role of docomomo International in heralding the project stops short of a unified approach, for despite the organisation's collaborative and multi-disciplinary structure, ultimately it is left to a minority that make up the ISC/U+L to progress such initiatives.

From the statistics on participating chapters and geographical spread, it became clear that docomomo still has the most chapters in Europe, resulting in bias on the one hand, and significant gaps in representation on the other. Africa and Oceania continue to have a limited number of docomomo chapters and only Ghana and Australia submitted sites for these geographical regions. Why are such levels of participation and degrees of geographical spread relevant? With so few chapters in some regions combined with the inevitable focus on architecture, the landscape heritage of the Modern Movement in those regions most certainly must still be overlooked and ill-defined. In these cases, the stewardship of significant landscapes from the Modern Movement remains still largely absent, and several chapters seemed keen to use the opportunity to raise issues around the documentation, protection and safeguarding of architectural and landscape architectural heritage.

The outcome also provokes the question of why several countries that have been active within docomomo for many years failed to participate. Perhaps this occurred because the call for submissions did not reach these chapters, or a result of memberships that are predominantly architectural, with a concomitant lack of availability of landscape knowledge, or even just a lack of time to commit to what are essentially voluntary activities. Participation did require a level of coordination, decision-making, responsibility, and ultimately, 'belief,' that landscapes did require attention and increased awareness in their region, and more initiatives.

The publication currently underway may go some way to turning this situation around, albeit there will then be the need to further backfill and develop a more complete inventory and more widespread involvement.

It is difficult to assess whether this initiative successfully or sufficiently helped to engage new landscape experts in docomomo, or other organizations that have activities and missions that include a focus on landscapes of the Modern Movement or recent past. From a study of the submissions it becomes clear that a large proportion of the submissions was not prepared by landscape experts, a result of the current make-up of the membership of docomomo. Nevertheless, many landscape experts or enthusiasts came forward to participate, and for instance the ISC/U+L could use this as an opportunity to engage more landscape people in its wider activities. Indirectly the current members may be now also more aware of the need to promote the ISC/U+L more vigorously — foremost using its intended publication.

5. FROM DOCUMENTATION TO MANAGEMENT AND BEYOND

The project and planned publication will ultimately bring together landscapes from the different regions so as to allow comparative analysis that to date has not yet occurred within docomomo other than via tacit recognition of landscapes as curtilage to buildings. To prepare the submissions some chapters had the advantage that they could rely on existing local or national registers. Other chapters had to develop completely new material. Some chapters appeared not even to have had a list of significant sites, meaning that the first challenge was to decide which sites would be suitable. The initiative may as a result have allowed for a moment of reflection in chapters on the status of documenting and understanding of significant sites in their regions. Ultimately a lack of skilled professionals to engage in the stewardship of landscape heritage of the Modern Movement appears to prevail.

Significant gaps in information extend to the existing conditions of sites and likewise the challenges faced in their ongoing viability and management. This project has raised the need for stewardship in order to progress the protection, revitalization and adaptive reuse while respecting the cultural significance of the landscapes' intangible and tangible layers, and keeping them relevant in a rapidly evolving society. Most submissions spoke only briefly about the existing conditions and conservation challenges that the landscapes faced, possibly due to the word limitations. However, some submissions strongly emphasize the current challenges, the lessons learned from conservation at the sites, and in some cases the urgent risks posed to the sites. An important observation was that many of the entries did not address intangible layers that may have been associated with the sites and still focused predominantly on the tangible aspects of the landscapes and their developments.

6. END NOTE

This paper has charted the formulation and preparation of a publication that is in the process of being written. However, a number of findings have emerged that will inform the drivers for critical essays within the book. An overall conclusion is that docomomo International and the ISC/U+L should continue to develop strategic actions to attract multi-disciplinary audiences to the organization and its activities. Additional calls to chapters should request them to submit landscape sites to the docomomo registers, or to organize activities with landscape topics, and regularly invite landscape themed contributions to its docomomo Journal or Technology Dossiers. The project will have contributed to enhancing the presence and visibility of landscapes and the practice of landscape architecture, shedding further light on its origins as a profession and the legacies of its contributions to the built environment during some of its most formative years during the Modern Movement.

NOTES

- 1 "Organization", accessed on 10 January 2020, <https://www.docomomo.com/about/organization/>.
- 2 Docomomo International, *The Eindhoven Statement*, DOCOMOMO International, Eindhoven, 1990.
- 3 Docomomo International, 1990, Art. 1 and 2.
- 4 Deborah Slaton, William G. Foulks, & Rebecca A. Shiffer (eds.), *Preserving the Recent Past Conference Proceedings*. Washington, DC, Historic Preservation Education Foundation, 1995; Deborah Slaton & William G. Foulks, *Preserving the Recent Past 2*, Washington, DC, Historic Preservation Education Foundation, 2000.
- 5 Charles A. Birnbaum, "Preserving Contemporary Landscape Architecture: Is Nothing Permanent But Change Itself?", *Preserving Modern Landscape Architecture, papers from the Wave Hill-National Park Service Conference*, Cambridge, Ma, Spacemaker Press, 1999, 5–8.
- 6 Jan Woudstra & Cristiano Ratti (eds.), "Garden history: reviewing the twentieth century landscape", *Journal of the Garden History Society*, Vol. 28, No. 1, 2000.
- 7 J. Haenraets, "Identifying key problems regarding the conservation of designed landscapes: Landscapes of the recent past", unpublished PhD thesis, Leicester, De Montfort University, 2010, 131–35.
- 8 Franco Panzini, "ISC/Gardens and Landscapes", unpublished paper, Rome, Docomomo International Specialist Committee on Gardens and Landscapes, 1996.
- 9 Jan Haenraets (ed.), *Landscapes of the Recent Future: Conserving the 20th-Century's Landscape Design Legacy, Proceedings of the Symposium held at the Edinburgh College of Art, 21 April 2011*, Edinburgh, Docomomo International Specialist on Urbanism and Landscape and Edinburgh College of Art, 2011.
- 10 Jan Haenraets, "Nurturing greater support, understanding and stewardship for landscapes of the recent future", *Landscapes of the Recent Future: Conserving the 20th-Century's Landscape Design Legacy*, 2011, 5–6.
- 11 The ICOMOS International Scientific Committee on Twentieth-Century Heritage, *Approaches for the Conservation of Twentieth-Century Architectural Heritage: Madrid Document 2014*, Madrid, ICOMOS.
- 12 Jan Haenraets, Andrew Saniga, & Gulnur Cengiz, "Call for Submissions", Docomomo International Specialist Committee on Urbanism and Landscape, 5 January 2018.
- 13 The 71 chapters included Docomomo Iberia, while separate submissions would be received for Portugal and Spain. Syria and Lithuania did not have a Docomomo chapter, bringing the total to 74.
- 14 United Nations, Department of Economic and Social Affairs, Population Division, "Definition of Regions", accessed on 10 January 2019, <https://population.un.org/wpp/DefinitionOfRegions/>.
- 15 A number of additional sites were submitted by chapters, but were not withheld given that they did not represent landscapes. These sites and chapters have not been included in the totals.
- 16 Sharp, Dennis and Catherine Cooke, *The Modern Movement in Architecture: Selections from the DOCOMOMO Registers*, Rotterdam, 010 Publishers, 2000.
- 17 Maristella Casciato & Émilie d'Orgeix, "Other modernisms: a selection from the DOCOMOMO registers", *Docomomo Journal*, March, 2007, No. 36.
- 18 Docomomo Israel, "Landscapes of the Modern Movement, Annual Conference, 31 March 2018, Technion Israel Institute of Technology, the Faculty of Architecture and Town Planning, Haifa, Israel".

EAST MEETS WEST: JAPAN AND THE IAUS

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ABSTRACT.

From the late 1970s until the early 1980s, the IAUS (Institute for Architecture and Urban Studies, an independent thinktank located in New York, founded by Peter Eisenman in 1967) held a large number of exhibitions on modern architecture. Three of them were Japan related: “A New Wave of Japanese Architecture” (1978); “Nine Quotations and Nine Metaphors: Arata Isozaki” (1978), and “Kazuo Shinohara” (1981). There is very little information available about any of them and, as far as I can ascertain, there are no extant photos of the installations or related events. Partly through these exhibitions, IAUS Fellow and architectural historian Kenneth Frampton found in Japan a rich source of Critical Regionalist alternatives to dispiriting global trends, whereas theorist Charles Jencks found exceptionally provocative examples of the Postmodern eclecticism to which Frampton was so opposed. Clearly allowing a broad and contradictory range of possible interpretations, these three exhibitions were the first exposure of the “new wave” Japanese architects to Western audiences, thereby bolstering their confidence and sense of collegiality with architects outside Japan, and leading to many ongoing intellectual engagements and personal friendships. Occurring at the historical moment in which Critical Regionalism became an important theoretical position and Postmodernism became a dominant theme, they enabled modern Japanese architecture to gain an important position within the global discourse.

Over a relatively brief period, from the late 1970s until the early 1980s, the New York-based Institute for Architecture and Urban Studies held many exhibitions on contemporary architecture. Three of them were Japan related: “Nine Quotations and Nine Metaphors: Arata Isozaki” (1978), “A New Wave of Japanese Architecture” (1978), and “Kazuo Shinohara” (1981). There is very little information available about any of them and, as far as I can ascertain, there are no extant photos of the installations or related events. The following is an attempt to reconstruct their story.

Some clues lie in the IAUS archive (though it is incomplete, with many documents missing and presumed destroyed), which is held at the Canadian Centre for Architecture, together with the personal archives of Peter Eisenman, founding director of the IAUS, and IAUS Fellow Kenneth Frampton. Other sources include a 2011 memoir by Suzanne Frank,¹ a 2013 film by Diana Agrest² (both IAUS Fellows), and the transcript of a lecture given at Columbia University in 1990 by Frederieke Taylor (IAUS Development Director 1976–80, Administrative Director 1980–81). I have supplemented these sources with interviews with many of the protagonists, some in New York (Diana Agrest, Peter Eisenman, Kenneth Frampton, Suzanne Frank, Silvia Kolbowski, Andrew MacNair, Joan Ockman) and others in Tokyo (Hiromi Fujii, Hiroshi Hara, Arata Isozaki, Toyo Ito).

The IAUS was an independent thinktank active from 1967 until 1984. Having been denied tenure at Princeton University, Eisenman began the IAUS as a way to obtain research funding and design commissions, but also to create an international center for avant-garde architectural thought. In 1973 the IAUS launched the journal *Oppositions*, which published essays by an international range of authors. From 1978 onward, *Oppositions* was supplemented

with the more populist newspaper *Skyline*, edited by IAUS Fellow Andrew MacNair, which also provided a calendar of architecture-related events in New York and elsewhere.

MacNair also started an exhibition program, which proved so popular with the general public that many other IAUS Fellows began to propose and curate exhibitions based on their personal interests and connections. For a few years, there was an extensive, varied, and innovative program of exhibitions, if somewhat haphazard and unprofessional due to lack of money and time.³ The IAUS also produced posters and catalogues, supplemented with lectures or symposiums. MacNair retired in 1981, and his role was taken over by Lindsay Shapiro. In 1982 the IAUS changed location, and no longer had a space for exhibitions. Shapiro left and the exhibition program ended, though the IAUS continued to provide support for architecture exhibitions at galleries elsewhere in New York.

There are catalogues for both “A New Wave of Japanese Architecture”⁴ and “Kazuo Shinohara”⁵ (Fig. 1) but they are more like parallel books containing no definitive information about what was exhibited, and “Nine Quotations and Nine Metaphors: Arata Isozaki” had no catalogue at all. According to MacNair,

*At the Institute we made posters for one hundred lectures and only twenty of them happened. And the posters went all over the world. [...] our myth was all these fantastic things that didn't happen. [...] That was part of the beauty of the place.*⁶

Nonetheless, the Isozaki exhibition is listed in the May 1978 issue of *Skyline*, and again the following month, showing that it was popular: the closing date was extended from 25 May to 16 June.

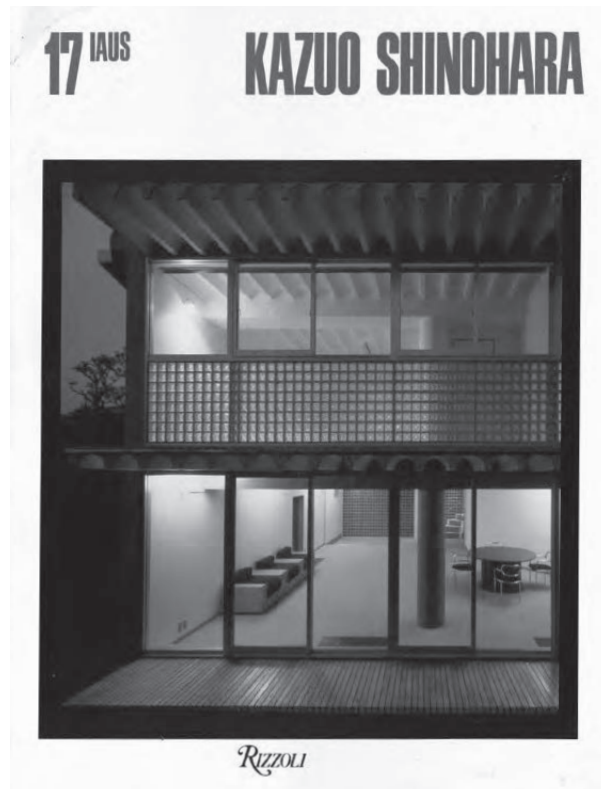
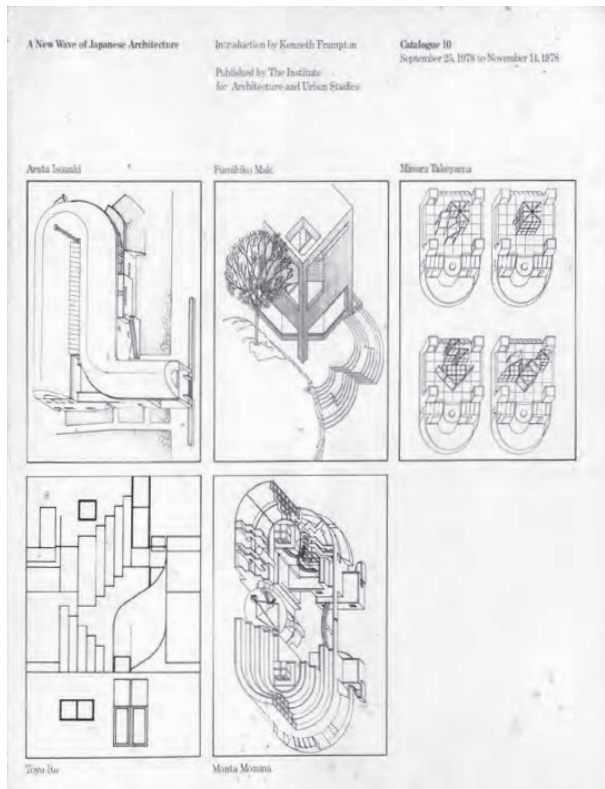


Fig. 1. Kenneth Frampton and Silvia Kolbowski, eds., *A New Wave of Japanese Architecture*, New York, NY, IAUS, 1978, and Kazuo Shinohara, New York, NY, ©Rizzoli International Publications, 1982.

Isozaki's official CV⁷ does not mention the 1978 IAUS exhibition, but does include a 1977 exhibition with almost the same title ("Architecture of Quotation and Metaphor — Arata Isozaki: Works in Architecture, 1960–1977") held at Gato-do Gallery in Tokyo.⁸ Very likely the IAUS exhibition was the same as, or similar to, the one held in Tokyo. In any case, the exhibition material apparently did not go straight to New York. The IAUS archive contains a letter from Carter Manny (director of the Graham Foundation in Chicago) to Eisenman and MacNair, dated 21 April 1978, inviting them to visit the Isozaki exhibition then at the Graham Foundation. Possibly they did so, and on the spur of the moment decided to bring it to New York. The Graham Foundation archive contains a poster announcing a lecture by Isozaki and photos of him at the opening party (Fig. 2), but no clear images of the work on display. Interestingly, the CCA holds a set of three original Isozaki hand-drawings dated 1977, titled *Observatory I, II, and III*. They show conceptual projects with no obvious relationship to any of Isozaki's buildings, and CCA records indicate they were purchased from the Gato-do Gallery in Tokyo. It seems highly likely they were produced for the exhibition in Tokyo, then included in the IAUS exhibition.

The back page of the October 1978 issue of *Skyline* has an

(unsigned) article titled "Japan Fever" that mentions the Isozaki exhibition, and an upcoming lecture tour by "five leading Japanese architects" to accompany a travelling exhibition of drawings and photographs (as yet untitled, but later known as "A New Wave of Japanese Architecture"), sardonically noting that the "lines should certainly prove shorter than this season's other peek into the mysteries of the Orient — the King Tut exhibition."

Again, there is no record of exactly what was exhibited. On the back of a scrap of paper in the IAUS archive is a scribbled note saying, "Insurance for travelling exhibitions / Jap. Wave 80 panels," suggesting that each architect provided a large number of images but no physical models. The IAUS poster states that the exhibition comprised work by eleven architects and would travel to ten US universities, accompanied by five of the participants (Takefumi Aida, Hiromi Fujii, Hiroshi Hara, Arata Isozaki, Minoru Takeyama), who were to give lectures at each venue (Fig. 3). Taylor believes that ten architects were on the tour⁹, and MacNair insists that all eleven were there. In any case, it was by all accounts a comedy of errors, of frequent miscommunications and occasional missed connections. It did, however, provide the impetus for MacNair to establish what he called the National Architecture Exchange, under the auspices of which the IAUS be-



Fig. 2. Arata Isozaki exhibition poster and opening party at the Graham Foundation, 1978. ©Graham Foundation archives, Chicago, USA.

gan to "rent" their exhibitions to other venues in the US.

The catalogue, edited by Kenneth Frampton and Silvia Kolbowski, contains designs and texts from eleven Japanese architects,¹⁰ with an introductory essay by Frampton. Following the national tour, the exhibition opened at the IAUS on 20 December 1978, and two days later it was guardedly reviewed by Paul Goldberger in *The New York Times*: "Little of the work has been shown here before. Much of it is very good, and a fair amount is pretentious and silly."¹¹ Goldberger mentions that it included ten architects, but the January 1979 issue of *Skyline* states it was only five — possibly there was insufficient space to mount the full exhibition. In January, it was again reviewed in *The New York Times*, this time by Ada Louise Huxtable, with less equivocation about its quality but clear discomfort at its intentions:

*If there is an active avant-garde today, this is it. [...] It is impossible to get much closer to sculpture in building than in this deliberate abstraction of form from content. [...] There are even cases where this work ceases to be architecture at all. [...] The chosen esthetic is so precise, exquisite and threatening that it almost causes pain.*¹²

The catalogue lacks information about translators, though Eisenman recalls that the Japanese architects provided their texts in English. The archive contains two 1978 letters from the American Academy of Arts and Sciences offering financial support for translations of essays in *Oppositions*, and for a new series to be called *Opposition Books*. According to Shapiro,

*We applied for a 3-year \$50,000 grant from the Graham Foundation, which we received. We had told the Graham Foundation and the MIT Press that we were going to produce 12 books in three years [...] I also found translators to work on Isozaki and other Japanese theorists.*¹³

There is some correspondence about a proposed book of essays by Isozaki, to be titled *Ruins of the Style*, translated by Richard Gage with an introduction by Peter Eisenman, but it was never published.

In Japan, the March 1979 issue of *A+U: Architecture and Urbanism* included a special feature on the exhibition, including a translation of Frampton's catalogue essay and reproductions of some (possibly all) of the panels.¹⁴ It also

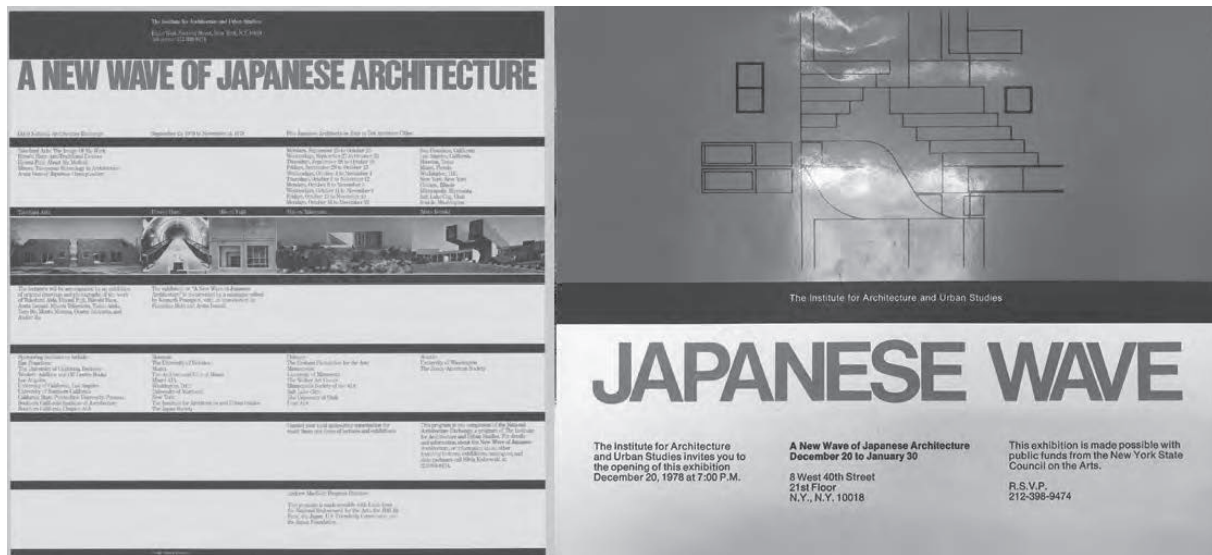


Fig. 3. Poster and invitation for “A New Wave of Japanese Architecture”, 1978. Institute for Architecture and Urban Studies fonds, 1965–1985, ©Canadian Centre for Architecture Collection, Montréal.

contains the transcription of a symposium in which Isozaki revealed that there were to have been twelve architects, but Kazuo Shinohara dropped out. Shinohara’s withdrawal from the group show seems to have been motivated by his (arrogant if justifiable) belief that he warranted a solo show. Throughout the 1970s, Isozaki and Shinohara were regarded within Japan as the two intellectual leaders of their generation, though with ideologically opposed standpoints: Isozaki valorised metropolitan architecture and eagerly adopted European influences, whereas Shinohara valorised the private house and insisted on the importance of continuity with Japanese tradition.¹⁵ The Frampton archive contains a January 1981 letter from Shinohara indicating that they had recently met in New York, and confirming plans for a solo exhibition at the IAUS, for which Frampton would write a catalogue essay. Indeed, the “New Wave” catalogue had made Frampton an acknowledged expert on Japanese architecture, and he was seen by Japanese architects as a valuable link to the West, his endorsement legitimizing their international and historical significance.

In mid-1981, Frampton and Kolbowski spent one month in Japan, following an itinerary organized by Isozaki, who also obtained the funding. The Frampton archive contains his agenda notebooks, which show a dense schedule of visiting buildings, meeting architects, giving lectures, and participating in symposiums (Fig. 4). His Japan diary formed the basis for a series of three essays later published in *Skyline*.¹⁶ Immediately after his return to New York, Frampton began to receive many personal letters from Japanese architects, including Tadao Ando, Toyo Ito, Kiyonori Kikutake, and Fumihiko Maki, who were implicitly (in some cases explicitly) hoping he would write about their work, as well as from

the editors of journals such as *A+U: Architecture and Urbanism*, *GA: Global Architecture*, and *SD: Space Design*, who wanted to commission new essays on Japanese architecture as well translate his older texts about world architecture into Japanese.

The Shinohara exhibition opened at the IAUS in December 1981, seemingly with very little preparation time. However, a memo in the archive describes it as “prearranged,” and the minutes of a 14 October meeting quote Eisenman as saying, “To get the Shinohara, we should offer the difference between shipment of the exhibition to Tokyo from Paris and to NYC from Paris as payment.” According to Lindsay Shapiro, it comprised wooden models of a number of Shinohara’s houses built by students at a French architecture school,¹⁷ suggesting that it was not a new IAUS production, and almost certainly an exhibition first held in Paris in 1979, organized by SADG (Société Française des Architectes). The French catalogue¹⁸ contains 30 houses, though the IAUS exhibition apparently had only eleven, again probably due to the lack of space. The exhibition then toured North America (including Université du Québec à Montréal, Canada, with an introductory lecture by Frampton on 19 January 1983), as part of the National Architecture Exchange. Invoices show that the IAUS received fees for this, so possibly there was additional curatorial work. The catalogue was published afterward, again edited by Frampton and Kolbowski, but contains no clear indication of what was exhibited, and lacks even the dates and venues of the exhibition. Indeed, the house shown on the cover (House Under High-Voltage Lines, Tokyo, 1981) had not been built at the time of the Paris exhibition, so either it was not in the IAUS version, or was added later.

Frampton had become increasingly interested in archi-

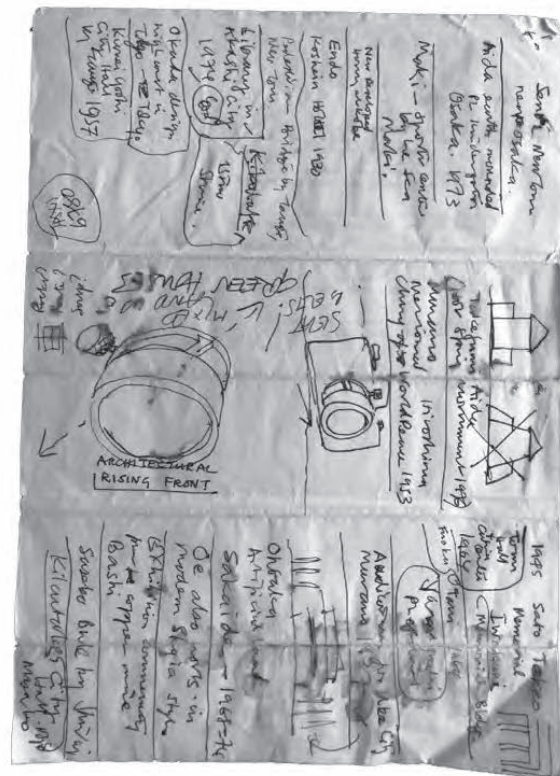
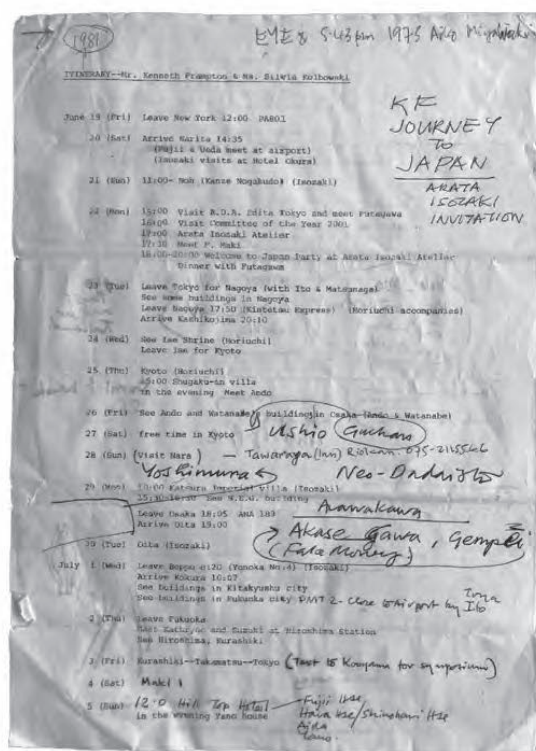


Fig. 4. Kenneth Frampton and Silvia Kolbowski, Japan itinerary, 1981. Kenneth Frampton fonds, 1958–2016. Canadian Centre for Architecture Collection, Montréal.

texture that he felt might somehow resist what he saw as the capitalist, corporate co-option of International Style Modernism and the frivolity of nascent Postmodernism (in 1980 he recused himself from the curatorial team for the first Venice Architecture Biennale shortly before its opening, in protest at the stylistic direction being taken). Significantly, 1981 was the year that the term "Critical Regionalism" first appeared in architectural discourse, in an essay by Alexander Tzonis and Liane Lefaivre: "By way of a general definition we can say that it upholds the individual and local architectonic features as against more universal ones."¹⁹ Frampton published his influential essay "Towards a Critical Regionalism: Six Points for an Architecture of Resistance" in 1983,²⁰ so we can assume that he spent those two years thinking about the theory and searching for examples of the practice.

Japan provided some obvious possibilities, but Frampton needed a champion, and at first it seemed to be a choice between Isozaki and Shinohara. The Frampton archive contains an unpublished translation of a discussion between Isozaki and Shinohara,²¹ apparently given to Frampton in order to allow him to understand their respective positions and disagreements. But around that time, Isozaki was starting to shift toward a Postmodernist sensibility, and he fell out with Frampton over his negative comments on the

Tsukuba Center Building, completed in 1983. Shinohara was also difficult, and perhaps too proud to be used to support someone else's theory, despite having sent a few more polite letters to Frampton implicitly hoping for his ongoing support.

Consequently, Eisenman and Frampton became closer to two other architects from the "New Wave" exhibition: Hiromi Fujii (Eisenman and Frampton both wrote about his work)²² and above all, Tadao Ando. In 1982, Jaquelin Robertson organized a conference at the University of Virginia that brought together many international architects to discuss their recent projects.²³ Ando showed one of his typical concrete house designs, and when he finished speaking, Postmodern classicist Léon Krier spat, "This has nothing to do with architecture. It is a miserable hole." Krier's reaction perhaps confirmed for Frampton that Ando might be his champion in the fight against Postmodernism, an uncompromising designer and thinker able to resist the decadent forces of capitalism, consumerism, commodification, and so forth.

Though Japan is not mentioned in Frampton's original 1983 essay, that year he published a complementary essay in *Perspecta* that deals extensively with Ando, whose theoretical writings

formulate more clearly than any other architect of his gener-

ation a set of precepts which come close to the idea of Critical Regionalism. This is most evident in the tension that he perceives as obtaining between the process of universal modernization and the idiosyncrasy of rooted culture.²⁴

The Frampton archive contains a vast amount of background material about Japan and Tadao Ando, about whom I would posit that he has written more words than any other architect. But if he found in Japan a rich source of alternatives to dispiriting global trends, ironically Japan was also where Charles Jencks found exceptionally provocative examples of the Postmodern eclecticism to which Frampton was so opposed.²⁵ Clearly allowing a broad and contradictory range of possible interpretations, these three exhibitions were the first exposure of the “new wave” Japanese architects to Western audiences, thereby bolstering their confidence and sense of collegiality with architects outside Japan, and leading to many ongoing intellectual engagements and personal friendships. Occurring at the historical moment in which Critical Regionalism became an important theoretical position and Postmodernism became a dominant theme, they enabled modern Japanese architecture to gain a significant position within the global discourse.

NOTES

- 1 Suzanne Frank, *IAUS, The Institute for Architecture and Urban Studies: An Insider's Memoir*, Bloomington, IN, Authorhouse, 2011.
- 2 *The Making of an Avant-Garde: The Institute for Architecture and Urban Studies 1967–1984*, Diana Agrest Films, 2013.
- 3 Frederieke Taylor lecture at Columbia University, 1990, transcribed in Frank, op cit.
- 4 Kenneth Frampton & Silvia Kolbowski (eds.), *A New Wave of Japanese Architecture*, New York, NY, IAUS, 1978.
- 5 Kenneth Frampton & Silvia Kolbowski (eds.), *Kazuo Shinohara*, New York, NY, Rizzoli International Publications, 1982.
- 6 Frank, op cit.
- 7 Maintained by the Misa Shin Gallery in Tokyo.
- 8 See Arata Isozaki, “In'yō to an'yu no kenchiku” [An Architecture of Quotation and Metaphor], *Kenchiku Bunka* No. 33, September 1978, 33–35, later anthologized in his book *Kenchiku no shūji* [The Rhetoric of Architecture], Tokyo, Bijutsu Shuppan-sha, 1979.
- 9 Taylor, op cit.
- 10 Takefumi Aida, Tadao Ando, Hiromi Fujii, Hiroshi Hara, Osamu Ishiyama, Arata Isozaki, Toyo Ito, Fumihiko Maki, Monta Mozuna, Minoru Takeyama, & Atelier Zo.
- 11 Paul Goldberger, “An Overview of Japanese Architecture”, *The New York Times*, 22 December 1978.
- 12 Ada Louise Huxtable, “The Japanese New Wave”, *The New York Times*, 14 January 1979.
- 13 Frank, op cit.
- 14 “America ni uchikaesu: Nihon kenchiku no atarashii nami” [Receding from America: A New Wave of Japanese Architecture], *A+U: Architecture and Urbanism*, No. 102, March 1979.
- 15 Thomas Daniell, *An Anatomy of Influence*, London, AA Publications, 2018.
- 16 Kenneth Frampton, “Modernism's Diffusion: Japan Diary” parts 1, 2, and 3, *Skyline*, April/May/June 1982.
- 17 Frank, op cit.
- 18 SADG, ed., *Kazuo Shinohara, architecte japonais: 30 maisons contemporaines*, Paris, l'Équerre, 1979.
- 19 Alexander Tzonis & Liane Lefaivre, “The Grid and the Pathway: An Introduction to the Work of Dimitris and Suzana Antonakakis”, *Architecture in Greece*, No. 15, 1981.
- 20 Kenneth Frampton, “Towards a Critical Regionalism: Six Points for an Architecture of Resistance”, Hal Foster & Port Townsend (ed.), *The Anti Aesthetic: Essays on Postmodern Culture*, WA, Bay Press, 1983.
- 21 This conversation has been published in Japanese as “Kenchiku ni tsuite” [On Architecture], *Shinkenichiku*, Vol. 50, No. 3, March 1975.
- 22 Kenneth Frampton, ed., *The Architecture of Hiromi Fujii*, New York, NY, Rizzoli, 1987, and Peter Eisenman, “Divisions of Excess: The Emptiness of Hiromi Fujii,” *Seven*

Experimental Essays on and by Hiromi Fujii, Tokyo, Suiseisha, 1999.

- 23 Jaquelin Robertson, ed., *The Charlottesville Tapes*, New York, NY, Rizzoli, 1985.
- 24 Kenneth Frampton, “Prospects for a Critical Regionalism”, *Perspecta: The Yale Architectural Journal*, No. 20, 1983.
- 25 Minoru Takeyama's Niban-kan (1970) is on the cover of the first edition of Jencks's seminal *The Language of Postmodern Architecture*, London, Academy Editions, 1977.

VIEWING ANGLE TO SEE SCALE MODELS —VISUAL MODEL / MOTION MODEL—

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ABSTRACT.

Until recently, there were no facilities in Japan that had the ability to archive scale models of architecture. For this reason, there are not many studies focusing on models. The purpose of this study is to clarify the role of the model in the establishment and development of modern architecture in Japan. The models to be analysed were collected from architectural magazines before 1945 and collections of works by architects. As a result, it was hypothesized that there are two types of models related to modern architecture in Japan: “visual models” and “motion models”.

An example of the “visual models” is Antonin Raymond’s model of the Reinanzaka House. The house is well known as an early example based on the concept of modern movement, not only in Japan but also worldwide. When Raymond first published the architecture in the French architectural magazine “L’architecture vivante”, he used photographs of architectural models, not architecture, even though the architecture had already been completed. Raymond might think that the best way to convey the characteristic of the house was from a perspective from above. At that time, it was difficult to obtain such a viewpoint in actual architecture. In this study, this kind of models that promotes remote vision is called “visual model” following the sculptor Adolf Ritter von Hildebrand. These “visual models” would then have many followers in Japanese architectural magazines.

1. INTRODUCTION

The concept of “pure vision” was presented by the art historian Heinrich Wölfflin in his book “Principles of Art History”, which analysed Renaissance and Baroque art. Pure vision is the idea that a certain era has a unique perspective. According to the idea of pure vision, there must have been a unique perspective of modern architecture. The hypothesis of this paper is that one of them is the gaze of looking at scale models.

A note on changes in architectural training that took place in the early twentieth century has been made by the architectural historian Adrian Forty. Until then, architects had mastered the job while working as apprentices in practical architects’ workplaces, but since then they have learned at academies, universities and architectural schools (except France). The result was that the “architect learned in the training became a principle, not a practice, and created a drawing, not an architecture”.¹ Models can be added to the drawings. There have been many studies on “drawing” so far, but at least in Japan, little research has been done on “models” of modern architecture. All articles on models in pre-war architectural magazines are listed in this study. In this paper, two models are analysed, which are considered to be important turning points. They are two models of Antonin Raymond’s Reinanzaka House and Sutemi Horiguchi’s Okada House. The purpose of this study is to clarify one aspect of pure vision in modern Japanese architecture by analyzing both models.

2. ANTONIN RAYMOND’S MODEL OF THE REINANZAKA HOUSE

2.1. Outline of the Model

Raymond’s Reinanzaka House is not only the earliest

architectural work using exposed concrete, but also an excellent architectural work based on the idea of “composition” derived from Destil (Fig. 1). The house was designed by Raymond shortly after the Great Kanto Earthquake on September 1, 1923, and Raymond began living there the following year in 1924.

This house was first published in the French architectural magazine “L’architecture vivante”, Fall/Winter 1925. It is said that this is the first time Raymond has published his work in magazines and other media.² The medium in which Reinanzaka House was first introduced in Japan was the book “Raymond House”, published in 1931. The house is also listed in his early work, “Antonin Raymond’s Works 1920–1935”.⁴ In all three of these media, photographs of architectural models appear on the first page of the article Reinanzaka House. In particular, in the article of “L’architecture vivante”, the house had already completed but no photos were posted, and the page was composed only of photographs of a scale model of the house (Fig. 2).

2.2. Viewing Angle of the Model of the Reinanzaka House

The reason that Raymond used the model photos rather than the architectural photos when announcing the Reinanzaka House was probably because he wanted to secure a viewpoint from a diagonally upper position. Of the five cuts of model photographs published in these magazines, four were taken from diagonally above.

When photographing a model with a camera, there must be a counterargument that the photographer inevitably takes a picture from an obliquely upper position. However, the actual architecture is also photographed diagonally from above (Fig. 1). This photograph is the most frequently used architectural photograph of Reinanzaka House. This was taken from an eye level upstairs. The caption of this



Fig. 1. Antonin Raymond, Reinanzaka House, Tokyo, Japan, 1924. ©Unknown (Renshichiro Kawakita, & Matsutaro Mineo, Tokyo, Raymond House, Koyosya. 1931, 4).

photo, later published in the book, states, “View from the ruins of the Great East Japan Earthquake, which is currently the site of the U.S. Embassy”.⁵ This photo was taken from the ruins after the Great Kanto Earthquake. Raymond would have wanted to ensure the height of the viewpoint.

2.3. Raymond's Intention

Raymond basically made such kind of models only for architecture with concrete structures, not for architecture with wooden structures. So why did Raymond need models to introduce his concrete construction? Raymond's concrete structure architecture was designed according to the principle of composition, in which several small volumes (= parts) were combined into one architecture (= whole). It is conceivable that what was necessary to present the principle of composition was a perspective obliquely from above. Actually, it is difficult to understand the entire structure of the house only from elevation or plan views. By presenting the viewpoint from obliquely above, it is possible to grasp at a glance the relationship between the parts and the entire house.

In this way, Raymond not only preserved excellent mod-

ern architecture, but also presented a perspective on modern architecture. After that, a large number of works shot diagonally from above of the model titled “Composition” were published in Japanese architectural magazines.

3. SUTEMI HORIGUCHI'S OKOSHIEZU OF THE OKADA HOUSE

3.1. Outline of the Model

Okada House was designed by Sutemi Horiguchi and built in 1933. It had a characteristic design that combines Japanese style rooms and modern style rooms. It is a house that has often been mentioned when talking about the history of modern Japanese architecture by Yuichiro Kojiro, Arata Isozaki, Yasuhiro Fujioka, Terunobu Fujimori etc. This article focuses on a drawing of the Okada House, which has been rarely mentioned before (Fig. 3).

This drawing first appeared in “One House and Its Garden”⁶ published three years after the completion of the house. As architectural historian Hiroyasu Fujioka states, this book might have been made for publication in the Ger-

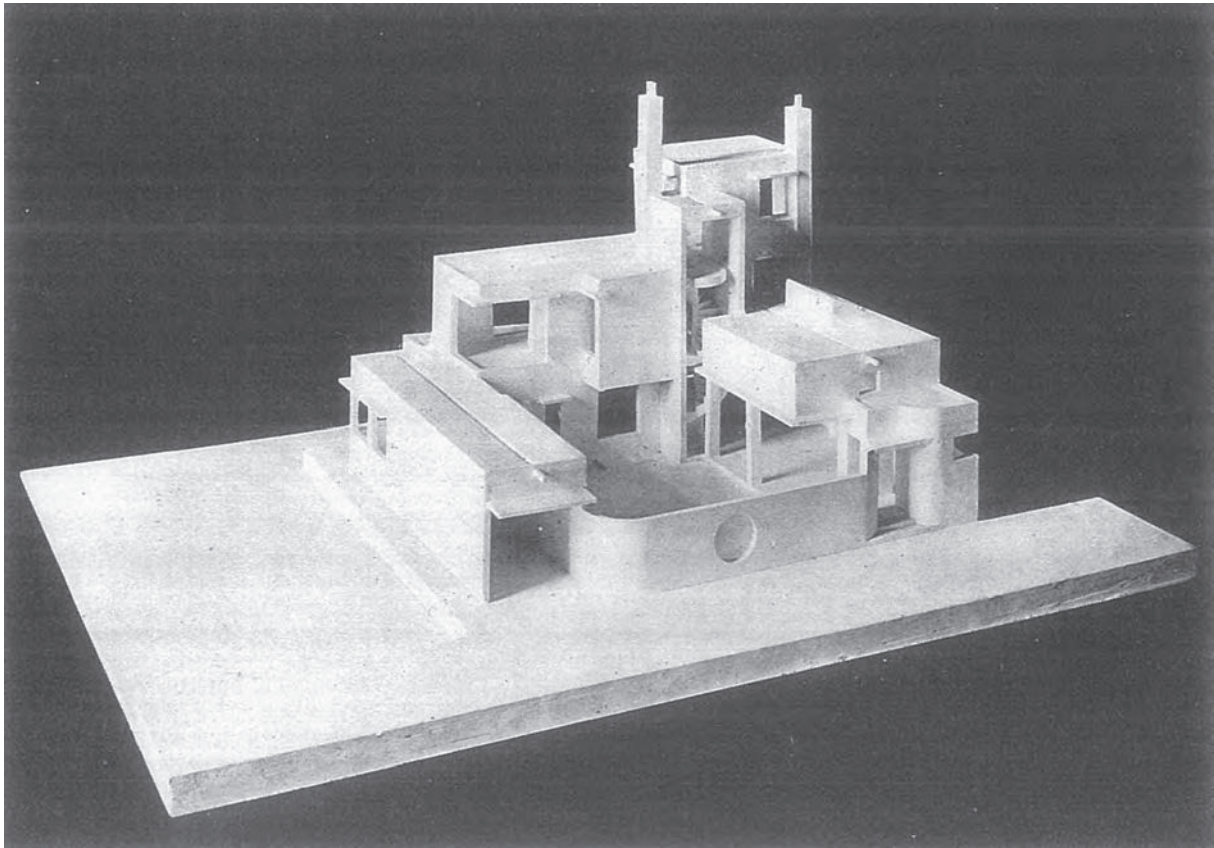


Fig. 2. Antonin Raymond, Reinanzaka House, Tokyo, Japan, 1924. ©Unknown (*L'architecture vivante*, Fall / Winter 1925, 34).

man architectural magazine *Das Werk* (September 1937). This is because the photographs in this book include people who are rarely used in Horiguchi's work, and had German captions.⁷ The drawing bears the year "1935" and the signature of Horiguchi, indicating that it was painted by Horiguchi himself two years after its completion. The gaze of removing the roof and ceiling and looking into the room from above is reminiscent of the tea room's "Okoshiezu".

"Okoshiezu" is a model of a tea house that is made of paper on a scale of about 1/20 to 1/30 and can be folded and assembled. It is well known that Horiguchi was conducting research on tea rooms in parallel with architectural design. He also supervised and published a book featuring the famous tea room's "Okoshiezu".⁸ Even after the war, he noted the benefits of designing using "Okoshiezu" in a design and drafting textbook⁹ which he supervised. In addition, it is known that he actually had students create "Okoshiezu" in lectures on design exercises at the University of Tokyo.¹⁰ From this kind of behavior of Horiguchi, it is highly probable that he himself used "Okoshiezu" when designing the architecture.

3.2. Viewing Angle of the Okoshiezu of the Okada House

What does Horiguchi look at in this drawing? Previous

studies have shown that the owner of the Okada house had called Horiguchi as the designer when the Japanese style rooms had been partially completed. After that, the design was changed, and the Japanese style rooms and modern style rooms were side by side. Based on these facts, it is presumed that the subject of this drawing is the part of the Japanese style rooms that Horiguchi already had as an inoperable part when he started designing, and in particular, the Japanese style living room, which is the vanishing point of this perspective. Horiguchi must have looked into the living room at the boundary between the Japanese style rooms and modern style rooms from above, and considered how to make a compromise between the two. The Okada house was completed after examining the design of the grass garden and the lawn garden and pond, the view of the modern style rooms from the Japanese style living room, and the concrete fence. It is presumed that in this drawing, Horiguchi did not simply look into the interior from above, but looked around from the inside out. It is also a gaze that demands architects in Japan and overseas to see the house like this.

3.3. Horiguchi's Intention

The keyword for understanding Horiguchi's perspective



Fig. 3. Suteami Horiguchi, Okada House, Tokyo, Japan, 1933. ©Suteami Horiguchi.

is “contemplation”. “Contemplation” means intuitive grasp of beauty in aesthetic terms, and Horiguchi used it to explain tea ceremonies. According to an architect Atsushi Shigaki, Horiguchi’s design philosophy is composed of three dimensions.¹¹ The first is the dimension of physical requirements, the second is the dimension of engineering and technical solutions, and the third is the dimension of contemplation. In case of the process of the Okada house construction, there are the existing Japanese style rooms and an intention of the owner (first dimension), a technology to realize it (second dimension), then a final aesthetic judgment (third dimension).

Horiguchi described the “contemplation” at the tea ceremony as follows, “contemplative attitudes at tea ceremonies (...) are independence in themselves. However, this contemplation is, in theory, only subjective, but sometimes objec-

tive, and may participate in tea ceremonies.”¹² The drawing of Okada house shows the perspective of Horiguchi’s contemplation, who participates in the tea ceremony subjectively and objectively. It is a viewing angle from the inside that is different from the outside vision as seen in the Raymond model discussed in the previous chapter. Behind this perspective, there is Horiguchi’s philosophy that describes the tea ceremony as an “art of living composition” and incorporates everything related to tea ceremony, including gardens, tea utensils, and humans into architecture.

4. CONCLUSION

Sculptor Adolf von Hildebrand described human perception in two ways: “visual representation” and “motion representation”.¹³ Visual representation means that the po-

sition of the viewer is far from the object, his eyes are not angled, and are born from a purely two-dimensional whole image obtained when viewing objects in parallel. On the other hand, motion representation is a combination of multiple images obtained when a viewer approaches an object and has to change their eye position or adjust their vision to see it. A three-dimensional image is obtained by combining visual representation and motion representation. The important difference between the two is that the visual representation is one major image, while the motion representation is composed of a number of different images.

A photograph of a model of Reinanzaka House encourages viewers to grasp the overall image of the architecture with “visual representation”. In a sense, it can be called a “visual model”, which offers the best perspective for understanding the structure of the Reinanzaka house. It offers a normative view of modern architecture, not just a view of one house.

However, as Hildebrand points out, “visual representation” alone cannot provide an overall picture of the house. Therefore, in the book “Raymond House” which introduces Reinanzaka House, Raymond puts the photograph of the model on the first page and then interior photos. They are sequential photographs as if the guests were guided through the house in order from the entrance. Indeed, they are Hildebrand’s “visual representation” and “motion representation”, and the two complement each other to present the overall image of the house.

Later, however, Japanese architectural magazines were filled with images such as sculpture-like models entitled “Composition” and visual representations without motion representations such as axonometric drawings. In other words, it can be said that before modern architecture was actually realized, a form of modern architecture without technology appeared in magazines.

On the other hand, as discussed in Chapter 3, the drawing of Okada house recalls Horiguchi’s perception from the inside of motion representation. The fictional Okoshiezu of Okada House can be called a “motion model”. Although it is a single model, it is reminiscent of multiple perspectives, unlike a “visual model”. Horiguchi’s perspective from the inside, which incorporates the exterior of the architecture into the design object, has a sharp criticism of the architecture at the time when the form manipulation of “visual model” was popular. With the exception of clay models by Murano Togo, there weren’t many models that could be linked to the genealogy of these “motion models”.

Both Raymond’s model and Horiguchi’s drawings were created to transmit to Europe, the center of modern movement at the time. It can be said that both “visual model” and “motion models” played a major role in the establishment and development of Japanese modern architecture in the tide of global modern architecture.

NOTES

- 1 Adrian Forty, *Words and Buildings: A Vocabulary of Modern Architecture*, Tokyo, KAJIMA INSTITUTE PUBLISHING CO., LTD., 2006, 201.
- 2 Hiroshi Misawa, *Antonin Raymond Architecture*, Tokyo, KAJIMA INSTITUTE PUBLISHING CO., LTD., 1998, chronology.
- 3 Renshichiro Kawakita & Matsutaro Mineo, *Raymond House*, Tokyo, Koyosya, 1931.
- 4 Katsuya Nakamura, *Antonin Raymond’s Works 1920–1935*, Jonan-shoin, 1936.
- 5 Isamu Kurita, *Antonin Raymond*, San-Ichi Shobo Publishing Inc., Tokyo, 1971, 99.
- 6 Sutemi Horiguchi, *One House and Its Garden*, Tokyo, Kyoyosha, 1936.
- 7 Yuichiro Kojiro & Hiroyasu Fujioka, “Sumi Horiguchi, Romanticist and Rationalist”, *The housing journal for builders and designers*, Tokyo, Kenchiku Shiryo Kenkyusha CO., LTD., 1995, 8–27.
- 8 Sutemi Horiguchi, *Chashitsu Okoshiezu*, Tokyo, Bokusui-shobo, 1963–1967.
- 9 Sutemi Horiguchi & Kunio Maekawa, *Shinsei Kenchiku Seizu*, Tokyo, Omu-sha, 1958.
- 10 Eizo Inagaki, “Okoshiezu Kaiso”, *Contemporary architect Sumi Horiguchi*, Tokyo, KAJIMA INSTITUTE PUBLISHING CO., LTD., 1983, 144.
- 11 Atsuhiko Shigaki & Takeshi Nakagawa, “study on expression process of Japanese Modern Architecture 3 : A philological study of Sutemi Horiguchi in the 1930’s”, *Summaries of technical papers of annual meeting*, Tokyo, Architectural Institute of Japan, 1993, 1493–1494.
- 12 Sutemi Horiguchi, “The ideological background and composition of the tea house”, *Tea room research*, KAJIMA INSTITUTE PUBLISHING CO., LTD., 1969, 798.
- 13 Adolf von Hildebrand, *The Problem of Form in Painting and Sculpture*, Chuokouron-bijyutsu, 1993.

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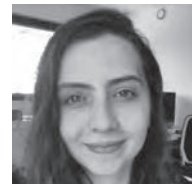
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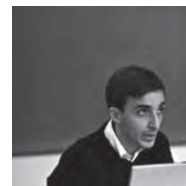
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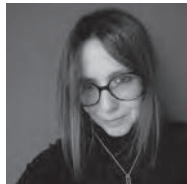
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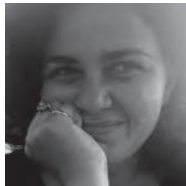
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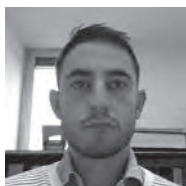
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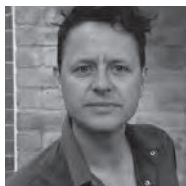
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