

SAHANZ 2018



HISTORIOGRAPHIES OF TECHNOLOGY & aRCHITECTURE

Proceedings of the 35th Annual Conference
of the Society of Architectural Historians
of Australia and New Zealand

Victoria University of Wellington 4–7 July 2018

Historiographies of Technology and Architecture
Proceedings of the 35th Annual Conference of the Society of Architectural Historians
of Australia and New Zealand

Edited by Joanna Merwood-Salisbury, Michael Dudding and Christopher McDonald
Published in Wellington, New Zealand by SAHANZ, 2018
ISBN: 978-0-473-45713-6

The papers in this volume were presented at the 35th Annual Conference of the Society of Architectural Historians of Australia and New Zealand, held on 4-7 July 2018 at the Faculty of Architecture and Design, Victoria University of Wellington, New Zealand.

Abstracts and full papers were subject to blind peer review by two referees. A full list of referees is published at the back of these proceedings.

Copyright of this volume belongs to SAHANZ; authors retain the copyright of the content of their individual papers. The authors have made every attempt to obtain written permission for the use of any copyright material in their papers. Interested parties may contact the editors.

Publication of the research documented in these Proceedings underscores the Society's commitment to academic freedom and academic integrity. Conclusions drawn from this research have been tested through appropriate formal academic review processes. The Society upholds the principle of a member's ability to express a view or form an opinion based on these conclusions. However, the conclusions and views expressed in the Proceedings do not necessarily reflect the views of the Society.

Historiographies of Technology and Architecture

The call for papers began with the observation that contemporary descriptions of the future of architecture and architectural practice continue to proclaim the benefits of technology: a built environment that is automated and intelligent; building construction via robotic fabrication processes; form and space-making utilizing virtual reality. The conveners asked, in what ways do our current obsessions echo, extend or overturn the profession's historic preoccupation with technology? The privileging of technology within architecture had its most obvious manifestation in the modernist period, when architects borrowed knowledge, practices and imagery from other technical fields. But the projection of architecture as technology has been ever present and has its own deep history. The Greek root "tekhnē" – meaning "art" or "craft" – reminds us that conceiving and making are inextricably linked. This dependency suggests that "tekhnē" lies at the core of architectural practice: the task of creating architecture has always been subject to modes of representation and analysis that can be thought of as 'technical.' Equally, the discipline of architecture is responsive to changes in manufacturing, engineering and the other applied sciences. Frequently, this reflexiveness is mediated by the social changes that are wrought by these new technologies. The conveners called for investigations into the changing manifestations of this relationship, welcoming papers exploring historiographies of architecture and technology considered within the global context. While they were particularly interested in papers examining the deployment of architecture as a technology of colonization and resistance in Asia and the Pacific, the term was interpreted widely to include not just technologies in the structural and environmental sense, but also: indigeneity and the vernacular; cross-cultural transfer of technology; sustainable and ethical technologies; individual architects and their preferred technologies; future technologies; histories and theories of architectural representation; technology and heritage practices; and even oppositions to technology.

Michael Dudding, Christopher McDonald and Joanna Merwood-Salisbury
Conference Conveners and Editors of the Conference Proceedings

Historiographies of Technology and Architecture

Contents

Keynote	1
Heedless Oblivion and Techno-Politics in Postwar American Architecture Claire Zimmerman	
The Ecole Des Beaux-Arts and the Advent of Modern Architecture in Interwar Iran Peyman Akhgar	2
Architectonics in Pre- and Post-Revolutionary Iran Rahmatollah Amirjani	16
Parlourinstaguest: How are New(er) Media Technologies Shaping the Discourse of Architecture? Alysia Bennett, Tania Davidge and Charity Edwards	30
“Their Presence Could Work a Revolution”: Women Architects and Homes in New Zealand in the 1900s-1930s Elizabeth Cox	47
Rudolph Schindler’s Church School Lecture On ‘Form Creation’ (1916): A Preliminary Reading James Curry and Stanislaus Fung	58
Modernist Concrete: Technologies of Brisbane Church Architecture in the 1960s Lisa Marie Daunt	78
William Wardell (1823-1899): Architect and Engineer ‘Convent and School, Kew’, 1889 Ursula M. De Jong	93
Learning From Lost Architecture: Immersive Experience and Cultural Experience as a New Historiography Alison De Kruiff, Flavia Marcello and Jeni Paay	113
The Rise and Fall of the Bungalow Shenuka De Sylva, Brenda Vale and Gordon Holden	127
Tradition vs. Technology: Periodicals as a Driving Force for the Architectural Debate: The Spanish Gaze Over the Pacific Ana Esteban-Maluenda	140

The Visible Invisible: X-Rays and Claude Bragdon's Fourth Dimension Marcus Fajl	157
The Technology of Axonometry in 1960s Britain: Kenneth Frampton and Peter Eisenman Sally Farrah	174
Like Gordon Wilson, Minus the Heritage Protection: Auckland's Upper Greys Avenue Flats, 1954-1959 Julia Gatley and Gina Hochstein	188
Potential For Interdisciplinary Collaboration Between Architecture and Social Science in Post-War Urban Redevelopment Morten Gjerde, Emina Kristina Petrović and Casimir Macgregor	202
Overdue For Change: Australian University Libraries After World War II Philip Goad, Hannah Lewi and Andrew Murray	216
"An Index of Real Effect": Early Photographic Reproductions in Australia's Building Press Paul Hogben	232
Big Data and Architectural History: How to Characterise Architects Using Big Data Adrian Humphris and Geoff Mew	247
Sight and Sensation: Observations on I. M. Pei's Approach to Composition Michael Jasper	257
Engrained Modernity: Robin Gibson's Pinkenba Grain Elevator Lloyd Jones	272
Historiographies of Image-Technologies in Architecture at the Turn of the Twentieth and Twenty-First Centuries Akari Nakai Kidd and Sanja Rodeš	285
Technology, Craft Culture and Sustainability: The Case of Pre-Modern Chinese Architecture Mengbi Li	301
Building Construction and Meaning: The Origin and the Occupation of Chinese Tingtang Pengfei Ma	311
Concrete Complexities: Reinforced Concrete in the Architecture of Auckland's Town Hall, Chief Post Office and Ferry Building Milica Madanovic	326
Tools, Which Tools?: The Changings of Architects Gill Matthewson	338

From Emergency Reception Centres to Housing Experiments: Migrant Accommodation and the Commonwealth Department of Public Works	349
Renee Miller-Yeaman	
The Problem of Air New Zealand House in 1960s Auckland	363
Luciana Mota, Elizabeth Aitken Rose and Julia Gatley	
Concrete: A Western Australian Tradition	378
Andrew Murray	
Knowledge Transfer in the Nineteenth Century: The Short History of Béton Aggloméré in Queensland	391
Elizabeth Musgrave	
On Why We Should Consider that the Interior Perspective Render is Art, After All	405
Louie T. Navarro and Gerhard Bruyns	
Edward Bell and the Technology of Sydney's Third Water Supply Scheme	419
Jennifer Preston	
The Stone Sarjeant: Architecture, Materiality and Colonisation in Pukenuamu/Queens Park, Whanganui	434
Matt Ritani	
American Modernist Tectonics vs Australian Gold Coast Topos	456
Marja Sarvimäki	
Rangahaua: Architecture and Cultural Interface	469
Mark Southcombe	
Eduardo Torroja, Concrete and Spain's Indigenous Structural Types	486
Brett Tippey	
Media(ted) Practice: The Globalisation of Architecture Through Standards, Softwares, and Spatial Imaginations	501
Aaron Tobey	
R.G.S. Beatson: From Student Work to Auckland Houses	519
Brenda Vale and Robin Skinner	
Intelsat: Satellites, Science and Science Fiction	535
Paul Walker	
Acknowledgements	551

Keynote

Heedless Oblivion and Techno-Politics in Postwar American Architecture

Claire Zimmerman
University of Michigan

The military-industrial complex of the United States began to take shape before WWI, but became an unprecedented force around WWII, both before and after the war itself. The architectural footprint of US global political and economic power in this period is generally associated with signature embassies, Hilton hotels, and large steel and glass corporate skyscrapers, all increasingly optimised by new building technology. Yet the buildings that enabled the growth of US political power were largely industrial buildings, constructed under regimes of intense competition and rapid change throughout the first half of the twentieth century. Complimenting the aesthetic program of this period was a campaign of industrial expansion that took place largely out of sight. The invisibility of US industrial power throughout the postwar period was gradually institutionalized by a retreat from the city—either to exurban sites nonetheless within reach of an urban workforce, or within the city itself. Hidden from view behind earthen berms, these sites came to replace the street front face of the urban factory, site of strikes and protest, and part of the public domain. This talk traces the invisibilisation of those parts of the built environment through which political domination was attained in the years following WWII. Focusing on the astonishing wartime output of Albert Kahn Associates, nonetheless advances more general claims about the project of US politics through technology, and the failure of architects and critics to call attention to the behemoth growing around them, a case of tacit yet heedless oblivion.

Claire Zimmerman is the author of *Photographic Architecture in the Twentieth Century* (Minnesota, 2014), and co-editor of *Neo-avant-garde and Postmodern: Postwar Architecture in Britain and Beyond* (New Haven, 2010). She co-edited *Grey Room 71* (Spring 2018), subtitled “The Cost of Architecture,” and recently published an article in the final volume of *AA Files* (#75). Current projects include a book manuscript with the working title *Invisible Architecture*, a historical analysis of the impact of US industrialisation on architecture through the Kahns of Detroit, and continuing work on the impact of photographic architecture on producers and users of buildings worldwide. She is an associate professor in History of Art and the Architecture Program at the University of Michigan, and Director of Doctoral Studies in the latter.

The Ecole des Beaux-Arts and the Advent of Modern Architecture in Interwar Iran

Peyman Akhgar
University of Queensland

Abstract

From the late nineteenth to the early twentieth century, Iran experienced one of the darkest periods of its history. Poverty, chaos, and material shortages of the First World War exacerbated the situation to the extent that almost all factions of the society were accorded with the rise of a strong government. It was only at this moment that Reza Shah (1925-1941) could organise the Coup of 1921 and become the new ruler of Iran. By the dawn of the 1930s, Reza Shah reached his absolute power. He placed among his priorities the construction reform to accommodate modern functions vital for the shaping of his government. Having a long-lasting cultural relationship with France, the Beaux-Arts graduates were among Reza Shah's principal architects and were promptly absorbed by the state. Alongside this, the interwar era brought with itself the popularity of new materials and construction techniques, particularly reinforced concrete, and created a new design approach prevalent among the students of the Ecole des Beaux-Arts. When the Beaux-Arts graduates travelled to Iran, they introduced a modern architecture, the design of which was originally emanated from their education at the Ecole des Beaux-Arts. Notwithstanding the significance of this issue, there is no publication pointing directly at the influence of the Ecole des Beaux-Arts on the advent of modern architecture in Iran. By looking at some works of Mohsen Foroughi, the first Iranian ever graduated from the Ecole, this article endeavours to unearth the significance of this noteworthy French school in the shaping of Iranian architecture of the interwar era as well as the role of Mohsen Foroughi as the facilitator of this architectural transformation.

The history of Iranian architecture of the Pahlavi era (1925-1979) has proven its significance through ongoing publications that became available from the early twenty-first century. The "Ecole des Beaux-Arts" is a set of words in almost all writings concerning modern architecture in Iran, but there is no publication on how the Ecole des Beaux-Arts, its architectural education as well as its encounter with interwar modernism, contributed to the creation of the new architectural language in Iran. This research will

add value to the understanding of the Iranian interwar architecture by returning to one of its initial sources, the agency of the Ecole des Beaux-Arts.

The concept of the “architect” as an educated person, who had not acquired his knowledge by experience but by officially enrolling in an architectural institution, was only introduced to Iran during the interwar era. Iran of the nineteenth and early twentieth century was deprived of an organised system of architectural education. The architect, known as *me'mar*, was a builder who worked traditionally with an *ostad* (master). The experience was his strongest tool through which he could acquire his architectural knowledge. It was in the interwar era, during the reign of Reza Shah (1925-1941), that the Iranian government for the first time felt the urge to employ educated architects. Reza Shah, the new ruler of Iran, a patriot and nationalist, insisted on changing and modernising the appearance of the country by implementing intensive programs of reform including the construction of modern buildings for housing new institutions, banks, ministries, etc. Lack of educated architects and incapability of the *me'mars* obliged Reza Shah to use foreign-educated architects, among whom the Beaux-Arts graduates found an unquestionable reputation.

Reza Shah and Architecture

The interwar era witnessed the rise of nationalist intelligentsia throughout the Middle East who aimed at reconstructing their lost national identity by criticising their past and hoping for a better future. It was a period of rigid modernisation and intensive reforms, which marked a socio-cultural shift from a traditional society towards a modern and Western-like nation-state governed mainly by fierce nationalists. Reza Shah ruled Iran for sixteen years from 1925 to 1941, during which he had two overriding goals: “to restore Iran to some of its former greatness and to establish himself as the absolute power on top of a reconstructed nation”.¹ When Reza Shah reached power, he soon established a dictatorship. He curbed the power of clergies who had a great social status during the Qajar era (1789-1925) and leaned strongly towards Iran’s pre-Islamic national identity. From 1931 to 1941, the Shah’s power became absolute and arbitrary. At the end of 1934, when the concept of an “Aryan Race” was the inseparable part of much debates in Europe, the name of the country, suggested by the Iranian embassy in Berlin, was officially changed from Persia to Iran (the land of Aryans).² After his visit to Turkey, in 1935, he ordered all men to wear European hats, and in February 1936 women were forced to give up their traditional black veil.

Reza Shah’s patriotic feeling and his tendency for being Iran’s absolute power, however, did not exclude architecture from his program of reform. Architecture was immediately turned into a tangible way of representing Iran’s lost power, prestige and glory. Arguably,

the first moment that Reza Shah became aware of the significant role of art and architecture was few months before his coronation, on 22 April 1925, when the American art historian and publicist Arthur Upham Pope (1881-1969) delivered a memorable speech on "the Past and Future of Persian Art". Organised by Mohammad Ali Foroughi, the President of Society of National Heritage³, later Reza Shah's first Prime Minister, this speech was for a group of prominent Persians including Reza Shah, Reza Khan at the time.⁴ In his remarks, Pope extolled the greatness of the Persian art and architecture as well as its worldwide significance, but also condemned its deterioration by some Persian rulers especially the Qajars. Moreover, Pope admired those Persian kings who were ardent advocates of artists and demanded support for a conscious renaissance.⁵

Pope's speech was in line with Reza Shah's appreciation of Iran's past glories, but, as Abdi pointed out, "patronage of arts and culture was a new challenge that he (Reza Shah) found particularly appealing".⁶ A few days after Pope's speech, Reza Khan ordered the restoration of the famous Sheikh Lutfullah Mosque in Isfahan using his personal funds and the construction of the National Bank (*Bank-e Melli*) in a purely "Persian style".⁷

Reza Shah's fondness for monumental architecture became apparent after his coronation, in his second visit to Persepolis in 1928, the most prominent Iranian pre-Islamic complex. There, Reza Shah was once again impressed by the glory of Persian kings, but this time conscious of imperial iconography embedded in their architecture. In his speech, he professed to an assembly of officials:

When I saw the structure of Persepolis, I was moved by those colossal monuments, but seeing them in such impaired state deeply depressed me. I was nonetheless delighted to learn that such great kings have ruled Iran and left these magnificent remains.⁸

Later in 1936, he left a comment for the construction of a guest house in Tehran: "the guest house building must be visible, scenic, and of grandeur".⁹

Reza Shah who sought his government to be as legitimate as the Great Persian Empire was now aware of the power of architecture as a new tool in his hand. He had preferences for pure Persian style and monumental architecture, but at the same time, he did not interfere directly in the work of design. Reza Shah greatly trusted his foreign-educated architects.¹⁰

The Beaux-Arts System, a Design Method

The dominance of French culture and language over Iran started in the nineteenth century. During the nineteenth century, Iran witnessed the foundation of different types of French schools inside its borders. Almost all educated Iranians could only speak French as the French language was the primary language of teaching in many schools.¹¹ The Franco-Iranian cultural relations, however, significantly intensified in 1900, when a Qajar ruler, Mozaffar ad-Din Shah (1896-1905), granted to the French the exclusive right of archeological excavation throughout Iran. The rise of Reza Shah, however, heralded a new era. Soon after his coronation, in 1927, Reza Shah terminated the convention of 1900, but the French cultural influence did not diminish. France remained the primary destination of Iranian students by attracting almost eighty percent of all students studying abroad.¹²

Perhaps the key event that led to the flow of the Beaux-Arts graduates in Iran happened in 1929 when to compensate the French for the cancellation of the 1900 convention, the Iranian government agreed with the employment of a French citizen as the first director of the "Antiquities Service of Iran".¹³ That nominated Frenchman was André Godard who studied architecture at the Ecole from 1901 to 1908. Following Godard, two other influential French citizens, Maxime Siroux (1928-1934) and Roland Marcel Dubrulle (1926-1934), travelled to Iran in 1935. It was not until February 1932 that the first Iranian, Mohsen Foroughi, was victorious at the entrance examination of the Ecole and returned to Iran in 1938.¹⁴

The Ecole des Beaux-Arts was a cosmopolitanism institution in Paris that offered tuition-free education by welcoming apprentice painters, sculptors, engravers, and architects from many countries. It provided a system of professional training in architecture that taught architecture from 1819 until 1968.¹⁵ The atelier was the core of the Ecole's education system where most of the student's learning was achieved. In order to graduate, the student had to fulfil four levels of requirements within the regulations of the Ecole. The lowest was preparation for the admission, above it was the *seconde classe* and *première classe*. And at the top, was the *diplôme* project as the final step.¹⁶

The Beaux-Arts system was premised upon the principles of classical composition.¹⁷ It was a method of design through which the student could attack and study any design problem.¹⁸ Most architectural problems at the Ecole were mere exercises of composition initiated with an *esquisse en loge* (sketch executed in small cubicles), executed usually in a twelve hour time frame. During this limited time, the preliminary ideas of composition would be generated. The preliminary ideas executed *en loge* were called *parti* (choices/ to make a

choice), a figure or diagram that highlighted “the main characteristics of a program’s distribution of an ensemble and the axes of composition.”¹⁹ The axes that the *parti* generated played a key role in arranging various elements of design as well as determining the dominant element, the focal point, located along the principal axis.²⁰ At the Ecole, symmetrical *parti* was preferred over asymmetrical ones, but sometimes it was inevitable to make a composition asymmetrical. The aim was to single out an appropriate composition that could address all practical and aesthetical requirements of a given program.²¹

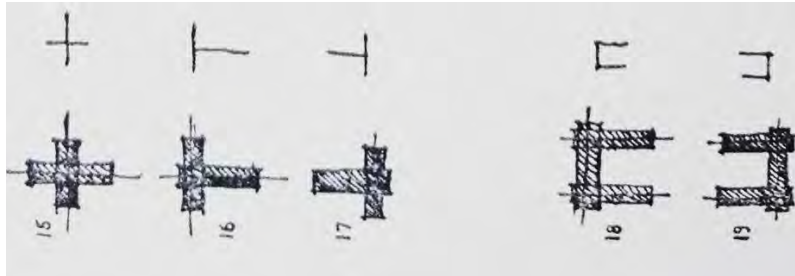


Figure 1. Some compound compositions described by Curtis.
 Making a good composition was the first thing one had to consider at the Ecole. The initial decisions regarding architectural composition had to be made through *esquisse en loge* by choosing the most suitable *parti*: (Nathaniel C. Curtis, *Architectural Composition*, (Cleveland: J. H. Jansen, 1935), p. 192)

The architectural style, however, came after the composition. The Beaux-Arts system was not “local and specific” but a “method” of design,²² which left the student with a freedom to shape the exterior facades according to the given program and its assumed location. With the Beaux-Arts design method, the student was able to create an excellent *parti*, addressing issues of function and circulation, and then decide upon the outward appearance of the building that expressed the dominant character of design.²³

Beaux-Arts, Modernism, and New Technology

The interwar era marked a challenging period in French architecture during which the Ecole des Beaux-Arts lost most of its hegemony. The technology of reinforced concrete gradually found unprecedented popularity among students and made the Ecole’s officials receptive to modern constructions. Avant-garde architects criticised the Ecole’s pedagogy and influenced more progressive students of the Ecole.²⁴ In 1924, the use of reinforced concrete first appeared in the designs of Grand Prix competition,²⁵ and after 1930, for the first time, the winner of the Grand Prix was the one who used reinforced concrete rather than cut stone in his design.²⁶

However, the dominance of new technology and the influence of modern movements did not mean that the Ecole would give up its long-lasting doctrine. Quite the opposite, most Ecole's followers were seeking a way to consolidate their tradition through modernising the appearance of buildings without sacrificing their beloved Beaux-Arts classical principles and design method. A modern architecture whereby they could sustain the Ecole's fame and simultaneously train students to design considering new technology and materials. This new approach was thus an unadorned classicism, a moderate approach the significance of which became explicit in 1932 when Emmanuel Pontremoli the new director of the Ecole encouraged students to eliminate the extensive amount of ornamentation and to learn "more practical measures".²⁷ By the mid-1930s most students applied "principles of classical composition, such as axially, symmetry and monumentality, with modern materials such as reinforced concrete."²⁸

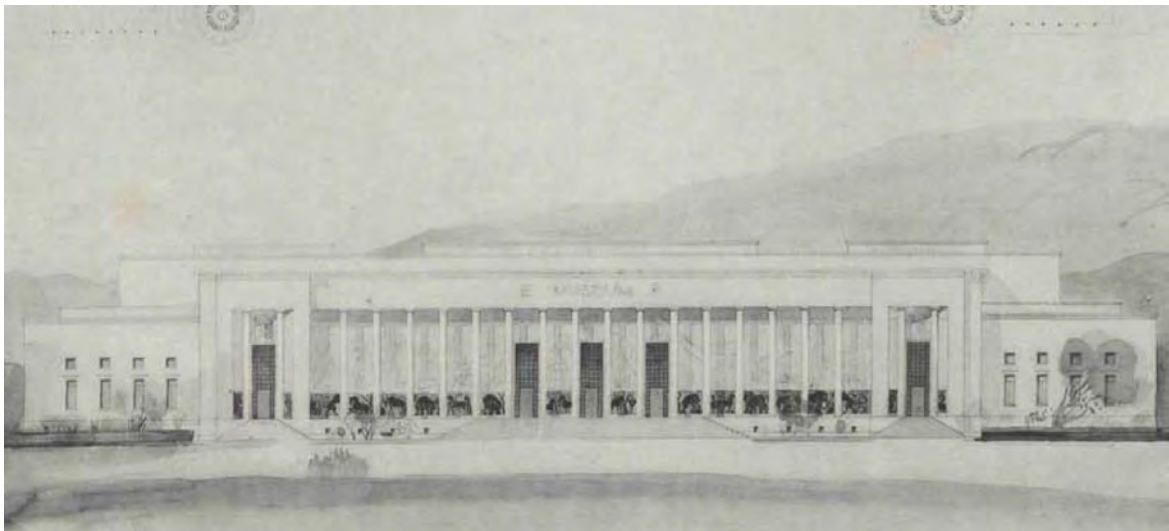


Figure 2. Student project by M. Julien, "*un musée des science natural* (a museum of natural science)". Projet rendu (Jan. 1937).

The popularity of reinforced concrete resulted in unadorned classicism, frequently implemented by students of the Ecole. (Les médailles des concours d'architecture de l'École Nationale des Beaux-Arts, Paris: Vincent, 1936-37, pl. 80)

It is true that the modern movement lessened the Ecole's omnipotence, but could not taint the Ecole's unique role as the leading cultural force in both architectural education and state-design commissions in France during the interwar period. The Beaux-Arts graduates remained the chief architects of the state, and their simplified classicism was considered modern and appreciated by the French government at the time.²⁹

The Beaux-Arts architecture, being modern in structure and appearance, monumental and classical in nature, was perhaps the best design method for fulfilling the nationalistic ambitions of Iran's dictator during the transitional period of the interwar era.

Iran, Ready for Modern Constructions

The interwar era portrayed a period of rapid modernisation and industrialisation in Iran, which was rigidly stipulated by powerful groups of the intelligentsia and nationalists, on top of them Reza Shah. During the 1930s, Iran was able to make a big step forward. New industries were gradually developed and the access to new construction materials, such as cement, steel and glass, was facilitated.³⁰ In 1934, the foundation of the first cement factory near Tehran heralded a new era of building construction that gave cement and later reinforced concrete an exceptional availability in the construction of state-owned buildings.³¹ The enormous popularity of reinforced concrete, as a substantial deviation from the use of the traditional material, resulted in the factory's remarkable expansion in 1939,³² which encouraged the construction of a considerable number of modern buildings in Iran. It was now the time for the Beaux-Arts graduates that with the accessibility to the new construction materials and their already-achieved learnings in Paris, to create a modern style of architecture and label it as Iranian.

Mohsen Foroughi: from Paris to Tehran

The first Iranian ever admitted to the Ecole des Beaux-Arts was Mohsen Foroughi (1910-1983). Born to a learned family in Tehran on 28 June 1910, Mohsen was the son of Reza Shah's first prime minister and a man of letters, Moḥammad-Ali Foroughi. After finishing his traditional schooling in Tehran, Mohsen enrolled in the Teachers College. Early in 1927, when Iran was experiencing the rise of an educated middle-class, together with his father and one of his brothers, he left Iran to embark on his new life and studying in Europe. They finally settled in an apartment in Paris where his father asked him to approach Qazvini (an eminent Iranian scholar) every Sunday. There, Mohsen "learned much about literature, history, philosophy and even architecture".³³ He began his study in Paris by enrolling in "the math department at the university, but after three years, he had a change of heart."³⁴ Art and architecture outshined.

Mohsen's penchant for art and architecture encouraged him to take part in the stringent entrance examinations for both "the Ecole Centrale des Arts et Manufactures and the Ecole des beaux-arts".³⁵ The outcome turned out to be successful in both tests. He chose the latter and turned enthusiastically towards architecture.

Mohsen enrolled at the Ecole des Beaux-Arts in February 1932 and entered the atelier of Gustave Umbdenstock and Paul Tournon as an *étranger* (foreigner).³⁶ His successful dossier at the Ecole demonstrates his trust in the Beaux-Arts design method. He set out his study as the *seconde classe* student on 8 March, 1932. Fulfilling the requirements of the *seconde classe*, he started the penultimate step, the *première classe* to which he was promoted on 16 July, 1934. Mohsen performed an outstanding job in two of his design projects in both of which he won prestigious medals. On 28 May, 1935, Mohsen obtained the highest award, *première médaille* equal to three credits, in an architectural project titled as *une Ecole des langues Orientales*, a School of Oriental Languages (figure 2). His sympathy for Iranian architecture persuaded him to pick an Iranian topic for his final project, titled as *une résidence d'été en Perse*, a summer residence in Persia. His final project was evaluated as *très bien* (very good), for which he accomplished a silver medal and the third prize of the best *diplôme*.³⁷ There, like many other students, he showed off his passion for simplified classicism, but he also expressed his affinity with Iranian architecture.³⁸ The symbolic use of Iranian elements such as *ivan*³⁹ as a gateway to the building decorated with *Kashikari*⁴⁰ was the most remarkable feature that he applied in at least those two projects. Surprisingly, the two projects above were not only the most successful projects in Mohsen's dossier, but also the only ones with topics related to Iranian and oriental architecture.



Figure 3. Student project by Mohsen Foroughi, “*Une Ecole des langues Orientales* (A school of oriental language)”, projet rendu (main elevation), March 1935. In this project, designed with asymmetrical composition (fig. 5, A), Mohsen's strict approach towards unadorned classicism as well as the apparent use of vaulted *ivan* and *kashikari* for highlighting the entrance, is noticeable. (Courtesy of the Ecole des Beaux-Arts' Archive)

Tackling the last step of the Ecole's educational program, Mohsen was graduated on 5 June, 1937. Accompanied by Qazvini, he returned to Iran in 1938 and became one of the most prolific architects during the last year of Reza Shah's reign.⁴¹ Apart from practical architecture, Mohsen participated actively in academic arenas by teaching in some faculties of the University of Tehran, the first Western-like University in Iran founded in 1934. First at the School of Literature, then at the Technical School, and finally as a professor of architecture atelier, he played a decisive role in the establishment of the first academic school of art and architecture, the School of Fine Arts in 1940, the program of which was modelled after the Ecole des Beaux-Arts.

Mohsen's Architecture

As discussed previously, the Beaux-Arts student of the interwar era especially mid-1930s was trained to create modern architecture. But unlike the avant-garde architects, the Beaux-Arts architect was taught to design expressive, but conservative, modern structures and choose a unique character that he considered the best for every individual project. From 1938 to 1941 (the end of Reza Shah's reign), Mohsen remained a rigid follower of the Beaux-Arts design method in major state-commissioned buildings. Regarding the character, he devised the best solution considering the significance, purpose, and function of the given program. He had two principal approaches concerning building's outward appearance, in both cases he followed the Beaux-Arts interwar classicism. Sometimes he pursued the unadorned classicism usually covered with stone and cement, propagated in Paris mainly by the Ecole and its graduates,⁴² or he localised the outer appearance of his architecture. While Beaux-Arts simplified classicism still reigned, some of his buildings were entrusted deliberately with an Iranian taste, a manifestation of Iranian national identity; an approach in which Mohsen had already been master of during his study in Paris.

An example of the former was the Faculty of Law and Political Science (1938-1940), Mohsen's first serious design project in Iran, located on the main campus of Tehran University. The University, as the leading institution of higher study, was the ultimate result of Reza Shah's educational reforms, the construction of which was headed entirely by the Beaux-Arts graduates. The design initiated by two French architects and archeologists, André Godard and Maxime Siroux. Later, Mohsen and Roland Marcel Dubrulle assisted them in the design of four other buildings.⁴³ Being influenced by the modern movement, and by considering the concept of the University as a product of the West,⁴⁴ as well as the University's concurrent foundation with Iran's first cement factory, the Beaux-Arts graduates decided upon designing a modern set of buildings. The University buildings were finally constructed with cement, metal and glass for the exterior elevations and technology

of reinforced concrete combined with baked brick and cement for the structure. The construction of the University, subjectively and objectively, was, in fact, a green light for placing Iran, albeit superficially, in the circle of developed countries.

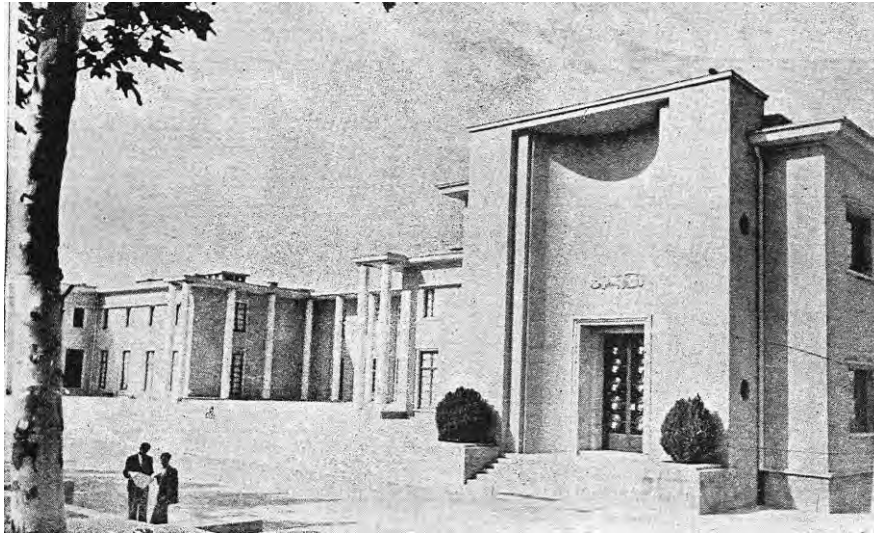


Figure 4. The Faculty of Law and Political Science designed by Mohsen in 1938. Cement elevations, monumental entrances, and grand U-shaped portico are the key characteristics of the main façade of the Faculty. (*The Regulation of Tehran University*, (Tehran: Tehran University, 1947), 105)

For the design of the Faculty of Law and Political Science, Mohsen singled out a symmetrical *parti* with a central axis and three subordinate axes positioning perpendicular to each other (fig. 5, B). It is a three-story building with a program divided into two major parts in the ground floor. The library and its facilities on the left, small rooms such as offices and restrooms on the right, for each of which he designated a grand entrance. For compensating lack of attention along the central axis, he designed a U-shaped, covered porch, and situated the dominant element, the biggest room, the theatre, on that axis (fig. 4).

Mohsen's passion for traditional Iranian architecture did not let him ignore the noble architecture of his motherland. He executed some of his most remarkable works with specific attention towards Iranian architecture. The best examples of this kind were four branches of the National Bank designed around 1940. The banks were structured mainly with reinforced concrete and constructed with stone facades in four different Iranian cities, namely Tehran, Shiraz, Tabriz, and Isfahan.

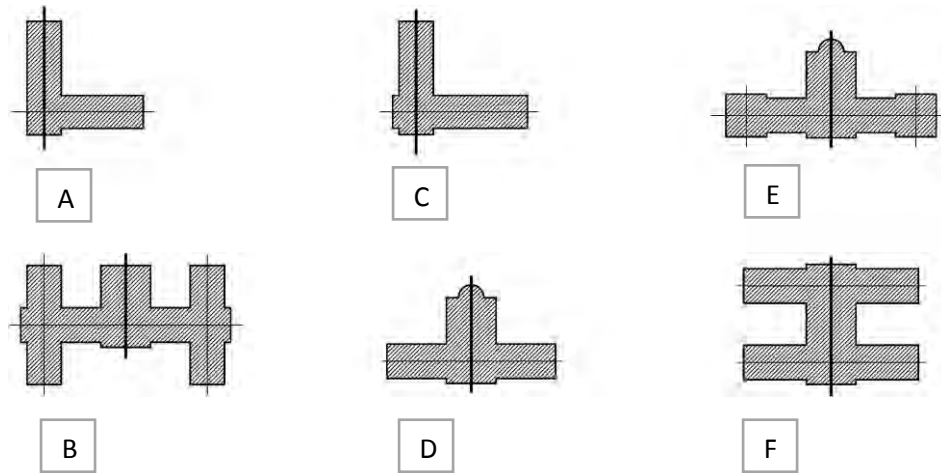


Figure 5. Some plan compositions accompanied by the axes of design used by Mohsen Foroughi (the principal axes has been drawn with a thicker line). A: a school of oriental language (Ecole's project), B: the Faculty of Law and Political Science, C: Isfahan National Bank, D: Shiraz National Bank, E: Tehran National Bank, F: Tabriz National Bank. (By Author)

Mohsen's approach in the design of the banks was almost identical to what he had already experienced at the Ecole, but this time with careful consideration of Iran's climate and simplifying Iranian elements on the main façade. Later, Mohsen, in an article published in 1961, defined "the sun" as one of the most effective factors in shaping the buildings throughout the history of Iranian architecture. He wrote:

In all old [Iranian] residential houses, the important rooms facing the south were endowed with *iwans*, and there were no windows in the Eastern and Western façades. In these buildings, if the proportion of *iwan* and shade-giving elements is calculated, they protect the building from the summer heat and absorb the winter sun.⁴⁵

The most particular of those shade-giving elements used by Mohsen during the interwar era was the long and linear covered porch in the southern elevations of his buildings (fig. 6).

He also continued the limited application of *iwan* and *Kashakari*, but this time with the rejection of imitating the traditional forms in favour of greater architectural abstraction. The vaulted *iwan* as the gate to the building was purified into a monumental rectangular entrance, decorated with *Kashikari*. Concerning the *Kashikari*, he did not follow the decorative styles of the past. He believed that imitating the past will make the appearance

of the building “old” and therefore will not be in harmony with “the style of the day”.⁴⁶ He applied *Kashikari* with a simple flower-like pattern (probably inspired by the Bank’s logo), using three different colours of white, turquoise, and dark turquoise (fig. 6).⁴⁷



Figure 6. Tabriz’s National Bank, (symmetrical composition, simplified classicism). The purified *iwan* decorated with *Kashikari*, and the longitudinal portico is representative of the transformation of traditional architectural forms and elements into modern structures. (Courtesy of the official website of Contemporary Architecture of Iran, caoi.ir/en/component/k2/item/367-bank-melli-tabriz-branch)

Regarding the architectural composition of the banks, Mohsen applied both symmetrical and asymmetrical *parti*. Specified by the size of the program, the only asymmetrical composition was the Isfahan branch (fig. 5, C). Designed in 1941, the asymmetrical composition of the Isfahan bank was most likely the result of its relatively small program, which did not allow the main axis to be located in the center. In three other branches, the symmetrical composition placed the main hall of the bank in the middle and office rooms in the wings (fig. 5, D, E, and F).

During the postwar era, the role of the Ecole in Iran did not diminish as each year Iranians were attracted to the Ecole until 1968. In Mohsen’s post-war architecture, modernism outpaced traditionalism, and his major works were published by the end of the 1950s in the avant-garde international periodical of *L'Architecture d'Aujourd'hui*. However, despite his inclination for capturing the modernity of his time, Mohsen, albeit modifying the Beaux-Arts design method, remained faithful to the very basics of the Beaux-Arts education, such as the importance of the axes of composition, centrality, and architectural monumentality.

Conclusion

During the 1930s, the gradual prevalence of new ideas and popularity of reinforced concrete paved the way for the creation of a modern architecture based on the Beaux-Arts principles. Thanks to the Beaux-Arts tradition, its graduates were capable of implementing a modern architecture, yet considering the purpose and location of every project. Mohsen's works are perhaps among the best instances of a non-European (and non-American) graduate of the Ecole that organised to incorporate traditional motifs with new material and structures. Imported from the Ecole des Beaux-Arts, but transformed and adapted to Iran's cultural and political situation of the time, Mohsen's interwar architecture, Beaux-Arts in design, monumental in nature, modern in appearance, and mostly Iranian in character, became a representative of Iranian national identity through a style of architecture that was expressive of the authoritarian government of Iran.

Endnotes

1. Kamyar Abdi, 'Nationalism, Politics, and the Development of Archaeology in Iran', *American Journal of Archaeology*, 105, 1 (2001), 51-76.
2. Abdi, 'Nationalism, Politics', 63.
3. The Society of National Heritage (NSH) was a national organization aiming primarily on the revitalization of Iranian lost culture and identity.
4. Jay Gluck, Noël Siver (eds.), *Surveyors of Persian art: a documentary biography of Arthur Upham Pope & Phyllis Ackerman*, (Costa Mesa, CA: Mazda Publishers, 1996), 89-90.
5. For reading Pope's influential speech see Arthur Upham Pope, 'the Past and Future of Persian Art', in Gluck, Siver (eds.), *Surveyors of Persian art*, 95-110.
6. Abdi, 'Nationalism, Politics', 60.
7. It resulted in the construction of some buildings inspired by Iranian pre-Islamic heritage. Gluck, Siver (eds.), *Surveyors of Persian art*, 90.
8. Abdi, 'Nationalism, Politics', 60.
9. Mostafa Kiani, *Memari-e dore-ye Pahlavi-ye aval (Architecture of the first Pahlavi era)*, (Tehran: Nashr-e Shahr, 2014), 107.
10. For instance, when Mohsen Foroughi was back from Paris to Tehran, Fawzia (the first wife of Reza Shah's son) invited him and his wife to a party where Reza Shah suddenly appeared. In a talk with Reza Shah, Mohsen was commissioned to inspect all government buildings and make sure if they are constructed using standard materials and technologies. Bagher Agheli, *Zoka al-Molk Foroughi and Shahrivar 1320* (Tehran: Maharat, unknown date of publication), 52.
11. The most prominent of those French language schools was the School of Darolfonoun, the first Western-type school established by the Persian government in 1851. Ali M. Hazeri, *Ravand-e E'ezam-e Daneshjou dar Iran (The Process of dispatching students in Iran)*, (Ghom: Samt press, 1994), 106-108.
12. Donald N. Wilbe, *Riza Shah Pahlavi: The Resurrection and Reconstruction of Iran, 1878-1944* (New York: Exposition Press, 1975), 148.
13. Abdi, 'Nationalism, Politics', 59.
14. From 1932 to 1968, almost 45 Iranians graduated from the Ecole. For information regarding the graduates of the Ecole working in Iran see Marie-Laure Crosnier Leconte, *the Dictionnaire des élèves architectes de l'Ecole des beaux-arts 1800-1968* (available online at <http://agorha.inha.fr/>), prepared by on behalf of the Institut national d'histoire de l'art.
15. Isabelle Gournay, & Marie-Laure Crosnier Leconte. 'American Architecture Students in Belle Epoque Paris: Scholastic Strategies and Achievements at the Ecole des Beaux-Arts'. *The Journal of the Gilded Age and Progressive Era*, 12, 2 (2013), 154-198.
16. Richard Chafee, *The Architecture of the Ecole des Beaux-Arts*, (London: Secker and Warburg, 1977), 82.

17. The academic tradition imbedded in the Ecole des Beaux-Arts was “to some degree influenced by the relatively free classicism of Michelangelo and architects of the Italian Baroque.” Donald D. Egbert, *the Beaux-Arts Tradition in French Architecture* (Princeton: Princeton University Press, 1980), 107.
18. Hyungmin Pai, *the Portfolio and the Diagram*, (Massachusetts, the MIT Press, 2002), 71-72.
19. Jacques Lucan, *Composition, Non-Composition* (Lausanne: EPLF Press, 2012), 184.
20. Lucan, *Composition, Non-Composition*, 181-183
21. The short period of decision making *en loge*, in fact, made the Beaux-Arts system a suitable design method for changing societies of the interwar era who were seeking rapid constructions.
22. Pai, *The Portfolio*, 71
23. For more information on the character of design in the Beaux-Arts method see John F. Harbeson, *The Study of Architectural Design*, (New York: the Pencil Points Press, 1927), 91-103
24. For instance, in 1923, some dissident students approached Le Corbusier to open an atelier attached to the Ecole, and in 1925, the Académie des Beaux-Arts asked Garnier for the first time to serve as the *juré adjoint titulaire* of the Grand Prix competition. Donald D. Egbert, *the Beaux-Arts Tradition*, 74-75.
25. Egbert, *the Beaux-Arts Tradition*, 74-75.
26. Elise Marie Moentmann, *Conservative Modernism at the 1937 International Exposition in Paris*, Doctor of Philosophy dissertation (Illinois: UMI, 1998), 27.
27. Moentmann, *Conservative Modernism*, 27.
28. Moentmann, *Conservative Modernism*, 27.
29. Moentmann, *Conservative Modernism*, 22.
30. The number of registered industrial companies increased from 38 in 1931 to 460 in 1940 in Iran. Willem Floor, *Industrialization in Iran 1900-1941*, (England: University of Durham, 1984), 18-35.
31. Mina Marefat, ‘the Protagonists who Shaped Modern Tehran’ in Shahriar Adl, Bernard Orchard (eds.), *Tehran the Capital of 200 Years*, (Tehran: Elmi va Farhangi Press, 1996), 103-133.
32. Floor, *Industrialization in Iran*, 29.
33. Abbas Milani, *Eminent Persians*, 2 vols, (New York: Syracuse University, 2008), 778.
34. Milani, *Eminent Persians*, 778
35. Richard N. Frye, ‘Mohsen Foroughi’, *Encyclopædia Iranica* (2000), online access: www.iranicaonline.org/articles/foroughi-mohsen.
36. All data on Mohsen’s accomplishments at the Ecole as well as his date of birth was acquired by the author from his Ecole’s dossier kept in the *Archives nationales de France*, AJ 52 series.
37. Crosnier Leconte, *the Dictionnaire des élèves*.
38. According to Marefat, ‘the Protagonists who Shaped Modern Tehran’, 119, Mohsen had an intimate knowledge of traditional Iranian architecture (probably through the lessons offered by his tutor, Qazvini).
39. An *iwan* is a vaulted space that opens on one side to a courtyard. The iwan developed in pre-Islamic Iran where it was used in monumental and imperial architecture. Strongly associated with Persian architecture, the iwan continued to be used in monumental architecture in the Islamic era. Kendra Weisbin, *Common types of mosque architecture*, (www.khanacademy.org)
40. tile-work that is particular to the Islamic architecture and reached its peak during the Safavid dynasty (1501-1736) in Iran.
41. Agheli, *Zoka al-Molk Foroughi*, 43.
42. A built example would be the *Musée d’Art Moderne* designed in 1935 by graduates of the Ecole.
43. Mohsen designed the Faculty of Law and Political Science, and the Faculty of Literature (constructed in 1937).
44. The final decision regarding the establishment of a university was made after comparing Iran to other countries. Ali-Asghar Hekmat, the minister of education, in a meeting, reported to Reza Shah that Tehran, unlike other big cities, is deprived of a university. Reza Shah replied: “I have also heard that such this supreme school must be established. All necessary equipment will be ready for you, start the work immediately”. *Tehran University Guide*, (Tehran: Tehran University, 1967), 2.
45. Mohsen Foroughi, ‘Building Developments in Iran’, *Golbang Magazine*, 3 (1961), 121-127.
46. Foroughi, ‘Building Developments in Iran’, 121-127
47. Mohsen was perhaps inspired by the common use of turquoise colour in the Safavid (1501-1736) architecture. In his article, ‘Building Developments in Iran’, Mohsen, when talking about *Kashikari*, he referred to the mosques and madrasas of the Safavid era, located mainly in Isfahan, a well-known city within turquoise domes.

Architectonics in Pre- and Post-revolutionary Iran

Rahmatollah Amirjani

University of Canberra

Abstract

The 1908 discovery of oil in southwest Iran resulted in rapid industrialisation and a constant escalation of the rate of technological advancement in the country. Since then, the general attitude of the populace toward technological expression in architectural “image” has transformed drastically. In the pre-revolutionary era, 1908–1978, the Pahlavi dynasty utilised architechnological statements, along with the prevailing commodification of culture, to position the nation on the global modernisation track, and to propagate a new identity for the existing semi-peasant society. At the time, many argued that Westoxification and Technological Toxicity had invaded the traditional fabric of cities; as a result, the 1978 Islamic revolution took place in resistance to the government’s allegedly hostile modern policies. Interestingly enough, since the revolution, not only has the trend for the technification of architecture been supported by a large number of intellectuals, architects and the masses, but the desire for Islamic Utopia has, paradoxically, gradually dissolved. This development has left architectural historians and critics with one fundamental question: why has the country’s attitude towards the modernization and technification of architecture significantly transformed in a short period of time? Discussing a number of contemporary architectural projects from these two contradictory historical junctures, this paper posits that the revolutionary power of technology, along with the domination of consumerism, have played a decisive role in changing the society’s attitude towards the modern lifestyle and its expression in architecture after the Islamic Revolution.

Since the advent of industrialisation, architecture in Iran has reflected the impact of not only the advancement of the building industries, but also the state ideologies practiced in different epochs. The pre- and post-revolutionary eras in Iran are significant periods in the country's contemporary history of architecture. Discussing several projects from these two historical junctures, this paper will highlight the impact of technology on architecture, and the culture of Iran at large. In the pre-revolutionary era (1908–1978), the Pahlavi dynasty promoted architectonics that coincided with the prevailing commodification of culture as an ideology to position the nation on the track of global modernisation, and to propagate a new national identity. At the time, many argued that Western technologies and modern architectural expressions invaded the traditional fabric of cities. In retrospect, one can argue that the 1979 Islamic revolution took place in part against the state's Technological Toxicity.¹ Interestingly, since the Islamic revolution, not only has the trend toward the technification of architecture been supported by a large number of intellectuals, but the desire for Islamic Utopia has also vanished. I will argue that the transformative power of technology, along with the dissemination of consumerism, have played a decisive role in changing the country's inclination towards the modern lifestyle and its architectural expressions even after the Islamic Revolution. In addition, since the 1970s the society has been transformed by technological influences, and most of the traditional fabric of cities and local cultures has been almost entirely subdued by the processes of modernization and the effects of the global dissemination of technology.

The Appearance of Early Modern Expressions in Iranian architecture

The 1908 discovery of oil in southwest Iran by English engineer William Knox D'Arcy, who had previously spent twenty years in Australia mining for gold,² resulted in the rapid industrialisation of the country.³ At the beginning of its industrialisation, Iran was an agrarian society ruled by Mozaffar Ad-Din Shah Qajar. The country's population was around 10–12 million, with 60% settled in villages, 25–30% nomadic, and less than 15% living in municipal centres. However, the creation of the Anglo-Persian oil company, swift development, and an abundance of jobs, resulted in population migration from rural areas to industrial towns⁴ such as Masjed-Soleyman, Haftkel and Naft-Sefid. Still, population displacement, as well as the migration of foreign workers and technicians from India and England in the early to mid-1910s, meant that the Anglo-Persian oil company engineers initiated a number of company towns for the workers and staff in industrial areas. Within a few years, due to the need for transportation and other necessities prompted by the Western lifestyle, oil-rich Iranian towns were confronted with a large number of modern facilities and technologies. It can be argued that the early modern expressions in architecture

emerged in these regions through exposing new materials, including concrete and steel (Figure 1). Although the local people and authorities were fascinated by the new buildings, due to the oil industries, it was only the southwest of Iran that was touched by new modern technologies, and the bulk of the population continued living in a peasant culture.

Technology as Ideology: Architectonics in the Pre-Revolutionary Era

By the end of the Qajar dynasty, and by the time of Reza Pahlavi (First Pahlavi) in the mid-1920s, the processes of industrialisation and modernisation were disseminated all over the country. Influenced by Mustafa Kemal Atatürk's reforms and the modern movement in Turkey, Reza Shah argued that modernisation was the only way forward to develop the country, and that the country could only succeed using modern technologies and the elimination of the dominant Islamic culture.⁵ Reza Shah initiated controversial policies and rules speeding up the process of modernisation, and planting the seeds of Iranian National Architecture style that aimed to combine Achaemenid architectural features with those of modern architecture, including asymmetrical compositions and flat rooves. Reza Shah aimed to reconstruct the core of national identity by replacing the existing radical Islamic culture ⁶“that [was] responsible for all the social failures and cultural lags since the Muslim conquest of Persia” with classical and modern elements.⁷ In this regard, Tehran became the main scene for the First Pahlavi's ambitions and ideology, the capital that would represent the previously forbidden pure Persian identity to the world.



Figure 1. Naft Club, a masterpiece of the Anglo-Persian Oil Company era in Masjed-Soleyman (Photograph by Rahmatollah Amirjani, 2017)

Through the collaboration of foreign architects and advisors, Reza Shah attempted to transform the traditional image of Iranian cities. In Tehran, most of the old houses, historic citadels, and sites were drastically destroyed, and modern Parisian boulevards, along with new public

buildings, were rapidly constructed. The buildings were supposed to convey a new identity motivated by Nationalism, Archaism, and Modernism, with no sign of Islamic elements. To this end, the administration employed several local and international modernist architects in the late 1930s, including Vartan Hovanesian, Mohsen Foroughi, Paul Abkar, Manochehr Khorsand, and most notably Gabriel Guevrekian, one of the founders of the Congrès Internationaux d'Architecture Moderne (CIAM) conferences.⁸ Arguably, through politicising art, the first architectonic manifestations of this ideology⁹ emerged in the work of the aforementioned architects in Reza Shah's period. Inspired by the Modern movement in Europe, most buildings were built based on the Modern language and National style,¹⁰ delivering a strong message of the upcoming era (Figure 2).



Figure 2. The Meli Bank by Mohsen Foroughi in 1940 (Photograph modified by Rahmatollah Amirjani, adapted from <https://uk.wikipedia.org>)

As a result of the abdication of Reza Shah in 1941, and by the power of Mohamad Reza Pahlav, the use of technology in architectural “image” reached its peak. The new Shah considered skyscrapers to be flags of modern countries, and had strong tendencies towards “building big” as part of his national modernisation plan.¹¹ Accordingly, the administration hired a number of foreign companies that were able to construct large projects in a short period of time. In addition, the Association of Iranian Architects-Diploma (AIAD) was organised in 1944 to determine the future orientation of architecture in Iran. Most of the AIAD members had studied in Europe under the influence of Modern architecture movements; as a result, they became the state’s advisers and contractors to fulfil Shah’s project of modernity. Although the AIAD members were aware of people’s dissatisfaction concerning the new emerging image of Iranian cities, they continued to

insist on modern architecture as a means for the government's cultural reforms. As Manochehr Khorsand, the head of AIAD, stated:

The generation of professional traditional architects does not exist anymore, and today, architecture is applied by illiterates and unprofessional individuals who could not develop the existing construction techniques. Since the rise of modern building in Iran, the people have been able to understand the revolutionary power of modern technology and also vernacular architecture weaknesses. Although the society has not welcomed the new trend yet, we could gradually prepare the public opinion for approaching [modern architecture expression].¹²

Among the work of the Second Pahlavi period, the Senate Building (1952-1955) has turned into a symbol of Mohammad Reza Shah's drive for modernization (Figure 3). The Senate project was designed by Mohsen Foroughi in collaboration with Heydar Gholi Khani Ghiaï-Chamlou, an Iranian modern architect, and Andreh Block, a French sculptor.¹³ Having a senate building or parliament as a modern cultural phenomenon was an attempt to deconstruct the previous dictatorial governing system, taking the first steps towards founding a Western democracy in the Middle East. In fact, this building portrays Pahlavi's ambitions regarding the country's governing system, architectural image, and identity.

Using both modern and ancient Persian architectural elements, the Senate project clearly highlights the authorities' hostility towards Islamic ideology and its presence in the society. For the first time, modern architectural language, along with the latest construction techniques, met Iranian pre-Islamic architectural elements, without addressing the customary geometric Islamic patterns. The composition of the building is another interpretation of the Great Palace of Xerxes in Persepolis. However, the Senate project is a collage of elements derived from a number of well-known modern buildings.¹⁴ To provide maximum natural light, the main facade of the Senate building contains glazed windows. In order to prevent the main facade from overheating, the design utilizes a giant rectilinear concrete frame, recalling Le Corbusier's modular system and his Claude & Duval factory in France. The articulation of geometric forms in interior spaces, the rectangular and square proportions, and the use of vertical and horizontal lines, for example, reflect De Stijl architecture. Decorated with Achaemenid features, the main hall is surrounded by electric movable curved walls, which were considered to be revolutionary at that time. In addition, the hall is covered by a unique transparent semi-dome, the first suspended cable structure in Iran.

The hanging gold chain-shaped columns at the main gate originated from the personification of Justice in ancient Sasanian art, which is known as Anoshiravan Dadgar.¹⁵



Figure 3. The Senate Building (Photograph modified by Rahmatollah Amirjani, adapted from Saman PourFalatoon, 2011)¹⁶

Arguably, the design was too extrinsic for the society to digest at the time; it drew objections from clergies and intellectuals at the beginning of its construction. Jalal Al-Ahmad, a leader of an opposition movement, wrote that “they pummelled Islam: dug out the ancient god of Zoroaster, revived Cyrus and Darius, reconstructed fire temples, and placed the Farvahar emblem on entries and walls.”¹⁷ In response, the British ambassador argued that “[the administration’s] destructive tendencies passed all of the logical boundaries.”¹⁸ Similarly, Ann K. S. Lambton, an Iranologist, wrote “a majority of the people despised Shah due to his hostile policies towards Islam.”¹⁹

Another significant factor for the technification of Iranian architecture was Harry S. Truman’s Point Four program, inaugurated between the 1950s and the 1960s. At that period, the US had become progressively more committed to the stability and security of the Middle East, as a way to suppress the Soviet Communist influence. This marked the beginning of heavy US support for the Pahlavi monarchy. The American government started exporting the latest technologies and capitalistic ideologies²⁰ under the cover of “humanitarian projects” such as Truman’s Point Four Program.²¹ In fact, the US foreign-policy makers determined to furnish Iran with Western ideas, commodities, and modernization in an effort to integrate the underdeveloped country into the global capitalistic economy. Later, American engineers built several low-cost residential projects and schools, and, although none of these works could be considered as modern architecture in its truest sense, they played a great role in the upcoming high-rise projects by educating the existing local

architects, and providing the latest construction technologies, including pre-fabricated concrete and steel systems.

During the aforementioned era, the emergence of an American goods and consumer culture could be counted as another influential feature that fuelled the desire for new technologies among the middle and upper classes. Under the Point Four educational program, changes in kitchens, cooking, hygiene and other domestic activities formed a new desire for Western products.²² In terms of architecture and urban image, the instant rise of the high-rise projects with public areas at ground level, upper-class green neighbourhoods, and the development of large avenues with modern facilities all offered a new way for experiencing Western pleasure. Simultaneously, American commodities, including cars and kitchenware, and the latest technologies in heating and cooling, communication and media, were widely advertised by different sectors of the government. Together these factors gradually transformed the taste of the society at different levels.



Figure 4. A modern living room with Western furniture, advertised by Anglo-Iranian Oil Company (Photograph modified by Rahmatollah Amirjani, adapted from Iranian Oil Operation Companies, 1957)²³

In the late 1960s, the dissemination of modern architectural expressions, large buildings combining International and Archaism styles, and Westernisation, along with influences of globalisation, gave rise to new oppositions among different classes of the society. The Shah's radical interventions, and the effects of what Fredric Jameson calls "market ideology,"²⁴ not only troubled the image of Islamic identity, but also affected the people's behaviour concerning the Islamic lifestyle. For instance, many people gradually start-

-ed to use indoor toilets, as a modern phenomenon, that were placed towards Mecca, or to live in modern apartments which did not consider privacy and other features of the Islamic way of living. Nevertheless, Tehran and some other cities were polarised between traditional and modern visions, causing a sense of disorientation among the people; as a result, some intellectuals argued that Mohammad Reza Shah poisoned the country with Western ideas and products, and they saw this as an opportunity to stand against his monarchy. It was at this time that new terms, including Westoxification and Technological Toxicity, emerged as a reaction to the Shah's Westernisation strategies. In addition, the Soviet Union took advantage of the new protests, highly supporting Communist and anti-imperialist parties, including the Tudeh Party²⁵ of Iran. Through different magazines and publications, groups with Communist and Islamic tendencies provoked the masses and clergies into fundamental acts against the Pahlavi regime.

Architecture or Revolution

Although the Second Pahlavi administration made many efforts to consider the Islamic culture and traditions in their interventions and Westernisation policies, it was too late to prevent the masses from toppling the regime. Through the departure of Shah on January 16, 1979, and the return of Ayatollah Khomeini, the leader of the revolution who had been in exile for fifteen years, the Pahlavi regime ultimately fell. In his first speech, Ayatollah Khomeini strongly rejected Westernisation and the new image of the country: "The Shah shifted us to whoredom and irregularity by Westernisation. We do not have any problems with modernisation; however, we want Islamic art, not the repetition of strange pre-Islamic and Western features. Everything should be Islamic: our cities, universities, art and television."²⁶

The pre-revolutionary protests clearly show that architectural ideology may have an influence on the socio-political status of societies.²⁷ In fact, "[architectonics are] effectively capable of embodying different theological and ideological meanings, and can provoke various cultural responses."²⁸ The pre-revolutionary situation in Iran highlighted that architectonics could be employed as a form of "screen," reflecting certain political and ideological values, however its powerful message could also create radical force for social change. Perhaps these incidents recall Le Corbusier's perception concerning architecture and revolution: "It is the question of building which lies at the root of the social unrest of today,"²⁹ and, as Neil Leach points out, "An appropriate architecture would combat social unrest and it could prevent revolution."³⁰

Architectural ideology in Post-revolutionary Iran

As a result of the successful of the revolution on the 11th of February, 1979, the country's infrastructure, organisations, and socio-political approaches were reconstructed based on an Islamic ideology. In a short period of time, Western technologies and commodities were attacked or banned by the revolutionary guards and the new Islamic authorities. Consequently, most of the technological agreements³¹ and contracts with the Western world were cancelled; any pleasure or fun with foreign music instruments or technologies was forbidden; and a large number of cinemas, theatres, bars and cafes were closed or destroyed. In addition, many buildings or artworks with Achaemenian and non-Islamic symbols were demolished. Moreover, a new committee, the Committee of Cultural Revolution, was formed for the Islamisation of universities, schools, and governmental organisations. Subsequently, most of the academies and important cultural sectors were shut down for almost two years, which resulted in the exile of many enlightened Iranians.

Shortly after the revolution, from 1979 to 1988, members of the Iranian architectural society faced the darkest days of their careers. As a consequence of its Modern approach and collaboration with the previous government, the AIAD organisation was obstructed, and its members, along with a large number of Second-Generation architects, were forced to leave the country. In addition, the new anti-imperialist ideology showed a clear animosity towards some countries, including Israel, which caused the departure of many foreign companies. Ultimately, the construction of many projects was stopped. By the time of the Iran hostage crisis³² on November 4, 1979, and the subsequent US sanctions, along with the outbreak of the war with Iraq in 1980, the post-revolutionary situation had become more complex. These issues not only fuelled the local anti-Western movements, but also completely interrupted the emergence of new modern buildings in the country.

As a result of the end of the war in 1988, and the rise of "The Era of Construction," post-revolutionary architectonic projects gradually emerged. In this period, some new terms, including Islamic Utopia and Iranian-Islamic Architecture, were highly advertised by the government. As in post-revolutionary Russia, the new regime attempted to employ architecture as a way of supporting their ideology. However, in reality, it was still the legacy of the Pahlavis' period that determined the architectural projects and tendencies. Through the reopening of universities, and the initiation of new projects, three main architectural trends slowly revived: first, the practice of combining Iranian vernacular features with modern construction technique, which was followed by the remainder of the Second-Generation architects; second, the absolute regional architecture; and third, the Modern style. Although the new ideology pushed architects to follow Islamic

principles, Modern and International styles became the dominant expressions in the early age of The Islamic Republic of Iran.³³

The Navvab complex might be the biggest post-revolutionary municipal project that was conceived at the peak of the radical Islamic movements in the early 90s (Figure 5). Through gentrification of a traditional districts in the heart of the capital, the project was supposed to deliver the first Islamic Utopia based on the new extreme anti-Western ideology. While creating a link between the south and north of Tehran, the Navvab plan also pursued other goals, including providing new public spaces that considered the norms of Islamic society, and forming new green areas in order to enhance the landscape and living environment.³⁴ After the completion of the complex in 1999, the project was considered to be one of the biggest failures in the contemporary history of social housing in Iran. Issues such as high-rise apartments instead of courtyard houses, air and noise pollution due to highway proximity, a defenseless and insecure environment, and a lack of green spaces for residents all reflected American well-known modern neighborhoods of the 1960s.³⁵ In fact, Navvab radically altered the traditional identity of the city centre due to its modern and high-tech image. As a result, many argued that the desire for Islamic Utopia had, paradoxically, gradually faded even among some sectors of the state.



Figure 5. The Navvab project, a post-revolutionary modern complex in Tehran (Photograph modified by Rahmatollah Amirjani, adapted from Trending.com, <http://trending.com/posts/2017-11-16/tehran-iran>).

Perhaps the existing Western construction technologies could be counted as an initial factor that helped Modern architecture to become a leading style after the revolution. By the end of the eight-year war, many houses and public buildings had been severely damaged by bombing. In addition, the high birth rate in the 1990s forced the government to build a large amount of social housing

for less well-off people.³⁶ Due to its fast construction speed and capacity for mass production and repeatability, the administration continued the pre-revolutionary Modern style for their projects. Simultaneously, the government not only started to complete the unfinished Pahlavi modern projects, but also reopened the abandoned Modern buildings for their use.

The globalisation and dissemination of the consumer culture of capitalism might be considered to be the other factor that stimulated the country's inclination towards modern architecture and Western technologies. Since the industrialisation of the country, Iranians have been obsessed with the Western commodities that bring comfort and pleasure. Although in the Second Pahlavi era, Westernisation, consumerism, and Technological Toxification became excuses for the people's protests, according to Karimi "Iranians themselves were actively engaged on a local level in figuring out which aspects of contemporary Western home life actually worked for them and which did not."³⁷ In addition, as a result of the dissemination of globalisation in the 1990s, digesting Western technologies as a consequence of universalisation has become easier; the consumption of Western commodities has rapidly increased and is not considered Westoxification anymore! These phenomena have also gradually affected the people's taste concerning architectural image. Reviewing the post-revolutionary projects constructed by the private sector clearly shows the society's tendency toward Modern architectural manifestation.

Interestingly enough, Shah's intended project of modernity, which was considered to be one of the reasons for the revolution, has become a symbol of, and identity for, the new Islamic state. Since the revolution, the government has not been successful in creating their own Islamic-Iranian prescription for the country's architectural image. Perhaps one reason for the administration's failure is that they have been unable to Islamize the foundations of Art and Architectural studies and the Pahlavi-era curricula in academies. In fact, they could not support their ideology with a logical discourse. In addition, post-revolutionary or Third-Generation architects had almost always studied under the supervision of the Second Generation. However, the works of these new architects have not been as powerful as the Second-Generation architectural work. This can be related to the emergence of digital architecture in the 90s, a factor that has arguably not only destroyed students' creativity and ability to reproduce complex Iranian vernacular patterns,³⁸ but also contributed to the emergence of poor modern abstract projects. Thus, the authorities have preferred to select the Second Pahlavi modern projects as symbols, because of their identity, individuality, and historical features (Figure 6).



Figure 6. Using a controversial pre-revolutionary modern project, the Senate Building, on a post-revolutionary paper-money (Image modified by Rahmatollah Amirjani, adapted from Wikipedia, https://en.wikipedia.org/wiki/Iranian_rial)

At present, a large part of the administration is still pursuing the quest for Islamic Utopia, severely rejecting modern projects and insisting on the use of Islamic symbols. For instance, the production of modern dome-less mosques,³⁹ or houses with open kitchens, is still a subject of debate between Iranian clergy and architects.⁴⁰ Interestingly enough, the aforementioned shifts in the people's tastes could also be seen in different layers of the regime. Nowadays, a large proportion of public projects are being designed based on Modern language and architectural features that were rejected by authorities.⁴¹ This paradox clearly shows the revolutionary power of technology, commodification, consumerism, and the influence of globalisation on both architecture and the country's inclinations.

Perhaps the pre-revolutionary intellectuals were indeed right about the effects of Technological Toxification, Westoxification, and capitalism on Iranian culture. Similar to the process of modernization in many other countries, Shah's project of modernity consisted of two major features: technology and products. Both of these aspects have influenced the behaviour of the people and brought something of a Western consumer culture and social transition to Iran. Although the revolution was a reaction against Westernization, it was too late to extract the pleasant venom of consumerism, and to deter the society from enjoying a Western lifestyle. Since the 1970s, the country has been metamorphosed by both the cultural and technical aspects of technology, and most of the traditional fabric of cities and local cultures has been almost obliterated by modern architectural expressions. Nevertheless, these events have left

architectural historians and critics with one major question: is there any reason to deter local cultures from technological and architectonic revolutions? Technological revolution or resistance!?

¹ The term Technological Toxicity is derived from the Persian term Westoxification, coined by Jalal al-e Ahmad, and refers to the fascination with Western technology, even as it erodes the traditional Iranian cultural practices.

² David Carment, "D'arcy, William Knox (1849–1917)," in *Australian Dictionary of Biography*, ed. Bede Nairn and Geoffry Serle (Canberra: The Australian National University, 1981).

³ Rahmatollah Amirjani, "An Analogical Quotation" In *Proceedings of 34th Annual Conference of the Society of Architectural Historians Australia and New Zealand* (Canberra, 5-8 July 2017), 13-24.

⁴ Nigel Westbrook and Ali Mozaffari, "A Return to the Beginnings of Regionalism: Shushtar New Town seen in the light of the 2nd International Congress of Architects, Persepolis, Iran 1974." In *Proceedings of 32th International SAHANZ conference, University of New South Wales, 7-10 July 2015*, eds. Paul Hogben and Judith O'Callaghan (Sydney, N.S.W: 2015), 715-725.

⁵ Seyyed Mohsen Habibi, *Intellectual Trends in the Contemporary Iranian Architecture and Urbanism: 1979-2003* (Tehran: Cultural Research Bureau, 2016).

⁶ Amir Bani Mas'ud, *Iran Contemporary Architecture* (Tehran: Honar-e Memari-e Qarn Publications, 2015).

⁷ Ramin Jahanbagloo, *Iran and the Problem of Modernity: Interview with a number of Iranian & non-Iranian authorities about the confrontation of Iran with the achievements of modern word* (Tehran: Ghatre Publication, 2016).

⁸ Bani Mas'ud, *Iran Contemporary Architecture*, 229-263.

⁹ An ideological manifestation is an articulation of identifiable elements or symbols through techno-aesthetic and techno-artistic features of architecture. See: Vladimir Mako, *Architecture and Ideology*, ed. Vladimir Mako, Mirjana Roter Blagojevic, and Vokotic Lazar. Marta (Cambridge: Cambridge Scholars Publishing, 2014).

¹⁰ The manifestation of ancient Achaemenid elements through Modern language, See: Bani Mas'ud, *Iran Contemporary Architecture*, 193.

¹¹ Fatemeh Farnaz Arefian and Seyed Hossein Moeini, *Urban Change in Iran: Stories of Rooted Histories and Ever-Accelerating Developments* (Cham: Springer International Publishing, 2016).

¹² Manuchehr Khorsandi, "The Association of Iranian Architects-Diploma," *Architect Magazine*, 1946.

¹³ Bani Mas'ud, *Iran Contemporary Architecture*, 254-257.

¹⁴ Bani Mas'ud, *Iran Contemporary Architecture*, 190.

¹⁵ Bani Mas'ud, *Iran Contemporary Architecture*, 254-257.

¹⁶ Contemporary Architecture of Iran, "Senate house of Iran," CAOI, https://fet.uwe.ac.uk/conweb/house_ages/council_housing/print.htm.

¹⁷ Bani Mas'ud, *Iran Contemporary Architecture*, 190.

¹⁸ Ivand Abrahamian, *A History of Modern Iran*, trans. Ebrahim Fattahi (Tehran: Nashre Ney Publisher, 2017).

¹⁹ Ivand Abrahamian, *A History of Modern Iran*, 170.

²⁰ "Capitalist ideologies" refers to ideologies based on a free-market system, where the means of production are operated for profit. Characteristics central to capitalism include the sovereignty of the consumer, private property, competitive markets, voluntary exchange, profitable systems of reproduction, capital accumulation, wage labor, a price mechanism, and, most relevant here, the commodification of art and architecture.

²¹ William E. Warne, *Mission for Peace: Point 4 in Iran* (Bethesda: Ibex, 1999).

²² Pamela Karimi, "Dwelling, Dispute, and the Space of Modern Iran," In *Governing by Design: Architecture, Economy, and Politics in the Twentieth Century*, edited by AGGREGATE, (Pittsburgh: University of Pittsburgh Press, 2012)

²³ Iranian Oil Operation Company, "Housing and Amenities," Iranian Oil Operation Company magazine, 1957, <https://abadancm.com/>.

²⁴ Fredric Jameson, *Postmodernism, or, the Cultural Logic of Late Capitalism* (Durham: Duke University Press, 1991).

-
- ²⁵ The Tudeh Party of Iran is an Iranian communist party, which was formed in 1941 with the support of the Soviet Union, and was active until the 1980s. For more information see: http://www.iranchamber.com/history/tudeh/tudeh_party01.php.
- ²⁶ "Ayatollah Khomeini's Speech in Behesht Zahra," YouTube video, posted by "Amir Soleymani," December 10, 2014, <https://www.youtube.com/watch?v=yeWHkEaWoUw>
- ²⁷ This concept is fully explained in: Manfredo Tafuri, *Architecture and Utopia: Design and Capitalist Development* (Cambridge: MIT Press, 1999).
- ²⁸ Vladimir Mako, *Architecture and Ideology*, 15.
- ²⁹ Le Corbusier, *Towards a New Architecture* (Eastford: Martino Fine Books, 1970).
- ³⁰ Leach, "Architecture and Revolution," 114.
- ³¹ Arms purchase, communication, transportation and nuclear agreements with America, England, Germany and France.
- ³² See History.com Staff, "Iran Hostage Crisis," A+E Networks, 2010, <http://www.history.com/topics/iran-hostage-crisis>.
- ³³ Bani Mas'ud, *Iran Contemporary Architecture*, 359-362.
- ³⁴ "The Negative and Positive Points of Navvab," Behtarin-Ha News Agency, <http://www.bartarinha.ir/fa/news/636876/%D9%86%DA%A9%D8%A7%D8%AA-%D9%85%D8%AB%D8%A8%D8%AA-%D9%88-%D9%85%D9%86%D9%81%DB%8C-%D9%BE%D8%B1%D9%88%DA%98%D9%87-%D9%86%D9%88%D8%A7%D8%A8-%D8%A7%D8%B2-%D9%86%DA%AF%D8%A7%D9%87-%DA%A9%D8%A7%D8%B1%D8%B4%D9%86%D8%A7%D8%B3%D8%A7%D9%86>.
- ³⁵ See Reza Shaker Ardekani, Hamed Akhgar, and Hossein Zabhi, "Obstacles of Iranian Inner-Cities Gentrification (Case Study: Navvab Project, Tehran, Iran)," *International Journal of Architecture and Urban Development*, 4, 1 (2014): 95-110.
- ³⁶ Tejarat Farda, "A Study on the High Birth Rate in the 1990s in Iran," *Tejarate Farda Magazine*, 207, 2017.
- ³⁷ Karimi, "Dwelling, Dispute, and the Space of Modern Iran," 120.
- ³⁸ Bani Mas'ud, *Iran Contemporary Architecture*, 363.
- ³⁹ Kamali Dehghan, Saeed. "A Modern Mosque without Minarets Stirs Controversy in Tehran." *Theguardian*, October 24 2017.
- ⁴⁰ "Banning 'Open Kitchens' in Kohgiluyeh and Boyer-Ahmad Province," Asre Iran News Agency <http://www.asriran.com/fa/news/251501/%D9%85%D9%85%D9%86%D9%88%D8%B9%DB%8C%D8%AA-%D8%B3%D8%A7%D8%AE%D8%AA-%D8%A2%D8%B4%D9%BE%D8%B2%D8%AE%D8%A7%D9%86%D9%87-%D8%A7%D9%88%D9%BE%D9%86-%D8%AF%D8%B1-%DA%A9%D9%87%D9%83%DB%8C%D9%84%D9%88%DB%8C%D9%87-%D9%88-%D8%A8%D9%88%DB%8C%D8%B1%D8%A7%D8%AD%D9%85%D8%AF>.
- ⁴¹ See The Agha Khan Award for Architecture, "Tabiat Pedestrian Bridge," (Aga Khan Development Network, 2016); "40 Knots House" (Aga Khan Development Network, 2016).

#ParlourInstaGuest: A Space to Speak?

Alysia Bennett
Monash University

Tania Davidge
University of Melbourne

Charity Edwards
Monash University

Abstract

How are new(er) media technologies shaping the discourse of architecture?

This paper discusses the use of the image sharing social media platform, Instagram, by Parlour, an advocacy group focused on women, equity and architecture. It explores how social media – a digital communication technology that enables the formation of online communities through platforms that encourage exchange, participation and knowledge sharing – is changing the way women participate in architectural discourse and architecture culture.

Architectural discourse is defined by the content and form of the media that disseminates it. Its role in society is established in relation to mass media (periodicals, newspapers, television, exhibitions and the like) through which architecture is produced, distributed and consumed.¹ These traditional forms of mass communication structure the perception and reception of architecture and determine the content we see and those who produce it. Within this space certain narratives of architecture are privileged and made visible while others are ignored, rendered invisible or denied time to develop through engagement with an active audience. Historically, the profiles and practices of women architects have been overlooked in architectural discourse. Although women have moved towards parity in architectural education the literature dedicated to recording and discussing the work of women architects remains elusive. With the rise of digital media platforms, the avenues for architectural communication have multiplied. Although the content published through these mediums is heavily influenced by the structures of established traditional media the way we

interact with and produce content is changing significantly, opening up spaces of visibility for alternative and activist voices.

In light of this shift in the media landscape, this paper explores the question: "If traditional, established forms of media are keeping women out of the conversation, are digital social media platforms, enabled by the increasing prevalence of digital communication technology, a place where women in architecture might finally find a place to speak?"

¹ Beatriz Colomina, "Introduction: On Architecture, Production and Reproduction," in *Architectureproduction*, ed. Beatriz Colomina and Joan Ockman (New York, NY: Princeton Architectural Press, 1988). p. 17.

The rise of digital media technology has multiplied the platforms for architectural communication. Although the content published through these mediums is heavily influenced by the structures of established print and television media, the way we interact with and produce content is changing. This paper explores how the social media platform, Instagram, is shifting architectural discourse and making visible architectural narratives that run counter to dominant modes of production and professionalism.

To further understand the potential of social media platform Instagram to act as a critical medium, this paper studies the Parlour Instagram hashtag #ParlourInstaGuest, an advocacy group focused on women, equity and architecture. The omission of profiles and practices of women architects from the public record, both historically and contemporaneously, continues to trouble architectural discourse. Traditionally, the preponderance of male architects was partially explained by the low numbers of women studying and practising architecture. Despite the advances made by women over the last half-century in achieving parity in architectural education systems, the literature dedicated to recording and discussing the work of women architects remains limited.¹ If traditional, established forms of media are keeping women out of the conversation, are newer, digital social media platforms giving women in architecture a place to speak?

Parlour is both spatial, referencing a gathering space typically constructed as feminine, and active, drawing on the French *parler* meaning 'to speak'. Parlour was established as a strategy to publicly disseminate the findings of the Australian Research Council-funded

(ARC) research project *Equity and Diversity in the Australian Architecture Profession: Women, Work, and Leadership*.² The research has led to the development of new workplace and professional policies for the Australian Institute of Architects, mentoring programs and a voice for contemporary women architects with its mission to “expand the spaces and opportunities available to women while also revealing the many women who already contribute in diverse ways”.³

Parlour aims to provide a space where women can speak through its website, www.archiparlour.org/, social media accounts, and networking and advocacy events, edited by Justine Clark. One of the critical social media platforms used by Parlour to progress its agenda is Instagram; a social media platform focused on the uploading and commenting on photographs and videos. Launched in October 2010, Instagram has become popular with creative professionals, such as architects and designers, due to the visual nature of its content. Unlike blogging or writing in professional publications, maintaining an Instagram account has proven to be an enjoyable and time effective mode of engaging with colleagues, accessing and reposting architectural ideas and precedents, and sharing insights into practice outputs and office culture.

Parlour uses Instagram, under the handle @_Parlour, to announce events, initiatives and new articles on the website and the ongoing ‘guest hosting’ initiative, #ParlourInstaGuest. ‘Guest hosting’ is the invited takeover of the postings of an Instagram account by persons other than the account owner or manager. Parlour uses these to curate broader narratives than those propagated by mainstream architectural media. Each week, since November 2015, a different individual or practice posts using the #ParlourInstaGuest hashtag. Hashtags, which are terms listed in content captions that include the hash symbol ‘#’, are a grouping and filing system that allows multiple user accounts to curate a collaborative thread of content. #ParlourInstaGuests have included architectural practitioners, academics, students, and even those typically considered ‘outside’ the profession such as builders, artists, and emerging entrepreneurs. #ParlourInstaGuest hosts are given some basic instructions on how to reach out to the Parlour audience.⁴ By examining the content posted by #ParlourInstaGuests between November 2015 and April 2016, this paper explores how Instagram is changing the ways architectural culture is communicated and assesses the potential of social media to establish and give voice to alternative or marginalised architectural publics.

How are new discursive technologies changing the architectural message?

The theorist and historian Beatriz Colomina has argued architecture's cultural role is primarily defined relative to mass (re)production and the mass media- such as periodicals, newspapers, television, radio and the exhibitions- through which architecture is produced, marketed, distributed and consumed.⁵ These established forms of mass circulation structure our perception and reception of architecture. They control the content which we see and authorise the producers of the material. Within the content, specific narratives within the profession are privileged and made visible while others are ignored, rendered invisible or denied.

Media influence is two-fold; it shapes what we see (the content) and how we see it (the medium through which we access that content). The media theorist Nick Couldry, drawing on the philosopher John Dewey, argues that to contest media power "ultimately means developing new forms of communication – that is, new ways 'in which people come to possess things in common'".⁶ Social media platforms have expanded the range of mediums through which we communicate culture and are therefore allowing architectural publics to redefine the way we imagine and interact with architectural content in a mediated world. Further, social media platforms afford criticality. Tania Davidge, in the forthcoming "Insta-critique: Critical Practices in the Moment of Social Media", argues that the Parlour Instagram feed is an example of emergent criticality. It is not a form of intentional architectural criticism such as that presented by a critic or even a citizen critic, rather its criticality lies in opening up narratives beyond those structured by traditional media.⁷ Distinctly, it's where the private life of architecture - "the backstage processes which involve many different kinds of people working in many ways on many different types of projects" - converges with the public life of architecture destabilising existing structural norms, reframing practice and opening up new publics for architecture culture.⁸

Shift in discourse from outputs to processes, top down to bottom up

As danah boyd argues, online communities are 'networked publics' which are "simultaneously (1) the space constructed through networked technologies and (2) the imagined collective that emerges as a result of the intersection of people, technology, and practice".⁹ Networked publics are shaped by the structures of the medium they use - social media - which afford specific forms of sociability. Unlike print media the medium of Instagram is immediate and temporal: posted photographs are not the perfect professional images typically printed in magazines, and their content is more akin to thought than an

essay. In this way posts and views unfold over time and have the potential to document the processes of architecture rather than capturing architecture as a snapshot frozen in time at the moment of completion.

Instagram posts carry comment and sometimes (although not as often as we might like) conversational form in the spaces below the images which, combined with posted images, collectively forms content. While often considered simply as providing individuals with the ability to upload a stream of thoughts and images instantly to their feeds and by extension into the entire world, social media users are typically selective about where, why, by which digital platform, and with whom they communicate.¹⁰

Unlike more traditional mediums, content on social media is not typically controlled by a 'gatekeeper' or editor, which allows contributions from people whose voices are excluded from mainstream media. Offensive comments and 'trolling' are particularly aimed at closing down the increased visibility and opinions afforded to women, POC, LGBTQIA+ communities, and disability advocates amongst others by the 'openness' of social media platforms.¹¹ In response, Instagram has more recently provided filter tools by which these 'contributions' can be more discretely 'managed'.¹² What cannot be dismissed, however, is that while much content on digital media reinforces traditional narratives, other conversations about and around architecture are developing in more interactive domains. It is in this context that @_Parlour guest hosts are developing critical voices and counter-narratives to those that structure more traditional architectural media.

Interrogating narratives

This paper focuses on media targeted at architectural audiences. One of the key media that constructs architectural discourse are 'journals of record' which are delivered to members of professional bodies as part of their membership package and have a broad reach. As such, they play a significant role in structuring and defining architectural discourse, culture, and practice in their respective countries.

To understand the divergence in content between Instagram and traditional media, we analysed six months of material, from August 2016 to January 2017, contained within journals of record. Three journals were selected: the American Institute of Architects' *Architect* magazine, the Royal Institute of British Architects' *RIBA Journal* (*RIBA J*) and the Australian Institute of Architects' *Architecture Australia* (*AA*). The analysis, which excluded awards issues as their focus on buildings skewed the overall results, indicated that the journals contain repetitively structured and narrowly focused content. Building

reviews comprised 43% of the content in *RIBA J*, 45% in *Architect* and 56% in *AA*. The building review, illustrated with beautifully constructed professional images of architectural form, privileges the form of architecture over its processes, practices and people. Tom Wilkinson argues that much online architecture media “regurgitates glamour shots from the architectural PR machine”.¹³ He argues for the polemical snapshot – in this case the image that shows architecture warts and all presenting shoddy construction, awkward detailing and unexpected viewpoints. We argue, aligned with Wilkinson, that the #ParlourInstaguest posts are a form of polemical snapshot although not one that shows an alternative view of the building, but one that opens up alternative narratives of the profession. In this context, it is worth interrogating which narratives are missing in traditional mainstream architectural media and how they are made visible through digital social media platforms. Also, we note that while the Parlour website expands the range of topics addressed beyond building reviews, practice profiles, and the like, its content is typically still in essay form and suitably geared towards (re)publication via more traditional print platforms. Users of #ParlourInstaGuest social media tag, however, represent a radically different mode of information dissemination. They do not just receive discourse from ‘authoritative’ providers. Instead, they are actively involved in the ongoing production and curation of representations on any given topic in amongst networks of others across the planet.¹⁴

The missing narratives in the message

Unlike the highly-controlled journals of record, social media exists as a generator of *exchange*; a (relatively) free and open mode by which we can receive feedback and create further discussions - the “new infrastructures of production” as Couldry terms them - rather than merely a loudspeaker of an often exclusive or privileged group.¹⁵ To understand these new infrastructures, we analysed shared imagery and textual responses drawn from #ParlourInstaGuest posts. The guest host posts were examined, noting gender, geographical location, and relationship to ‘diversity’ (where identified). From this, we compiled a series of themes that captured the prevalent messaging across each week and identified keywords that provided more nuanced detail to those themes. Amongst this data, we found a high frequency of discussion corresponding to ‘family’, ‘life/work balance’, ‘historical reconsiderations of the architect’, ‘events’, and glimpses of everyday content showcasing ‘a day in the life of’. It is striking that many of these themes, which we discuss below, were absent from the journals of record and related to the private life of architecture bringing them to public light. This type of practice can be linked to the history of critical activist, feminist positions which use the public sphere to expose private practices, thus highlighting their marginalisation.¹⁶

‘Life/work balance’ and ‘a day in the life of’

The concerns of a ‘life/work balance’ is already the topic of many contemporary practice discussions and think pieces within traditional architectural media formats,¹⁷ and figure prominently in #ParlourInstaGuest posts.

Maintaining life/work balance in architecture is a difficult task, and many women (and men) choose to move out of the profession to rebalance their lives. Representing the experience of many of those who operate beyond the traditional norms of architectural practice in Parlour, is an engaging young professional Phuong Le. She is currently working as a design manager and describes herself as an architect, event organiser, photographer, and nominated leader of an emerging architects network. Her contribution as a #ParlourInstaGuest (as shown in Figure 1) was to ask ‘where do all the women go?’, itself a cry drawn from Despina Stratigakos’ book on gender inequity in architectural practice. Further, she profiled women who have shifted into allied fields following their dissatisfaction with working life in architecture.¹⁸ In her posts there is no admonishment of their choice to leave architectural practice; instead, she reflects on their decisions with admiration, with insights from her role in the construction industry and questions why women *would* stay with architecture.

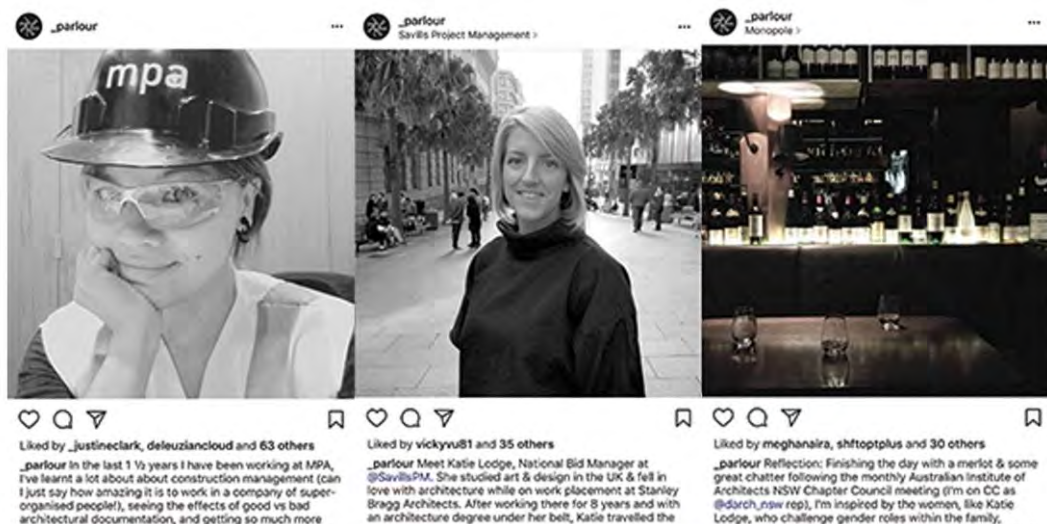


Figure 1: Life/work balance as a #ParlourInstaGuest, Phuong Le.¹⁹

Many guest hosts also documented ‘a day in the life’ of various practitioners in the built environment, as demonstrated in Figure 2. Modelling alternative narratives is perhaps only possible on social media, where the personal governs the curation of messages as

opposed to institutionally or commercially driven agenda, and which might well provide the impetus for many @_Parlour followers to make real changes to their work routines. Giving presence to narratives structured as private by traditional media affords us the opportunity to create more inclusive narratives around our profession and to bring to light private practices that sustain and affect our ability to participate in professional life. Undisclosed, such practices are not open for discussion but brought to light by #ParlourInstaGuests they have the potential to influence discourse and affect transformation.

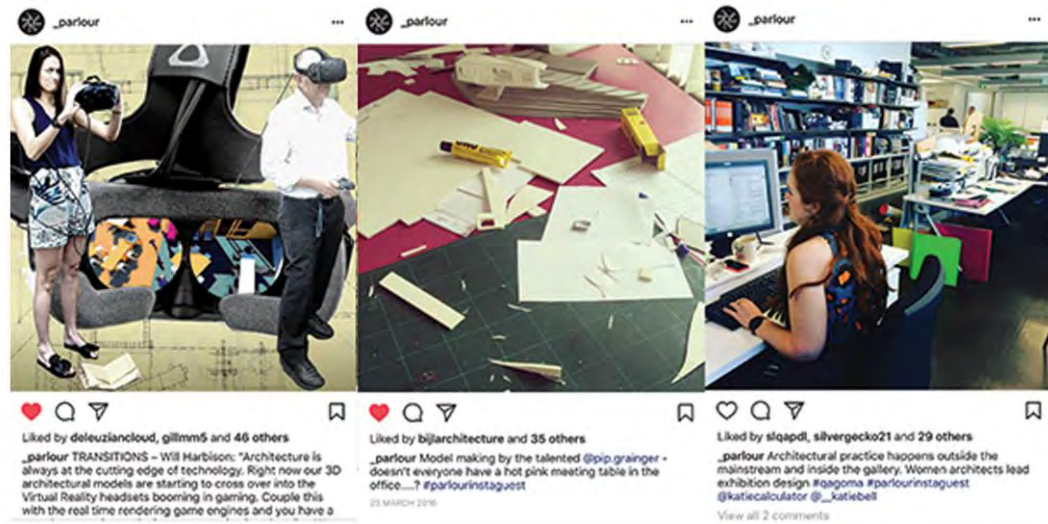


Figure 2: Guest host posts range from experiments with virtual reality, messy model making processes and atypical project documentation.²⁰

Family

A different example of the contrast between the representation of daily practice in social and traditional media is provided in the #ParlourInstaGuest posts by Cumulus Studio, an Australian practice with offices in Tasmania and Victoria. A profile of Cumulus Studio in AA includes a brief discussion on the history of the firm before presenting extensive visual and verbal documentation of their significant projects; which is a typical format for the coverage of practices in industry publications.²¹ The piece does not reflect the distinct practice culture behind the work and focuses on the composition of the studio in a top-down manner, which is evident in both the article content and the office portrait for each respective profile. While the AA article includes a headshot of the four directors dressed in black, the #ParlourInstaGuest self- introductory post is a candid photo of the whole team at an awards ceremony. Another key theme that emerges in Cumulus Studio's #ParlourInstaGuest posts is the notion of family. While the inflexibility and 'un-family-friendly' nature of much architectural practice has been reviewed elsewhere,²² *actual* representations of 'family' are

underrepresented in traditional media. The #ParlourInstaGuest initiative allows architectural practitioners to depict all manner of family life.

The Cumulus Studio guest posts include examples of 'traditional' notions of family (with posts showing office dogs and architects' children in the office), and also demonstrates broader notions of this social unit: the collective grouping of people within and beyond the studio, both past and present as posted in Figure 3. The broader network is a fundamentally important part of the Cumulus Studio's collaborative culture, both across the offices and with external parties, captured in the #ParlourInstaGuest posts that present projects by aspects of the design that emerged through collaborations.

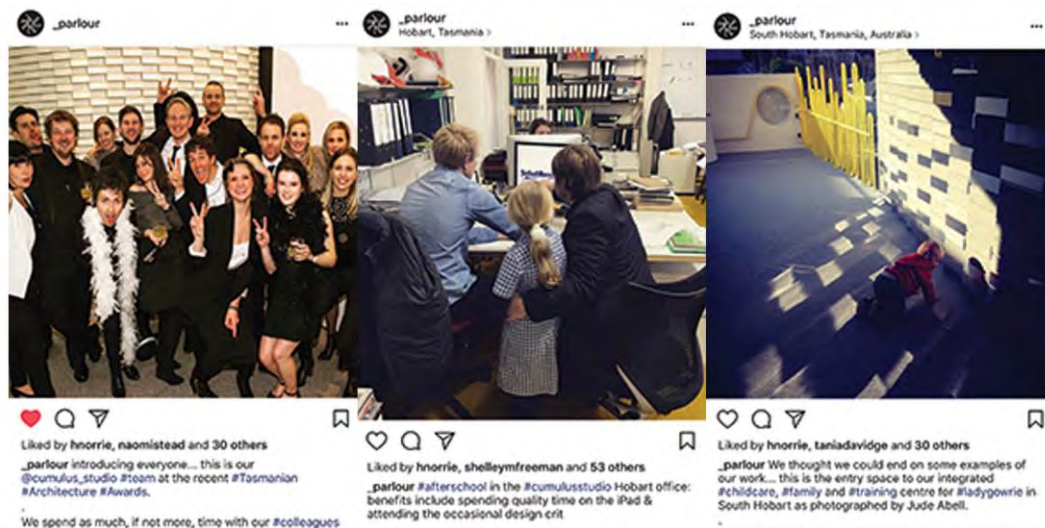


Figure 3: A candid team shot and the increasingly porous boundaries of 'the office' with small children present during work hours. Beyond the traditional notions, the Cumulus 'family' also includes architecturally trained artist Judith Abell's involvement in Lady Gowrie (a childcare centre in Hobart).²³

Events

Where print media primarily presents images of architecture at a particular point in time, Instagram can address temporal qualities of architectural outputs and discourse. These fleeting moments subvert the idea of a monumental or canonic architectural presence which privileges the object of architecture over the people who occupy it. Typically, architectural events are reviewed at a point post-event through thoughtful, well-crafted arguments often following one line of thought. However, events unfold very differently on Instagram: views are multiple and fleeting, shared before they are fully polished; some threads get followed, and others record moments in time, as Figure 4 illustrates.

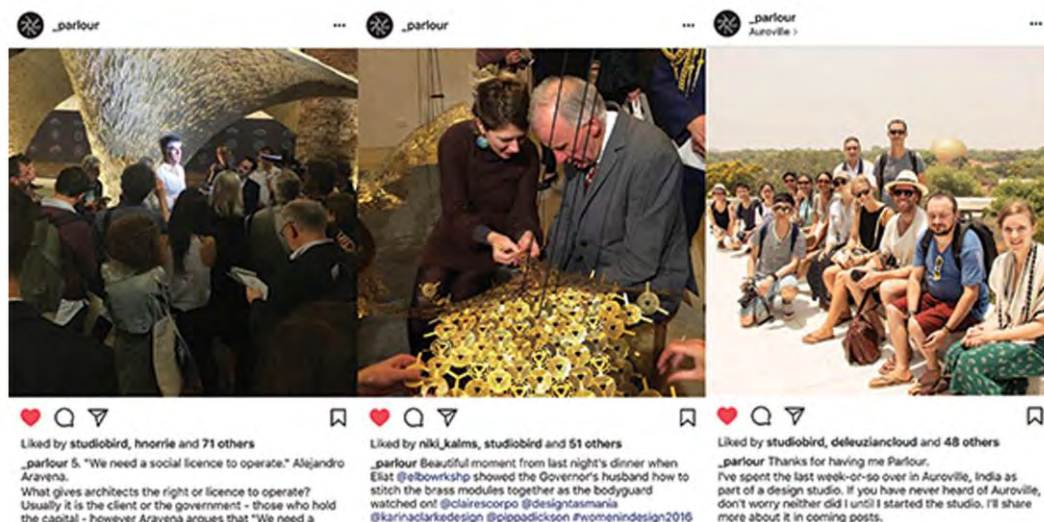


Figure 4: In addition to showing architectural processes, the #ParlourInstaGuest postings document the unfolding of architectural discourse in real time over the course of events. Examples include the *Venice Architecture Biennale*, *Women in Design* in Launceston, Tasmania and through the eyes of a student taking part in a design studio study tour to Auroville, India.²⁴

Dr Helen Norrie's postings on the collaborative making of a filigree brass 'chainmail' installation, designed by Eliat Rich and Claire Scorpo, visually describes the community that forms around an act of making. Her posts, which include video content as well as still images, bring to life the concentration, collaboration and engagement that a public act of making inspires. More recently Anthony Richardson, an Australian architecture student, has documented a study tour of Auroville, India. His posts capture his sense of place, cultural differences in construction practices and the participatory processes the studio engaged in to develop a brief for their project, the Udhayam Educational and Cultural Centre, in Kottakarai. While the *Venice Architecture Biennale*, documented by #ParlourInstaGuest Tania Davidge, is a significant event on the architectural calendar, the *Women in Design* event and the study travels of students are stories that are not often captured. Instagram allows different stories to be told, broadening the way they are shared and the way we view them, as they unfold over time.

Historical reconsiderations of the architect

An international initiative that Parlour has facilitated in the Australian context has explored the writing of women into the history of the built environment. WikiD is an ongoing series of free workshops and events, which emerged from International Women's Day Wikipedia editing events held in New York, Berlin and Melbourne in March 2015, providing editing instruction and Wikimedia support to assist in adding the biographies of women architects

onto Wikipedia.²⁵ However, as Wikipedia only allows the addition of pages that can reference at least two quality print publication sources it further propagates under-representation. Instagram's lack of verification requirements allows for the quick and easy posting of the profiles and practices of 'inspirational' women from history, often for the first time and to a new audience, as illustrated in Figure 5.

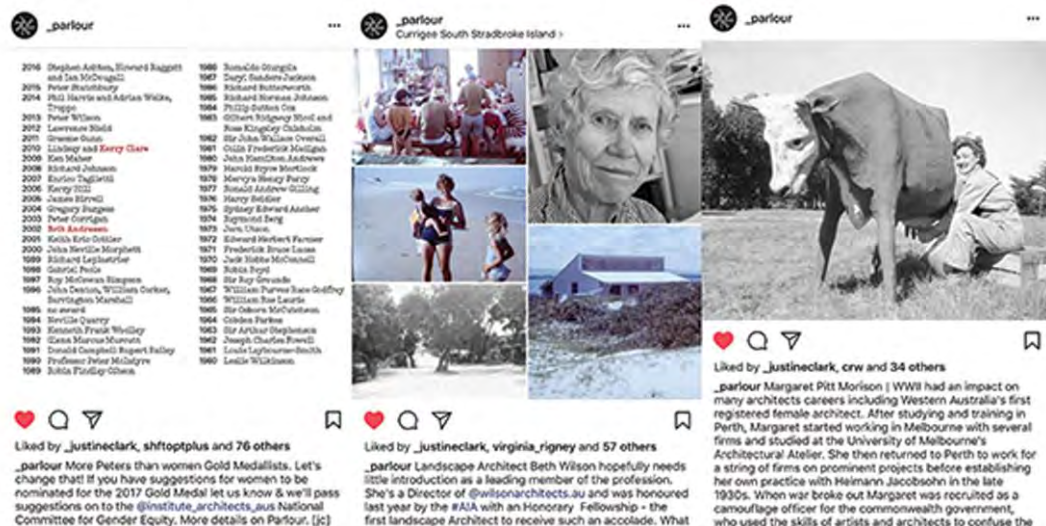


Figure 5: The historical re-representation of women in the built environment emerges through photoshopped award listings, the remembrance of local women's contributions to professional discourse and practice and architects who merely failed to receive recognition.²⁶

Typically, where architectural discourse is disseminated through traditional media platforms, a canon of notable historical figures and projects can be easily identified. When discussed, expertise is most often represented by an 'art history' model: a chronological sequence of 'great buildings' and the lone male 'genius' that authored them.²⁷ As Karen Burns has also argued, such representations work at many levels - "the cultural unconscious of a discipline writes on individual editors even as they write upon it"²⁸ - by shoring up 'acceptable' accounts of what is important and what can be relegated as 'surplus' to discussions of architecture. However, when opening up media to less controlled curations of 'precedence' and 'significance', interesting new perspectives can emerge. All the more so when those producing the content come from 'outside' the profession, as is the case of Scott Burchell, a #ParlourInstaGuest who initially studied architecture before moving into construction, as shown in Figure 6.

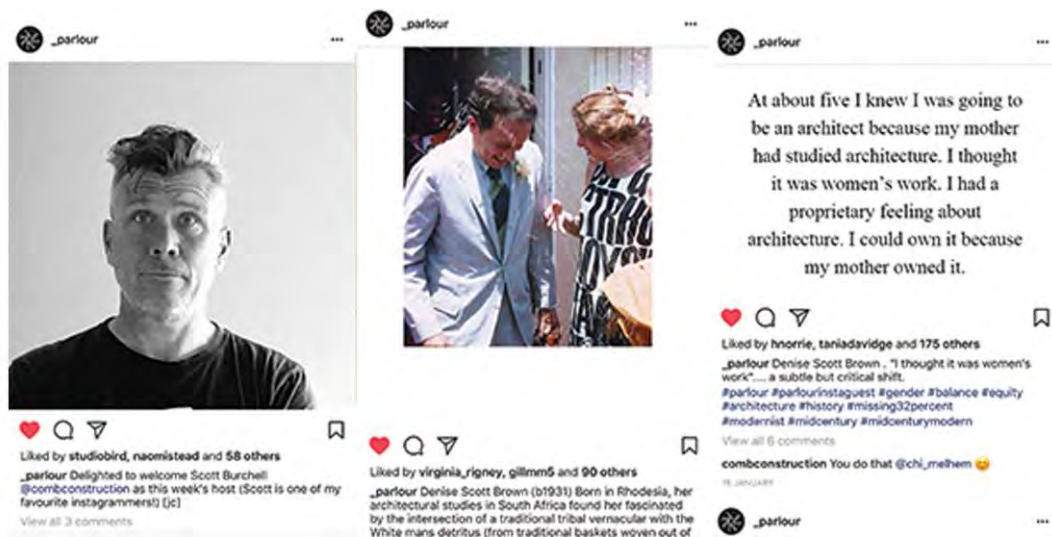


Figure 6: Providing ‘some historical context’ as a #ParlourInstaGuest, Scott Burchell.²⁹

At the beginning of his guest hosting Burchell states that his role was to present posts that were “limited to providing some historical context from some that have gone before”.³⁰ Initial content included depictions of the post-World War II era ‘good life modernism’ in popular mass communication to candid photos of already well-known notable female figures from architectural discourse. As the week continued, the posts became more free-flowing, relaxed and inclusive of Burchell’s reflections and anecdotes from his encounters with examples of (a gendered) architectural history: from quiet admiration of Marion Mahony-Griffin’s performative costumes and Denise Scott-Brown’s Pop Art-inspired wedding dress to his mother. Burns reminds us of the transformative potential of such ‘anthologies’, which we argue are produced via new social media platforms by initiatives like #ParlourInstaGuest. Indeed, Burchell’s diverse and reflexive posts work to gather different content in surprising new collections of what constitutes architectural discourse. Media practices like these work to resist existing canons of spaces, people and events that typically matter, and construct new arenas of what is critical to the practice of architecture - in Burns’ words again, “dissent is the murmuring of different voices”.³¹

Discussion

#ParlourInstaGuest demonstrates that social media can facilitate culture building within the profession in two ways. First, platforms like Instagram can expose the practices and profiles of minority practitioners that are traditionally underrepresented in academic and professional publishing. Secondly, in the context of a skill based industry like architecture, social media can provide a platform that allows academics, practitioners and non-architects in related fields to engage with architectural discourse collectively. Viewers of the traditional

architectural press are typically passive. However, on social media, audiences have the opportunity to participate as publics and as citizens in the space of the digital public realm which shapes discourse.³² Within the #ParlourInstaGuest feed, where people are finding and developing voices to speak on issues of structural inequity, and outside, where Parlour's body of research is gaining traction in the academic and professional realms of architecture.³³

Although the 'new infrastructures' of communication are transforming who has access to and produces media, the shortcomings of the medium also need to be addressed. The ability and right to access social media platforms is not open to everyone due to economic and censorship constraints. Uncritical technological optimism, as described by communications theorist Christian Fuchs, stress the enabling aspects of platforms such as Instagram, but do little to consider the asymmetric relations of power and visibility that comprise contemporary social media participation.³⁴ While convergent social media have the *potential* to create larger publics, many social, cultural, political and economic groups are excluded, thus limiting genuinely democratic engagement. Furthermore, platforms are owned by corporate entities and are therefore invested in turning a profit through leveraging user data. In this context, the boundaries between promotion and self-expression are not always clear. However, profit need not preclude activism and the development of critical public voices.

Different forms of media structure engagement in different ways. Traditional architectural media presents structured professional narratives, and social media and Instagram lend themselves to more personalised and social narratives. In many ways, posts on social media present an idealised, contrived and staged version of the self. However, in terms of this discussion, we see the #ParlourInstaguests as forming part of a critical narrative that falls outside of traditional architectural media. We found that the #ParlourInstaguests did not subvert the typical uses of Instagram but rather used its more personalised mode of story-telling to broaden the stories we tell about architecture and women in architecture through the media.

One of our primary observations from #ParlourInstaGuest is that it is a predominantly positive space. In many respects, it is wonderful to see the celebration of women in architecture that unfolds across the feed. However, it must be noted that this does not reflect the full criticality of the content on the associated Parlour website. In many ways, this is due to the design of the medium of social media. Instagram only has two primary modes of interaction through the 'like' and 'comment' buttons; there is no dislike button.

Critical content of real depth often takes time to develop and, in the immediacy of a medium such as Instagram, comments can be misread or just not well thought out. Social media can be intentionally and constructively critical, and it would be interesting to see this criticality being more actively cultivated in keeping with the content on the Parlour website. However, the @_Parlour Instagram feed provides nuance and complexity to the discourse surrounding women, equity and architecture. Social media does not merely offer a secondary platform for under-represented stories and themes but instead allows marginalised narratives to create a more complete picture of architectural culture. Indeed, media theorists Nadav Hochman and Lev Manovich remark that the benefit of platforms like Instagram is in their strengthening of the capacity and reach of multiple interrelated networks of marginalised voices. That is, “exploring diversities of singularities not through hierarchies and categories but rather through relations, transition and sequences, while moving from the singular to the plural, from the close to the distant”.³⁵

Architectural discourse rarely steps outside of established frameworks to consider what might be required to tackle systemic obstacles that impede women’s capacity and visibility to succeed, enjoy life and work. Social media technologies have the potential to act as disruptors to this framework, provoking change. If architectural discourse were able to suspend its presumption of the essential ‘rightness’ of its long-held working practices, how might our profession be able to reconfigure itself in response to widespread inequity and underrepresentation at the intersections of race, class, and gender? Discussions of cultural diversity (let alone economic, sexuality or otherwise) may be limited in architecture.³⁶ But the succession of ‘personal vignettes’ and subtexts that emerge from the Parlour guest hosting process contribute to a new kind of highly personal architectural discourse that appears to be developing a community of like-minded and affirmative individuals that can share a personal recalibration of life and work during challenging times as a professional. This blurring of the personal and the professional is extremely rare in traditional architecture media where academic publications observe and analyse from a position of research ‘objectivity’ and journals of record stylise and structure the working experience to maintain benchmarks of professionalism, valuing architectural form over the process of making architecture. In this context, @_Parlour is providing a media space via #ParlourInstaGuest that is shaping the way we both speak about architecture and address expectations of the profession.

¹ For example, see: Gill Mathewson, "Sketching in the Margins: Women in the Architectural Profession", in Charles Walker (ed) *Exquisite Apart: 100 Years of Architecture in New Zealand*, (Auckland: Balasoglou Books on behalf of the New Zealand Institute of Architects, 2005); Naomi Stead, "Celebrating the Collective: Reflections on Gender, Diversity, the Visual, and an Attempt to Capture a Communal Portrait of the Architecture Profession in Australia", *Architecture and Culture*, 6, 1 (2018), 123-144; Despina Stratigakos, *Where Are the Women Architects?* (Princeton: Princeton University Press, 2016).

² The researchers on the project were Dr. Naomi Stead, Professor Julie Willis, Professor Sandra Kaji-O'Grady, Professor Gillian Whitehouse, Dr. Karen Burns, Dr. Amanda Roan, Ms. Justine Clark and Dr. Gill Mathewson.

³ Parlour, "Welcome to Parlour," accessed 10 April, 2017, <http://archiparlour.org/about/>

⁴ Parlour, "Instagram guest hosting," accessed 10 April, 2017, <http://archiparlour.org/instagram-guest-hosting/>

⁵ Beatriz Colomina, "Introduction: On Architecture, Production and Reproduction", in Beatriz Colomina and Joan Ockman (eds.), *Architectureproduction* (New York, NY: Princeton Architectural Press, 1988), 17.

⁶ Nick Couldry, "Beyond the Hall of Mirrors? Some Theoretical Reflections on the Global Contestation of Media Power", in Nick Couldry and James Curran (eds.), *Contesting Media Power: Alternative Media in a Networked World*, (Lanham, Md.: Rowman & Littlefield, 2003), 42.

⁷ For discussions of the possibilities and pitfalls of digital criticism, see: Geert Lovink, *Zero Comments: Blogging and Critical Internet Culture*. New York: Routledge, 2008; Naomi Stead, "Losing My Illusions About Open-Source Criticism." *Volume: Ways to be Critical*, 36 (2013): 118-25.

⁸ Tania Davidge, "Insta-critique: Critical Practices in the Moment of Social Media" in Chris Brisbin and Myra Theissen (eds.), *The Routledge Companion to Criticality in Art, Architecture, and Design* (London: Routledge, 2018), 33.

⁹ danah boyd, "Social Network Sites as Networked Publics: Affordances, Dynamics and Implications", in Zizi Papacharissi (ed.), *A Networked Self: Identity, Community and Culture on Social Network Sites* (New York: Routledge, 2011), 39.

¹⁰ John D. Boy and Justus Uitermark, "Reassembling the city through Instagram", *Transactions of the Institute of British Geographers*, 42, (2017).

¹¹ Karen Lumsden and Heather M. Morgan, "Cyber-trolling as symbolic violence: deconstructed gendered violence online", in Nancy Lombard ed. *The Routledge Handbook of Gender and Violence*, (Abingdon, Oxon: Routledge, 2018); Mainack Mondal, Leandro Araújo Silva, and Fabrício Benevenuto, "A Measurement Study of Hate Speech in Social Media." in *Proceedings of the 28th ACM Conference on Hypertext and Social Media*. (New York: ACM, 2017).

¹² Kevin Systrom, "Strengthening Our Commitment to Safety and Kindness for 800 Million", accessed 01 Feb, 2018, <https://instagram-press.com/blog/2017/09/26/strengthening-our-commitment-to-safety-and-kindness-for-800-million/>.

¹³ Tom Wilkinson, "The Polemical Snapshot: Architectural Photography in the Age of Social Media." *The Architectural Review*, 237 (January 2015).

¹⁴ Boy and Uitermark, *Transactions of the Institute of British Geographers*.

¹⁵ Couldry, "Beyond the Hall of Mirrors: some theoretical reflections on the global contestation of media power", 44.

¹⁶ Rosalyn Deutsche, "Agoraphobia", in Rosalyn Deutsche (ed.) *Evictions: Art and Spatial Politics*, (Cambridge, Mass.: MIT Press, 1996).

¹⁷ Valerie Caven and Ani Raiden, "Work-life balance among architects," in *Proceedings of 26th Annual ARCOM Conference*, ed. C. Egbu (Leeds, UK: Association of Researchers in Construction Management, 2010), 533-542; Karissa Rosenfeld, "Work/life/work balance by Andrew Maynard", *ArchDaily* (15 May, 2012), accessed April 02, 2017, <http://www.archdaily.com/234633/work-life-work-balance-by-andrew-maynard>; Bruce Tether, "Results of the 2016 Women in Architecture Survey revealed," *The Architectural Review* (26 February, 2016), accessed April 02, 2017, <https://www.architectural-review.com/rethink/results-of-the-2016-women-in-architecture-survey-revealed/10003314.article>

¹⁸ Stratigakos, *Where Are The Women Architects?*

¹⁹ Image sources | Left: Phuong Le, Instagram post, June 12, 2016, accessed April 15, 2017, <https://www.instagram.com/p/BGjb7m0AqEv/>; Centre: Phuong Le, Instagram post, June 07, 2016, accessed April 15, 2017, <https://www.instagram.com/p/BGVP0vjAqLF/>; Right: Phuong Le,

Instagram post, June 07, 2016, accessed April 15, 2017, <https://www.instagram.com/p/BGWqLqjAqNc/>.

²⁰ Image sources | Left: Jasmine Richardson, Instagram post, February 08, 2017, accessed April 30, 2017, <https://www.instagram.com/p/BQPCqEMlId/>; Centre: Genevieve Lilley, Instagram post, March 23, 2016, accessed April 15, 2017, <https://www.instagram.com/p/BDSDziKAqGi/>; Right: Instagram post, November 25, 2015, accessed April 02, 2017, <https://www.instagram.com/p/-f06Y3AqLa/>.

²¹ Kirsten Orr, "Cumulus Studio", in *Architecture Australia*, 102, no. 2, (2017), 104-108.

²² Gill Matthewson, Naomi Stead and Karen Burns, "Women and leadership in the Australian architecture profession: prelude to a research project," in Rosemary Francis, Patricia Grimshaw and Ann Standish (eds.), *Seizing the initiative: Australian women leaders in politics, workplaces and communities*, (Melbourne: The University of Melbourne, 2012).

²³ Image sources | Left: Cumulus Studio, Instagram post, September 20, 2016, accessed April 15, 2017, <https://www.instagram.com/p/BKjYhYBgKbj/>; Centre: Cumulus Studio, Instagram post, September 22, 2016, accessed April 15, 2017, <https://www.instagram.com/p/BKptfrDAsUY/>; Right: Cumulus Studio, Instagram post, September 25, 2016, accessed April 15, 2017, <https://www.instagram.com/p/BKwVbl8gsYq/>.

²⁴ Image sources | Left: ; Helen Norrie, Instagram post, July 22, 2016, accessed April 15, 2017, <https://www.instagram.com/p/BIKNsjwAdA3/>; Centre: Helen Norrie, Instagram post, July 24, 2016, accessed April 15, 2017, <https://www.instagram.com/p/BIPAUI3Ari8/>; Right: Anthony Richardson, Instagram post, April 27, 2017, accessed April 30, 2017, <https://www.instagram.com/p/BTXW05jhCwP/>.

²⁵ Sonia Harford, "Project to increase listing of women architects in Wikipedia," *The Sydney Morning Herald* (18 March 2017), accessed April 02, 2017, <http://www.smh.com.au/entertainment/art-and-design/project-to-increase-listing-of-women-architects-in-wikipedia-20170316-guzm5g.html>; Patricia Arcilla, "#wikiD: Help ArchiteXX Add Women Architects to Wikipedia," *ArchDaily* (25 February 2015), accessed April 02, 2017, <http://www.archdaily.com/602663/wikid-help-architexx-add-women-architects-to-wikipedia>

²⁶ Image sources | Left: Justine Clark, Instagram post, July 29, 2016, accessed April 15, 2017, <https://www.instagram.com/p/BlcDocyggRI/>; Centre: Virginia Rigney, Instagram post, May 08, 2016, accessed April 15, 2017, <https://www.instagram.com/p/BFIQ2D1ggEK/>; Right: Alysia Bennett, Instagram post, November 12, 2015, accessed April 02, 2017, <https://www.instagram.com/p/9-AzSAAqOP/>.

²⁷ Gill Matthewson, Naomi Stead and Karen Burns, *Seizing the initiative: Australian women leaders in politics, workplaces and communities*.

²⁸ Karen Burns, "A Girl's Own Adventure: Gender in the Contemporary Architectural Theory Anthology," *Journal of Architectural Education*, 65, 2 (2012), 128.

²⁹ Image sources | Scott Burchell, Instagram post, January 9, 2017, accessed April 30, 2017, <https://www.instagram.com/p/BPBgoF-IK-E/>; Centre: Scott Burchell, Instagram post, January 15, 2017, accessed April 30, 2017, <https://www.instagram.com/p/BPQsEU1FZ3n/>; Right: Scott Burchell, Instagram post, January 15, 2017, accessed April 30, 2017, <https://www.instagram.com/p/BPRktCXlwx4/>.

³⁰ Scott Burchell, Instagram post, January 9, 2017, accessed April 30, 2017, <https://www.instagram.com/p/BPBh3EUFYi8/>

³¹ Karen Burns, *Journal of Architectural Education*, 133.

³² Sonia Livingstone, "On the Relation between Audiences and Publics", in Sonia Livingstone (ed.) *Audiences and Publics: When Cultural Engagement Matters for the Public Sphere*, (Bristol, England: Intellect, 2005).

³³ Parlour has presented their research through the ARC funded project *Equity and Diversity in the Australian Architecture Profession: Women, Work, and Leadership* at numerous academic conferences and the research was also integral to the development of the Australian Institute of Architects *Gender Equity Policy* (accessed May 1, 2017, <http://wp.architecture.com.au/news-media/landmark-decision-for-architecture-profession-on-gender-equity/>). An output of the research project, the *Parlour Guides to Equitable Practice* (accessed May 1, 2017, <http://archiparlour.org/parlour-guides/>) are referenced by the Australian Institute of Architects and were presented at Equity by Design: Metrics, Meaning, and Matrices hosted by the San Francisco Chapter of the American Institute of Architects in 2016.

³⁴ Christian Fuchs, *Social Media: A Critical Introduction*, (London: SAGE, 2017).

³⁵ Nadav Hochman and Lev Manovich, "Zooming into an Instagram City: Reading the local through social media", *First Monday*, June (2013): no pagination.

³⁶ Yvonne Meng, "Cultural diversity in architecture," Archiparlour.org.
<http://archiparlour.org/cultural-diversity-in-architecture/#fnref-13343-3>

“Their Presence Could Work a Revolution”: Women Architects and Homes in New Zealand in the 1900s-1930s

Elizabeth Cox

Abstract

In 1917 a journalist at the Auckland Star wrote: “Up to the present men have built our houses, and the average woman who walks round and inspects them sighs heavily”. The journalist thought the presence of women in the architectural profession “could work a revolution... In no profession is the woman intellect so much needed”. The never-ending and back-breaking drudgery of housework, the advent of the ‘servantless household’ and the continuing provision of “old uncomfortable labour-creating” houses in New Zealand were of increasing concern to women in the first half of the twentieth century. Doubt was cast on the abilities of men to design good houses, and from this concern grew support for women to move into the architectural profession. This paper examines the call from many in the community for women to join the profession, and concludes with an examination of the work and writings of a small number of female New Zealand architects designing houses intended to improve the lives of women.

Introduction

In 1917 a journalist at the *Auckland Star* wrote: “Up to the present men have built our houses, and the average woman who walks round and inspects them sighs heavily. Years of silence have made her inarticulate, and economic pressure has deprived her of power ... But things are moving.” The journalist thought the addition of women to the architectural profession would “work a revolution. In no profession is the woman intellect so much needed.”¹ This paper examines both the reasons behind the call for women to become architects in the period 1900s-1930s, particularly to design houses, and whether that call was answered in these decades, the time in which women began to emerge, gradually, into the profession.

“Naturally a capable woman architect should prove invaluable”

There was an increasing perception in this period that the house was a piece of technology which was radically failing women. The extremely physical burden of

housework was a serious issue for both middle and working class women at this time. Working-class New Zealand women's enduring lack of enthusiasm for a career in domestic service, and reducing family sizes, meant women were increasingly labouring in their homes alone. Middle-class women's groups and governments suggested and tried numerous solutions to the "servant problem" over the years, such as assisted immigration for women prepared to be servants, and domestic education for both young colonial-born and Maori women. Despite these measures, Charlotte Macdonald has argued that the trend in New Zealand, beginning in the 1890s, while following the general pattern of other Western countries, was more marked here – leading to the "early and widespread phenomenon of the 'servantless household' ", for all but a very small elite. The burden of managing the home therefore fell almost exclusively on the woman of the house.²

Not only this, but bad house design made housework harder, surfaces difficult to keep hygienic, and workspaces, especially kitchens, sculleries and laundries, were unpleasant, gloomy and unsafe for women.³ As a result, women's groups became involved in critiquing house plans and campaigning for women, as consumers of architecture, to have better homes and towns. For example, a Women's Committee of the Town-Planning Association was established directly after the famous 1919 Town-Planning conference, chaired by Dr Daisy Platts-Mills. One of its first actions was to draw up an 'Emergency Report on Housing', which set out minimum required standards for all government-funded housing, including railway houses. The organisation were alarmed by those it had already seen, which were, it said, in the "old uncomfortable labour-creating style" which would both give rise to ill-health among mothers, and to distaste for home life among daughters. They rejected the idea that all women wanted from their house was "outside show", instead, they said, what women wanted was a house designed "for convenience, for labour-saving and for home comfort". Its five page report itemised the needs for the "average family" where the mother was doing her own housework and bringing up her children, and set out the need for proper light, warmth and ventilation in spaces like laundries and kitchens where women worked, cookers and sinks set at comfortable heights for women, fixed cupboards, hot and cold water, and a combined living and kitchen space.⁴

From this disquiet about the inadequacy of New Zealand houses arose a desire for women to become architects themselves. Women's groups, MPs and others asserted that women architects could make a significant difference to the lives of their fellow women, both middle- and working-class, and the wider community, through better use of new technology and design.⁵

Doubt was cast, in particular, on male architect's abilities to design sensible houses. The Woman's World column of the *Wairarapa Age* said in 1919:

The trouble is that, up to the present, men have designed our houses for us, and women architects are only just coming into their own. Surely there is no more suitable field for women than that of designing homes; and I hope ere long to see domestic architecture almost entirely taken over by women. Then, and then only, shall we have really sensible, comfortable homes to work in as well as to play in. How can a man who has his business to attend to, possibly understand the needs of a woman who spends most of her time in the kitchen? He doesn't stop to think how she does her many and varied tasks, because they are usually all done by the time he comes home.⁶

Likewise, the *Ashburton Guardian* asked "how many houses have been bungled in their construction and the daily lives of the occupiers made uncomfortable by faulty planning?" and concluded "If architects did the house work – well there would be different houses in which to do the work".⁷ David McLaren, the first Labour mayor of Wellington, gave a speech in 1913 to the Society for the Protection of Women and Children predicting the rise of women architects, which would result in "cupboards and stairs in their proper places, instead of having houses which require double the amount of women's work as should be necessary".⁸

A rare insight into the views of individual woman looking for better homes comes from interviews with two women in New Plymouth by a journalist in 1920. One, a woman who was interested in modern homes who had closely supervised the building of more than one home for herself told the journalist "there are a hundred and one little things that a women will think of that will not readily occur to a man". While she personally wasn't sure a woman architect would be a success, she didn't think it was a problem because "you can be your own architect in collaboration with your real architect can't you?". In contrast, the second woman interviewed stated that she thought architectural firms could in fact employ women "to considerable advantage", and the firms who did so would receive a great deal of work as a result. The enterprising New Plymouth journalist then went out to ask a number of local architects how they felt about the idea of employing women as architects, based on their experience of working with female clients. The male architects agreed women were indeed more imaginative than men in planning a home, and conceded men had a lot to learn from women about "elaborating" a home. They felt

women were particularly good at “deleting the out-of-date arrangements that only make for unnecessary work and drudgery”, and acknowledged that women of limited means inevitably preferred a small home that was “elaborately appointed and conveniently arranged” rather than a large home that wasn’t.⁹

During debate in parliament about the proposed New Zealand Institute of Architects (NZIA) Act in 1913, Liberal MP Thomas Wilford expressed concern about the draft form of the legislation, worried the Institute was deliberately shutting off architecture as an avenue for women’s employment. “Many women would make good architects”, he told the House. He argued women would do an excellent job designing workingmen’s houses, which would reduce the work of working class women. He added, for good measure, that no woman would have been foolish enough to put the cookhouse in the Wellington Town Hall where it currently was. His parliamentary colleague G M Thomson of Dunedin North agreed, telling a tale of attending an opening of a Post Office near Dunedin – while he walked around “admiring everything”, he said, the woman who was to take charge of the office pointed out there wasn’t a single cupboard in the building.¹⁰ Wilford returned to this theme ten years later, when Leader of the Opposition, saying that a “clever woman architect would bring about the building of a better class of house” which was more serviceable, economical and with labour-saving devices.¹¹ It is notable that both Wilford and Thomson referred to the possibility of women working on public buildings, not only houses.

Wilford’s 1913 speech also talked of women’s abilities to design for beauty. He gave the example of a house, one of the biggest in Wellington, which had been designed by a woman; she had not only designed the house and arranged the rooms, he said, but carved the staircase – “a marvellous example of what a woman can do”.¹² This theme, of women’s abilities in the field of domestic interior design, was one some commentators presented as possible second string to their bow for women architects – a way in which they could be even more valuable in the architectural space. When the University of Auckland began offering a full-time architectural degree course in 1926, its newly appointed head, Professor Cyril Knight, emphasised the career was suited to women: “So far as I can see, there is no reason why women should not take up architecture as a profession ... There is plenty of scope for them in the designing of houses, and the interior decoration of these homes, when built, is peculiarly their work.”¹³ Journalist Marjorie Hutton-Whitelaw likewise encouraged her female readers to take up the architectural career: since “a woman has to spend a great deal of her life in the house, so it would seem that women are more fitted for domestic architecture than a man”. She

advised women to also do extra study into fabrics, the history of furniture, and the retail prices of furnishings, in order to be able to advise their clients on the entire decoration of a house. She thought this should not be difficult, “for here her natural feminine capabilities will shine ... there is scope for much imagination and application of feminine ingenuity.”¹⁴

“Naturally a capable woman architect should prove invaluable”

Julie Willis and Bronwyn Hanna’s detailed study of women architects in Australia in the first half of the twentieth century has highlighted the careers of around 140 women significantly involved in the profession there.¹⁵ And yet, as Julia Gatley’s 2014 literature review about New Zealand’s female architects has shown, the presence of women architects here has been almost completely overlooked, particularly in this early period. With very few exceptions, the careers of women working in New Zealand at this time have not been discussed in any detail before.¹⁶

After Wilford made his claim in parliament in 1913 that the NZIA was trying to exclude women from the profession, *Progress* responded by saying he might like to know there was already a qualified female architect in New Zealand. The magazine was presumably referring to Lucy Greenish. Lucy Greenish was taken on at the age of 20 in 1909 by the Wellington architectural firm Atkins and Bacon. Her brother Frank was also a Wellington architect.



Figure 1. Lucy Greenish, later Symes (1888-1976)
New Zealand’s first female registered architect. Family collection.

On the strength of her training at Atkins and Bacon, when the NZIA was registering all the established architects under their new legislation in 1914, she became the first female

registered architect in New Zealand; the only woman out of the 315 architects to be registered as part of that process (and three years prior to the first woman registered by an Institute of Architects in Australia).¹⁷ She later worked for another Wellington firm, Robb and Page and possibly for Dunedin architect Henry Mandeno. In 1927, a year after having a illegitimate baby in Australia in her late 30s, she took the extraordinary step of setting up her own sole practice in Lower Hutt, advertising in the *Hutt News*. She only advertised her new firm briefly, and further work is needed to find more about her career.¹⁸

In 1919 the *Star* reported that there were a number of other “girls” in New Zealand architect’s offices studying to make architecture their profession, particularly in Christchurch, and concluded “naturally a capable woman architect should prove invaluable”.¹⁹ In my wider study of early female architects in New Zealand, of which this paper is a part, I have found almost 30 women training or working as architects and architectural assistants in New Zealand in the 1900s-1930s, completing their articles, sitting NZIA exams, working with their fellow students in ateliers, studying at university, working in architectural offices and government departments, and in similar professions such as town planning, and a number who travelled overseas to further their study. Further evidence can be found in the New Zealand census: in 1916 there was one woman listed as an architect, plus one classed as an apprentice (presumably carrying out her articles), five architectural assistants and two architectural draftswomen, separate from the 25 other women working as clerks and typists in architectural offices. In 1921 there were three women classified as architects, and in 1926 there were eight, plus one apprentice. In 1936 this had gone down to four architects, with no apprentices; the Depression had hit the entire profession hard, so this decrease is not surprising. In 1945 there were eight women classified as architects, of which one appears to have been working on her own account.²⁰ Not all these women became NZIA registered architects, however; after Lucy Greenish’s registration by the NZIA in 1913, it took until 1936 for the next woman to register as an architect with the NZIA. This was Dorothy Wills (later Coulthard), who had been the second woman to graduate from the University of Auckland with a BArch in 1933.²¹ Likewise, after Greenish set up her sole practice in 1927, it is possible the next woman to do the same was not for a number of decades.²²

Why it took so long for other women to replicate Lucy Greenish’s achievements is one of the many puzzles which will have to be teased out in my project. Nevertheless, it remains striking just how many women in this period there were training and working in architectural offices. Space in this paper unfortunately excludes the detailed examination

of the careers of these women, but it will conclude with an examination of the work of a few which helps to further illuminate the issue of women designing better homes for women, with which the paper began.

A “work-room pure and simple”

Although architectural plans drawn by women, and statements by women working during this era are difficult to find, we do have some remaining examples, in which the emphasis is squarely on labour-saving homes. One of these is the work of Florence Field, who gives us a rare insight into her domestic architectural work. She was the daughter of Thomas Andrew Hemming Field, MP for Nelson, and sister of journalist and infamous anti-semitic Arthur Nelson Field. Florence trained in a series of architectural practices, beginning in around 1915 - two years with Nelson architect Arthur Griffin, two with notable ecclesiastical architect Frederick de Jersey Clere, and then more training with a third as yet unidentified architect. She was excused from sitting some of her NZIA exams, on the strength of her prior training with these architects, and passed others, but for unknown reasons she did not become a registered architect. Florence never married and lived most of her life with her family in Nelson.²³

During her time with Clere, she entered at least three architectural house design competitions, set by *Progress* magazine. One of these competitions was judged by Clere himself; as her employer, he couldn't place her in the competition but he provided commentary: “for a seaside cottage it seems to me to be admirable. The treatment is original and the planning practical.”²⁴

Unfortunately the plans for these competition houses weren't reproduced but we have more details about the house which she designed for her father, extolled in a lengthy *Ladies Mirror* article of 1923 titled “A Kitchen Planned by a Woman”.²⁵ The article says Field both designed the house and supervised its construction. A feature of the house is the arrangement of the kitchen and other spaces designed “with a view to reduce the drudgery of housework to a minimum”. Field's kitchen, she told the journalist, was intended to be a labour-saving “one-woman kitchen”, and a “work-room pure and simple”. It is designed for the woman of the house to work in, not a servant, although Field mentions that the plan could easily be altered to suit a home with a servant if desired.

The functionality, scale of spaces and ergonomics, as well as hygiene and ease of cleaning, have all been carefully considered. Helen Leach's history of the New Zealand kitchen has documented gradual changes in the 1920s and 1930s in kitchen layouts in

modern new houses, towards more compact designs.²⁶ Field's design accords with these trends, including the removal of the old model of three separate rooms – kitchen, scullery and pantry – in preference for a single room, and the separation of the laundry function from the rest of the house. Surfaces are designed for easy cleaning, and the kitchen fitted with a gas stove and a 'fireless cooker', with no coal range, further reducing grime in the kitchen. The "ever recurring task of dish washing still has to be done, but it is robbed of much of its drudgery and unpleasantness in this kitchen", thought the journalist, with a clever use of technology.

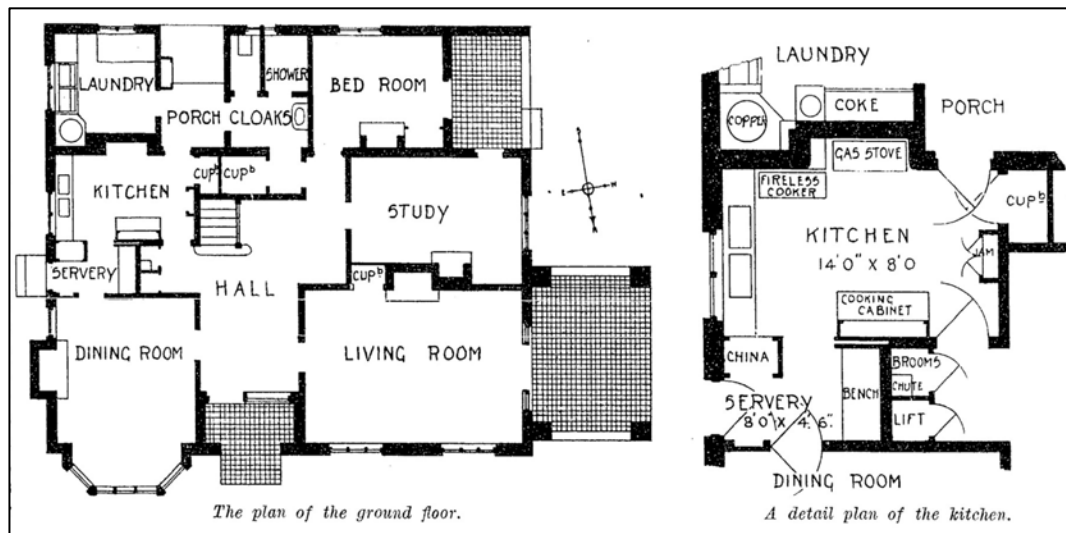


Figure 2. The ground floor plan (left) of the Nelson house designed by Florence Field and a detail plan of the kitchen (right)
Ladies Mirror, 1 Nov 1923

Work surfaces, sinks and cookers were designed with the height of women in mind; even the toes and knees of those standing or sitting while working were considered. The space is designed to reduce the amount of walking required within the workspaces, and has a lift for carrying food upstairs.

Esther James, who worked in the office of Auckland architect William Cumming while studying architecture papers at Auckland University in the late 1920s or early 1930s, told a group of feminists in Australia in 1933 that the work of designing houses should fall entirely to women.²⁷ In her autobiography she specifically wrote of her efforts to make more comfortable houses for women while she worked for Cumming:

Bungalows were fashionable as homes at the time and as the demand grew Mr Cumming came to leave more and more of the planning of them to me. "Here", he would say, tossing a rough sketch of a job on my table, "another client wanting a new-fangled bungalow. You design one." This aspect of architecture was thrilling to me. After having watched my mother

walk miles in big, old-fashioned houses and exhaust herself with the sheer physical effort of making meals and doing simple housework, I was delighted to be able to design compact, labour-saving homes. Working on such a job I would become engrossed.²⁸

She described drawing elevations, perspectives, and scale plans for details, as well as completing specifications, calculating quantities, taking levels and contour surveys on site. She worked not only on houses but shops, office buildings, flats, schools and dairy factories. She later had a very varied career outside architecture, and also designed her own homes.²⁹

A few other examples exist where we know women were designing homes in New Zealand. Possibly the first woman to complete her architectural training in New Zealand was Katherine (Kate) Beath, later McDougall, the niece of Kate Sheppard, who completed her articles with Samuel Hurst Seager, training in his Christchurch office from 1905 before going overseas in 1908. Further work is needed on her career, but art historian Ann Calhoun writes that house and furniture plans by Beath survive, in the Art and Crafts style.³⁰ Another is Margaret Hamilton, later Munro, who began work in architect Cecil Wood's Christchurch office during the 1930s. While working full time she also studied towards her NZIA qualifications, taking part in an atelier set up to support Christchurch architecture students. She learned her trade in Wood's office typing specifications, colouring and tracing plans, as well as general typing and office work, and by the end of her time in his office she was executing working drawings, meeting with clients, and carrying out supervision. She recalled to her biographer that while working for Wood in the 1930s clients would be referred to her specifically for the planning of their kitchens. (Later, outside the period of this study, she also designed a number of homes in her partnership with her husband, architect Bob Munro, and then in her own practice).³¹ Furthermore, it appears that at least one woman was employed by the government to work on state housing: Merle Greenwood, who had been the first woman to graduate with a BArch in New Zealand in 1933, was described in 1940 as being 'engaged on the Government housing scheme'.³²

Conclusion

This paper opened with the bold statement from the *Auckland Star* that women could 'work a revolution' in the architectural profession, particularly in the design of houses. Similar studies of United Kingdom and Australian female architects working in this era have also found that women were designing houses specifically for women. Kirsty Volz,

for example, surveying early female architects in Queensland, also noted the emphasis on domestic architecture within the writings about and by women architects in the same era and suggested that while the compartmentalizing of women into the domestic sphere could perhaps have had the effect of limiting their practice, it may also have allowed them to create for themselves a specialized niche in which they could excel.³³

One of the inherent problems of studying architectural history is that the collaborative nature of the profession means the work of almost all architects, both male and female, who don't have their name on the door, is lost. This is magnified for women of this period, because they often did not continue a life-long career in the profession, and because their work is likely to be attributed to male colleagues. There are some tantalising hints as to their role and their design interests, such as the plans by Florence Field, and the memories of Esther James, who was so clear in her desire to design Auckland bungalows which would better the lives of their inhabitants. With each of the women referred to here and others found as part of this project, it goes without saying that more work is required to better understand their work and their contribution to the profession.

¹ "Women in Architecture", *Auckland Star*, Jan 20, 1917, 16.

² Charlotte Macdonald, "Strangers at the Hearth: the Eclipse of Domestic Service in New Zealand Homes, c1830s-1940s", in *At Home in New Zealand: Houses, History, People*, ed. Barbara Brookes, (Wellington: BWB, 2000): 41-56. Her review also contains comparisons with similar trends in other countries.

³ Helen Leach, *Kitchens: The New Zealand Kitchen in the 20th Century*, (Dunedin: Otago University Press, 2014).

⁴ "Emergency Report on Housing by the Women's Committee of the Town Planning Association", 24 Sept 1920, R3 Box 154, 1914/2913/1 Pt 1, R20480108, Archives New Zealand, Wellington.

⁵ This survey focuses on articles written for and by New Zealanders, rather than overseas articles reprinted in our papers.

⁶ *Wairarapa Age*, Nov 21, 1919, 2; *Progress*, Dec 1, 1919, 14.

⁷ *Ashburton Guardian*, November 14, 1913, 6

⁸ *The Colonist*, 25 October 1913, p3

⁹ "The Ideal Home", *Taranaki Daily News*, Aug 28, 1920, 6.

¹⁰ *Hansard*, 18 July 1913, 647, *Evening Post*, July 19, 1913, 9.

¹¹ *New Zealand Herald*, (July 18, 1923), 10.

¹² The woman he is referring to here will require more research.

¹³ *New Zealand Herald*, March 30, 1926, 12.

¹⁴ "Women as Architects", *New Zealand Herald*, 11 Aug 1928 supplement, 6.

¹⁵ Julie Willis & Bronwyn Hanna, *Women Architects in Australia, 1900-1950*, (Red Hill: Royal Australian Institute of Architects, 2001).

¹⁶ Julia Gatley, "Women in New Zealand Architecture: A Literature Review" in *Proceedings of the Society of Architectural Historians, Australia and New Zealand: 31, Translation*, ed Christoph Schnoor (Auckland: SAHANZ, 2014), 249–262. The two important exceptions are Julia Gatley, 'Alison Shepherd (née Sleight), ARIBA "Success of New Zealand Lady Student" Revisited, *Fabrications*, 2007, 17:1, 20-45 and Mary-Jane Duffy, "Margaret S. Munro, Architect", MA Thesis, University of Canterbury, 1993. The organisation Architecture+Women <http://www.architecturewomen.org.nz> have been active in creating new resources. Other existing material is acknowledged where specific women are mentioned below, and in Gatley's 2014 paper.

-
- ¹⁷ The first was Beatrice Hutton, admitted to the Queensland Institute of Architects in 1916. Florence Taylor was the first woman to qualify professionally as an architect in Australia but her application to join the Institute of Architects of New South Wales was rejected in 1907 as a result of her gender, before finally being accepted in 1920. Kirsty Volz, 'Claiming domestic space: Queensland's interwar women architects and their labour saving devices', *Lilith: A Feminist History Journal*, vol 23, (2017), 105-117.
- ¹⁸ NZIA Applications for Registration, AEBC18486 W2429/1, Box1, Archives New Zealand, Wellington; Geoff Mew and Adrian Humphries, *Raupo to Deco: Wellington Styles and Architects 1840-1940*, (Wellington: Steele Roberts, 2014), 181-2, 327; *Hutt News*, August 26, 1927, 1.
- ¹⁹ "Women as Architects", *Star*, May 27, 1919, 7.
- ²⁰ *Census of New Zealand*, 1911, 1916, 1921, 1926, 1936 and 1945, ATL. (The 1931 and 1941 censuses were cancelled as a result of depression and war). Census data should be used with care, as definitions change over time and may not always accord with industry definitions.
- ²¹ NZIA Applications for Registration, AEBC 18486 W2429/1, Box 4, Archives New Zealand, Wellington; information from Dorothy's family to the author, 2018.
- ²² One suggestion for the next woman to set up a sole practice in New Zealand may be Muriel Sanders (later Lamb), in the 1950s.
- ²³ NZIA Register of Examinations and Register of Students, J C Beaglehole Room, VUW.
- ²⁴ *Progress*, October 1, 1916, 751-2; October 1, 1916, 545; Dec 1, 1916, 826-7.
- ²⁵ "A Kitchen Planned by A Woman", *Ladies Mirror*, Nov 1, 1923, 20-21.
- ²⁶ Leach, *Kitchens*, 73-77.
- ²⁷ *Sunday Mail* (Brisbane), April 2, 1933, 16.
- ²⁸ James, *Jobbing Along*, (Christchurch: Whitcombe & Tombs, c1965), 43-44.
- ²⁹ James, *Jobbing Along*; John Barton, "James, Esther Marion Pretoria", Dictionary of New Zealand Biography, <https://teara.govt.nz/en/biographies/4j2/james-esther-marion-pretoria>.
- ³⁰ Ian J Lohead, "An Architectural Tour on the Continent: Samuel Hurst Seager's Visit to Belgium in 1884", *Bulletin of Art History*, Vol 17, 1996; Ann Calhoun, *Arts & Crafts Design: "like yet not like" nature – sources for a New Zealand Story*, Wellington 2015, <http://www.artsandcraftsnz.co.nz>, 13, 230-2, 317.
- ³¹ Duffy, "Margaret S. Munro, Architect".
- ³² *Evening Post*, April 22, 1940, 12.
- ³³ Kirsty Volz, 'Claiming domestic space'; Mark Llewellyn, 'Designed by women and designing women: gender, planning and the geographies of the kitchen in Britain 1917-1946', *Cultural Geographies*, 2004, 10, 42-60

Rudolph Schindler's Church School Lecture on 'Form Creation' (1916): A Preliminary Reading

James Curry
University of Adelaide

Stanislaus Fung
Chinese University of Hong Kong

Abstract

The primary aim of this paper is to contribute to the task of identifying and discussing the original ideas put forward by Rudolph Schindler in his writings. This paper examines a lecture on 'Form Creation' given by Schindler in 1916, the notes for which have survived in an unpublished manuscript (the 'Church School Lectures') in the University of California, Santa Barbara Archive. Containing notes for 11 lectures, this manuscript contains Schindler's most extended and theoretical discussions on architecture. This paper offers the first transcription of the lecture, and provides a commentary that contextualises Schindler's thought at this period.

Schindler's views represent important advances on the architectural thinking developed by Frank Lloyd Wright and Adolf Loos: (1) The design thinking about form as the shape of matter and space involves a two-step process of "Form Conception" (geometric concerns) and "Form Creation" (material concerns) (2) Highlighting the role of machines and machine-based processes and then investigating their implications for the older understandings of what rooms should be. (3) A novel argument that positions the machine as something operating between meaning and technique.

The Church School Lectures

In a previous study on Rudolph Schindler's Church School Lectures, we called attention to the significance of 112 pages of handwritten notes for 11 lectures presented by Schindler at the Chicago School of Applied and Normal Art in 1916, and we offered a close reading of his lecture on decoration (Lecture No. XI).¹ In the present paper, we extend our study of his lecture notes by presenting a close reading of Schindler's lecture on "form creation" (Lecture No. X).

The lectures on decoration and on form creation share a common set of issues: space and enclosure, construction and purpose, the cultural status of the architect and the role of the machine. Many of these topics had been discussed in the writings of Gottfried Semper, Otto Wagner, Adolf Loos and Frank Lloyd Wright. Thus one of the main objects of our present study is (1) to situate Schindler's remarks in their nineteenth and twentieth-century context, and (2) to call attention to the distinctiveness of Schindler's remarks.

This distinctiveness is not only found in by comparing various architects' statements on the same set of issues, indicated by the same keywords. Rather, different architects might use a different cluster of terms to discuss a particular issue. For instance, Semper discussed enclosure in relation to material and ornament, Loos discussed it in relation to material and space, while Schindler discussed it in relation to space and texture. In what follows, our intention is to show how subtle variations in the clustering of terms indicate shifts of horizons. Thus the task of analysing Schindler's architectural discourse might avoid the pitfall of cognitivism, the pretense that thinking and the literal content of sayings are neatly aligned in a one-to-one correspondence. We hope to show how the clustering of terms, shifts of horizons, statement and implications can help in teasing out the sense of Schindler's lecture notes.

Here we would like to configure the frame of analysis in terms of an interplay between the said (clustering of terms, statements) and the unsaid (shifts of horizons and implications). The advantage of doing so is related to an insight expressed by Harry Francis Mallgrave in his analysis of Schindler's 1913 manifesto "Modern Architecture: A Program."² Mallgrave observed a shift in Schindler's thinking around 1914: the initial concerns of 'space' and 'comfort' had shifted to those of 'space-form, texture and color.'³ The implications of such a shift have not been discussed by scholars. This had given too much credence to the unity and rigidity of Schindler's thinking.⁴ By paying attention to the interplay of what Schindler says and what he leaves unsaid, we shall argue that there are two orders of silences in Schindler's lecture notes and in his general thinking in the years around 1913-1915. (1) Schindler's thinking on form creation revolves around a series of contrasts. We shall argue, however, that he would often focus on one term of discussion explicitly while implying its relationship to two other terms. Thus the conceptual clustering of terms crosses a divide between the said and the unsaid. (2) In his lectures, Schindler raised more issues than he could resolve. This could be due to the limited circumstances of the lecture presentations (time and audience), but it could also, at least in part, reflect the limitations of his own thinking at the time.⁵

If we follow the flow of ideas and their implications across the lecture, it is clear that the subtext of the lecture is Wright, Wagner and Loos. Schindler is maintaining the tradition of room enclosure. However, it is also evident that Schindler wishes to depart from this tradition through the use of the possibilities of the machine and the discovery of surface design.

Textual Structure

The manuscript for Schindler's lecture has a number of typographic elements. The lecture is handwritten on five sheets numbered consecutively and written on both sides. Pagination was recorded on the upper right of the recto pages. Each page is partitioned vertically, with the headings and subheadings on the left and the notes on the right.

On the top of the first sheet of the manuscript is a header marked 'tenth lecture'. On the upper right corner, roman numerals mark this. On the first sheet on the recto side, Schindler gives the title of the lecture "Form Creation."

The lecture consists of 13 headings. Each heading has a distinctive title. For ease of reference, we have added roman numerals in square brackets and the end of each section in our transcription. In accordance with the rules of transliteration, words that were originally abbreviated in the notes have been written out in full. All abbreviations have therefore been expanded, with additions underlined.

On first inspection the manuscript raises a series of issues as if they were all of equivalent status. Upon closer analysis, however, the manuscript has implicitly two major sections. (1) Schindler initially addresses the spatial interplay between form and materials. (2) In the second section of the manuscript, he outlines his views on how 'the room' should be conceptualised.

In our reading, we have broken these two sections into four parts in order to maintain the flow of ideas and their implications. It is clear that the issues of colour, structure facing and form discussed by Schindler were issues first announced by Frank Lloyd Wright and Adolf Loos, and that Schindler is giving them a new twist. However, not all the issues raised by Wright and Loos are being modified, and so we endeavour within the commentary to show when and how this is happening and clarify this within Schindler's text.

[Sheet 1, recto]

[1]

—Xth LECTURE—

X₁

— FORM CREATION—

[2]

FORM & EXECUTION

LAST LECTURE SPOKE ABOUT CONCEPTIONS OF FORM/

CONCEIVING FORM NOT ALL — /

FORM MUST BE CARRIED OUT — /

SPIRITUAL FIRST — BUT NOT ALL/

ARTFORM = MATTER IMPRESSED BY HUMAN MIND/

NOT AN IDEA — BUT MATTER OF FACT/

THEREFORE EXECUTION HAS ITS INFLUENCE/

THEREFORE MATERIAL HAS ITS INFLUENCE/

MATERIAL NOT ALL FORMS ABLE TO BE EXECUTED IN /
ALL MATERIALS/

NOW — METAL/

THEREFORE CERTAIN FORM ASKING FOR/

DEFINITE MATERIAL /

CERTAIN MATERIAL ASKING FOR DEFINITE FORM/

ARTIST WHO IS THE “INTENSIFIER”/

CONSIDER MATERIAL BY CONCEIVING FORM./

TECHNIC CONSIDERATION NOT ALWAYS THE SAME/
TECHNICAL DEVELOPMENT HAS TO BRING OUT /
ALL DIFFERENCE IN MATERIAL/
INSPIRE OF THE FACT THAT REAL ARTIST/
FEELS POSSIBILITY OF MATERIALS/
PRACTICAL —_USUALLY OBVIOUS SOLUTION/
RESOURCEFULNESS [sic] TO MAKE IDEAS PRACTICAL/

[Sheet 1, verso]

HISTORY APPRECIATION DIFFERENCE BEFORE & NOW /
GREEK/
HOMER DESCRIPTION OF PALACE OF ALKINOS [sic]⁶/

DOORS GOLDEN/
 THRESHOLD BRAZEN/
 DOORPOSTS] /
 LINTEL] SILVER/
 WALLS BRACEN/
 FRIEZE BLUE! /

APPRECIATION OF COSTLY & SHINY METALS /
 FRIEZE — BLUE — OTHER MATERIALS ONLY COLOR/
 CONSIDERATION/

EXPLAINS PLASTERING MARBLE TEMPLES/
 COLOURING MARBLE TEMPLES/

NOTE IN MARGIN: ALL CLASSIC ARCHITECTURE = DECORATIF [sic] — /
 FACINGS (STRUCTURAL MATERIAL /
 DISSAPPEARS — DEMATERIALISED)/
 FACINGS APPLIED (INFLUENCE /
 OF USE OF TEXTILES?)/
 ADOBE ETC. /
 (SEE SEMPER)/

MODERN TIMES/
 HIGH APPRECIATION OF MATERIALS /

NOTE IN MARGIN: POSSIBLY
 JAPAN INFLUENCE
 IS CONSEQUENCE OF GOOD
 CRAFTMANSHIP — ONLY AS
 PART OF CRAFTMANSHIP CONNECTION WITH ART

NOT FOR DURABILITY & STRENGTH ONLY/
 MARBLE — SICK — PASTED UP CAREFULLY/
 FOR SAKE OF BEAUTY./

ADDITIONAL NOTE IN MARGIN:
 MODERN ARCHITECTURE /
 NO FACINGS/
 DEVELOPMENT/
 SPACE BUILDER NOT /

"Form Creation" is not an abstract consideration, idea or principle of form. According to Schindler, the creation of form needs to consider materials. In Lecture IX of the Church Street Lectures, entitled "Form Conceptions," Schindler had defined form as the 'shape of matter or space'. Forms in nature were described as both 'organic' and 'anorganic' and could not be invented by the mind, only imitated, while man's conceptions were geometric (although he does not specify what kind). Schindler argued that "Form Conceptions," had to take into consideration issues of materiality, as material execution 'has an influence' on 'art-form' and should not upset its geometric conception. Thus, Schindler's approach to form is extremely specific and not at all abstract. In Lecture X, "Form Creation," Schindler will outline how geometric "Form Conceptions" conceived mentally would be impressed upon 'matter or space.'

After positioning the materials in relation to form, Schindler argues that not all forms can be executed in materials and that each material has a disposition towards certain forms. It is the 'artist' who can intensify the interrelationship between form and material.

The relation of materials to form should be viewed neither as an aesthetic consideration nor in terms of 'truth to materials'. On the contrary, Schindler argues that materials are to be considered in relation to space, in which the architect feels the material possibilities. 'Feeling the material' was not a new idea, as Adolf Loos had previously argued for its importance in "The Principle of Cladding" (1898).⁷ Schindler uses relatively few technical terms in his lecture notes but, as will become clear, he departs from Loos's approach through a reconsideration of surface design.

Schindler then provides a short history in which he contrasts a classical and modern use of materials. Schindler instances the description of the Palace of Alcinous to the time of Homer — where materials were appreciated for their function as a display of wealth and for their lustre, but consideration was limited to their colour. In order to advance the claim on the decorative use of facings within the classical, Schindler additionally refers to Gottfried Semper's discussions of the textile enclosure in which a hidden secondary support is secondary to the primary facing.

In contrast, Schindler posits a shift during "Modern times."

Speculating both that the craftsman's use of materials and the influence of Japan had brought about a high appreciation of materials, he suggests that the modern concern is one of 'space building' and not that of decoration.

Schindler's use of key terms has a specificity rooted in nineteenth-century German and Viennese discussions on the interplay between material forces and architectural form.⁸ Space building is not objective; space is sensation. Here, Schindler is refusing a Kantian understanding of space.⁹

IMITATIONS CARING FOR MATERIALS BRINGS UP MANY/
IMITATION/
VERY ANTAGONISM AG. [??] IMITATIONS ON/
OTHER SIDE/
IMITATIONS NOT POSSIBLE
ALWAYS SURFACE EFFECT
~~STRUCTURE~~ TEXTURE OF MATERIAL CAN BE FELT
THROUGH/
SURFACE/

[Sheet 2, recto]

X₂

EVERY MATERIAL HAS EFFECT ON FEELING INSTINCT/
WHICH CAN NOT BE IMITATED/

IMITATIONS SOMETIMES TRIED THROUGH „FACING”/
USING LESS COSTLY MATERIAL INSIDE/

FACINGS FACING ALWAYS WRONG IF IT DOES NOT /
SHOW AS SUCH/
DECEIVING HAS NO PLACE ANYWHERE [sic] /
NOT IN ART EITHER/
TAKING FORM AS THE MATTER OF FACT /
NOT AS MEANS FOR EXPRESSION /
OR IMPRESSION /
IT HAS TO FOLLOW ITS INNER LAWS /

AND WILL ALWAYS SHOW ITS CONCEPTION /
& MAKESHIFT /

THEREFORE WE CAN TALK ABOUT A FEW /
PRINCIPLES FOR FACING /

PRINCIPLES

1) THE MATERIAL FOR FACING MUST /
BE DIFFERENT IN TEXTURE/
FROM THE SUPPORTING ONE/
WILL GENERALLY BE THE FINER /
SUBTLER [sic] COSTLIER [sic] MATERIAL.

2) THE FACING MATERIAL MUST HAVE ITS /
OWN FORM IN SPITE /
OF SHOWING ITS CHARACTER /
OF FACING /

[Sheet 2, verso]

EXAMPLE:

IF YOU FACE A BRICK FLOOR OR WALL /
OR ANY OTHER FLOOR OR WALL /
WITH CARPET OR WALLPAPER /
THIS CARPET SHALL NEVER /
HAVE THE LINES OF BRICKWORK /
ON IT./

OR IF YOU PAINT WOOD/
IT GETS TO BE A WORK /
OF PAINTING CRAFTSMENSHIP/
THE FORMS SHALL BE SUCH TO FIT /
THE TECHNIC/

OF PAINTING — NO WOODWORK /
& THE PAINT SHALL NEVER IMITATE /
WOOD./

THE FACED MATERIAL IS ONLY SUPPORT/
NOT FORM GIVING/

CLASSIC ART: ONE FACING ON TOP OF OTHER — /
WALL + PLASTER + GOLD + ENAMEL [??] /
LATER — GOLD PAINTED TO IMITATE CHEAPER /
MATERIAL/
TEPPICH = RAUMABSCHLUSS (NICHT MAUER)/
DACH AUF SÄULEN (NICHT APF, MAUER)/¹⁰
ROMAN — RENAISSANCE!!/

NOTE IN MARGIN: SEE SEMPER SEE XI ₅
--

Continuing with the contrast between the classical and the modern, Schindler's discussion turns upon the surface at a time in which material imitations and surrogates dominated through industrialisation. The caring for materials, linked to an earlier context of homemaking within the domestic interior,¹¹ is interpreted as one of surface effect, while Schindler advances the surface texture of materials as it can be felt.¹²

According to Schindler, a material's surface texture produces tactile impressions that cannot be 'imitated' through material surrogates and imitations. It is as if the feelings themselves are within the material itself. Further, the use and production of material imitations had made it necessary for Schindler to develop two key principles. Here, Schindler followed Loos, who had also perceived the necessity of developing a principle of cladding.¹³ Schindler's contribution to the discussion on cladding and the removal of ornament is twofold.¹⁴ First, Schindler draws attention to a material's texture, insisting that texture of the facing must be distinct from its supporting structure (Schindler suggests that the facing is usually finer and more expensive material than the support) and second, that the facing material must be considered independently from its backing. Both insights extend Loos's argument for structural clarification.

Schindler's examples here and later in the lecture are more important than might be generally realized, because he has to raise so many issues. The examples suggest his thought but do not express it thoroughly. He is exploring, not presenting a fully worked-out body of theory. The importance of Schindler's examples is that he is thinking about materials in terms of techniques in relation to space building and not in terms of a look or an aesthetic. Techniques bring out the texture. Therefore facings should not resemble the supporting brickwork, nor a painted surface the timber backing.

Later on in this lecture, Schindler will reveal the impulses that drove the shift towards texture and form. In the meantime, it is worth noting the importance of 1) the machine, new manufacturing processes and materials, and 2) Schindler's long held desire to work for Wright. Furthermore, Schindler's observations (as Ákos Morávanszky has observed) must be seen in a particular context:¹⁵ discussion of ornament and cladding among Wagner's students had for some time been in crisis, prompting a range of different responses.

[Sheet 3, recto]

X₃

QUALITY OF MATERIALS THE FORM GIVING QUALITY OF
 MATERIALS/
 IS THE TEXTURE/
WHAT IS MATERIAL — /
 WHAT IS DIFFERENCE OF
 APPRECIATION/
 OF MATERIAL OR COLOR LIKE FORMER/
 TIMES/

TEXTURE & COLOR ARE DIFFERENT THINGS/

COLOR IS AN EFFECT ON „EYE”/
IS DEPENDING FROM LIGHT/
IS SURFACE APPEARANCE/

TEXTURE & COLOR TEXTURE IS FORM/
 ARCHITECTURE ART OF SPACE = ART OF FORM/
 STRANGE TO COLOR/
 NEAR RELATION TO TEXTURE/
 CAN BE FELT LIKE FORM = FORM
 COLOR — TIMED — LIGHT INFLUENCE—

EMOTIONAL/

TEXTUR[E] — ETERNAL = MONUMENTAL/
 COLOR NOT MONUMENTAL/
THEREFORE MONUMENTAL BUILDING — MATERIAL/
 IN NATURAL COLORS = TEXTURE/
COLORING OF MATERIALS ONLY POSSIBLE ON THE /
 TEMPORARY PARTS/

CAN COLOR — CLOTH/
MAY STAIN — WOOD/
NEVER TOUCH — STONE/

[Sheet 3, verso]

COLOR USED IN FACINGS FREELY/
PAINT IN ALL COLORS/
DO NOT USE COLOR AT MATERIALS OF VALUE/
NOT NECESSARY/
NATUR[E] PROVIDES MARBLE ALL COLORS/
WOOD MANY COLORS/
WOOL FEW COLORS TO BE/
FREELY COLORED/

TREATING OF MATERIALS MODERN METHODS/
TECHNIC/

MACHINES FOR QUALITY/
MACHINES MAKING MATERIALS/
HAVE OWN CHARAKTER [sic] —
MOSTLY PLAIN/
SMOOTH/

STRAIGHT UNIFORM LINES/
GLASS— /

NATURAL MATERIAL ALL SIGNS OF ERUPTIV[E] BIRTH/
MARBLES/

TEXTURE & FORM

INFLUENCE OF TEXTURE	
COARSE — LARGE FORMS	STONE/
FINE — SMALL FORMS	METAL/
SHINY POLISH — SMOOTH ROUND	WOOD/
<u>NATURAL</u> GRAIN — PLAIN	MARBLE/
PLAIN — RICHER FORMS/	

MACHIN[E] MADE MATERIALS = PLAIN TEXTURE BUT!
SIMPLE FORMS/
MACHIN[E] FORMS ALWAYS SIMPLE — REPETITION/
WOULD MAKE ELABORATE FORM TAST[E]LESS/
CHARACTER OF MACHINE — PLAIN!

NOTE IN MARGIN:	BRICK =	UNIFORM QUIET./
	STONE =	<u>UNIFORM QUIET/</u> PANNELS SHALLOW TO/ KEEP STRENGTH, SURFACE/
	WOOD =	PANNELING./

TECHNIC :

WILL BRING OUT THIS QUALITIES/
MAY BE ABLE TO OVERCOME THEM/
BUT INSTINCT HAS TO BE FOLLOWED/
SHALL NOT GIVE FORM WHICH CAN /
BE DONE, BUT ONE/
WHICH BRINGS ESSENTIAL /
QUALITIES OF MATERIALS OUT./

EXAMPLE: SKY SCRAPERS/
SKELETON BUILDING./
SEE DURING CONSTRUCTION — FINE/
LATER SKELETON CANNOT BE SEEN/
HUMAN BODY — BONES/
SKY SCRAPER LOOKS LIKE BRICK BUILDING./

FORMS OF ROOFS:

SMALL UNITS SHINGLES ETC./
STEEP ROOF/
LARGE UNITS SHEETMETAL/
PAPER = HIDE/
FLAT ROOF/
ROUND ROOF/

NOTE IN MARGIN: STREETS — COBBLE STONES/ ASPHALT/

[Sheet 3, verso]

TECHNIC:

GREEK BUILDING TEMPLES WITH ROUGH STONES/
 FLOOR & COLUMN & EVERYTHING/
 FINAL FORM CUT ON JOB/
 ALLOWS ENTASIS & SLIGHT CURVES/
 OUR TECHNIC CUTTING WITH MACHINES /
 IN SHOP/
 COMPELLES STRAIGHT LINES/

Along with the earlier discussion on facings, in this section of the lecture Schindler diverged from a Semperian tradition in important ways. We can summarize the situation in the following way: (1) by moving away from a craft tradition and embracing the use of machines; (2) by arguing implicitly that form is not a self-sufficient primary term (i.e. form is understood in terms of textured materials and space building); and (3) by proposing that the architect does not compose with colours (i.e. critiquing polychromy).¹⁷

Schindler zooms in on colour and texture within 'classical' and 'modern' periods. Despite the connection to surface, colour is a distinct concern from texture. Colour is an effect on the eye, while texture is form. The importance of the latter is that Schindler defines architecture as 'an art of space', in which space and form are linked.¹⁸ The space builder implicitly composes with textural surfaces rather than colour.

Space building orchestrates various optical effects produced by manufactured and machine-based processes. It is not about 'objectising' the building. According to Schindler, the modern use of a material's surface texture along with its structural clarification distinguishes it from the classical use of decorative facing, allowing for the possibility of space as sensation. Further, Schindler is thinking about subtraction, namely giving up something that is customary. This giving up something customary is the decorative use of facings. Here, he breaks new ground. Previously, the idea of facings had a place for ornamentation as an additional consideration.

In this section of the document, Schindler raises the problem of the machine in relation to materials. The machine had previously been discussed by Wright in 'The Architect and the Machine' (1894), 'The Art and Craft of the Machine' (1901) and 'In the Cause of Architecture' (1908).¹⁹ Critiquing the use of the machine to imitate craft-based techniques, in which the labourer was distanced from the handicraft, Wright saw the potential to integrate machine-made elements to produce new artistic forms of expression.²⁰

In "The Art and Craft of the Machine" (1901), Wright highlighted wood as an example. Rejecting the use of the machine to imitate wood carving, Wright argued that the architect ought to draw out the beauty of materials, "its beautiful markings," "its texture" and "its color" through the "cutting, shaping, smoothing and repetitive capacity." Steering the discussion away from jointing and connection to fabrication processes, Wright argued for an aesthetic that permitted "beautiful surface treatments" with the extended use of stained wood and plaster.²¹

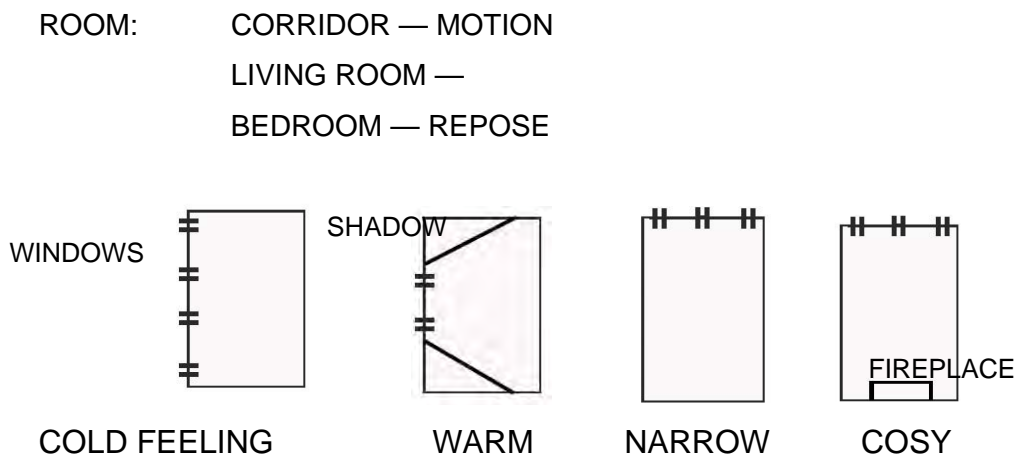
Wright similarly discussed the steel frame. As he had done with the printing press, Wright interpreted the frame as a representation of the machine. Pointing to a disconnection between art and the machine within existing arts and crafts practices,²² where the "art" is torn and hung upon the steel frame of commerce', Wright argued for a new 'robe of ideality' in which the building façade is "sincere"; that "idealises its [the steel frame's] purpose without structural pretence."²³ Wright had seen in the skyscraper a way of developing the art of architecture which could integrate machine methods and processes, and give "sincere" expression to a relationship between façade and structure.

There is an implicit relationship between Schindler's discussion of the size and type of roofing material in relation to form and Wright's discussion of the steel frame. Schindler is attempting to articulate a relationship between material and form, in which materials are not subordinate to forms. Schindler's argument, however is not just about domesticity but also about a condition of modernity. He clearly found Wright's views congenial, as he was prepared to include skyscrapers in his vision of modernity.

In raising the subject of the machine, Schindler is clearly following Wright, who departed from a craft tradition. While Semper had earlier despaired of the overwhelming capacity of the machine to produce decorative effects with cheap materials, and Loos had remained within a craft tradition, both Wright and Schindler display a certain optimism in contemplating its use.²⁴ While Wright develops an ornament from the process of fabrication, Schindler's

discussion is much more specific, as he is exposing a European discourse on cladding to American discussions on the machine.²⁶

In Schindler's discussion, there are two shifts of horizons: first, architecture as a technical object is presented as something with its own sense of meaning. Schindler is implicitly attacking the dissonance between culture and technology in the arts and crafts by pointing towards a technical culture. Second, Schindler was not only interested in the clichéd discussion of architecture as technical object there was fixated on utility and usage. He was interested in the genesis of technical objects.



DOORS MUST NOT BREAK UP ROOM IN /
 ANY DIRECTIONS/

[Sheet 5, recto]

X₅

ROOM FORM ARCHITECTURE MATERIAL=ROOM
 PURPOSE & ROOM EVERYROOM IS NOW[?] CONCEIVED IN VIEW
 OF ITS/
 PURPOSE/
 THE GREEN OR BLUE CHAMBER OF THE LOUIS
 XV/
 IS BEDROOM WITH BED/
 & DINING ROOM WITH TABLE/
 (OLD FIREPLACE)/
 EVERY ROOM ONLY FOR ONE PURPOSE/

ROOM CONCEPTIONS PLAIN STRAIGHT OUTLINE [?]/
CURVED OUTLINE[?]/

3 KINDS: CENTRIC/
EXCETRIC/
ACENTRIC/

CENTRIC ROOMS CENTRIC ROOM: CIRCULAR/
GEOMETRIC CENTER: DOM[E]S/
SQUARE WITH CENTRIC FORMS/
MOSTLY ROOMS WITHOUT PURPOSE/

EXCETRIC ROOM CENTER OF ROOM NOT GEOMETRIC/
BUT CENTER OF INTEREST/
MOSTLY ROOM WITH DEFINITE PURPOSE/
POINT OF INTEREST:/
ALL LIVING ROOMS FOR HUMAN BEINGS/
TO HAVE SUCH CENTER — COZY & LIVABLE/
HIGHTS OF ROOMS — HUMAN FIGURE/
INTERLOCKING OF ROOMS/
LIVING IN A ROOM (BACK DOOR, PRIVACY ETC.) PRESENTATION)/

[Sheet 5, verso]

CENTER EITHER FURNISHED BY/
LONGING FOR HEAT = FIREPLACE/
LONGING FOR LIGHT = WINDOW/
CHURCHES, THEATER — ETC./

ACENTRIC ROOM ACENTRIC: NO CENTER/
ROOMS WITH CHANGING
PURPOSES/
SHALL NOT APPEAL LIVABLE./

OUR TIME DOES NOT CREATE/
CENTRIC ROOMS/
NOT "MODERN"/

THE RENAISSANCE CHURCH WITH DOM[E] = /
MIXTER CENTRIC & /
EXCENTRIC/
PROVES: NOT CONCEIVED AS ROOM/
BUT AS SCULPTED CONSTRUCTED MATTER/

Having previously defined architecture in his discussion of material texture as the "art of space," Schindler asserts here that the issue of materiality is linked directly to the topic of the room and defines three room typologies, two of which are described as "modern." Along with the Acentric room, the Excentric room is described as "Modern" and is contrasted with Centric rooms. The Excentric room is horizontally compressed, having been scaled to the height of a human, with an expression of comfort, such as a fireplace or daylight penetration, at its centre. Acentric rooms have neither a fixed mode of use or point of interest, while Centric rooms—a room type affiliated with the nineteenth-century mass-space architecture of Semper—as one of implicit hierarchy, are driven by geometry and have little relation to a specific use.

It is important to note how, in maintaining a focus on the topic of the room, Schindler is giving it a new sense.

Overall, there is an implicit relationship between the two sections of the lecture; the discussion of form (texture of material) and the geometric concerns of room. Schindler did not comment on this relationship explicitly, but he had previously alluded to a range of structural materials or systems and discussed types of cladding that could work with that structure. He then seems to be thinking about using it in a way that maintains the articulation of the new possibilities of structure and cladding. In following the flow of ideas across Schindler's lecture, we would logically expect his thinking to have implications for the room type, in the sense of whether rooms are centred or not centred.

If materials are changing due to the development of the machine, then we cannot think about the materials individually because we are always putting them together. For Schindler, the context of putting materials together is the room. Schindler wants to explore how this way of using materials has an impact on the room, notably by doing away with the centric room.

The Significance of Lecture X

One of important aspects of Schindler's Lecture X is that he dis-articulated the relationship between structure and cladding. In Schindler's argument, texture provides a way of thinking about modern structural relationships with the cladding and facing that implies a move away from the centric room both structurally and constructionally.

Schindler's discussion implies that architects might have been too much concerned about effects and too little about the genesis of the material object. For Schindler, Loos's approach to culture was inherently conservative and looked backwards towards existing modes of culture. Loos's handicraft is essentially reproducing the normative framework of pre-industrial technical culture, and points to the cultural anxieties of a *petitbourgeoisie* that was experiencing rapid modernization at the turn of the twentieth century. For Schindler, Loos's approach was based on a misunderstanding of the mechanization of production techniques. In hindsight, what Schindler considered a misunderstanding was about the tool-bearing ability of human beings, and how that ability was transferred to machines in the industrial age.

For those attached to handicraft, the transfer of the tool-bearing function from humans to machines heralds the prospect of kitsch, when machine-made products simply mimicked hand-made products. For Schindler, however, the question was whether it was appropriate to construe the industrial age in terms of a transfer of the tool-bearing function from humans to machines. He was looking for a positive and liberating potential in the relationship between building construction and industrialization. Like Wright, Schindler was searching for the reintegration of technology into culture, but he did not merely admire machines made by industry in the way other architects wrote about cars and aeroplanes. Schindler's line of thinking pointed to a new sense that machines and new fabrication processes would allow him to make larger surfaces with particular textures within the room, whereas in the craft tradition large surfaces could not be made with particular textures. Schindler was not talking about using machines to replace human beings, a proposition sometimes discussed in arts and crafts circles. The working of machines and the relation between machines—their coordination—became a key concern in Schindler's thinking about the room.

Schindler was not thinking of the room as a site for registering arts and crafts sensibilities or registering a machine aesthetic. Rather, he saw architects as transducers between machines. The terms of his lecture on form creation can then be placed in an overall

understanding of life: the room as a situation of life should be (at least partially) construed in terms of the rhythm of machines.

-
- 1 See James Curry & Stanislaus Fung, 'Rudolph Schindler's Church School Lecture on 'Decoration' (1916): A Preliminary Reading' paper given at 'Quotation' SAHANZ 2017. R.M. Schindler, Lectures "Church, School, Chicago" delivered Chicago School of Applied and Normal Art 1916, are held by the University Art Museum at the University of California, Santa Barbara (UCSB) UCSB Box 3, Folder 231.
 - 2 R.M. Schindler, 'Modern Architecture: A Program (1913)', in *R.M. Schindler: Composition and Construction*, eds L. March and J. Sheine. (London: Academy Editions, 1993), 10–12.
 - 3 H.F. Mallgrave, 'Schindler's Program of 1913', in *R.M. Schindler: Composition and Construction*, eds L. March and J. Sheine. (London: Academy Editions, 1993), 19.
 - 4 The discussion within scholarship of the lecture notes has been brief, having prioritized Schindler's earlier 'Modern Architecture: A Program' (1913). The most extended discussion of the notes can be found in Jin-Ho Park, "Numerical Properties of Rudolph Michael Schindler's Houses in the Los Angeles Area," *The Mathematical Intelligencer* 28, no. 1 (2006). Park similarly locates Schindler's approach to space as emerging from both the theoretical writings of Loos and Semper. However in Park's analysis, Schindler's discussion of materials, the machine and the importance of texture are not discussed.
 - 5 In the lecture notes, Lecture I, 'Introduction', Schindler describes the character of his lectures: '[The] form of lectures was not developed', but would 'cover all ground', providing a 'skeleton of ideas.' Then, he declared, 'I want to show our problem of architecture, new conception, new aims . . .'
 - 6 The description of the Palace of Alcinoos can be found in BkVII:78-132 of Homer's *Odyssey*.
 - 7 Adolf Loos, 'The Principle of Cladding (1898)', in *Spoken into the Void*, trans. Jane O. Newman and John H. Smith (Cambridge, MIT Press, 1982).
 - 8 M. W. Schwarzer, 'The Emergence of Architectural Space: August Schmarzow's Theory of Raumgestaltung,' *Assemblage*, 15 (1991), pp. 49 – 61.
 - 9 For a discussion of Kant's development of the Cartesian dualism between mind and matter, see Michael Prodo, *The Critical Historians of Art* (New Haven: Yale University Press, 1982). 9-11
 - 10 The English translation of the text reads "CARPET = BORDER OF THE ROOM (NOT WALL)/ ROOF ON PILLARS NOT [?], WALL". Our thanks to Urs Bette for the translation.
 - 11 Charles Rice, *The Emergence of the Interior: Architecture, Modernity, Domesticity*. London and New York: Routledge, 2007.
 - 12 Curry & Fung, 'Rudolph Schindler's Church School Lecture on 'Decoration' (1916)
 - 13 Adolf Loos, 'The Principle of Cladding (1898)', in *Spoken into the Void*, trans. Jane O. Newman and John H. Smith (Cambridge, MIT Press, 1982).
 - 14 Schindler was familiar with the theoretical writings of Semper, Wagner, Sullivan, Wright, and Bragdon. Their names are listed in various freehand lecture notes throughout Schindler's writings. Further Schindler attended Loos's lecture course at his Museum Café. See . Giella, *R. M. Schindler's Thirties Style: Its Character (1931 – 1937) and International Sources (1906 – 1937)* (PhD dissertation, New York University, 1985).
 - 15 Ákos Moravánsky, *Metamorphism: Material Change in Architecture* (Basel, Verlag Birkhäuser, 2018), 236.
 - 17 The discussion on polychrome can be found in Gottfried Semper, 'Preliminary Remarks on Polychrome Architecture and Sculpture in Antiquity' in Gottfried Semper, *The Four Elements of Architecture and Other Writings*, trs, Harry Francis Mallgrave and Wolfgang Herman (Cambridge, Cambridge University Press, 1989), 45–73.
 - 18 Jin Ho- Park has made the observation that the terms space, room and form are in 'reciprocal relationship' where matter was tied to form, space with the room. see, 'R. M. Schindler's theory of space architecture and its theoretical application to his Space Development of 1945 *The Journal of Architecture*, 11:1, 37-54,
 - 19 Frank Lloyd Wright's, 'The Architect and the Machine (1894)', 'The Art and Craft of the Machine' (1901) and 'In the Cause of Architecture' (1908) can be found in *Frank Lloyd Wright: Collected Writings*, vol. 1, ed. Bruce Brooks Pfeiffer. New York: Rizzoli, 1992
 - 20 See A. Alofsin, *Frank Lloyd Wright The Lost Years, 1910 – 1922* (Chicago and London, The University of Chicago Press, 1993). 158 and Kenneth Frampton, "Frank Lloyd Wright and the Text-

Tile Tectonic," in *Studies in Tectonic Culture: The Poetics of Construction in Nineteenth and Twentieth Century Architecture* (Cambridge, MA: MIT Press, 1995), 101-2.

21 Wright 'The Art and Craft of the Machine' (1901) in *Frank Lloyd Wright: Collected Writings*, 64-5.

22 Kenneth Frampton, *Wright's Writings: Reflections on Culture and Politics 1894-1959* (Columbia Books on Architecture and the City, Columbia University New York 2017), 17

23 Wright 'The Art and Craft of the Machine' (1901) in *Frank Lloyd Wright: Collected Writings*, 62-3.

24 The discussion of the machine in Semper and Loos can be found in Aline Payne, *From Ornament to Object, Genealogies of Architectural Modernism* (New Haven: Yale University Press, 2012), 46-48 & 217-229.

26 For a discussion Wright's use of ornament in relation to a Semperian tradition, see of Kenneth Frampton, "Frank Lloyd Wright and the Text-Tile Tectonic," in *Studies in Tectonic Culture*, 101.

Both Louis Sullivan and Frank Lloyd Wright were exposed to Semper's theories. His influence was discussed by Frederick Baumann in 'Thoughts on Architecture' (1890) and "Thoughts on Style' (1892). While Wright's knowledge of Semper's theories may have been due to John Root and Fritz Wagner's English translation of 'On Architectural Styles', *Inland Architect and New Record*, 1889 – 90. Roula Geraniotis "Gottfried Semper and the Chicago School" and Barry Bergdoll, "Primordial Fives: Frank Lloyd Wright, Gottfried Semper and the Chicago School" both papers delivered at the Buell Center, Columbia University, 1988.

Modernist Concrete

Technologies of Brisbane church architecture in the 1960s

Lisa Marie Daunt
University of Queensland

Abstract

The reinforced concrete Holy Family Catholic church in Indooroopilly, designed by Douglas and Barnes between 1960 and 1963, was a milestone in in-situ concrete construction for Queensland (and possibly Australia). Influenced by international modern concrete church designs – most notably Marcel Breuer's St John's Abbey church, (1953-1961) and Oscar Niemeyer's chapel of the President's Palace (1958) – the team involved in the design, engineering and construction of Holy Family seized the opportunity to develop a building with expressive new forms, using new construction materials and methods, a combination never before tested in the State. Not surprisingly, the monumental and sculptural building repeatedly challenged its architects, engineers and builders. The separate baptistry chapel's jewelled crown of arches and slender spire, forced the architects to use complex mathematical formulae and geometries (tilted hyperbolic parabolas derived from conic sections) to prepare detailed drawings for the builders, who were already struggling to construct the church building's folded concrete walls and ceiling. One pleated bay at a time, they positioned double and single sided formwork, secured the reinforcing and concealed downpipes, poured concrete in sections into forms and also sprayed concrete in layers onto forms, waited for curing, before releasing the forms and repositioning to start the next pleat – a sequencing challenge of 'monumental' scale and unprecedented technical complexity. Due to these challenges, the church took more than two years to build and involved two construction contracts (after sending the first builder bankrupt). Fortunately, on two occasions when forms and a crane fell, workmen narrowly escaped injury and the building was unaffected. Based on interviews, archival and on-site research, this paper examines the design's conception and the buildings' realisation. Documenting the development of the Holy Family throughout its various phases, it seeks to understand how significant a milestone this church was for in-situ concrete construction in Australia.

Modern concrete churches

From the inter-war period on, church architects broke away from the nineteenth century's determination that Gothic was the architecture most fit for ecclesiastical buildings.¹ From the late nineteenth-century architects had increasingly used modern materials, like concrete, to harness the efficiencies of modern construction methods. Then in the inter-war years *avant garde* architects further used these methods, experimenting with expressive and geometric forms, as they sought modern architecture capable of evoking the sacred, like the Gothic had for its time. The church of Notre Dame Le Raincy (c.1923, France) designed by Auguste Perret (1874-1954) and the St. Englebert Catholic church (c.1932, Cologne-Riehl, Germany), designed by Dominikus Böhm (1880-1955) were globally recognised front-runners of modern reinforced concrete church design.² Post-war, Le Corbusier's (1887-1965) design for Chapelle Notre Dame du Haut in Ronchamp (c.1955, France)³ had a very far-reaching architectural and artistic influence. A few years later, Marcel Breuer's (1902-1981) St John's Abbey church, (1953-1961, Collegeville, Minnesota USA), which he designed with the renowned Italian engineer Pier Luigi Nervi (1891-1979)⁴ and Oscar Niemeyer's (1907-2012) chapel of St Francis of Assisi (c.1943, Brazil, Pampúlha) and chapel of the President's Palace (c.1958, Brazil, Brasilia) pushed the plasticity of concrete church architecture further.⁵ Each of these churches were widely published and inspired many architects worldwide.⁶

In Australia architects began to experiment with concrete and new geometric forms from the early 1940s on. Most notable among these, is of course Jørn Utzon's (1918-2008) design for the Sydney Opera House (constructed 1959-73); and the Shine Dome in Canberra (c.1959) by Roy Grounds (1905-1981) for Grounds Romberg and Boyd.⁷ In the 1950s Kevin Borland (1926-2000), Robin Boyd (1919-1971) and Peter McIntyre (b.1927) were also experimenting with Ctesiphon (sprayed concrete) construction to achieve parabolic structures.⁸ In Brisbane, James Birrell's (b.1928) experiments with both in-situ and precast concrete created the curving forms of the Century Pool Complex (c.1959 Spring Hill), the geometric pattern panels of Wickham Terrace Car Park (constructed 1959-60, Spring Hill) and the textural zigzagging structure of Union College at the University of Queensland (built in stages between 1964 and 1974).⁹

Around the time that these buildings were realised, Australian church architecture began shifting away from Neo-Gothic and Romanesque architecture towards more modern variants, most frequently steel or concrete frames and brick cladding or infill panels. Notable exceptions to this general tendency included churches by Kevin Curtin (1925-1996). His St Bernard's Catholic church (c.1955, Botany, NSW) was most likely the earliest Australian

church to use an extruded parabolic arch cross-section for the length of the church, achieved with the combination of steel framing and precast.¹⁰ In North Queensland Edwin (Eddie) Oribin (1927-2016) designed St Paul's Church of England (c.1959, Proserpine), using laminated timber and concrete portals to create an extruded parabolic form.¹¹ St Mary of the Sea Catholic Cathedral (c.1962, Darwin, NT, designed in 1957 by A. Ian Ferrier (1928-2000) of J.P. Donoghue, Cusick & Edwards) used reinforced concrete parabolic ribs expressed as the entry façade and within the interior.¹² Nervi's unbuilt 1957-61 scheme for the New Norcia Cathedral (WA) proposed multiple parabolic arches, arranging them as the three intersecting arches pitched tall over a triangular-planned cathedral.¹³ Pleated pre-cast concrete was used by Loder and Dunphy for the street-facing, side elevation of St Andrews Presbyterian church (c.1960, demolished 2002, Gosford, NSW).¹⁴ Gibbons and Gibbons used both precast and post-tensioned concrete shell construction (c.1961, Dee Why, NSW) and parabolic arches to create a highly expressive pleated and draped structure¹⁵ - a design of similar size and an interesting comparison to Holy Family. Because of their innovativeness, all these designs were widely published. Nervi's scheme, in particular, received a great deal of attention. It was first announced in Australia by the Melbourne newspaper *The Age* in May 1959, immediately after receiving approval from Rome. Its realisation then seemed a certainty. The announcement suggested construction of the 'triangular ferro-concrete cathedral designed by the famous Italian engineer-architect Peri Luigi Nervi'¹⁶ would commence as soon as August or September. Then in 1960 the scheme was showcased on the front cover and was the feature article in *Australian Architecture Today*.¹⁷ The unrealised scheme for New Norcia



Figure 1. Western street approach; and Baptistery chapel
(State Library of Queensland, Royal Australian Institute of Architects, Photography Collection).

(lack of finances the likely reason),¹⁸ was inspirational for Australia's architects; Rome's approval implying a permission for local church architects to use Nervi's material of choice, "ferro-cemento."¹⁹

Amidst the excitement generated by New Norcia's scheme, the reinforced, in-situ concrete Holy Family War Memorial Catholic church was designed in 1960-61²⁰ by William (Bill) Douglas (1930-2005)²¹ and Harvey Blue (b.1938)²² for the Brisbane-based practice Douglas and Barnes.²³ It was progressive for its modern geometric form, materiality and applied construction technology. Holy Family is, arguably, one of the earliest Australian examples of in-situ construction being used to realise a complex geometric design of angles and curves.²⁴ For Australian church architecture it is one of the most expressive, achieving the Catholic Church's design aspirations of immanence and transcendence²⁵ through its evocative form, tall volume and integrated modern artwork.²⁶ However, the liturgical movement's progressive ideas for liturgical renewal, formalised by the Catholic Church as part of Vatican Council II (1962-1965), are not evident in the design of Holy Family.²⁷ Instead Holy Family's vertical structural form and elongated basilica plan supports pre-conciliar attitudes.²⁸ Yet as had happened with its experimental ecclesiastic predecessors, local newspapers, Catholic publications and trade periodicals announced its arrival with pride, describing it as 'bold', 'striking', 'unusual and modernistic', 'most attractive' and even 'picturesque'.²⁹

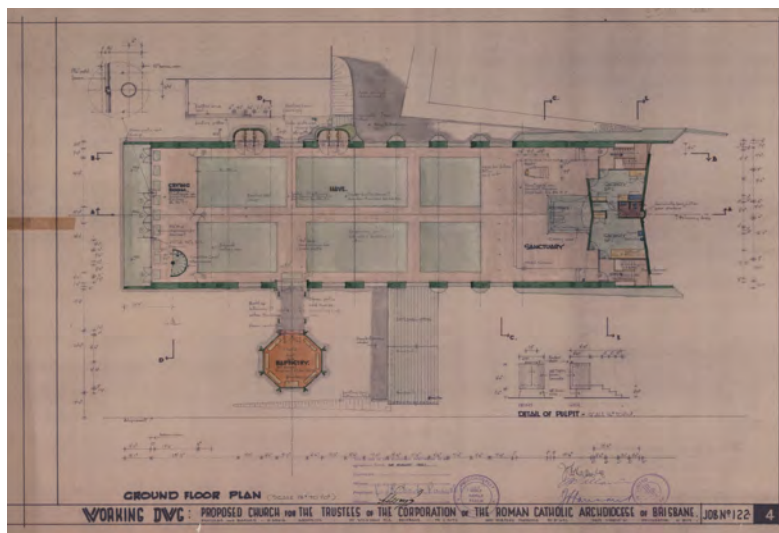


Figure 2. Floor Plan
(University of Queensland, Fryer Library Douglas & Barnes Collection, UQFL289 job0122).

Designing the Holy Family

Holy Family is one among a group of Douglas and Barnes' designs that use curved geometries to create local landmarks. Inspired by church architectures from abroad and interstate, they saw the potential of modern construction techniques, and experimented. Both their Southport Methodist church (designed 1959, opened 1964)³⁰ and their St George Presbyterian church (c.1968)³¹ used parabolic geometry to create unique landmark roofs. At Southport, a 'twin parabolic-tiled roof'³² is draped over a fan-shaped plan and mirrored along the length of the centre aisle the roof rises above the sanctuary to frame a large stained-glass feature window. Their St George Presbyterian church used parabolic geometry to create a roof that sweeps up to a point from the four sides of its square roof plan. Holy Family is, however, larger and more complex than these other churches. The time, the project brief and their skill sets aligned and they seized the opportunity to create a religious landmark building for their own city - Brisbane.

Douglas designed the 615-seat church building, but gave Blue (then a young architecture student)³³ the opportunity to design the baptistery chapel building. Blue subsequently drafted nearly all the projects construction drawings. Douglas prepared the specification and penned a couple of drawings.

The church building's monumental design has walls tilted at ten-degree off vertical, with origami-like pleats incorporated at high level along both sides that continue across the roof, a design which resembles the folded-plate structure of Breuer's St John's Abbey church. An imposing column-free concrete shell measuring 170-feet long by 47-feet wide (51.8m by 14.3m), and 57-feet 3-inches (17.5m) tall at its western end, Holy Family stood out within the pre-WWI residential suburbia,³⁴ and contrasted sharply with the former timber church it was built alongside of. Like its neo-gothic predecessors Holy Family's interior is grand, with its long nave, tall and narrow volume, and pleated ceiling. The worship space interior is approximately 33-feet 9-inches (10.3m) in height and 121-feet 4-inches by 43-feet (37m by 13) in plan.

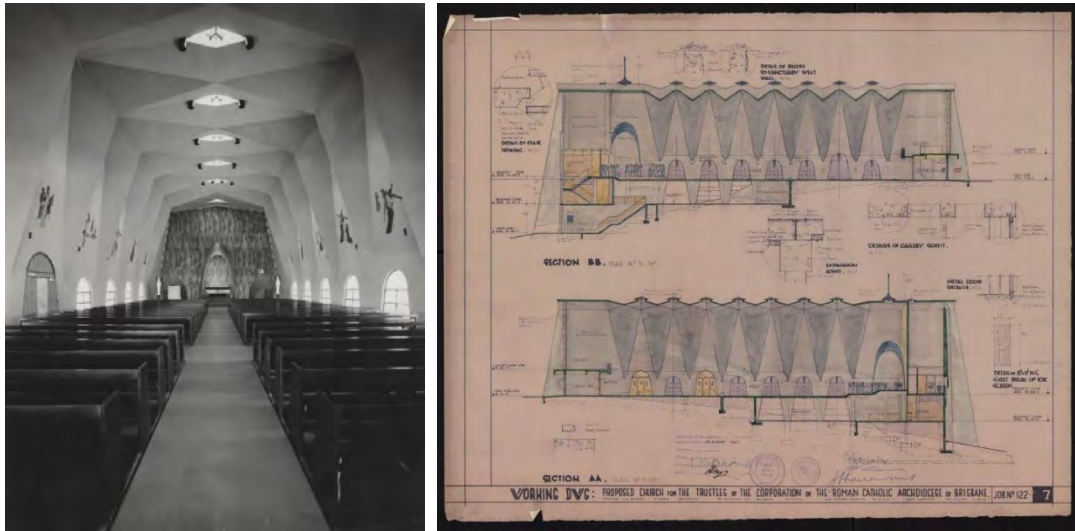


Figure 3. Interior; and Longitudinal building sections
(State Library of Queensland, Royal Australian Institute of Architects, Photography Collection; and University of Queensland, Fryer Library Douglas & Barnes Collection, UQFL289 job0122).

The baptistry chapel is octagonal in plan, with eight tilted hyperbolic parabola arches forming the walls. Sculptural curved pleats in the ceiling/roof connect the arched bays together, with a 40-foot (12.2m) slender and tapering spire taking the overall height to 65-feet (19.8m) and 90-feet (27.4m) above Central Avenue street level. The chapel is reminiscent of Böhm's St. Englebert Catholic church.³⁵

The two structures are connected by an arched link, with arched openings along both sides. Also, a reinforced in-situ concrete structure, the link acts as a human scale device between the church and chapel's monumental forms. The confessionals bulging from the opposite side church curves added a curved organic geometry.

The design forced the architects to use complex mathematical formulae and geometries to prepare numerous detailed drawings for the builders.³⁶ For instance, the eight hyperbolic paraboloid arches of the baptistry chapel were calculated and set out using conic sections, with their ten-degree inward tilt adding a further factor of complexity to these calculations. Blue was very interested in mathematics and geometry, which Douglas recognised. Blue read the American periodical *Architectural Record*, which in the late 1950s and early 1960s had an 'Architectural Engineering' section in the back with technical articles, providing detail on both concrete shell construction and the use of mathematics in architecture.³⁷ The geometries and mathematics of regular solids and conic sections fascinated Blue, as did the work of the 1960 Royal Institute of British Architecture (RIBA) Gold Medal winner, Nervi, and Eero Saarinen's Chapel at Massachusetts Institute of Technology (MIT) with its outer cylinder walls, inner waving sin curve-like walls and the play of light within the space.³⁸

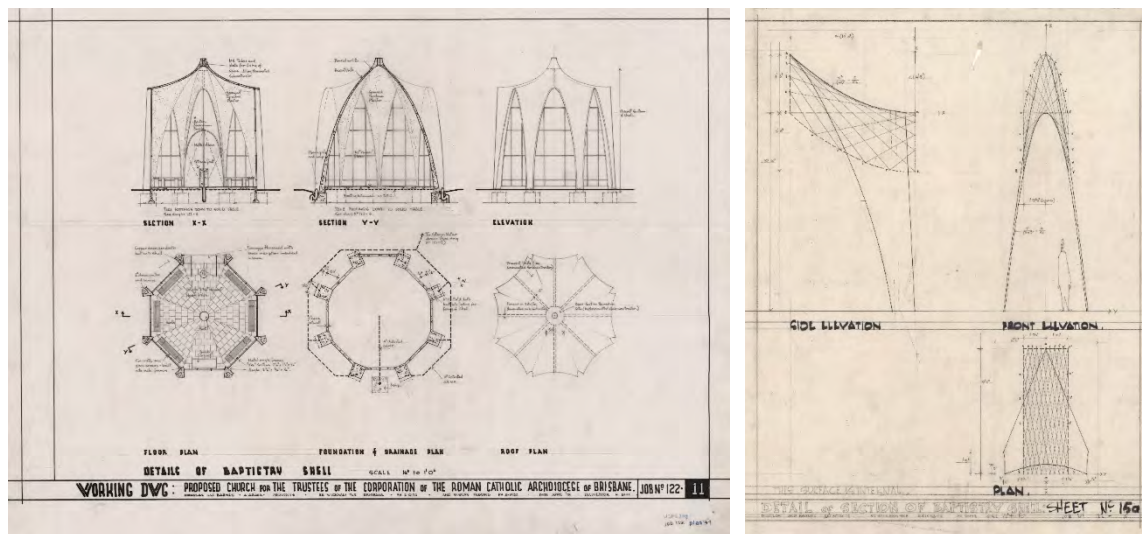


Figure 4. Baptistery Chapel Drawing & butter paper calculations
(University of Queensland, Fryer Library Douglas & Barnes Collection, UQFL289 job0122).

The building's realisation

The complex geometries and forms of Holy Family's design required a variety of concrete techniques and construction methods to be realised – slab on ground, suspended slab, post-tensioned waffle slab, tapered circular in-situ columns, tilting and vertical conventional double-formwork in-situ walls, single-form shotcrete wall and roof construction, on site pre-casting, spun-concrete and ferro-concrete. A progressive and knowledgeable structural engineer was required. R.J. McWilliam and Partners were commissioned for the project.³⁹ This practice was led by Russell John (Jack) McWilliam (1894-1991) and known for its concrete and steel capabilities. McWilliam's had considerable experience in engineering; he had also worked within the architectural practice of Hall and Prentice and lectured University of Queensland architectural students on construction. He was a member of the concrete structures code committee in the interwar years, and from 1946 a member (federal president in 1967) of the welding institute of Australia post-WWII.⁴⁰ This distinguished pedigree set him apart from his engineering peers. Working with McWilliam, Geoff Clarke (1928-2002) was the design engineer for the project.⁴¹

A challenging build, the church took more than two years to build and involved two construction contracts (bankruptcy necessitated the change of contractor). Pendus Pty Ltd won the tender with the lowest price and the contract was signed on 1 August 1961.⁴² However, John D Booker Constructions Ltd took over the project and was recognised for completing the project.⁴³ Achieving the architects' design was a test for the builders, as non-

standard construction methods and locally untested techniques were extensively required. Within the architects' tender documentation some of the construction methods were specified in detail, and others were left to be resolved later,⁴⁴ or were adjusted in the process of working with the builder and his sub-contractors.⁴⁵ The project was to be completed in June 1962,⁴⁶ but took until November 1963. Costing more than £70,000,⁴⁷ it was not only one of the largest, but also one of the most costly Catholic churches to be built in Queensland post-war.⁴⁸

The subfloor and main floor slab were constructed using conventional industry construction methods. However, as observed by *The Catholic Leader*, from the main floor slab up 'the method of construction was most unusual ... instead of the building growing upwards, it grew longitudinally'.⁴⁹ The industry standard setup for scaffold was to surround the building envelope, but this was not possible with the walls tilting inwards. Instead the project's structural engineer designed a steel scaffold tower, which was produced by the builder. Supported on 'bogies'⁵⁰ – wheel sets used under train cars – and slid on rails down the centre of the building, 14-foot (4268mm) each move, the structure was referred to as the 'Jumbo and falsework'.⁵¹ Interestingly, this approach resembles that used for tunnel construction and is not unlike one of the falsework methods that John Fitchen describes in his 1961 book *The Construction of Gothic Cathedrals*.⁵² However, unlike the timber falsework used by Medieval builders and the sliding forms of tunnel construction, the engineer's design needed to enable the forms to be collapsed and lowered between slides, due to the inward folds of the pleats. To do so, the Jumbo supported a collapsible 'butterfly-like' formwork with hinges on winding jacks that pivoted from the top, and used a worm drive (a turning screw rod) to lift the formwork vertically up and down.⁵³ On two occasions the forms failed and a crane fell. Fortunately, workmen narrowly escaped injury and the building was unaffected. On the first of these occasions the formwork worm drive's rod screw failed, breaking along a weld joint. A new one was made using a single piece of steel. This was at the beginning of the church's pleated wall and roof concrete works.

The complexity of the formwork, concreting and reinforcing was specifically highlighted in *The Queensland Master Builder's* 1963 article, 'Bold Design Craftsman Built':

Workmanship and detail in the formwork was of paramount importance in this off-the-forms finish ... Externally the pleats, wide and deep at the top and tapering out at the bottom, called almost for moulds rather than formwork, and the variety and complexity of the reinforcement caused some difficulties in the construction.⁵⁴

The walls and roof of the church are a combination of four and eight-inch (102 and 204mm) in-situ concrete. Double-forms were used for the vertical and ten-degree tilted wall sections (figure 5, left most detail, shown with a horizontal hatch pattern in elevation). Single-forms were positioned on the interior side of the wall pleats (no hatch pattern to this part of the same detail) and integral ceiling/roof.⁵⁵ Using this formwork, the church building was constructed from east to west,⁵⁶ with the eastern non-pleated walls and roof completed first, then one pleated bay at a time until all eight were done, finishing with western non-pleated walls and roof. As formwork was positioned for each pour, steel reinforcing was secured, concealed downpipes, conduits, bolts, and other attachments positioned for the later trades, ahead of concreting trade works. Complicating the construction sequencing further, the double-forms used a different concrete mix and a pouring method to the single-forms.

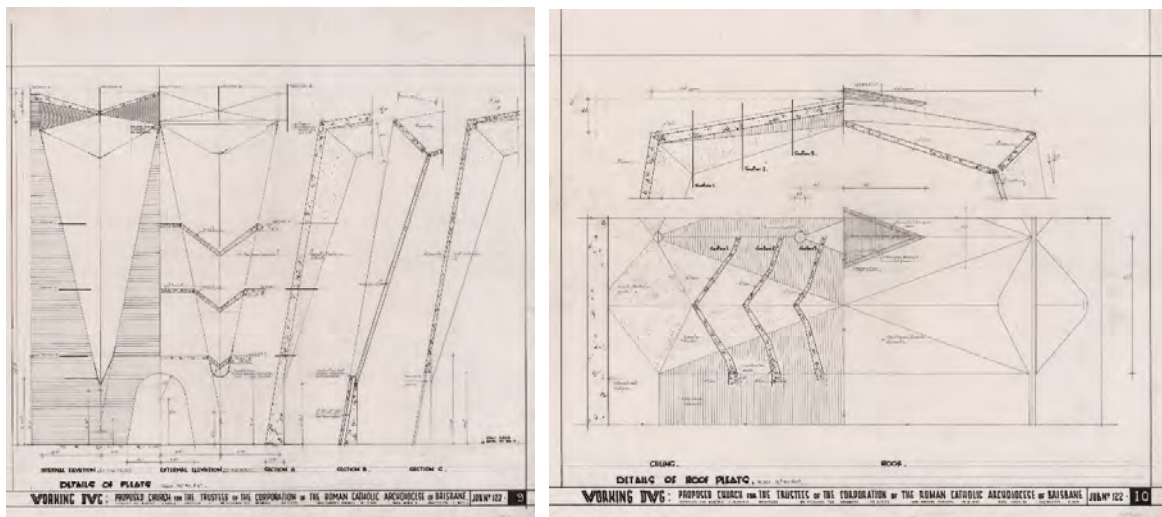


Figure 5. Pleated concrete wall and roof detail sheets
(University of Queensland, Fryer Library Douglas & Barnes Collection, UQFL289 job0122).

For the double-form wall sections a small hopper and light flexible drop chute were used to place the concrete mix in sections not exceeding 5-feet (1524mm) in height, which was then carefully vibrated.⁵⁷ It was this small hopper that caused the second construction accident towards the end of the project. It swung and hit the side of the jib crane. Not designed for sideways impact the crane fell. Blue recalls watching (from the other end of the site) as Douglas at pace descended (jumping almost 15-feet) from the top of the church's walls to run for safety. Douglas was surprised, though also relieved, that the crane driver overtook him as they and other workers ran up the hill for safety.⁵⁸

The additional lean within the wall's pleats was deemed unsuited to double-forms by project's architects and engineers, due to the likelihood of the concrete slumping to the

interior form and causing the outer face to honeycomb. So, for the wall pleats and roof/ceiling single-forms, 'shotcrete',⁵⁹ a low-stump concrete mix was sprayed onto formwork in layers and whilst green the outer face was finished to an even plane.⁶⁰ The exterior wall forms were released after three days. However, it was not until after the concrete had cured (at least 28 days),⁶¹ that the interior forms were released and lowered. Then with the Jumbo tower the forms slid along and repositioned for the next tilted and pleated wall section. The level of technical and constructability difficulty to achieve the acute origami-like triangular geometry, would have been immense, with various form types, complicated steel reinforcing, and alternating concrete mixes and pouring methods.

For the chapel, the contractor engaged a local boat builder to construct the formwork. Its complex curves were crafted using an 'adz', a broad bladed hoe with a short handle. The chapel's arched shell concrete walls and roof also used shotcrete, but were cast on the ground each as a column with a half-arch to each side,⁶² cured and later the eight sections were raised and joined together – an early and highly crafted tilt-up construction method. The spire is spun-concrete, created by using techniques common for concrete light poles fabrication.⁶³ The spire was secured by pre-tensioned bolt connection to the chapel's apex, then all the chapel's concrete joints were concealed with sprayed concrete.⁶⁴

Both the confessionals and the covered link were constructed using shotcrete, with the confessionals constructed as ferro-concrete, a method that sprays concrete to both sides of reinforcing covered in wire mesh.⁶⁵ The link used horizontal board forms installed to the outer face, the lines of these forms leaving a striped textural finish.

According to Blue, the architects 'were on tenterhooks' for much of the build,⁶⁶ concerned as to whether the concrete quality could and would continue to be achieved. The releasing of the baptistery chapels forms (arches and spire) were particularly stressful moments. Blue remembers the sense of relief when the forms came off to reveal both the shape and finish intact.⁶⁷

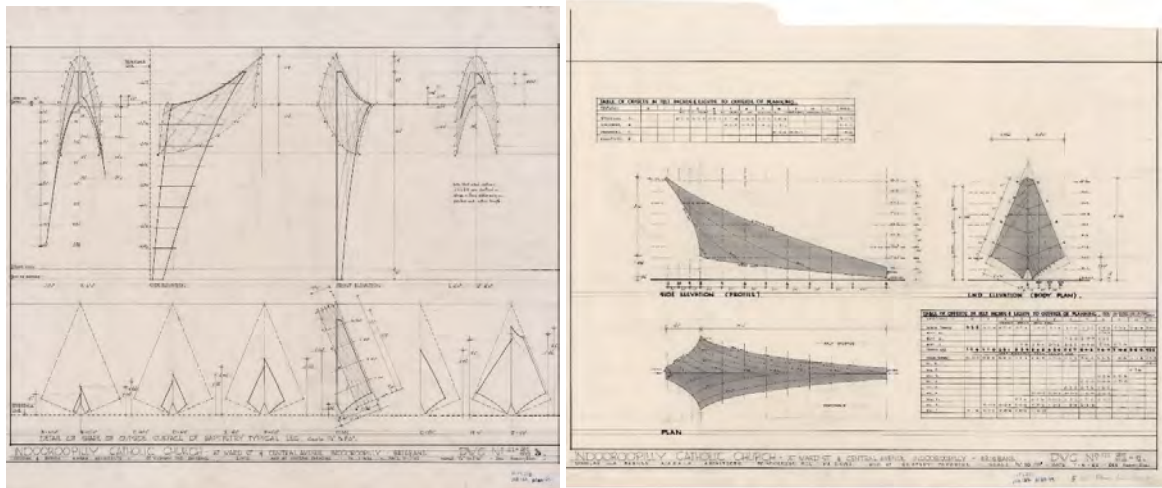


Figure 6. Setout for the outside shape of the Baptistry chapel
(University of Queensland, Fryer Library Douglas & Barnes Collection, UQFL289 job0122).

In the final construction phase, the buildings were coated externally and internally with 'Plastevic', a gloss vinyl paint,⁶⁸ which was boldly marketed as 'a liquid envelope ... [providing] everlasting waterproofness.'⁶⁹ Blue also recalls the then general assumption - ignited by the lauded designs of Breuer, Niemeyer, Le Corbusier - that 'concrete once [constructed] could do all these things and last'.⁷⁰ The exterior was a very light shade of green vinyl paint,⁷¹ except for the rendered and roughcast-stucco finished western facade wall, which was painted gold.⁷² The worship space's pleated concrete wall and ceiling surfaces were sprayed in acoustic plaster, with finely ground stone additives.⁷³ When completed, the gloss and sparkle of the finishes would have been a sight to behold.

Conclusion

On 10 November 1963, Holy Family Catholic church was blessed and opened by Archbishop James Duhig (1871-1965; Archbishop 1917-65). He recognised the Parish Priest, Father Victor Francis Roberts (1904-1975, Indooroopilly PP 1938-1973),⁷⁴ with whom he had left the detail of the project, and spoke of his aspiration for Queensland's church buildings to be 'some of the finest specimens of architecture',⁷⁵ as Europe's church buildings are for architecture in Europe.⁷⁶ However, Duhig, perhaps 'diplomatically', chose not to describe the new building:

I am not now going to enter into any commentary on this building, although what I might call its new features would tempt one to do so ... there will no doubt be comment and criticism, for there are certain new features in the building that call for them, but that will pass.⁷⁷

Not that long before, in 1959 while opening a new church in Tugun on the Gold Coast, Duhig spoke vehemently against modern architecture: 'it is about time we returned to dignified Goth'c & Romanesque arch'ture: modern ecclesiastical arch'ture is abominable'.⁷⁸ Maybe the basilica-type and landmark qualities of Holy Family aligned with Duhig's architectural ideals, even if (we speculate) the inherent structural expression of modernist concrete did not. Perhaps Duhig's restraint was due to his recognition of the herculean efforts that the parish community and construction team had just endured (fund raising and building).

A challenging design to document and build, Holy Family is still a landmark of monumental design today. It speaks of a time when church architecture aspired to be modern and express this in monumental complex forms. For Australia's church architecture, Holy Family played an experimental a role, it opened ideas of modern architecture. Yet, with the early 1960s Queensland Catholic Church only at the very cusp of liturgical renewal, Holy Family's worship space retained a conventional plan and a volume akin to the 'Gothic' spaces of its predecessors. Reinforced concrete was the new material of choice and technically challenging construction methods were necessary to achieve the architects' and parish priest's aspirations for 'new in design, old in tradition ... [combining] beauty and dignity.'⁷⁹

This paper was prepared as part of doctoral research being undertaken with an Australian Government Research Training Program (RTP) Scholarship, under the supervision of: Dr Janina Gosseye, Professor John Macarthur (UQ School of Architecture) and Associate Professor Sven Sterken (KU Leuven, Belgium). Overseas research, which informed parts of this paper, received funding by The University of Queensland's Guilford Bell (School of Architecture) 2016 and Joan Allsop (Graduate School) 2017 Travel Scholarships. Mark Hogan (Associate, Architectus Brisbane) assisted with the architectural drawing and specification review and accompanying me during site observations.

Endnotes

¹ A determination led by Augustus Pugin (1812-52). Richard Hurley, *Irish Church Architecture in the era of Vatican II*. (Dublin: Dominican Publications, 2001), 4.

² Victoria M. Young, *Saint John's Abbey Church: Marcel Breuer and the Creation of a Modern Sacred Space*, (Minneapolis: University of Minnesota Press, 2014), 34-7.

³ Visited by Blue in 1965, while travelled and visited architecture in Europe. (Harvey Desmond Crampton Blue, interviewed by Lisa Daunt (by phone), 17 April 2017).

⁴ 'Published as early as 1954: 'A Benedictine monastery by By Marcel Breuer,' *Architectural Forum* 101 (July 1954), 148-155.

⁵ Other designs by Eero Saarinen's (1910-1961), Enrique de la Mora (1907-1978), Felix Candela (1910-1997), Antonin Raymond (1888-1976) and Francis Barry Byrne's (1883-1967), were also significant advances in modern concrete and church design, pre-1960.

⁶ Especially the American and English publications: *Architectural Record*, *Architectural Forum*, *Architectural Review*.

⁷ Refer: Philip Goad, "Shells, spires and a dome: science and spirit in the space age." in Ann Stephen and Philip Goad, Andrew McNamara (eds), *Modern Times: the untold story of modernism in Australia*, (Carlton, VIC: Miegunyah Press, in association with Powerhouse publishing), 2008, 130-143.

⁸ The Rice House (constructed 1953-4) designed by Boland in 1951; the Wood House and Supermarket designed by Boyd in 1952; and the Bellfield Community Centre designed by Borland and McIntyre in 1953. Refer to the Victorian Heritage Register listings H0123, and H1377.

⁹ Macarthur, John, Deborah van der Plaats, Janina Gosseye, and Andrew Wilson (eds). *Hot Modernism: Queensland Architecture 1945-1975*. London: Artifice Books on architecture, 2015, 206-7, 274-5 and 156-7; and the Queensland Heritage Register listings 601240, 601511 and 602504.

¹⁰ Cross-Section no.22 (August 1954); Cross-Section no.33 (July 1955); *Architecture in Australia*, (October-December 1955); Cross-Section no.39 (Jan 1956); Goad, 2008, 134.

¹¹ Martin J. Majer, *E.H. Oribin; the Work of a Far North Queensland Architect*, (Unpublished undergraduate thesis: University of Queensland, 1997); *Queensland Heritage Register*, listing 601589, <https://environment.ehp.qld.gov.au/heritage-register/detail/?id=601589> accessed 27 September 2016.

¹² Geoffrey Douglas, 'St Monica's War Memorial Cathedral, Cairns', *The Twentieth Century Heritage Society of NSW Inc. The News*, (Spring 2012), 6-11; Fiona Joy Gardiner, Alice L.T.M. Hampson, *Interview with Ian Ferrier*, (St Lucia: May 30, 1999); Goad, 2008, 134.

¹³ Annette Condello, 'Nervi and New Norcia: Italian Modernism in the Australia Outback,' 2012, http://www.arcduecitta.it/2012/07/magazine_nervi-and-new-norcia-italian-modernism-in-the-australian-outback-annette-condello/ accessed 13 December 2017.

¹⁴ *Cross-Section*, no.95, (Sept 1960), 1; *Architecture in Australia*, (September 1960), 84-7

¹⁵ *Architecture in Australia*, (September 1961), 100-102.

¹⁶ 'Italian Design W.A. Cathedral', *The Age*, Melbourne, (Tuesday 26 May 1959), 4.

¹⁷ "Australia's first Nervian structure", *Australian Architecture Today*, (June 1960), 12-16. The scheme was subsequently published "New Cathedral for New Norcia," *Building: Lighting: Engineering*, (July 1960), 25-26, 41; and aboard in England's *The Daily Telegraph* 'Abbey Arches in Concrete', (6 April 1960), then in both Italian and American periodicals.

¹⁸ As speculated in Condello, 2012.

¹⁹ *Building: Lighting: Engineering*, 1960, 41.

²⁰ Land purchased August 1960 (*The Catholic Leader*, (16 November 1916), 3); 1 August building contract signed (UQFL289 job#0122); 12 November 1961 Foundation stone (mounted at north side entry of building); 10 November 1963 blessed and opened (Erin Ahearn (compiled by), *Diamond Jubilee, Holy Family Parish, Indooroopilly: 1926-1986*, (Brisbane: Holy Family parish, 1986).

²¹ Board of Architects of Queensland database, contacted 13 February 2018.

²² Blue, 2017.

²³ 'In 1955 William (Bill) Leonard Douglas commenced private practice in Brisbane as William L. Douglas Architect and joined in partnership with Barry Barnes, as Douglas and Barnes, in Brisbane and the Gold Coast in 1957; until dissolution in 1972, when the practice returned to sole ownership of Bill Douglas.' (UQFL289 *Douglas, Daly and Bottger Collection*). Barnes ran the Gold Coast office and Douglas the Brisbane office.

²⁴ Most concrete buildings presented in compendia of Australian modern architecture (for example Jennifer Taylor's *Australian Architecture since 1960*, (Sydney: The Law Book Company Limited, 1986); and Harry Sowden (ed), *Towards an Australian Architecture*, (Sydney: Ure Smith Pty Ltd, 1968)) are square, structural forms, with the Sydney Opera House and the Shire Dome the examples of curving and non-square geometries.

²⁵ Immanence and Transcendence have been defined within Christian Theology. Immanence is the emergence of inherent or spiritual qualities. A church building should be immanent of faith, of belief and immanent of God. Transcendence is to go beyond the grasp of human experience. God is transcendent as he exists beyond the limitations and materiality of this earth. It is through immanence and transcendence that people worship together and have their own relationship with God. Thus, achieving both is what makes a church building sacred architecture and unique from its residential, secular and civic counterparts.

²⁶ Lisa Daunt, '1960s Brisbane Church Architecture: Creating modern, climatic and regional responses to liturgical change,' *Queensland Review* 23.2. special Issue, 'Queensland Modernism,' (December 2016) <https://doi.org/10.1017/qre.2016.31>

²⁷ While formalised by Vatican Council II, the need for liturgical renewal has a history dating back to the late 19th Century, the beginnings of the liturgical movement. Liturgical renewal led to significant architectural changes including: moving the altar forward, lowering the sanctuary, removing screens and altar rails, positioning the baptismal font within the main worship space and fanning the nave seating to gather the congregation around the sanctuary. Brisbane's first Catholic churches to address mid-twentieth century liturgical change were St Joachim's, Holland Park, opened 1961 (architect: P.J.L. Hanman); Our Lady Help of Christians, Hendra opened late 1961 (architect: Frank L. Cullen and Partners); and Our Lady of Dolours opened mid-1965 (architect: Frank Cullen, Fagg, Hargraves and Mooney).

²⁸ Pre-conciliar (pre-Vatican) and the attitude then was devotional individual worship (observing the priest), in comparison to post-Vatican Council II's liturgical change towards a church community that gathers to participate (with the priest) in worship.

²⁹ Including: *The Catholic Leader*, 'Striking Indooroopilly Church' (17 August 1961); 'Bold Design Craftsman Built', *The Queensland Master Builder* (August 15, 1963), 10-11; 'Three Chapels', *Building Ideas* (March 1964), 4; and *Architecture Building Engineering*, 'Modernistic church for Indooroopilly, (1 February 1964), 57.

³⁰ *Cross-Section* no.149, (1 March 1965), 2; UQ Fryer Library; SLQ Pictures Qld (RAIA photo collection); *Architecture in Australia*, (January-March 1959), 77; Visited by Lisa Daunt 20 October 2016.

³¹ Douglas, Daly and Bottger UQFL289 job no.0328; and *History of St. Andrew's Presbyterian church, St. George*, unpublished, 2011, copy provided to Lisa Daunt 30 January 2018 by Victor Weber.

³² Alice. L.T. Hampson, *The Fifties in Queensland: Why Not! Why?* (unpublished undergraduate thesis: University of Queensland, 1987), 215.

³³ Blue started working for Douglas and Barnes in 1960, married and graduated 1961, registered architect 1962, left for Europe in 1963 before Holy Family was completed on site (Blue, 2017).

³⁴ Indooroopilly, 6.5km from Brisbane City Hall, was then an established outer suburban suburb. The next suburbs (Chapel Hill and Kenmore) were subdivided and developed in the 1960s.

³⁵ When asked, Blue does not recall this building as a direct reference. (Blue, 2017).

³⁶ UQFL289 job 122. There are over 150 drawings in architectural construction set.

³⁷ Technical articles including: Seymour Howard, "Useful curves and curved surfaces: 31, 32, 33 – Hyperbolic Paraboloid" *Architectural Record* (June 1958), 215, 217, 219; Felix Candela, "Understanding the Hyperbolic Paraboloid" *Architectural Record* (July 1958), 191-5 and (August 1958), 205-7, 215; Seymour Howard, "Useful curves and curved surfaces: 19, 20 and 21 – Cones" *Architectural Record* (June 1957), 211, 213, 215.

³⁸ Blue, 2017.

³⁹ R.J McWilliams and Partners, becoming McWilliams Consulting Engineers, Qantec McWilliams, in 2007 they were acquired by Opus in 2010, which was acquired by WSP in 2017. (www.opus.com.au/assets/Uploads/PDFS/opus-Heritage-timeline.pdf accessed 16 December 2017)

⁴⁰ P.F. Clarke, 'McWilliam, Russel John (Jack) (1894-1991)', Australian Dictionary or Biography, National Centre of Biography, Australian National University, <http://abd.anu.edu.au/biography/mcwilliam-russell-john-jack-14656/text25791>, published online 2014, accessed 16 December 2017; R.L. Whitmore, Geoffrey Cossins (eds), *Eminent Queensland Engineers*, vol.2 (Brisbane: Institution of Engineers, Australia, Queensland Division, 1999), 74-5; Donald Watson, Judith McKay, *A Directory of Queensland Architects to 1940*, (St Lucia: University of Queensland Library, 1984), 136.

⁴¹ Email correspondence 18 January 2018 to Lisa Daunt, from Brian Wooldridge of Opus. No structural engineering drawings have been retained in archives. Email correspondence 1 and 9 February January 2018 from Peter Clarke (brother).

⁴² UQFL289 job122 company seal used for the signed contract set and drafted sign board drawing 19, dated August 61.

⁴³ The building company listed in *Building Ideas*, (1964), 4; and *The Queensland Master Builder*, (1963), 10. It is unclear, from literature and archival review, when and how the main contractor changed. Blue speculates that it may be the same builder, re-named following financial restructure (Blue, 2017).

⁴⁴ For example, the baptistery chapel's construction was documented as a provisional sum, then clarified (in part) as a tender addendum (UQFL289 job122 Specification, 44 and 103)

⁴⁵ For example, the double-formwork was documented by the architects as timber (6" and 4" T.& G. boarding), to see the timber grain like seen in published European and American buildings. However,

during the tender phase the builder proposed 'acrow' formwork instead, this was accepted by Douglas and an addendum issued. (Specification, 25, 103; Blue, 2017)

⁴⁶ *The Catholic Leader*, (17 August 1961), 3.

⁴⁷ Over \$19 Million in 2017 AU\$ according to <http://www.thomblake.com.au/secondary/hisdata/calculate.php>

⁴⁸ Reported completed and furnished cost. *The Catholic Leader*, 'Archbishop Blesses Stone of New Indooroopilly Church', 16 November 1961, p.3; and '£3,750,000 has been spent on churches by the Archbishop,' *Catholic Leader*, 14 November 1963.

⁴⁹ *The Catholic Leader*, (7 November 1963), 6.

⁵⁰ *The Queensland Master Builder*, (1963), 11.

⁵¹ *The Catholic Leader*, (7 November 1963), 6; and *The Queensland Master Builder*, (1963), 11.

⁵² John Fitchen, *The construction of Gothic cathedrals: a study of medieval vault erection*, (Oxford: Clarendon Press, 1961), 34-7.

⁵³ Harvey Blue, interviewed 31 October 2016 by Kaitlin Nichols (by phone); Blue 2017.

⁵⁴ *The Queensland Master Builder*, (1963), 11.

⁵⁵ Specification, 25.

⁵⁶ Blue 2016.

⁵⁷ With mechanical immersion vibrators - Specification, 29; Blue 2017.

⁵⁸ Blue 2017.

⁵⁹ 'Shotcrete' the generic product name used in the documentation, with 'Gunite' the brand name noted by Blue.

⁶⁰ Specification, 30-35, which on page 31 requires the works to 'be carried out in accordance with the Standard of the American Concrete Institute "Recommended Practice for the Application of Mortar by Pneumatic Pressure" (ACI 805 - 51).'

⁶¹ Specification, 30.

⁶² Blue, 2017; As detailed on the roof plan – see figure 4.

⁶³ Blue, 2016.

⁶⁴ *The Catholic Leader*, (7 November 1963), 6; *Building Ideas*, (1964), 4; and *The Queensland Master Builder*, (1963), 0.

⁶⁵ Specification, 43.

⁶⁶ Blue, 2017

⁶⁷ Blue, 2017

⁶⁸ Specification, 72-3. Made by Enamel Varnish and Chemical Co, of Blacktown, Sydney, and applied by S. and S.M. Broinawski, the Queensland Agents for 'Plastevic'.

⁶⁹ Blue, 2017.

⁷⁰ Blue, 2017.

⁷¹ Specification, 98; Blue, 2017.

⁷² Specification, 98; *The Queensland Master Builder*, 1963, p.10.

⁷³ *The Queensland Master Builder*, 1963, 10; Specification, 88.

⁷⁴ 'Crowd at Mass for Fr Victor Roberts, *The Leader*, (8 June 1975); Email correspondence 22 January 2018 to Lisa Daunt, from Carolyn Nolan, Catholic Brisbane Archdiocese Archives.

⁷⁵ *The Catholic Leader*, (14 November 1963), 6.

⁷⁶ *The Catholic Leader*, (14 November 1963), 6. Duhig's lack of comment, his building project expenditure and his greater aspirations for Queensland's church architecture were also the content of Brisbane's local newspaper, *The Courier-Mail*, (11 November 1963), 7; and later in Queensland's periodical *Architecture, Building, Engineering*, (1 February 1964), 57. A very consistent (Quoting nearly the same of Duhig's words) text was published across these papers.

⁷⁷ *The Catholic Leader*, 14 November 1963, 6.

⁷⁸ The new Tugun Catholic Church was a 'neat, obviously cheap, unpretentious modern building' *Cross-Section*, no.80, (June 1959), 2.

⁷⁹ Fr Roberts quote in 'Challenging Design in New Edifice', *The Catholic Leader*, (14 November 1963), 6.

William Wardell (1823-1899): Architect and Engineer 'Convent and School, Kew', 1889

Ursula M. de Jong
Deakin University

Abstract

William Wardell was born and died in the nineteenth-century, a most extraordinary century in which to be both an architect and engineer, when rivalries rather than collaborations between these two professions were generally the focus. Wardell's training and experience as architect and engineer comes to the fore in Genazzano FCJ College Kew project, a work of architecture thrust into the social, political and economic turmoil of late nineteenth-century Melbourne. Building commenced just before the crash of marvelous Melbourne in 1890: attempts to curtail the project reveal pragmatics driving out any design considerations and financial considerations dictating the building program. The Mother Superior suggested removing one floor, the Archbishop considered that the spire added nothing to the design anyway! The architect convinced his client that this was not the way forward in dire times and contemporary accounts tell us that as the building neared 'completion' the full beauty of Wardell's design became apparent.

Genazzano demonstrates how conceiving and making are inextricably linked in a project where architecture as art, building, craft, utility, and function come together, where the realisation for use depends upon technologies of communicating, of building, of materials, ventilation, heating and cooling systems, water supply, and sufficient closets. Alongside this use of new technologies, Wardell stuck to the Gothic tradition within an established oeuvre, adhering to Pugin's two great rules of design.

This paper draws largely on primary evidence. Two drawings: Wardell's bird's eye view and his son Herbert's finished presentation drawing (Herbert Wardell was in practice with his father during the 1890s). Wardell's working drawings and specifications have disappeared through time, however, his Letterbooks are preserved in the Mitchell Library, SLNSW. They detail the project from the architect's perspective as it was built during 1890-91. While the architectural vision was for a splendid late Gothic Revival collegiate edifice, circumstances dictated that only a sound, good, honest building could be realised. Wardell's experience as architect and engineer, his knowledge and skills of building technologies meant that the practical builder cajoled and shepherded stage one to completion against all odds. Wardell's Genazzano may be simple and austere, but it is nonetheless incredibly impressive in scale, in attention to craftsmanship and detail.

Introduction

December 1889 was a critical make or break point in the building of the Convent and School, Kew. Mother Daly had signed a contract with the builder for over £34,000 in June 1889. Work had begun on excavations for the foundations in the same month, and by December part of the roof of the three-storey structure was already up. The FCJ Annals, Richmond of 1889 report that not only did building commence but it advanced with “astonishing rapidity”.¹ Early in December Wardell learnt that the FCJ Sisters were in financial difficulties. Mother Daly, who had been assured that monies would be forthcoming in a very buoyant almost hedonistic financial period, found herself unable to meet the regular payments she had agreed to. Indeed the FCJ Sisters became casualties of the great financial crash following the boom of marvelous Melbourne, when banks collapsed and foreclosed on their customers. In buying the land at Kew, and commissioning the new building, the FCJ Sisters had committed to more than £50,000 of debt. As the boom bubble burst, land values also plummeted. Re-financing became impossible.² Wardell writes immediately to Mother Daly, his client, explaining her contractual obligations with regard to the building under construction. He advises that taking off the second-storey could be ruinous to the building’s “effect and appearance”. Breaking a contract would be costly. Rather he suggests borrowing money; or extending the contract over a longer period.³ Mother Daly wrote to the FCJ Mother Convent in Europe in despair, begging for help.⁴ Carr, the Catholic Archbishop of Melbourne, made it clear he could offer Mother Daly no help, and that she should abandon the project.⁵

The book *William Wardell and Genazzano FCJ College*, written for the 120-year anniversary of the College, tells the full story of the Convent and School, Kew.⁶ This paper focuses on the circumstances that faced the architect and how he overcame them. It explores how his training as architect and engineer stood him in good stead, in this single project where 'real' engineering and pragmatism were forcefully pitched against architectural concerns.

In England, in the 1960s and 1970s, the late Stephen Welsh, Emeritus Professor of Architecture at Sheffield University, set about compiling a *catalogue raisonne* of Wardell's English work, as an inadvertent corollary to his research on Mathew Hadfield and George Goldie, who took over Wardell's practice in 1858. Welsh was an avid compiler of lists and by self-admission preferred the detective work of the compiler, to the critical analysis of architectural historians. His work led him to conclude that

Wardell was never a copyist working within antiquarian precedent, but a designer who realised the need to find a consistent agreement of the forms chosen with the

appearance of the building both inside and out, with the forces which brought it into being: materials and construction, the requirements and resources of the client.⁷ Welsh could have been describing the Convent and School, Kew.

Architect and Engineer

Wardell's professional training was as engineer and architect. Wardell's exact movements between the years 1838 and 1843 remain unclear. Sometime during 1838 Wardell entered the office of a Mr. Morris, one of the Surveyors to the Commissioners of London Sewers and a Civil Engineer in private practice. This was followed by a period in the office of W.F. East, an architect then practicing in London. No extant records exist for either Morris or East in their respective professional bodies. Nonetheless, Wardell's five-year apprenticeship seems to have trained him well and was to stand him in good stead in a long career, bridging engineering and architecture, at a time when these professions were generally perceived as separate.⁸

The spark which touched off the explosive expansion of self-conscious archeologically correct Gothic was the powerful polemical literature of the Catholic convert architect A W N Pugin (1812-1852). In 1841, Pugin published his *True Principles of Pointed or Christian Architecture* and on the first page enunciated his two great rules of design:

- 1st, that there should be no features about a building which are not necessary for convenience, construction or propriety;
- 2nd, that all ornament should consist of enrichment of the essential construction of the building.⁹

While Pugin considered these rules to apply solely to Pointed or Christian architecture, these principles are not explicitly Gothic. That the Vitruvian triad could be understood to transcend a specific language of architecture, and underlie all architecture, is of singular importance when considering Wardell's work. He applied Pugin's rules of design equally adeptly to edifices in the Gothic or Italian mode, as well as to his engineering projects. The 1842 (revised) edition of Chambers' *Information for the People* provides an idea of the general use made of the Vitruvian triad in the nineteenth century: "The rules of building require, that in a whole fabric judiciously and elegantly erected, there should be solidity, convenience, and beauty, along with simplicity and harmony of design".¹⁰

Wardell approached architecture from an architect-engineer's viewpoint, combining practicality with an aesthetic intuitiveness. While he subscribed to Pugin's architectural

principles, his buildings are distinct from Pugin's, stemming from what was to become an intrinsically different philosophy. Pugin's treatment parallels a development in fifteenth century Italian architecture whereby churches were designed from the inside out, and where many buildings were left with unfinished rubble walls on the exterior. Pugin admitted "that to have sacrificed the internal splendour of the house of God for the sake of exterior display, would have been utterly departing from true Catholic principles".¹¹ Such an approach would never have worked in Kew in 1889.

Apart from his engineering training and command of practical and structural aspects of building, the acquisition of skills and disciplines, and the mastery of techniques, Wardell had an intuitive feeling for architectural effect. He knew how to create expressive architecture. He understood massing, the juxtaposition of volume and space, the penetration of light, the depths of shadow. At a time when specialist training and growing professional class-consciousness resulted in a rigid division between nineteenth-century architects, engineers and builders, and little attempt was being made to share common ground in design, Wardell seems to have had a distinct advantage over many of his contemporaries. The writings of Wardell's contemporary, the architect William White highlight the problem. He advised: "it would be well if each knew a little more of the other's branch". But when it came to defining engineering and architecture, he envisaged them as distinctive professions: "the one consisting in the science and art of construction - the other in the science and art of composition and design".¹² White could not reconcile his intuitive feeling that architects and engineers should work together, with the commonly held belief that engineers were inferior. In the practice of architecture, Wardell's approach was to be lauded.

Explicit evidence of Wardell applying engineering thinking has come to light in twentieth-century restorations of two of his significant Melbourne buildings: St Patrick's Cathedral and the ANZ Gothic Bank. At St Patrick's the blank triforium integrated into the clerestory windows above the nave, actually provide ventilation into the roof space of the aisles. Photographic evidence of the front façade of the building in 1862, showing the scaffolding and the gantries needed to raise the bluestone blocks, reveal a veritable working railway line on top of the building. The work needed to raise the nave ready for use by 1868 is evidenced in the monumental side buttressing and in the flying buttresses. It is again "railway engineering stuff" according to the conservation architect Arthur Andronas, who oversaw the centenary project.¹³ Yet the proportions of the cathedral are simple, robust, noble, pure, in a word stunning. They would work in any material – basalt, colloquially known as bluestone, sourced from Victoria's western district, was robust, cheap, cost effective and available. The quality of the work carried out during Wardell's supervision is formidable, and in remarkably good condition 100 plus

years later. During this period in the 1860s Wardell was also Inspector General of the Public Works Department in Victoria and engineer in charge of designing and building the Alfred Graving Dock, Melbourne. At £300,000 it was the largest construction of its time. Constructed of bluestone it is an awesome *tour de force*, servicing the British Navy's requirements for its ships to be repaired in Colonial ports.

During the late 1980s and early 1990s Allom Lovell and Associates undertook the restoration of the ANZ Gothic Bank – Wardell's ES&A Chartered Bank built 1883-1886. In that process they uncovered much about its architect and engineer. While Miles Lewis has described the secular Gothic design as *retardaire*, Wardell's conservative and restrained building is nonetheless considered beautiful. For a small bank, it is incredibly decorated. However it is the engineering of the cast iron and wrought iron beams that allowed the construction of its glorious banking chamber: a jewel-like space filled with extraordinary light. Wardell's training and knowledge as engineer enabled him to oversee the trialing and testing of the columns which each needed to support 250 tons. The actual structure of each column reveals "a real gutsy raw engineering solution": it is massive and does not shy away from truthful expression of the structure. According to Peter Lovell, "The decorative layer barely relieves it".¹⁴

Wardell's General Note Book was an early indicator of Wardell's far ranging interests and concerns. The notebook was begun in the 1850s when Wardell's practice was already well established. Most of the gathered data relates to Melbourne and Sydney, though it follows habits begun in England. His career in Australia encompassed the roles of ecclesiastical architect, public servant and secular architect, civil engineer and memberships of numerous Boards, Committees and affiliations as various as the Royal Geographical Society and the Commission into Fine Arts in Victoria. Many entries in the General Note Book refer to these activities.

The format of the more than three hundred and sixty pages was informal and convenient. Newspaper articles and journal clippings were slipped in beside interesting facts and figures. Jottings relating to science, hypotheses and theories, new scientific and technological inventions and discoveries, mathematics, practical geology and the properties of metals lie side by side with definitions of architectural terms, Vitruvian advice, comments on Alberti's, Palladio's and Serlio's treatises and extracts from Scott's - Gothic Secular and Domestic. The latter provide important evidence of his wide reading, ancient and modern, in historical, theoretical and practical matters. Above all, this notebook shows Wardell to have been an informed architect and engineer, alert to contemporary issues in many fields. He was not a rabid medievalist nor did he plead for a return to a medieval way of life. He was a Gothic

Revivalist in the modern nineteenth-century world. Wardell knew he lived in a time of “brilliant technological advances” and “unprecedented industrialization”,¹⁵ but he also believed in the primacy of Pointed Architecture as a correct expression of his Catholic faith.

“Convent and School, Kew”

We do not have any drawings other than Wardell’s bird’s eye perspective drawing for ‘Convent and School, Kew’ (Figure 1) and his son Herbert’s presentation drawing dated July 1889.



Figure 1. William Wilkinson Wardell, Sketch drawing for Convent and School, Kew, 1889. Genazzano FCJ College Archives.

These drawings tell us that Genazzano FCJ College, Kew, was to be a robust late Victorian Gothic asymmetrical three-storied brick building designed to integrate a convent, school, chapel, and dormitories. While we have many references to Wardell’s full set of architectural drawings and documentation for this project in his letters and in Mother Daly’s letters, none of the original working drawings, nor specifications or contracts have come to light. In June 1889 Wardell sent Mother Daly a copy of the specifications for the Clerk of Work’s use, and asked her to give the specifications and the plans to the Clerk of Works so that he could “master their contents as soon as possible”.¹⁶ From the Annals of Kew, 1889, we learn that “Father Kennedy also came to see the children and showed and explained to them the plan of their future

school”.¹⁷ In 1892 Mother Daly wanted copies of the drawings and specifications, but when she asked Wardell for them, he said she could of course have access to them to check various details or matters of concern, and take notes from them, but that the drawings and specifications remained the property of the architect. He considered them his intellectual property, his tools of trade so to speak. Wardell did not want them passed on “for the benefit of other architects”.¹⁸ In February 1896 Reverend Mother was again allowed to borrow the ground and first floor plans, “On the understanding that you will not allow them to go out of your possession until you return them to me”.¹⁹ So while Mother Daly had the specifications and the plans in her hands on a number of occasions, they seem to have been passed on to contractors or returned to the architect. No planning permission was required until after World War II. The FCJs would have required a building permit from the City of Kew, but even where drawings had to be submitted they were often stamped and returned. Only a minority of Councils in Victoria still have drawings in their possession.

Copies of Wardell’s letters to his Quantity Surveyor, Arthur Anderson; his Clerk of Works, Leonard Carr; the contractor, Robert Gamlin; and various tradesmen working on the project or consulted for advice are contained in his five volumes of Letterbooks (or more correctly pressed letterbooks), held in the manuscripts collection of the Mitchell Library, State Library of New South Wales. Here we also have copies of Wardell’s letters to Fr Kennedy SJ and Mother Daly FCJ. A number of Wardell’s original letters to Mother Daly are held in the FCJ Archives, Richmond, Victoria. Wardell ordered the letters mostly chronologically, keeping an index to each of the five volumes, which contain about 5000 letters. The letters are curt and business-like, always polite, short and to the point. Time was of the essence. Paper was expensive.

These letters now give us insights into the process of building in the nineteenth century, the letting of tenders, procurement, the trades, work practices and into the supervising role of the architect. The correspondence also reveals glimpses of the architect’s relationship with his clients. Further, we can surmise something of the attitudes of the clients, patrons and builders through this correspondence. However the record is incomplete: the Letterbooks preserve only outgoing correspondence from the architect’s office. What we do see is the process of building through the eyes of the architect: these were his personal day-to-day records used for the running of his professional practice. We get to know his values and his concerns.

Constructing the Convent and School, Kew

Wardell supervised the building of the Convent and School, Kew, from Sydney, which had its own challenges given the considerable distance from the site. Wardell did commute to

Melbourne regularly but it was a long journey by sea down the east coast or by train through Albury, and he preferred to come when there was good reason. On the 15 July 1889 Wardell wrote to his Clerk of Works, Leonard Carr plainly and directly: "I do not wish to come to Melbourne before it is necessary and should be glad if you would give me at least 10 days notice of when I shall be wanted".²⁰

Given the distances involved, it was even more critical that Wardell had good people, whom he could trust implicitly on the ground, for a work of such magnitude. While Inspector General of the Public Works Department in Victoria (1861 - 1878), Wardell had relied on some excellent traveling inspectors. On 12 June Wardell writes to Reverend Mother Daly with regard to the new Buildings at Kew.

With your permission to select the Clerk of Works, I have been fortunate in securing the services of a man who I am sure is well fitted for the position, a Mr Leonard Carr of Glen Street Hawthorn. I have known him for many years, and he has acted under me in a similar position in the Government Works in Victoria, and I know him to be thoroughly competent for large works, and trustworthy. His duties are to commence on 24 June, and his salary will be £6.0.0 per week. I have desired him to see Fr Kennedy and I will ask Fr Kennedy to bring him to you, and I think you will see he is the proper "stamp" of man for the work.²¹

From the start Wardell is concerned that only the best quality materials are used for construction and that the workmanship is up to the best standards. Excerpts from letters refer to timbers for flooring, brickwork in foundations, cement and asphalt. They clearly demonstrate Wardell's concern with the art and craft of building, with the aesthetics and the function. On the 3 May Wardell asks Anderson

Will you be good enough to specify the flooring to be the best picked NSW Black Butt from Northern forests, in battens 4"X1 1/4" [note Wardell corrects this 1 1/2" on 11 May] tongued and grooved etc etc instead of Jarrah and ask for an alternative price for Kauri. The stairs to remain in Jarrah. I enclose you a tender from a timber dealer and ships owner here showing the prices at which he will deliver it at the ships site in Melbourne exclusive of duty and loading charges.²²

On 15 June he writes to Fr Kennedy regarding the bricks to be used for the foundations of the Church of St Ignatius, Richmond. Samples of bricks from the Upper Hawthorn Brick Co are considered excellent by Wardell, however he does not know if they will be dearer than bluestone for foundations. He notes that the contractor (Mt Robert Gamlin of Flinders Lane E Melbourne) is in charge of works and materials at the Convent and School, Kew, and that he himself has nothing to do with supply.²³ In August Wardell writes directly to the Managing

Director of the Hawthorn Brick Co reiterating that all samples of brick must go through the contractor and “so long as he fulfils his contract conditions he is free to purchase materials from anyone he pleases”.²⁴ In February 1890 Wardell is asking Carr in a PS to “Be good enough to take great care that the brickwork is not hurried during the hot weather and that the bricks are always wetted and used wet”.²⁵

Keen to see work started immediately Wardell writes to Leonard Carr on the day he begins as Clerk of Works on 24 June:

As I presume the contractor is by this time prepared to commence work I write to say (referring to Clause No 7 of the general Conditions) that I wish the excavations, over the whole surface intended to be reduced, to be first completed, and following this, the excavations for the walls. You will observe on p.8 of the specifications that the trenches are to be excavated to their full length and width and to be examined and approved before any contracts in other works are commenced. The cement to be used is to be approved “Star” brand, the sand, coarse grit *Sandridge*, and the blue stone metal to be hand broken. I draw your attention to these because I should be glad that you would make the contractors understand from the first that the specification is to be strictly adhered to and that no deviation will be permitted without written authority.²⁶

Ever on the alert Wardell writes to Carr on 6 July

From an enquiry made today I have reason to think the contractor is trying to purchase asphalt in Sydney from a company that manufactures it here. I do not desire that you should mention this to him, but I let you know it to put you on your guard as to the quality he brings on the ground. It must be “Claridge’s Patent Seyssel Asphalt” as described in the specification. I am told he says there is none to be had in Melbourne, if this be so, he had better telegraph to Europe at once for it. The blocks as you know are all stamped “Claridges Asphalt”. When the excavations are commenced it would be desirable to have two or three trial pits sunk to test the ground for foundations.²⁷

In this way Wardell kept a close eye on all that took place on site, even though he was 800 kilometres away!

Once the foundations were in hand Wardell turned his attention to the ventilation of the building, to clarifying the levels on Mount Victor Road and the service end of the building. Wardell’s Letterbooks document for us the contrast between imagining the dream and the

process of achieving it. In striving to achieve the vision laid out for Mother Daly in Wardell's bird's eye perspective drawing for 'Convent and School, Kew' there is much hidden work. Getting the detail right is not 'romantic' at all (Figure 2). If the building doesn't function properly what is the point of the constructing it?



Figure 2. William Wilkinson Wardell, Detail of the completed section taken from Sketch drawing for Convent and School, Kew, 1889. Genazzano FCJ College Archives.

As already seen at St Patrick's Cathedral, good ventilation is crucial to the longevity of the building fabric and to the occupants comfort. At the end of September Wardell writes to Carr

I shall be glad if you will arrange an outlet 14 X 6 from each corner of every room at the floor level not only through the outer walls but also through those next to the corridors etc. I intend to fix Tobin tubes to these hereafter but at present you need only form the outlets. Of course you will take care that all outlets are cemented over the bottoms so as to prevent any water that may be driven in from soaking into the walls. The bottoms should be shaped up inwards and it would be desirable to give the surface of the cement a coat or two of paint.

With respect to the wall ventilators in the upper part of the rooms (14 X 6) I wish them placed as near the ceilings as possible on both sides of the rooms and those in the outer walls to be arranged over the haunches of the window thus [Wardell

includes a sketch] and none are to be placed over the points of the arches.

Wardell repeats the instructions and insists that there are to be “no other openings” except those specified above.²⁸

While the siting of the building on high ground is lauded in many contemporary articles, no account is given of the implications of a steep site for construction. Thus we find that the writer in *The Advocate* gives no information on the building but lots on what he refers to as “the picturesque suburb of Woodlands”. The article contains this enthusiastic description of the beauty and health benefits of the site: “Great wisdom has been shown in procuring the site for the convent as it commands a splendid view of the country for miles around, and owing to its elevation above the sea level, it is a most healthy one”.²⁹ Clarification as to the levels on the Mount Victor Road side of the convent and schools are the subject of Wardell’s letter to Carr on 29 September.³⁰

In order for this large building complex to accommodate convent, school, chapel and dormitories it had to be well serviced. The site was unsewered, so Wardell had to give careful consideration to supplying enough closets (toilets) for the Sisters and the boarders. By mid-October, Wardell suggests to Carr that “It would be well to do as little as possible with all these back buildings until I am next in Melbourne. I hope the questions of heating, laundry arrangements and Earth Closet fittings will be determined”.³¹ By the end of that month Wardell again puts his mind to fitting out the closets, writing to Messrs Draper & Sons, 83 Bourke St West, Melbourne:

I enclose you a plan showing the closets connected with a building now being erected under my direction at Kew W. Melbourne and I should be glad to receive an estimate from you for preparing & fixing them complete. There are 7 on the ground floor, two on the first floor and two on the second floor eleven in all. The estimate must include the nightman’s hoist fitted in the Brick shaft prepared for it with all the necessary appliances and gear and left perfect and in good working order. These are for a Convent and Ladies School only. They are to be in Deal painted and must be emptied and filled from the back, and I should be glad of any suggestions from you with a view of making them as perfect as you can although without unnecessary expense.

You will observe in the plan that there is direct access from the road to the passage at the back of the closets from which they must be attended to without any necessity to enter the house or premises. There is space reserved for dry earth if you think it desirable.³²

Wardell also asks for an estimate and cost for “maintenance and cleaning say twice a week”.

Some practical problems were also associated with the altitude of the site, such as getting running water on site and then supplying it to all three levels of the building. In November Wardell has “received a definite reply from the Water Supply department to the effect that the pressure of the Yan Yean supply cannot reach above the level of the ground or thereabouts”. In his letter to Mother Daly, Wardell continues: “This will of course make it necessary to use mechanical means for pumping it into a high level tank in the tower. There is however no difficulty about this, nor do I think it will be a matter of any serious expense or inconvenience and I will endeavour to have some schedule ready for your consideration on my next visit ...”³³ How delighted the Sisters and their pupils were to have running water in their new building, having lugged buckets daily from the stream at the bottom of the property while resident at Range View. How interested the girls’ papas were in the whole engineering feat of achieving it!³⁴ On 2 November Wardell writes to Mother Daly: “The weekly reports from the building continue to be of a very satisfactory character except that the recent rains have checked their progress somewhat”.³⁵ Work continues through November into December.

The end of marvellous Melbourne

On the evening of 5 December Wardell receives a telegram alerting him to the fact that all is not well in regards to his project for the Convent and Schools Kew. In fact, its continuance is in jeopardy. On 6 December the concerned architect writes to Mother Daly: “I received last night a telegram dated yesterday from Fr Kennedy as follows: ‘Nuns in money difficulties about Convent. Can you come here’. Sorry cannot leave at present. ... Am writing. Please send statement of case as full as possible.” Wardell reminds her that

You have contracted for certain works to be completed by next September. The Contractor is to be paid as the works proceed – the whole amount £36885 - being payable by next October.

If any failure in payment occurs he will be entitled to secure an interest at the rate of 10 per cent per annum of the sum due to him without prejudice to his rights ... I am of course not a lawyer, and can only point out some of the questions and consequences. If the works were stopped temporarily he would be entitled I think, to be paid up at once the full value of work done including the reserved percentage, and the value of materials he has purchased as they were delivered. If they were stopped permanently he would be entitled to claim to be paid the full amount of profit he would have made if he completed the contract in addition. This would mean a very serious demand on you, and if the works were ever resumed or completed under another contract the loss would be a very heavy one.

These are matters for our grave consideration in determining the action you will take, and while I know the deep anxiety they will cause you and most heartily sympathize with you in it, it would be the greatest breach of duty if I did not bring them before you ...³⁶

Wardell writes to Fr Kennedy on the same day: "My dear Fr Kennedy, I need not say your telegram which I received last night took me very much by surprise, for when I left Melbourne only 10 days ago, I had heard nothing to suggest it."³⁷ As the architect of the project Wardell is keenly interested to ensure that the Convent and Schools, Kew, will be completed. In January 1890, while continuing to attend to details requested by the contractor, Wardell comes to Melbourne and together with Fr Kennedy works towards negotiating a position for Mother Daly with the contractor.

On 21 January, back in Sydney again, Wardell writes once more to Mother Daly assuring her and requesting information as to arrangements of the laying of the foundation stone:

I enclose you, as I promised ... a copy of the general Conditions of the Contract for the Convent & Schools at Kew to keep by you for reference. I have marked that portion of the 18th Clause which bears on the questions of payments deferred. I instructed the Clerk of Works to do nothing more with the Porch until arrangements for laying a memorial stone were determined as that will be the best place for it. ... It will however be well to bear in mind that all those preparations will involve expense. I trust Dear Reverend Mother that you have dismissed all anxiety from your mind and am yours sincerely ...³⁸

Working towards occupation

What is clear from Wardell's letters from now on is his increasing mindfulness of cost and his focus only on that which is absolutely necessary. On 25 January a note confirms that Wardell sends Carr the "tracing of details in chapel windows and for eaves to roof of apse of chapel".³⁹

On 24 January Wardell responded to a telegram from Gamlin:

I have received your telegram, but you will perceive reference to your memorandum of the 29th Nov last that the next certificate is to issue when the 2nd Floor joists are on throughout the building. Please do nothing with the plastering of the second floor wall or the staining and varnishing of the Roofs, until further instructions'.⁴⁰

On the same day Wardell writes to the Rev Mother

With reference to the suggestion that a ceiling should be formed, under the Rafters and framing of the roofs by a Deal lining with the object of reducing the cost I find on reference to the contractors tender that it would increase the cost considerably as his tender for the work with the ceiling is £35236 ... and without it (as it is being carried out) £34586. So that unless you instruct me to the contrary I will not order any alteration in this respect, but I will request them to postpone the plastering and the varnishing in the second floor until further notice. From the Clerk of Works report of last week I think works will have progressed by about the 14 February to entitle the Contractor to his next certificate £5190 and you will have 7 days grace after he presents it ...⁴¹

On 3 February Wardell writes to Carr re details of the jambs of the Chapel windows, concluding that "All girders & joists of the second floor must be fixed and finished before the next certificate is given".⁴²

The 9 March 1890 was set by Archbishop Thomas Carr for the laying of the memorial stone. A week later headlines in *The Advocate* read "The Faithful Companions. The memorial stone of their new convent laid. A Brilliant Assemblage". It reported that "... the time fixed for the ceremony was half past three o'clock, but long before that hour a large concourse of people from all districts surrounding Melbourne had assembled, and the avenues to Cotham-road, which was gaily decorated with flags, was filled with long lines of fully laden vehicles and streams of pedestrians who could be seen coming from all directions ...".⁴³ In the architect's description of the edifice, it is noted, that "At present only the north wing and the main front up to the central block inclusive are commenced, and these have been carried up with great care as well as rapidity by Mr Gamlin the contractor".⁴⁴

Wardell's attention to the detail of construction continues through 1890 (Figure 3). By the end of March he is concerned that monetary difficulties will continue as the strains on banks have not abated. While he has postponed many works, he tells Mother Daly that

The Clerk of Works cannot – without danger – be dispensed with until the very last: there is no part of the work that does not require his attention and he is if possible even more necessary at the settling of accounts, as he has the record and history of all the details of extras and omissions. You suggest a change of material for the roof, but as I explained before any change of material would only mean a disastrous [outcome] to you. I can and will of course postpone all fitting up of baths, laying on tap and water (except the tank in the tower, which must be done with the tower) and everything else that can be postponed with safety and precedence.⁴⁵



Figure 3. William Wilkinson Wardell, Convent and School as completed. Genazzano, 1890 with original tower on left (removed in 1893). Photograph, Genazzano FCJ College Archives.

In June, Wardell has great concerns re the procurement and fixing of the bell for the small bell tower over the Sodality Chapel (Figure 3). He writes to Mother Daly and on 2 June, 1890 to Fr. Kennedy:

I am doing my best to persuade Rev Mother to have a bell for the bell cote over the Sodality Chapel procured and fixed now. She desires to postpone it, but it will be such a very costly business to fix it hereafter, and moreover incur such risk to the slates and roofing it would be the very worst possible economy to postpone it. Will you do me the kindness to explain this to her and urge her to revise her decision and have it bought and fixed at once. I do not know what the cost of the bell would be in Melbourne, but it could not be much, as the extreme dimension of the largest diameter should not exceed 2'3". I am sure I may rely on your good offices in this matter as it would be a grievous blunder to postpone it. W.⁴⁶

By July Wardell strongly recommends to Reverend Mother that works temporarily postponed be carried out "to avoid a heavy loss of money."⁴⁷ While savings of £950 may be made if

temporarily postponed works are omitted, Wardell writes

I am sure it will be evident to you that as this is not a permanent saving, but a postponement of an outlay which must be incurred very soon at a great increase, to give the accommodation you require, it would be a clear waste of money not to do the work now. And this also applies to other matters which must be done before it is possible to occupy the building, as for instance kitchen and laundry fittings, water supply, underground tanks, drainage, etc,etc,etc It is now certain that the Yan Yean pressure will not be sufficient to reach the necessary lands and we must therefore have recourse to pumping. The gas engine necessary for this can of course be utilized for laundry and other purposes for which it will also be necessary. I do not think therefore you can hope to have the building fit for occupation without an expenditure of £2,000 or perhaps £3,000 for additional works not included in those of the contract, and it seems useless to delay what is absolutely necessary to make the building fit for its purposes. I hope you will not think I am exceeding my duty in pressing this on your consideration, for I cannot see any other conclusion that it is an absolute necessity to incur the cost of completing the building fit for its work, before you can expect it to produce such results as will enable you to pay for it..."⁴⁸

Accommodating the FCJs and the boarders

In mid-August Wardell is able to give Gamlin the go ahead to proceed with these works.⁴⁹ Wardell continues to coax the building to completion so that it can be safely (if not yet comfortably) occupied. The interiors are not all sealed, draughts abound. The building needs to settle. In October he authorises the construction of the infirmary staircase without consultation, because he considered it a necessity for the sound functioning of the building, and asks for forgiveness and understanding.⁵⁰



Figure 4. William Wilkinson Wardell, Convent and School, Kew as completed. Genazzano, 1892 with students. Note the bare grounds which caused problems in summer (dust) and winter (mud). The shelter shed on the right was a proud addition. Photograph, Genazzano FCJ College Archives.

In the following summer dry conditions and dust are playing havoc with the ventilation and machinery on site (Figure 4). Wardell explains to his client

I explained to your carpenter how the [ventilators] should be made but looking at the present condition of the surface of the ground about the building, and the quantity of dust generated and blown into the building by strong winds, I would advise you to block up these ventilators by a board nailed across them on the inside, until the grass grows again and the dust nuisance is abated, and postpone the Tobin tubes until then, with kind regards ...⁵¹

The summer dry continues, and in February, Wardell records that “On my last visit to Kew the dust was so considerable that I was obliged to direct Mr Simpson to enclose the gas engine at once by a wooden enclosure, and not have it used when it was enclosed, for the dust getting into the parts would destroy the engine in a very short time”.⁵²

In the winter that followed, severe storms assailed the building on its exposed site (Figure 4).

Some leaks were reported to the architect. Wardell seeks an independent investigation to satisfy himself and the Reverend Mother that the building is sound.

I have received Mr. Todd's report who examined the building after the recent storm and flood and I am glad to say that it is in the highest degree favourable to the work. The following extract from it will probably be sufficient. He says "I have superintended the erection of many buildings of a similar character and have inspected many more, and I can truthfully say that I have never seen a sounder one. All the trades have been excellently carried out and reflect great credit to all parties concerned'.⁵³

The following winter, in similar circumstances Wardell, is again confronted by concerns about the soundness of the building. He writes: "Let me repeat dear Mother you have so good and honest a building as it is possible to erect, but like every other building in the world it will require maintenance, and from time to time repairs, in proportion to its extent and position."⁵⁴

A final reflection

Wardell's Convent and School, Kew may be simple and austere but it is incredibly impressive in scale, in attention craftsmanship and detail. The architect used materials to articulate the structure and construction, where loads are transferred, where arches are indicated, where levels changed, so proportions are more easily read and understood. In his published public statement about the Convent and School, Kew, Wardell touched on the differences between aspiration and reality in his discussion of partial completion and assigning a space for a temporary chapel until the real one is completed.⁵⁵ He acknowledged that the building is of Gothic character, evoking an architectural tradition, a Christian architecture, a medieval prototype, as well as memories of England and the continent in the FCJ Sisters and the colonists. Wardell looked above all to the fitness for purpose and sound construction in all his buildings, but this comes to the fore in the dire circumstances facing his commission for the Convent and School, Kew. We recall Wardell's concern with materials: the 'visible' in the timbers and brickwork, and the 'invisible' in the cement and asphalt. We recall his care with the construction of the foundations which support the masonry building, and the ventilation which allowed the building to breathe. All necessary for convenience, construction and propriety. The building's ornament came from the care with which the building was crafted: the laying of the brickwork, the joinery in the timber window frames, doors and architraves, the beautiful serviceable floors, the 'cathedral' glass, with its many hues of yellow and lemon and gold. The relationship of architecture and engineering are inextricably linked within Wardell's design persona. Wardell dies in 1899. It is unfortunate that monies were never forthcoming to complete his original design (Figure 1).

-
- ¹ FCJ Annals, Richmond 1889, copy held in Genazzano FCJ College Archives College
- ² Refer to Ursula M de Jong, *William Wardell and Genazzano FCJ College*, (Kew, Victoria: Genazzano FCJ College, 2009), Chapter 5 Financing the new Convent and School, Kew. Refer also histories of the period: Michael Cannon, *The Land Boomers* (Melbourne: MUP, 1966) and John M Freeland, *Architecture in Australia – A History*, (Ringwood, Victoria: Pelican Books, 1972).å
- ³ William Wilkinson Wardell Letterbooks, identified as WWW Letterbooks, 1883-1890, ML MSS 10, 9 December 1889.
- ⁴ Mount St Joseph, Vacluse, Richmond, 13 December 1889, Mary John Daly fcJ to Reverend Mother Marie de Bussy. FCJ Provincial Archives, Richmond, Victoria, ACC85.3/95
- ⁵ 16 December 1889 Carr to Reverend Mother John Daly, FCJ Provincial Archives, Richmond, Victoria, 85.4/2
- ⁶ Ursula M de Jong, *William Wardell and Genazzano FCJ College*, 2009.
- ⁷ Stephen Welsh (Manuscript), "William Wilkinson Wardell, 1823-1899, A Biographical Note and a list of the principal works of William Wilkinson Wardell F.R.I.B.A., A.M.I.C.E., during the first phase of his professional career 1846-1858", August 1975, RIBA Library, WeS/28/1/1. RIBA, Portland Place, London, Correspondence, Welsh to D I McDonald.
- ⁸ Andrew Saint, *Architect and Engineer: A Study in Sibling Rivalry* (New Haven, CT: Yale University Press, 2008).
- ⁹ A W N Pugin, *The True Principles of Pointed or Christian Architecture: set forth in 2 lectures delivered at St. Marie's Oscott, "by A. W. Pugin, Architect and Professor of Ecclesiastical Antiquities in that College"*, London: John Weale, 1841, (Reprint facsimile, London: Education Academy Press, 1973, p.1).
- ¹⁰ William and Robert Chambers (eds.), *Chambers' Information for the People: New and Improved Edition* (Volume II, Edinburgh, 1842, pp.673-688 (no.93): "Architecture", p.685).
- ¹¹ Pugin quoted by Phoebe Stanton, *Pugin*, (London: Thames and Hudson, 1971, p.60).
- ¹² William White, R.I.B.A. *Transactions*, 1865-6, pp.15-30, quoted by Paul Thompson, "The Writings of William White" in Summerson, John (ed.), *Concerning Architecture: Essays on Architectural Writers and Writing presented to Nikolaus Pevsner*, (London: Allen Lane Penguin, 1968, p.237).
- ¹³ Verbal communication with author, Arthur Andronas Conservation Architects, February 2018.
- ¹⁴ Verbal communication with author, Peter Lovell, Lovell Chen Conservation Architects, February 2018.
- ¹⁵ Marina Henderson, foreword to A W N Pugin, *The True Principles of Pointed or Christian Architecture*, London: John Weale, 1841 (Reprint facsimile, London: Education Academy Press, 1973).
- ¹⁶ WWW Letterbooks, 1883-1890, ML MSS 10, pp. 819-820, original letter held at FCJ Archives, Richmond, Victoria.
- ¹⁷ The Annals of Kew – 1889, p. 2, FCJ Archives, Richmond, Victoria.
- ¹⁸ WWW Letterbooks, 1892, ML MSS 10, p. 535, original held at FCJ Archives, Richmond, Victoria.
- ¹⁹ WWW Letterbooks, 1896 ML MSS 10, 10 February, p. 165.
- ²⁰ WWW Letterbooks 1883-1890, ML MSS 10, p. 844.
- ²¹ WWW Letterbooks 1883-1890, ML MSS 10 pp. 819-820, original held at FCJ Archives, Richmond, Victoria.
- ²² WWW Letterbooks 1883-1890, ML MSS 10, p. 796.
- ²³ WWW Letterbooks 1883-1890, ML MSS 10, pp. 828-829.
- ²⁴ WWW Letterbooks 1883-1890, ML MSS 10, p. 870.
- ²⁵ WWW Letterbooks 5 Feb 1890-16 Nov 1893, ML MSS 10, p. 9.
- ²⁶ WWW Letterbooks 1883-1890, ML MSS 10 pp. 832-833.
- ²⁷ WWW Letterbooks 1883-1890, ML MSS 10 p. 838.
- ²⁸ WWW Letterbooks 1883-1890, ML MSS 10, letter 27 September, between pp. 897-898.
- ²⁹ *The Advocate*, 15 June 1889, p. 16.

-
- ³⁰ WWW Letterbooks 1883-1890, ML MSS 10 p.898.
- ³¹ WWW Letterbooks 1883-1890, ML MSS 10 pp.916-917.
- ³² WWW Letterbooks 1883-1890, ML MSS 10 pp.926-927.
- ³³ WWW Letterbooks 1883-1890, ML MSS 10 pp. 951 and 952.
- ³⁴ The Annals of Kew – 1889. FCJ Archives, Richmond, Victoria.
- ³⁵ WWW Letterbooks 1883-1890, ML MSS 10 p. 934.
- ³⁶ WWW Letterbooks 1883-1890, ML MSS 10 pp.961 and 962.
- ³⁷ WWW Letterbooks 1883-1890, ML MSS 10 p. 964.
- ³⁸ WWW Letterbooks 1883-1890, ML MSS 10 p. 994.
- ³⁹ WWW Letterbooks 1883-1890, ML MSS 10 p. 998.
- ⁴⁰ WWW Letterbooks 1883-1890, ML MSS 10 p. 999.
- ⁴¹ WWW Letterbooks 1883-1890, ML MSS 10 p. 999.
- ⁴² WWW Letterbooks 1883-1890, ML MSS 10 p. 1000.
- ⁴³ *The Advocate*, 15 March 1890, p. 8.
- ⁴⁴ *The Advocate* 15 March 1890, p. 8; an almost identical article is published in the *Building, Engineering and Mining Journal*, 3.8.1889, p. 96.
- ⁴⁵ WWW Letterbooks 5 Feb 1890-16 Nov 1893, ML MSS 10/3, p.57.
- ⁴⁶ WWW Letterbooks 5 Feb 1890-16 Nov 1893, ML MSS 10/3, pp.142-143
- ⁴⁷ WWW Letterbooks 5 Feb 1890-16 Nov 1893, ML MSS 10/3, p.185.
- ⁴⁸ WWW Letterbooks 5 Feb 1890-16 Nov 1893, ML MSS 10/3, p.212.
- ⁴⁹ WWW Letterbooks 5 Feb 1890-16 Nov 1893, ML MSS 10/3, p.225.
- ⁵⁰ WWW Letterbooks 5 Feb 1890-16 Nov 1893, ML MSS 10/3, p.288.
- ⁵¹ WWW Letterbooks 5 Feb 1890-16 Nov 1893, ML MSS 10/3, p.364, 31 January, 1891.
- ⁵² WWW Letterbooks 5 Feb 1890-16 Nov 1893, ML MSS 10/3, p.370, 19 February, 1891 to Rev Mother.
- ⁵³ WWW Letterbooks 5 Feb 1890-16 Nov 1893, ML MSS 10/3, p.435, 27 July 1891 to Rev. Mother.
- ⁵⁴ WWW Letterbooks 5 Feb 1890-16 Nov 1893, ML MSS 10/3, p. 535 22 July 22 1892 to Rev. Mother.
- ⁵⁵ *The Advocate* 15 March 1890, p. 8

Learning from Lost Architecture: Immersive Experience and Cultural Experience as a New Historiography

Alison de Kruiff
Swinburne University of Technology

Flavia Marcello
Swinburne University of Technology

Jeni Paay
Swinburne University of Technology

Erik Champion
Curtin University

Jane Burry
Swinburne University of Technology

Abstract

In 1986, a group of Spanish architects decided to physically recreate an icon of modernist architecture. Mies van der Rohe's German pavilion for the Barcelona World Expo of 1929 was at the cutting edge of spatial and structural innovation but its influence was limited to what we understand through drawings, photographs, limited film footage and historical interpretations. We can now physically visit the pavilion and experience it but what of all the other pavilions by famous (and less famous) architects that are no more? It would be costly and time consuming to physically rebuild all of them, however virtual reality (VR) technologies and human computer interaction (HCI) methods can bring them back to life. International expo pavilions are temporary structures designed to be at the cutting edge of structural and material technology but what makes them unique and inspirational is seldom preserved directly, their architectural insights, experiential richness and cultural significance are easily lost. This paper asks: How might immersive digital experiences of space help us to recapture 'authentic' experiences of history and place? What implications does this have for architectural history, heritage and conservation?

The authors offer some answers to these questions by presenting preliminary results from a larger project entitled 'Learning from Lost Architecture': a virtual reconstruction of the Italian Pavilion at the Paris Expo of 1937. Firstly, we will contextualise the practice of digital cultural heritage and present its potential for immersive, investigatory architectural experiences. Secondly, we will critique our own practice to

better evaluate the potential of virtual reconstructions to affect architectural learning, discovery and historiography.

Barcelona, 1986

When Ludwig Mies van der Rohe designed the German Pavilion for the 1929 Barcelona International Exposition he would have imagined, like all the other architects designing their nation's pavilions, that soon after the Expo's close his structure would be gone and largely forgotten. History has shown us otherwise. Thanks to the space for innovation afforded by its status as a temporary structure, the Barcelona Pavilion entered the canon of modern architecture along with Mies' 'canonisation' as one of the four great modernist 'masters'. Had Mies lived to 100 he would have seen his pavilion brought back into being. When Oriol Bohigas wrote to him in 1959, Mies agreed to lead the reconstruction but the project did not go ahead until well after his death ten years later.¹ The work of the Fundació Mies van der Rohe in Barcelona exemplifies how physical and virtual reconstructions of temporary architecture can work together, creating a 'complete' experience of architectural space and place. But what of the sense of history? In neither case can we completely travel back in time to experience the newness of the exhibition architecture for the first time, instead revisiting a particular time, with specific cultures, via the concept of "cultural presence"², or the feeling of being in a place constructed, inhabited and modified by a different culture.³

Recapturing Pivotal Movements in Architectural Innovation

Modern Architectural history was dramatically shaped by revolutionary innovation experienced firsthand at exhibitions and World Fairs. The pavilions were unique sites of spatial, structural and material innovation—highly resourced, competitively sourced and tasked with displaying a nation's cutting edge.⁴ Yet architectural historians are seldom resourced to leverage sophisticated Virtual Reality equipment, heritage organisations are only recently recognising modern architecture (especially temporary exposition buildings), and technology's ability to create richer, immersive experiences of built environments is only now becoming feasible as an educational resource and scholarly tool.

A strong practice exists of recording information about historical buildings using Building Information Modelling (BIM), Geographic Information Systems (GIS) and other 3D modelling primarily for research, documentation, conservation, and recreation of buildings.⁵ However, the architectural accuracy of BIM and GIS projects fails to create a sense of embodied presence or provide experiential learning.⁶

Embodied Learning links the development of creativity and critical thinking, bridging interdisciplinary connections between science and art.⁷ However, researchers have insufficiently studied embodied learning applied to architectural history, and the consequent effect on the practice of historiography. Interaction designers have evaluated embodied learning methods in virtual reality with users, demonstrating successful support of spatial visualisation in anatomy learning in an active, experiential way.⁸ How, then, can this impact learning about lost architecture? Design, analysis, and evaluation of interactions with and around technology increasingly use the concept of embodied interaction.⁹ This paper presents preliminary investigations into how these methods can effectively and affectively transfer to virtual experiences of architectural space. According to Waters, Hughes and Hughes,

Virtual Reality transports the mind beyond the two-dimensional bounds of text and photographs; it engages the imagination and forms visual and cognitive links. VR can free participants from stereotyped bounds projected by society ... the stories of these technological wonders and numerous related artefacts ... can be fully explored and used to motivate the inquiry process.¹⁰

In addition to extensive research within the gaming domain, several applications of Virtual Reality (VR) extend people's current knowledge and capabilities. Research in Human Computer Interaction (HCI) currently focusses on supporting human interactions in virtual environments, including interactions with objects to explore cultural heritage,¹¹ enriching feedback through multi-sensory engagement;¹² and enhancing understanding of large datasets through embodied navigation.¹³ Our research builds on previous investigations in embodied interaction and virtual environments, leveraging digital technology with multi-sensory feedback and embodied navigation, to create a phenomenological experience of past innovative architecture, providing new opportunities for scholarly discoveries.

Current VR practice in architecture and expositions

A preliminary review of current 3D visualisations of International Expositions revealed no complete reconstruction, virtual or otherwise of the Paris Expo of 1937 despite its relative fame amongst 20th Century Expositions. Existing Expo visualisations are mostly fly-overs or walkthroughs of deserted sites. Examples include: a 3D reconstruction of the 1913 Ghent World Fair;¹⁴ the World Expo Museum's virtual reality fly-over of Shanghai, the former site of Expo 2010;¹⁵ a virtual tour of Monaco pavilion at the 2015 Milan Expo;¹⁶ and UCLA's recreation of Chicago's World's Columbian Exhibition of 1893, experienced in a

CAVE (an immersive virtual reality environment where are projected on three to six of the walls of a room-sized cube).¹⁷

Virtual reality is increasingly accessible for architectural practices, home users, and cultural and educational institutions as a new delivery mode for content. Due to digital games and visual effects in films the public has high expectations of immersive, engaging experiences. However, architectural history repositories of 3D content are scattered; inaccessible; lacking in features or narrative; or only available on specialised technology. Online collections generally don't exploit the scale, sensory richness and potential of VR, biofeedback and sensory technology now available. Meanwhile, logistical difficulties exist for Australians and New Zealanders attempting to visit the sites, recreations and VR labs of Europe or the USA. In terms of tools and repositories, UCLA is developing VSim, highly detailed models with associated historian narratives and resources; the Smithsonian has a 3D online viewer of some of its artefacts; Europeana has a 3D model collection; 3D-ICONS aims to produce architectural masterpieces for Europeana; and Cyark is a project to digitally preserve heritage at risk and has online 3D models but it is still unclear how the public can access the models.¹⁸

Challenges of virtual reality and exposition pavilions

Embodied learning requires the viewer to believe they are 'really there' in the virtual environment. However, is this enough to create what we call 'embodied discovery' of innovative practices, where architectural scholars can construct their own understandings of lost spaces? Virtual reality relies on sight and sound to block stimuli from the 'real world' and replace it with the virtual environment. What of the other senses people use for navigating the world—smell, taste and touch? These senses are more primitive, creating strong emotional responses, triggering memories, and providing background information to human interactions with the world. Without emulated smells of 1937 Paris air, the feel of the marble floor, and the touch of a breeze, how realistic can any emulation of the Paris World Exposition be? Researchers have explored multi-sensory virtual reality with touch, smell and taste, but corresponding device development is in its infancy.¹⁹ Sensory devices and related interface methods can augment the ocular-centric tendencies of Virtual Reality environments.²⁰ However, deciding on shared and contested levels and elements of authenticity²¹ has proven more difficult, some have even argued that photorealism creates its own problems for both critical understanding²² and for historically and culturally appropriate interaction.²³ One solution may be to convey attenuating, location-specific, graduated sensory input, modulate sound, view or shaders in relation to the level of agreed upon knowledge, modulate viewpoint by avatar chosen, or depict the stability or opacity of

built objects according to the level of trust in the authenticity of the records.²⁴ User experience research will determine which sensory stimuli will augment embodied learning and discovery in the virtual reality pavilions.

The nature of World Expositions calls into question whether this project may unintentionally detract from the original pavilions' aura. Ephemerality is part of their value. A World Expo is fleeting, elevating the memory of the visit because the buildings will soon be lost forever. Constructing magnificent buildings, only to tear them down a year later reinforces the costly investment, enhancing the pavilions' financial and cultural status. Would the audience value exposition visits as much if they could conveniently revisit the site anytime later in virtual reality? Is archiving a 3D pavilion replica for posterity a fitting tribute to what the buildings represent? Or would a temporary virtual exhibition, to be deleted afterwards, better exemplify the ethos of the expositions?

The virtual reality experience itself may oppose embodied learning and discovery. Although presence can transport the audience emotionally to another place and time, the person remains aware of their physical location. The mediating technology, whether a head-mounted virtual reality display or an immersive installation, never completely disappears. The novelty of virtual reality creates an experience focused on the technology, distracting from the experience of the virtual reality content. This tension between the technology and the content informs the virtual experience, challenging designers to shape this new space into an embodied environment to provide an immersive, meaningful experience of a 1937 pavilion in 21st Century technology.

Paris 1937 and the larger project

Of the 20th Century Expositions, Paris 1937 stands out as the last Universal Exposition, dedicated to Peace in a political climate on the brink of global war. Each country recruited its most famous architects to design a pavilion responding to the expo theme: 'Arts and Techniques in Modern Life' while presenting the best of its nation to an international audience.²⁵ The *Learning from Lost Architecture* project will create embodied experiences of the interior and immediate exterior context of five pavilions chosen for their architecture, innovations, design or integration with modern art (Australia, Finland, Italy, Japan and Spain). The chosen pavilions represent different political, cultural and geographical contexts, including a mix of well-known and lesser-known structures. We will also create the walk under the Eiffel Tower along the expo's main avenue to experience the famous 'stand-off' between the German and USSR pavilions by Albert Speer and Boris Jofan.

The Italian Pavilion, our initial prototype, was designed by the country's most famous architect, Marcello Piacentini. The equally influential Giuseppe Pagano designed the interiors and was director of the exhibition designs. The Italian Pavilion's reinforced concrete structure was a modernist interpretation of the Classical tradition, housing innovative exhibition design of the 1930s developed at the Milan Triennale. We chose the Court of Honour for our initial prototype as it acted as the ceremonial entrance to the building from the neighbouring street, bringing visitors face-to-face with a large bronze statue of *Italy who Flies Across (Italia Trasvolatrice)* set against a shimmering wall of blue-grey mosaic tiles, soaring up the pavilion's six-storey tower. One side of the colonnade was a solid wall decorated with frescoes and in front of them was an exhibit of four venerable objects showcasing Italy's technological advances: from Galileo's telescope to the latest propeller (Figures 1 & 2).²⁶

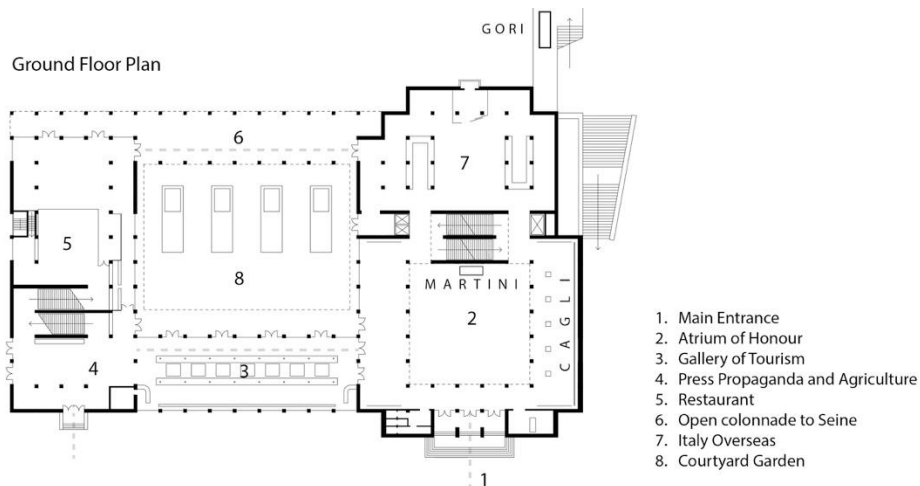


Figure 1. Marcello Piacentini & Giuseppe Pagano, Italian Pavilion, 1937 Paris Exposition. Plan showing court of honour and other spaces seen in the virtual model. Source: authors.



Figure 2. Marcello Piacentini & Giuseppe Pagano, Italian Pavilion, 1937 Paris Exposition. Colour render of pavilion entry. Authors & Photographs of court of honour from *Casabella*.

Creating cultural presence for discovery in history

To create and test the phenomenological experience the broader project *Learning from Lost Architecture* will employ a user-centred, iterative development approach to explore new forms of interaction, embodiment and collaboration linked specifically to the methods and findings of architectural history (Figure 3). The project will investigate which aspects of the virtual reality experience promote the strongest sense of ‘being there’ while providing an environment conducive to interpretation of the designer’s intentions for lived experience of the built environment. The innovations inherent in temporary expo pavilion architecture have strongly influenced subsequent designers, but think how much more far-reaching the impact would be if designers and historians could cross over from visual and intellectual stimuli into the realm of embodied experience to make their own discoveries. Books, fly-throughs and current virtual reconstructions of canonical architecture impose a specific view dictated by the architectural historian or the virtual reality artist. Virtual reality with a user-driven interface can extend our imaginative space through embodied movement, design and interaction, empowering the audience to become the agents of their own understanding of space.²⁷

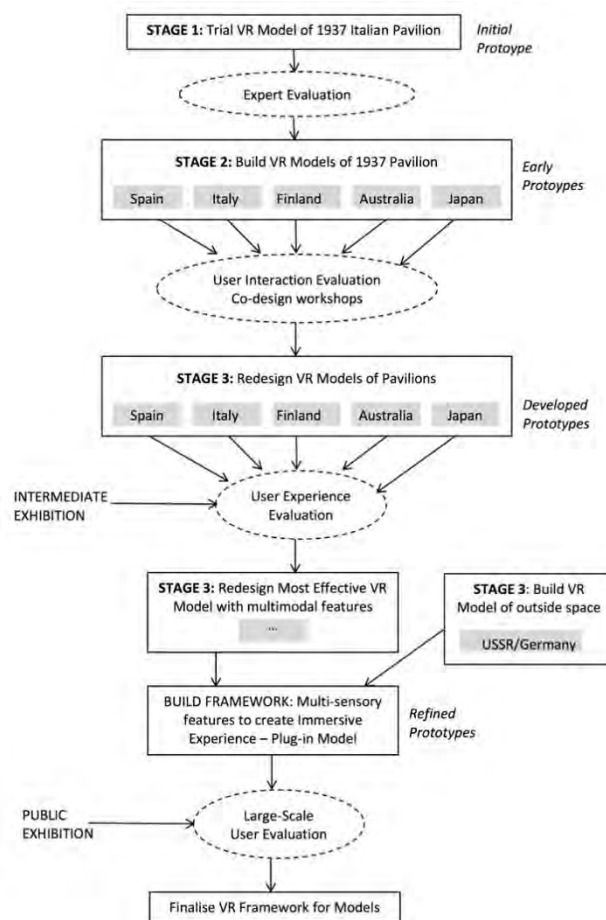


Figure 3. Iterative development model. Source: authors.

Creating an immersive experience of lost architecture is a complex process beginning with the traditional methods of architectural history: collection, collation and interpretation of primary source data for the pavilions, including plans, sections, photographs, film footage and contemporary descriptions. These were used by architectural modellers, VR specialists and VR developers to construct our initial Italian Pavilion prototype. This input material and the initial prototype will feed into a virtual place-making approach through a series of user evaluations and co-design workshops with architecture students, architectural historians, architectural designers and urban planners, exploring their needs and design ideas. These activities will interrogate what different user groups seek in an immersive experience by defining what can be understood from current information sources, and what is lacking. The workshops will comprise small group discussions, forum reporting and critiquing of envisioning tasks to sketch their ideal experience and imagine possibilities of emerging digital interactive technologies. The researchers will introduce existing 3D models of buildings, including the Italian Pavilion VR prototype, to participants during the workshops for inspiration (Figure 4). Workshop outputs then contribute to developing the interactive experience and the four remaining pavilion VR models. The research will evaluate with users the experience in an immersive CAVE environment (EON Icube Mobile) to the use of mobile phones in wearable headsets (Samsung Gear VR), and head-mounted displays (HTC Vive) gauging the role played by shared experience through person-to-person interaction, facial expressions, body language and dialogue with other end-users in the same space of the cube.

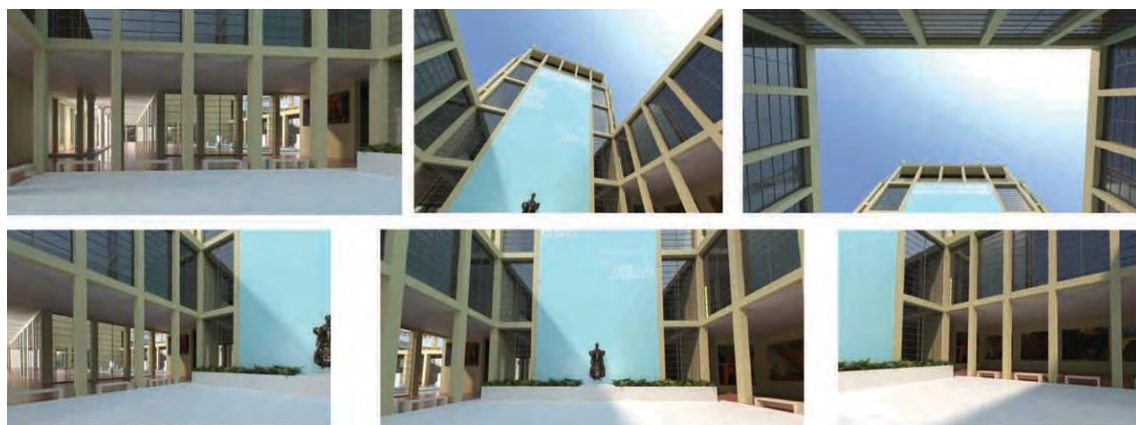


Figure 4. Screenshots of virtual model of Italian pavilion showing the different views available. Source: authors.

A limitation to using iterative development with user experience testing to create cultural presence is that we can only include the receiving culture in the design process—modern day architectural historians, students and designers. Personal input from the transmitting culture, the original architects and population in 1937 is limited to personal descriptions

through diary entries, descriptive articles and architects' statements which lacks the richness of direct human participation.

Initial prototype: *the Virtual Italian Pavilion*

The VR development team created a first stage prototype to act as a discussion prompt in the user experience research to find out what additional elements would be needed for an embodied architectural experience. Applications were exported for EON Icube Mobile, Google Cardboard, HTC Vive and Samsung Gear VR so that multiple platforms could be tested. Google Cardboard's low resolution and limited field of view resulted in a poor sense of immersion so this platform was deemed unsuitable for the project. Further, the SketchUp model initially supplied could not be accurately imported into Autodesk Maya, so the models had to be constructed over again.

Developing for the EON Icube Mobile created a challenge for the development team. The Icube could only display static objects, so advanced capabilities of VR such as objects moving in the breeze, real-time lighting and shadows, and moving water were impossible to display on this platform. To facilitate this limitation the development team followed an architectural visualisation pipeline which fixed, or 'baked', lighting and shadows onto the models' texture maps. The process for developing the preliminary prototype can be seen in figure 5.

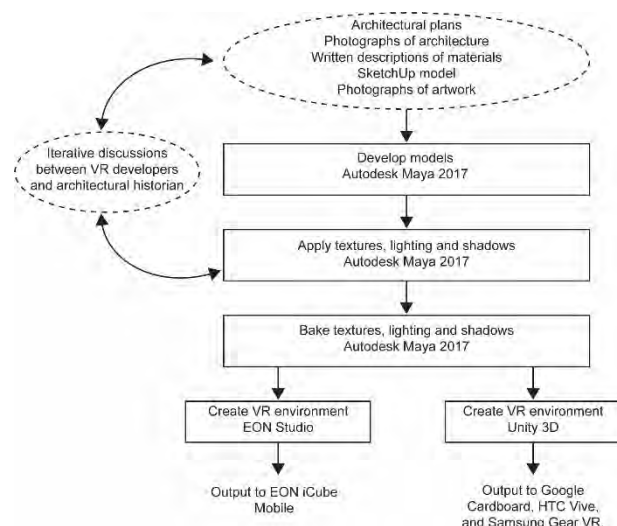


Figure 5. Development pipeline of initial prototype. Source: authors.

This process meant that the headset VR apps also had static objects with baked lighting and shadows, reducing the realism even though these headsets are capable of greater fidelity than the EON Icube Mobile. In future iterations of the prototype, an adapted pipeline

will diverge earlier to keep fidelity as high as possible (figure 6). The development team will use Unreal Engine instead of Unity 3D for Samsung Gear VR and HTC Vive because of its greater rendering quality and speed on those platforms.

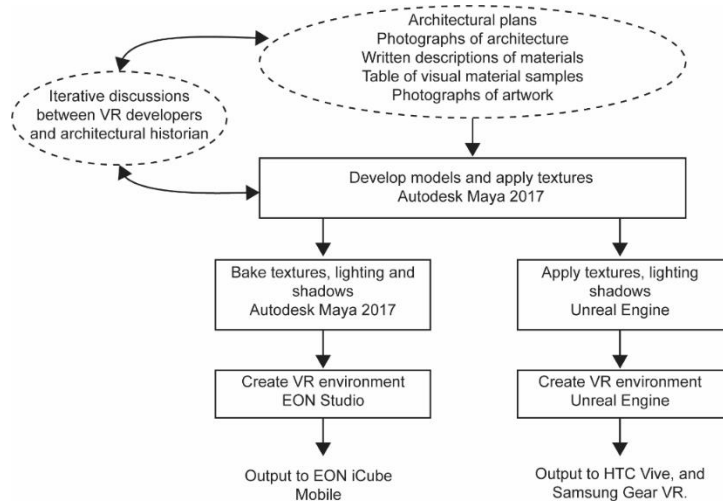


Figure 6. Revised development pipeline. Source: authors.

Through an expert evaluation, the prototype revealed three main insights: the value of non-architectural information, the importance of movement and the value of detail. Non-architectural information such as lighting and weather conditions are intrinsic to spatial experience. In the preliminary model the image of the sun and clouds were fixed in the texture of the sky to simulate a generic, fine-weather day (Figure 6). The use of precise location of the sun based on the time and date, longitude and latitude would create shadows similar to those present during the exposition to encompass various weather types throughout the Exposition's duration (25 May 1937 to 25 November 1937). Even better would be a system that allows people to experience different lighting and weather conditions to see the architecture in different environmental contexts.

Movement and intuitive self-navigation to explore the space are also key to immersive experience. This became apparent when comparing the experience inside the EON cube with the Samsung Gear VR and HTC Vive. The higher resolution of the head-mounted displays can make the environment seem more 'real', however the EON Icube Mobile affords the ability to walk around inside the cube as one does inside physical space (albeit within a 3m x 3m limit). It also possible to relate to others, seeing facial expressions and body language, comparable to the experience of physical architecture. Navigation devices used across the various platforms can detract from immersion. The EON Icube Mobile and HTC Vive require use of a hand-held controller

and Samsung Gear VR has a button on the headset. Concentrating on the navigation device causes participants to feel like they have one foot in the 'real' world, preventing them from experiencing total immersion.

Our third insight echoes Mies himself—'God is in the details'. The prototype model omitted the background sights and sounds of the site. Views of a generic streetscape from the virtual windows diminished the atmosphere of the fair which, in 1937, would have included paving surfaces, visitors walking past in 1930s clothes, voices, the river lapping around the shores and glimpses of the other pavilions. We contend that these and other sensory stimuli will help match the viewer's mental schema, building credibility in the experience and the sense of 'being there'. This allows for more effective immersion in an embodied discovery experience.

The other important detail is the integration between the experience of art and space. Pagano felt strongly about the unity between art and architecture, making it the main design driver behind his work at the Triennale. The location of the statue, frescoes and views out to the large courtyard and the Gallery of Tourism were an integral part of the spatial experience. Standing close to the bronze statue and looking up to her towering presence is part of the thrill of being in the courtyard. The artwork provided focal points to the VR experience, giving the viewer meaningful objects to explore.

Conclusion

The initial prototype of the Virtual Italian Pavilion has made the first step to move beyond virtual reconstructions for the purpose of architectural documentation or information delivery into embodied experience for holistic understanding of a building's experience and embodied discovery. In the next stage, *Learning from Lost Architecture*, user experience research and human-computer interaction will provide opportunities to enhance learning, discovery and meaning for an audience and matching mental schemas with virtual stimuli and interaction to create a more immersive experience. Further research will also include ways to preserve and distribute these virtual heritage 3D models to make them accessible to other researchers including issues of accuracy documentation, metadata, interoperability, searching and long-term preservation.²⁸

World Exposition pavilions represent an important topic to explore in virtual reality: temporary constructions that hold a permanent and significant place in architectural history, with a unique culture providing insight into the world history and the legacy

of innovation. The prototype of the Italian Pavilion, demonstrated benefits to using this visualisation approach and feedback on the usefulness of different VR technologies. Our contribution is to provide an immersive VR experience of lost architecture that goes beyond delivery of information toward scholarly discovery of new insights and re-interpretations of past innovation in design.

Acknowledgements

We would like to thank the VR development team, Stephen Jeal, Casey Richardson and Casey Dalbo, and Professor Kim Vincs from Swinburne University of Technology for their contribution to the project.

Endnotes

¹ After the fall of the Franco regime, Bohigas revived the initiative though Barcelona's city Council and Ignasi de Sola Morales, Cristian Cirici and Fernando Ramos supervised and researched the reconstruction. In 1983 work began and the pavilion was able to be built on its original foundations. Fundacio Mies van der Rohe Barcelona, *Virtual Tour*, accessed 22 February, 2018, <http://miesbcn.com/the-pavilion/virtualtour/>. The Fundacio also offers a didactic 360-degree view virtual tour of the pavilion Fundacio Mies van der Rohe Barcelona, Cl3ver, accessed 22 February, 2018, <http://3d.cl3ver.com/7Ni0c>.

² Erik Champion, *Playing With The Past* (Dordrecht: Springer, 2011), 63–82.

³ Erik Champion, 'Cultural Presence', in Subhasish Dasgupta (ed.), *Encyclopedia of Virtual Communities and Technologies*, (Hershey, PA: Idea Group Inc., 2005), 97.

⁴ Paul Greenhalgh, *Ephemeral Vistas: The Expositions Universelles, Great Exhibitions, and World Fairs, 1851–1939*, (*Studies in Imperialism*), (Manchester: Manchester University Press, 1988).; Robert W. Rydell, *World of Fairs: the century-of-progress expositions*, (Chicago, Ill: University of Chicago Press, 1993).

⁵ Sander Münster, 'Workflows and the role of images for virtual 3D reconstruction of no longer extant historic objects', in *ISPRS Annals of Photogrammetry, Remote Sensing and Spatial Information Sciences II-5/W1 XXIV International CIPA Symposium, 2 – 6 September 2013, Strasbourg, France*, ed. Pierre Grussenmeyer (Göttingen: Copernicus Publications, 2013) 197–202.; Rebecca K. Napolitano, George Scherer, and Branko Glisic, 'Virtual tours and informational modeling for conservation of cultural heritage sites', *Journal of Cultural Heritage*, 29, (2018), 123–129.; Michela Ott, and Francesca Pozzi, 'Towards a new era for Cultural Heritage Education: Discussing the role of ICT', *Computers in Human Behavior*, 27, 4 (2011), 1365–1371.

⁶ Thomas Schubert, Frank Friedmann, and Holger Regenbrecht, 'Embodied presence in virtual environments', In Ray Paton, Irene Neilson (eds.), *Visual representations and interpretations*, (London: Springer, 1999), 269–278; Erik Champion, *Critical Gaming: Interactive History and Virtual Heritage* (Surrey: Ashgate Publishing, Ltd.), 2015.

⁷ Zacharoula Smyrniou, Menelaos Sotiriou, Eleni Georgakopoulou, Ourania Papadopoulou, 'Connecting Embodied Learning in educational practice to the realisation of science educational scenarios through performing arts', In Angelos Lazoudis, Stephanos Cherouvis (eds.), *Inspiring Science Education, Athens 22–24 April, 2016* (Pallini: Epinoia S.A., 2016), 37–45.

⁸ Jinsil Hwaryoung Seo, Brian Michael Smith, Margaret E. Cook, Erica R. Malone, Michelle Pine, Steven Leal, Zhikun Bai, Jinkyoo Suh, 'Anatomy Builder VR: Embodied VR Anatomy Learning Program to Promote Constructionist Learning', In *Proceedings of the 2017 CHI Conference Extended Abstracts on Human Factors in Computing Systems (CHI EA '17)*, (New York: ACM, 2017), 2070–2075.

⁹ Paul Dourish, *Where the Action Is: The Foundations of Embodied Interaction*, (Cambridge, Massachusetts: MIT Press, 2001).; Paul Marshall, Alissa Antle, Elise Van Den Hoven, and Yvonne Rogers, 'Introduction to the special issue on the theory and practice of embodied interaction in HCI

and interaction design', *ACM Transactions on Computer-Human Interaction (TOCHI)*, 20, 1 (2013), 1.

¹⁰ Lori C. Walters, Darin E. Hughes, and Charles E. Hughes, 'Interconnections: Revisiting the Future', *Games and Culture*, 6, 6 (2011), 538-559.

¹¹ Nishant Bugalia, Subodh Kumar, Prem Kalra, and Shantanu Choudhary, 'Mixed reality based interaction system for digital heritage', In *Proceedings of the 15th ACM SIGGRAPH Conference on Virtual-Reality Continuum and Its Applications in Industry*, 1, (New York: ACM, 2016), 31-37.

¹² Susumu Tachi, 'Embodied media: expanding human capacity via virtual reality and telexistence (keynote)', In Yukiko I. Nakano, Elisabeth André, Toyooki Nishida, Louis-Philippe Morency, Carlos Busso, and Catherine Pelachaud (eds.), *Proceedings of the 18th ACM International Conference on Multimodal Interaction*, (New York: ACM, 2016), 3.

¹³ Alberto Betella, Enrique Martínez Bueno, Wipawee Kongsantad, Riccardo Zucca, Xerxes D. Arsiwalla, Pedro Omedas, and Paul FMJ Verschure, 'Understanding large network datasets through embodied interaction in virtual reality', In *Proceedings of the 2014 Virtual Reality International Conference*, (New York: ACM, 2014), 23.

¹⁴ Frederik Verstraete, 'A virtual reconstruction of the 1913 World Fair at STAM – Ghent city museum', In *MWF2014: Museums and the Web Florence, February 18-21, 2014, Florence, Italy* (2014), accessed March 02, 2017, <https://mwf2014.museumsandtheweb.com/paper/a-virtual-reconstruction-of-the-1913-world-fair-at-stam-ghent-city-museum/>.

¹⁵ Bureau International des Expositions (BIE), *World Expo Museum in the spotlight at Expo 2017 Astana*, (2017), Accessed 02 March, 2017, <http://www.bie-paris.org/site/en/news-announcements/bie-activity/world-expo-museum-in-the-spotlight-at-expo-2017-astana>.

¹⁶ Frank Rechtmann, *Pavillon Monaco Expo Milano 2015*, accessed 02 March 2018, http://your360.de/EXPO/MON/expo_monaco_360.html.

¹⁷ Harold C. Barnett, 'World's Columbian Exposition, Chicago, 1893', *Building Chicago*, accessed March 2 2018, <https://buildingchicago.wordpress.com/2013/06/23/worlds-columbian-exposition-chicago-1893/>; The Urban Simulation Team at UCLA, *The World's Columbian Exposition Chicago, 1893: A real-time visual simulation model currently under construction by the Urban Simulation Team at UCLA*, accessed March 2 2018, http://www.ust.ucla.edu/ustweb/Projects/Columbian_Expo/ust_wceinfo_121.pdf.

¹⁸ Institute for Digital Research and Education (IDRE), *VSIM*, accessed October 18, 2017, <https://idre.ucla.edu/research/active-research/vsim>; Smithsonian Institution, *Smithsonian Digitization 3D*, accessed October 17, 2017, <https://3d.si.edu/>; Adrian, *Exploring 3D on Europeana with Sketchfab*, Europeana Blog, accessed October 17, 2017, <http://blog.europeana.eu/2017/01/exploring-3d-on-europeana-with-sketchfab/>; Athena Research Centre, *3D-Icons*, accessed October 17, 2017, <http://www.ipet.gr/~akoutsou/3dicons/showall.php>; Europeana Foundation, *3D-Icons*, Europeana Pro, accessed October 17, 2017, <https://pro.europeana.eu/project/3d-icons>; Cyark, accessed October 17, 2017, <http://www.cyark.org/>.

¹⁹ Peter Arnold, 'You Better Eat to Survive! Exploring Edible Interactions in a Virtual Reality Game', In *Proceedings of the 2017 CHI Conference Extended Abstracts on Human Factors in Computing Systems Denver, Colorado, USA — May 06-11 2017*, (New York: ACM, 2017), 206-209; Kasun Karunanayaka, Nurafiqah Johari, Surina Hariri, Hanis Camelia, Kevin Stanley Bielawski, and Adrian David Cheok, 'New Thermal Taste Actuation Technology for Future Multisensory Virtual Reality and Internet', *IEEE Transactions on Visualization and Computer Graphics* (2018); Hrvoje Benko, Christian Holz, Mike Sinclair, and Eyal Ofek, 'Normaltouch and texturetouch: High-fidelity 3d haptic shape rendering on handheld virtual reality controllers', In *Proceedings of the 29th Annual Symposium on User Interface Software and Technology, Tokyo, Japan — October 16-19 2016*, (New York: ACM, 2016), 717-728; Dhruv Jain, Misha Sra, Jingru Guo, Rodrigo Marques, Raymond Wu, Justin Chiu, and Chris Schmandt, 'Immersive terrestrial scuba diving using virtual reality', In *Proceedings of the 2016 CHI Conference Extended Abstracts on Human Factors in Computing Systems, San Jose, California, USA — May 07-12 2016*, (New York: ACM, 2016), 1563-1569.

²⁰ Tyler Johnson. *Interpretation at the Controller's Edge: The Role of Graphical User Interfaces in Virtual Archaeology* (Arkansas: University of Arkansas, 2015), 32, 65. <https://search.proquest.com/docview/1679469316?accountid=10382>.

²¹ Víctor Manuel López-Menchero Bendicho, , Mariano Flores Gutiérrez, Matthew L. Vincent, and Alfredo Grande León. "Digital Heritage and Virtual Archaeology: An Approach Through the

Framework of International Recommendations." *In Mixed Reality and Gamification for Cultural Heritage*, pp. 3-26. Springer, Cham, 2017.

²² Maria Roussou and George Drettakis. "Photorealism and non-photorealism in virtual heritage representation." In *First Eurographics Workshop on Graphics and Cultural Heritage (2003)*, p. 10. *Eurographics*, 2003.

²³ Erik Champion. "Heritage role playing-history as an interactive digital game." In *Expertise in Design: Design Thinking Research Symposium 6*, Interactive Entertainment Conference, University of Technology, Sydney, Australia, 17-19 November 2003, p. 29. Yusuf Pisan (ed.), 2003.

²⁴ Torre Zuk, M. Sheelagh T. Carpendale, and William D. Glanzman. "Visualizing Temporal Uncertainty in 3D Virtual Reconstructions." In *VAST*, 6th. (2005).

<https://pdfs.semanticscholar.org/96ab/ad7f66adf5888c84a2d694a1ede4c9ba0b57.pdf>

²⁵ See: Kate Kangaslahti, 'Absence/Presence: The Efficacy of Text, Image, and Space at the 1937 Exposition Internationale', *Avant-Garde Critical Studies*, 26 (2011): 191-208; Ihor Junyk, 'The Face of the Nation: State Fetishism and Métissage at the Exposition Internationale, Paris 1937', *Grey Room* 23, Spring (2006): 96-120 & James D. Herbert, 'View of the Trocadero: the Real Subject of the Exposition Internationale, Paris, 1937', *Assemblage* 26 (1995): 94-112.

²⁶ Flavia Marcello, "'Italians do it Better': Fascist Italy's New Brand of Nationalism in the Art and Architecture of the Italian Pavilion, Paris 1937", in Devos, Ortenberg & Vladimir Paperny (eds.), *Architecture of Great Expositions 1937-1958*, 51-69.

²⁷ Lisa M. Snyder, 'VSim: scholarly annotations in real-time 3D environments', In *DH-CASE II: Collaborative Annotations on Shared Environments: metadata, tools and techniques in the Digital Humanities*, (New York: ACM, 2014), 1-8.

²⁸ Erik Champion. "The Role of 3D Models in Virtual Heritage Infrastructures." In *Cultural Heritage Infrastructures in Digital Humanities*, edited by Agiatis Benardou, Erik Champion, Costis Dallas and Lorna Hughes, 15-35 (United Kingdom: Routledge 2017); David Koller, Bernard Frischer, and Greg Humphreys. 2010. Research challenges for digital archives of 3D cultural heritage models. *J. Comput. Cult. Herit.* 2, 3, Article 7 (January 2010), 17 pages.

DOI=<http://dx.doi.org/10.1145/1658346.1658347>

The Rise and Fall of the Bungalow

Shenuka de Sylva
Victoria University of Wellington

Brenda Vale
Victoria University of Wellington

Gordon Holden
Griffith University

Abstract

The distance between the floor of the bungalow and the ground has varied with both time and distance. This paper first looks at vernacular houses raised off the ground in Sri Lanka and the reasons for this arrangement. It then looks at the different reasons behind elevating the tea planter's bungalow, which were to do with seeing and being seen to be seeing. When the bungalow first arrived in the UK in 1869 as a coastal, holiday second home for the wealthy it hit the ground with novel protection to avoid rising damp. Although since coming down in the world to the point where the term 'bungalow' is somewhat pejorative, the UK bungalow has tended to stick to the ground. The bungalow also arrived in Queensland in 1860 when it began a process of gradually lifting itself off the ground until main living occurred at first floor height. The reasons behind this evolution are explored.

Introduction

Briggs' well known comment that "A Cottage is a little house in the country, but a Bungalow is a little country house—a homely, cosy little place, with verandahs and balconies, and the plan so arranged as to ensure complete comfort with a feeling of rusticity and ease"¹ sets up the nature of the bungalow as being something less formal than a conventional house. It also includes spaces that mediate between indoors and out, thus making outside living an important aspect of daily life. Given that many settlers came to New Zealand in search of a life that was perhaps less formal than the one left behind the popularity of the New Zealand bungalow should not be a surprise.² However, this paper is not about the New Zealand bungalow as its history has been well documented,³ but rather looks at how the distance between the natural ground and the floor of the bungalow has changed from its colonial origins, using examples from Sri Lanka, its arrival in the UK, and then in Queensland.

The Bungalow in Sri Lanka

The two principal features of the Sri Lankan vernacular house are its high-rising roof and the 'pila' a raised base platform on which the house sits. Both features are a direct response to the intense tropical heat of the day and the monsoonal downpours which inundated the land, often causing flooding. The vernacular roof, a steep domineering canopy stretches out well beyond the outer walls and extends down towards the ground to shade and cool the house. The height of the pila varied to suit the contextual situation and was both the foundation of the building and the base of the outer walls⁷ and generally wide enough for sitting and sometimes for walking.⁸ While features like the roof, veranda and courtyard are the key focus in architectural literature, the raised platform and its socio-cultural significance, particularly in domestic architecture is only briefly discussed. The reason being the pila, essentially "an elevated semi-outdoor space protected by a roof overhang"⁹ is often confused or interchanged with the verandah, an Anglo-Indian term introduced to the country by its European colonisers. Fortunately Bandaranayake's 1974 study of historic monastic buildings of the ancient capital 'Anuradhapura' from the 9th and 10th centuries, and considered the golden age of Singhalese architecture, devotes an entire section to the base platform and its moulding details.¹⁰ From this study and Sansoni's¹¹ and Lewcock's¹² studies on vernacular domestic architecture from the 14th to 19th centuries we know the significance of the pila did not just end with its protective functions. Rather its detailing and the design of related architectural elements like the entrance steps, doorway, wall-face and columns contributed to reinforcing the symbolic significance of the building and social status of the occupants.

In the simple wattle and daub homes of peasant farmers the pila would rise a couple of steps above the ground and extend outwards at the front and sometimes to the back to form a threshold between the house and the landscape.¹³ Often enclosing the front pila, but setback from the edge, was a short wall which served as a protective base for the timber columns supporting the roof, a security barrier against wild animals and intruders, and a seat elevated above that formed by the pila. The partially enclosed pila was the main living space where family gathered, tasks related to livelihood were carried out, and guests were entertained with visitors of a lower social status sitting or standing on the ground beyond the pila. The grander homes of village headman, feudal chiefs, and royal courtiers, the *walavva*,¹⁴ and the much simpler monastic residences of the Buddhist clergy, the *vihara*, were also elevated on platforms. Davy (1821), a British medical officer based in the newly captured central Kandyan hill province from 1816-1820 writes of the residences of the Kandyan aristocracy "their best houses, those of the chiefs, are of mud and tiled roofs, raised on a low terrace and always of a single storey".¹⁵ The more durable construction materials used in the

walavva such as stone and mud brick enabled sturdier foundations, wider external and internal walls, and larger columns to support the longer timber members of the larger and heavier terracotta tile or thatch roof. This created a wider external pila where guests could be entertained and business conducted, and a wider internal pila around courtyards where household duties and family activities could occur. In these vernacular homes the pila was a socio-cultural threshold and an architectural element essential for maintaining social etiquette associated with caste structures and 'rajakariya', responsibilities in service to the monarch.

Although the original purpose of the pila was functional, in a feudal society strictly defined by caste, the domestic vernacular architecture was a medium through which authority and social status was practiced and maintained. Ancient building codes established through royal decree reinforced these traditional practices. A visitor of a lower caste would stop at the pila venturing onto it or beyond only if invited. Although colonisation may have undermined and gradually eradicated some traditional practices, colonial administrators saw and grasped the opportunities thus presented for asserting and maintaining their own authority on the colonised. Pieris commenting on the appropriation of feudal structures of authority by colonial administrators writes "in the maritime provinces the rural walawwa culture lost its authority and was appropriated for colonial forms of symbolic capital."¹⁶ The colonial plantation, a production unit isolated by unrelenting hilly terrain, unsophisticated communication networks and distance from administrative centres, was a patriarchal micro colony governed by a plantation manager. Although much like the traditional pre-colonial production unit, without traditional caste structures and the 'rajakariya' system, authority had to be commanded at a high cost. As the plantation bungalow, an Anglo-Indian import of the 1830s lacked the implicit authority of the traditional walavva, as had its counterpart when first introduced around 1800 to the British administrative centre, the Colombo Fort, and from which by 1803 the natives and their vernacular architecture had been prohibited, symbolic authority was acquired in both situations through architectural appropriation, scale and strategic positioning for visibility.¹⁷ Elevated well above the line-room plantation labour housing, the fields and the factory, the spacious plantation manager's bungalow commanded authority, reinforced social status and controlled through seeing and being seen to be seeing (Figure. 1), as the bungalow within the fort did over its surroundings.¹⁸



Figure 1. Managers Bungalow, Lansdowne Estate, Ratnapura, circa 1917 (Leslie Marshall. 2000)

Early plantation bungalows were speedily built for hastily employed bachelor planters from the ranks of soldiers after the Crown Lands Encroachment Ordinance Number 12 was passed in 1840. Under this act 13, 275 acres of land was confiscated from local peasant farmers and sold to British government officials, businessmen and the clergy.¹⁹ Their design reflected the struggles of establishing an industry of which they had no previous experience.²⁰ Several poorly constructed basic bungalows needed extensive repair or were demolished²¹ following the gradual change of management from private ownership to agency houses and to the more profitable production of tea. This occurred from the 1850s and after coffee cultivations were destroyed by disease in the mid-1880s.²² During this time plantation bungalows reached a new level of architectural grandeur and became the main incentive for attracting managers and their families from Europe to a volatile industry that paid basic wages, and to a job made harder by continued labour issues even after south Indian workers replaced the reluctant Singhalese,²³ and isolation increased as the industry penetrated deeper and higher into the central hills.

Elevated on the plantation, the manager's bungalow was often raised on a platform or foundations, and entered through a ceremonial path surrounded by terraced and landscaped gardens (Figure 2). A porch, entrance steps, verandah and (or) an enclosed entrance hallway defined the multiple thresholds of entry. Each threshold was utilised through gradual elevation and increasing enclosure to manage class differences and maintain etiquette, and to give the plantation manager the status once enjoyed by the owner of the *walavva*. Even well into the late 20th century, higher ranked administrative staff rarely ventured beyond the front verandah, and labour only approached the bungalow from the rear where the kitchens, garages and domestic staff quarters were located. However, diverging from the *walawwa* the

staff spaces were removed from the main living areas of the bungalow but connected by a roofed or enclosed hallway. This was both for privacy and to separate the spaces of the indigenous domestics from those of their European manager and his family.²⁴ The bungalows of junior managers further reinforced the superiority of the manager by their lesser degrees of elevation and architectural detailing, although they too were strategically positioned on the plantation for visual surveillance and control.²⁵ Pieris elaborating on this situation writes “colonial society had only two major concerns when it came to domestic architecture—the facilitation of social rituals that maintained ‘European’ superiority and the segregation of Europeans from their native servants.”²⁶ However, the European adaptation of the traditional single storey form was sufficiently attractive to become an architectural import in both the UK and its dominions.



Figure 2. Westward-Ho Bungalow, Labukalle Estate, Nuwara Eliya circa 1883. (Raji de Sylva. 2001)

The Bungalow in the UK

The bungalow arrived in the United Kingdom in 1869 in the form of a small settlement of houses on the Kent coast designed by the architect John Taylor.²⁷ Although in 1793 the artist William Hodges had described the Indian bungalow as “...generally raised on a base of brick, one, two, or three feet from the ground...”²⁸ when it came to Kent it was firmly built on the ground, and even given a cellar and a private tunnel to the beach. What made these new seaside houses bungalows rather than houses or cottages was their simple rectangular form and the addition of verandahs, although the latter were not designed to keep the sun out as in the colonial examples, but rather as sheltered places for sitting out. Professor Erasmus Wilson bought one of these early bungalows from Taylor and his endorsement in the form of a letter written to Taylor in 1870 is worth quoting in full.

I find everybody charmed with my Bungalow, and I believe if there were many Bungalows, there would be many buyers. The house is a novelty, very convenient, fitted for a single family [Professor Wilson though married had no family], and easy as to price. The idea of Bungalows seems to take people's minds immensely. They are novel, quaint, pretty, and perfect as to sanitary qualities. The best sanitary home for a family is a Bungalow.²⁹

This endorsement of the sanitary quality of the bungalow came from a noted surgeon and specialist in skin diseases, who also treated the poor for free and is credited with instituting the daily bath in the pursuit of health.³⁰ Professor Erasmus Wilson is also known for bringing Cleopatra's Needle to London and for the 1878 statement that electric light would die with the closing of the Paris Exhibition.³¹ Although wrong about the latter his idea that the bungalow was associated with healthy living looked back to the Indian bungalow and other colonial examples whereby with the belief in airborne disease the isolated, well ventilated bungalow sat in the middle of its compound offered a healthy way of life.³² A holiday home by the sea enabled the new wealthy middle class to escape the soot and pollution of the city and enjoy the benefits of coastal pastimes, including salt water bathing. The early Kentish bungalows developed on land owned by Taylor's architect partner John Pollard Seddon came equipped with croquet lawns as well as private access to the beach. Seddon is better known as an architect for his gothic revival work and as a designer of the decorative accoutrements of architecture, such as metal work and stained glass, about which he also wrote.³³ His later Tower Bungalows of 1881-82 at Birchington-on-sea still exist and others designed by him have applied decoration (Figures 3 and 4).



Figure 3. Tower bungalows, Birchington-on-sea, designed by J. P. Seddon (Robert Vale, 2017).



Figure 4. Bungalow Birchington-on-sea with decorated frieze by J. P. Seddon (Robert Vale. 2017)

Birchington-on-sea bungalow details

In his book Briggs set out the essence of the bungalow as having fewer rooms for entertaining than the country house, and he promoted the use of the combined hall-sitting room. He also advocated rooms at least partly within the roof form as an economical form of bungalow building.³⁴ From the start, therefore, the bungalow in the UK was not necessarily single storey and both types exist in the early bungalows along the Kent coast. The first of these bungalows were single storey under one roof and only one example survives from 1874 built at Birchington-on-sea (the earlier ones in Westgate have been demolished).

Essentially these early bungalows were second homes for the increasingly wealthy middle class with easy access by rail from the nearby station. The less well-off seeking the seaside attractions such as donkey rides and afternoon tea would continue onwards to Margate.³⁵ As such the dwellings were commodious with room for servants. Mayhew in his 1881 account gives a plan of a two storey bungalow with the comment “...Mr. Taylor has given a capital reproduction of a cool, spacious, Indian-like hill-dwelling.”³⁶ The plan is roughly square with a central circulation zone containing the stair and leading through to the offices (coals, scullery, and larder) with to one side a cloakroom with WC, library and kitchen and on the other music room opening into drawing room and dining room. Upstairs the central circulation zone leads to nine bedrooms, with the two for servants together with another WC over the offices. The bungalow came with both heating from a boiler to the drawing room as well as the normal fireplaces. The larder was equipped with cooling whereby shelves could be lowered into a space that connected two wells on the property to the effect that “...when

lowered the cold is so great in summer that butter becomes quite hard and provisions of all kinds can be kept for a length of time, whilst so cold is the draught that not a fly will remain in it.”³⁷

However, the real technical triumph came in the length Taylor took to keep the damp at bay in a bungalow sitting on the ground. In a paper read to the Royal Institute of British Architects Taylor stated “I have introduced into my Birchington Bungalows, a foot above the ground, an invention of mine which I call a damp-proof course.”³⁸ Made of vitrified brown stoneware this was moulded with numerous air spaces that allowed free circulation of air under the floor. In 1910 Henry Adams in *Cassell’s Building Construction* had four drawings of varied patterns of stoneware damp proof courses all labelled “Taylor’s” (Figs, 175 -179, with 178-9 being two tiles to be combined into a DPC) but the one most like Taylor’s Birchington invention is Fig 181, labelled “Jenning’s Damp-proof Course”.³⁹ At Birchington Taylor also considered water penetration of walls, being disparaging of iron ties used in cavity brickwork. His solution was an L-shaped facing brick that supported a full brick resting on the foot of the L and an inner brick leaf to create a cavity. This idea seems to have disappeared by the time Adams was writing, although Fig. 194 is a solid brick wall faced with “Taylor’s vitrified stoneware facing”, which are perforated thick and thin ‘tiles’ on the outer face of the wall.⁴⁰ Taylor also wanted a bungalow free from rain penetration and for the roof he used a tapering interlocking tile that could be laid at a low pitch like slate but still keep out the rain. These patented tiles were sold by the Broomhall Company⁴¹, and still look good today (Figure 4). By the 1930s Taylor’s innovative stoneware damp-proof course was dismissed as being “somewhat more costly” than the conventional alternatives of lead, slates or bituminous felt,⁴² although the bungalow was still going strong as “...a labour saving form of structure.”⁴³

Going up in Queensland

Queensland worker’s dwellings in the two decades after free settlement were modest in size, typically of two to four rooms with a square floor plan and pyramidal roof, often having a lean-to roof at the back accommodating the kitchen and ablutions and generally having a verandah on the front, facing the street. While competing with Georgian, Tudor and Victorian architectural influences, many worker and larger homestead dwellings in the second half of the nineteenth century may be considered as derived from the Indian Bungalow. Bungalow design was probably influenced through the migration of British officers and merchants with experience in tropical and sub-tropical areas of India, South East Asia, the Caribbean and the Southern States of America. However the term ‘bungalow’ was not commonly applied at the time, first occurring around the late 1860s. Charles Allen writing in 1870 says “I stayed

many months in a Queensland bungalow, built somewhat after the model of those in India and which may be taken as a type of the best of the bush houses.”⁴⁴ These early bungalows were close to the ground on low stumps.

By the late 1880s the term bungalow was in common use. A traveller to Brisbane in 1888 describes what this paper terms the Queensland bungalow.

One of the first features which strike the attention of the stranger approaching Brisbane, especially by the river, is the architecture of the dwelling house. The prevailing style is, with modifications, that of the Indian bungalow – a single, sometimes double, storeyed cottage, generally of wood, with pyramidal roof and surrounded by broad verandahs, upon which open many French doors or low windows.⁴⁵

Ubiquitous elevated timber dwellings became known as ‘Queenslanders’, their form and character being distinctively different from other types in Australia. The surrounding verandahs of these dwellings, directly accessible from inside rooms, provided shaded comfort from harsh sunlight, protection from driving rain, access to the prevailing breezes, semi-outdoor informal shelter for sleeping and relaxation and places from which to engage with nature and those passing by. The Queensland bungalow expressed the informal relaxed lifestyle of the population. While their development and refinement took place in Queensland they were not invented there. Precedents for their elevation above ground abound from plantation dwellings and vernacular settlements in other parts of the world. The Port Essington (NT) settlement (1838-1848) is the first recorded Australian location where buildings were raised on high stumps. The first buildings were prefabricated in Sydney to be set on stumps for the purpose of providing additional sheltered storage which would be later built in. Several years after initial settlement, a raised building which had been enclosed underneath was found to be infested with white ants, yet other buildings that were not, while not escaping white ants, allowed for observation and their destruction. In 1864 in the establishment of the settlement of Somerset on Cape York Peninsular, building designs were prepared in England and forwarded to Queensland colonial architect Charles Tiffin for estimates and prefabrication.⁴⁶ The Somerset buildings were elevated some five feet (1.5m) above ground. This history demonstrates that colonial administrators and engineers recognised certain benefits of raising buildings on stumps and it seems reasonable to conclude that such knowledge passed through to civil society, probably reinforcing settler experience from elsewhere.

Several practical reasons have been put forward for the elevation of Queensland bungalows. Miles Lewis concludes that “There is no simple explanation of the source of the stump, the ant cap or the high - set house, but there are interwoven strands of evidence which largely explain them”.⁴⁷ From reference to historical accounts, Bell (p99) provides four main reasons for the adoption of high stumps “defence against malaria, improved ventilation, control of termites and increased space at low cost”.⁴⁸ Roderick compellingly advances the desire to be above the ‘miasma’ as the principal driving force for the medium elevation of the Queensland bungalow.⁴⁹ Miasma is the unhealthy vapours emanating from the ground believed at the time to cause disease but later refuted, requiring the floor level to be at least about four or five feet above ground.

From the late 1860s dwellings were regularly raised on high stumps in Queensland mainly for the practical reasons of creating useable space under and coping with sloping land.⁵⁰ Most of the early examples were simple, if not crude in execution, and most likely designed and constructed by local carpenters to the requirements of the owner. In contrast, many other early Queensland bungalows were designed by architects and pre-cut manufactured then shipped to their destination, this industry continuing the long British tradition of prefabrication of buildings especially for remote settlements (Figure 5).



Figure 5. Typical Worker's Cottage circa 1890s, Chelmsford Avenue, Ipswich. Modest Bungalow of the type that was prefabricated (Gordon Holden. 2018).

In the decade or so leading to Federation of the Australian States in 1901, the intellectual, political and social energy that was present provided an environment for design refinement of the bungalow by professional architects. This was a search for a distinctive style of architecture that responded to the climate, culture and place and which expressed optimism

worthy of the new nation (Figure 6). With its simple elements of an overarching roof and sweeping verandahs the elevated Queensland bungalow form remained the clearest architectural style of this period, albeit one that was not particularly respected by some architects; Robin Dods, arguably the most talented architect of the time, was appalled by “those unsightly houses set on a forest of black stumps.”⁵¹



Figure 6. “KAMERUKA” 1917, Roderick Street, Ipswich, demonstrating the high point of the development of the 'Queenslander Bungalow (Gordon Holden. 2018)

Following the First World War the numerous variations of the elevated Queensland bungalow developed through the adoption of gables, porches and decoration all of which disturbed the simplicity of the original form. Dwelling designs had largely abandoned the range of Federation styles in favour of influences from California, considered to have a similar climate to Australia. Versions on the elevated Queensland bungalow style continued to be built in lesser numbers up to the Second World War, after which the type was more or less abandoned in favour of low set dwellings built of brick.

Conclusion

If the bungalow had its origins in the British Empire, the discussion of those in Sri Lanka showed that the colonisers adopted a highly developed house form of great cultural significance. However, this significance was lost both in its original adoption and the later architectural interpretations of the bungalow in the UK. These were no more than holiday homes of a simplified form that made them both affordable and reflected the idea of life on holiday being less complex than life every day. In exporting the bungalow to the Dominions it was perhaps the simplicity of the form that was key, together with the way that form could be organised to respond to local circumstance. This ability of the bungalow to cope with climatic

differences is already apparent in the near freezing temperatures of Figures 3 and 4 and the 40°C+ of Figures 5 and 6. In Queensland elevation allowed for management of white-ants and floods, access to breezes and the convenience of under-house storage. None of these exported examples, however, had the cultural richness of the original Sri Lankan *walawwa*, suggesting that copying form alone is perhaps never a good idea.

Endnotes

- ¹ Robert Alexander Briggs, *Bungalows and Country Residences* (London, B.T.Batsford, 1901), v.
- ² Jock Phillips, "History of immigration", *Te Ara – the Encyclopedia of New Zealand*, <https://teara.govt.nz/en/history-of-immigration/print>
- ³ Jeremy Ashford, *The Bungalow in New Zealand* (Auckland, Viking, 1994); William Toomath, From Villa to Bungalow to Jazz Modern: new Zealand houses between the Two World Wars, *The Journal of New Zealand Studies*, 2, 4 (1992) 13-21
- ⁷ Senake Bandaranayake, *Sinhalese Monastic Architecture: The Viharas of Anuradhapura*, (Lieden: Brill, 1974), 313
- ⁸ Ronald Lewcock, Barbara Sansoni and Laki Senanayake, *The architecture of an island: The living legacy of Sri Lanka: a thousand years of architecture illustrated by outstanding examples of religious, public, and domestic buildings* (Colombo: Barefoot (Pvt)Ltd.1998).
- ⁹ Nihal Perera, *Society and Space, Colonialism, Nationalism and Postcolonial Identity in Sri Lanka* (United States of America, Westview Press, 1998) 110
- ¹⁰ Bandaranayake, *Sinhalese Monastic Architecture*, 313-351
- ¹¹ Babara Sansoni, *Vihares and Verandas Ceylon*, (Colombo, Barefoot (Pvt) Ltd, 1978)
- ¹² Lewcock, *Architecture of an Island*.
- ¹³ V. Basnayake, *Kandyan Yoeman's house: A detailed study of three existing traditional houses in Dullewa*, (unpublished: M.Sc Dessartation, Department of Architecture, University of Moratuwa, 1980)
- ¹⁴ Anoma Pieris, *Architecture and Nationalism in Sri Lanka: The Trouser Under the Cloth*, Routledge Contemporary South Asia Series; 65 (London; New York, Routledge, 2013)
- ¹⁵ John Davy, *An account of the interior of Ceylon and its inhabitants with travels in that Island*, (London: Longman, Hurst, Rees, Orme and Brown, 1821), 256
- ¹⁶ Anoma Pieris, *Architecture and Nationalism in Sri Lanka*.
- ¹⁷ Nihal Perera, *Society and Space*, 50-51
- ¹⁸ Nihal Perera, *Society and Space*, 70
- ¹⁹ James S. Duncan, "Embodying colonialism? Domination and resistance in nineteenth-century Ceylonese coffee plantations", *Journal of Historical Geography*, 28, 3 (2002) 317-338
- ²⁰ E. C. Elliot and F. J. Whitehead, *Tea Planting In Ceylon*, 2nd Edition, (Colombo, Times of Ceylon Co. Ltd, 1931), 225-227
- ²¹ E. C. Elliot, *Tea Planting In Ceylon*, 225
- ²² James S. Duncan, "Embodying colonialism?" 320
- ²³ James S. Duncan, "Embodying colonialism?" 320-321
- ²⁴ Anoma Pieris, *Architecture and Nationalism in Sri Lanka*
- ²⁵ E.C Elliot, *Tea Planting in Ceylon*, 227
- ²⁶ Anoma Pieris, *Architecture and Nationalism in Sri Lanka*
- ²⁷ Anthony King, "The Bungalow: an Indian contribution to the west", *History Today*, 32 (1982), 38-44.
- ²⁸ Kathryn Ferry, *Bungalows*, (London: Bloomsbury Publishing, 2014), 6.
- ²⁹ Anon, "Mr Taylor's Bungalows at West Cliff and Birchington-on-sea", *The Building News*, 25, (15 August 1873), 166
- ³⁰ Copeman, "Erasmus Wilson (1809-1884)", *Clinical and Experimental Dermatology*, 25, 1, 2000, 82-84.
- ³¹ Scott Liebs, "The fine art of NIT-picking: technological innovations abound. Which ones are right for your company?(take-away)", *CFO, The Magazine for Senior Financial Executives*, 19, 15, 2003, 56.
- ³² King, 'The Bungalow: an Indian contribution to the west', 40.
- ³³ John P Seddon, "The relation of the architect to the decorator", *The British Architect*, 19, 15, 1883, 173.
- ³⁴ Briggs, *Bungalows and Country Residences*, vi.

-
- ³⁵ Alan Kay, "The first bungalow estate", *Birchington Heritage Trust Newsletter*, 2002/3, <http://www.birchingtonheritage.org.uk/articles/bungalows.htm>
- ³⁶ Athol Mayhew, *Birchington-on-sea and its bungalows* (London: British Library Historical Print Collections, 1881), 21.
- ³⁷ Mayhew, *Birchington-on-sea and its bungalows*, 23.
- ³⁸ Mayhew, *Birchington-on-sea and its bungalows*, 40.
- ³⁹ Henry Adams, *Cassell's Building Construction*, (London: Cassell and Company, 1910), 71
- ⁴⁰ Adams, *Cassell's Building Construction*, 73
- ⁴¹ Anon, "Mr Taylor's Bungalows at West Cliff and Birchington-on-sea", *The Building News*, 15 August 1873, 166
- ⁴² William Frost and C. Powell, "Damp-proof course: theory and practice", in S. G. Blaxland Stubbs (ed), *The Building Encyclopaedia*, 4 vols (The Waverley Book Company: London, 1930), 2, 438-443
- ⁴³ G. Maxwell Aylwin, "Bungalows: planning and construction", in S. G. Blaxland Stubbs (ed), *The Building Encyclopaedia*, 4 vols (The Waverley Book Company: London, 1930), 1, 230-242
- ⁴⁴ John Archer, *Building a Nation: a history of the Australian house*, (Sydney: Collins, 1987), 106
- ⁴⁵ Archer, *Building a Nation: a history of the Australian house*, 109
- ⁴⁶ Donald Watson and Judith McKay, *Queensland Architects of the 19th Century – A Bibliographical Dictionary*, (Brisbane: Queensland Museum, 1994)
- ⁴⁷ Miles Lewis, "Off the Groun", *Fabrications*, 8, 1 (1997), 20-36
- ⁴⁸ Peter Bell, *Timber and Iron*, (St. Lucia: University of Queensland Press, 1984), 99
- ⁴⁹ Donald Roderick, *The origins of the elevated Queensland house*, PhD thesis (2004), University of Queensland.
- ⁵⁰ Bell, *Timber and Iron*; Ian Evans, (2001), *The Queensland House – History and Conservation*, (Mullumbimby: The Flannel Flower Press, 2001); John Maxwell Freeland, *Architecture in Australia – A History* (Ringwood: Penguin Books, 1972); Peter Newell, "The Origins and Development of the Queensland House", *Journal of the Royal Historical Society of Queensland*, 10, 4 (1979), 18-28
- ⁵¹ Archer, *Building a Nation: a history of the Australian house*, 110

Tradition vs. Technology: Periodicals as a driving force for the architectural debate: the Spanish gaze over the Pacific¹

Ana Esteban-Maluenda
Universidad Politécnica de Madrid

Abstract

With a country ravaged by the Civil War (1936-1939) and internationally ostracised, Spain set about its reconstruction remembering 'glorious' moments in the history of the nation. In architecture, the government promoted the search for a national style, which reproduced past architectures in official buildings, while local folklore was used to 'decorate' regional works.

However, as the 1940s progressed, some Spanish architects began to propose other alternatives. Tradition and a return to origins became subjects of debate in the mass media. Initially focused on finding their own identity, in less than ten years they began to take an interest in foreign trends and participate in international discussions. The translation of the renowned article 'Stocktaking' by Reyner Banham (The Architectural Review, February 1960) in the Madrid magazine Arquitectura, instigated a discussion that would extend throughout the 1960s. It focused the Spanish gaze on technological proposals, that were completely at odds with the reality of the nation. Due to its technological backwardness, Spain had to focus its attention on much more advanced countries. Architects could have looked to England or Germany, but their interest was in much further away places: Australia and Japan.

Based on the articles published in the main Spanish periodicals of the moment, this paper aims to take a journey through the evolution that took place within Spanish architecture, from the most conservative tradition to the defence of technology over other aspects of architecture. The tradition-technology duality (present in Banham's article) will accompany the opinions expressed by the authors and will reflect the true debate that was promoted by the magazines: the exaltation of rural life as opposed to industrialization and the idea of an advanced city, which, curiously, the Spanish architects preferred to seek in the Pacific.

Modern architecture should present itself as the harmonious result of an appropriate original thought and an exact application of the available materials.²

At the beginning of the 1940s, Spain was suffering from the immediate consequences of the Civil War (1936-1939) and the coming to power of a new regime. Physically and emotionally shattered by the war, the country needed to be uplifted at the same time as trying to overcome the international isolation to which it had been subjected, both by the German and Italian collaboration in the creation of the regime and by the ambiguity demonstrated by Franco during World War II. And so, the reconstruction of the country was based on the only thing that remained: the memory of other more 'glorious' moments in the history of the nation.

The government supported the search for a so-called 'national style' in architecture, which was generally limited to official buildings, whereas a folkloric style was employed in regional and rural works. Although initially most architects assumed these guidelines and built perfectly framed examples in the proposed models, through the specialist architecture media they began to question the type of architecture that should be built.

Tradition vs. technology: a warm debate in Spanish periodicals

In 1943, *Revista Nacional de Arquitectura* (RNA; National Architecture Magazine), the dissemination body of the Dirección General de Arquitectura (General Agency for Architecture), published a conference in which the German architect Paul Bonatz defended "the true" and "the authentic" against an "enthusiasm for new technical possibilities", which had "disappeared like a ghost", to the extent that "technology is no longer the master, but a servant."³ Although not directly aimed at the Spanish situation, this article is appropriate to illustrate a new formal review that began through the pages of the magazines: the survival of the paradigm of the machine versus the recovery and enhancement of vernacular and anonymous architecture.

During the first moments of the debate, in Spanish journals the balance between both options prevailed.⁴ In 1947, the *Boletín de la Dirección General de Arquitectura* (BDGA; Information Bulletin of the General Agency for Architecture) invited them to "achieve the balance [...] between traditional culture and modern technology, overcoming the functionalist movement [...] and linking it to tradition through the Spanish formulas of integration."⁵

Months later, in the V National Assembly of Architecture in 1949, the Italian Alberto Sartoris affirmed that “the development of technology seems to reduce the importance of geographical, geological diversity, but in fact it does nothing but explain, specify, fix the limits within which a given Architecture can fulfil its purpose.” Sartoris did not deny technology but considered it at the service of individuals who had “to consider the machine as the ideal tool to manufacture those elements that will be used to build the city that is destined to make man free, allowing physical stability in terms of place and work”.⁶ In similar terms, the architect Juan Rivaud expressed himself in an article in the Mexican publication *La propiedad* (The property), reproduced in *RNA*. From his point of view, “we must not allow technology to enslave us, we should enslave technology, to make it fulfil our highest desires.”⁷

Mariano Rodríguez Avial opted for the opposite position and considered “materials and construction techniques” as factors that “can influence or determine modern architecture.” So much so that, although he judged that “construction techniques have not been innovated in any important way since ancient times,” he held “new materials” as pieces that “enable problems that could not be solved until now to be solved and, by providing new solutions, new architectural forms emerge as a logical consequence.”⁸ The American Denison Bingham Hull went a bit further by stating that “the shape of our architecture” is:

...fundamentally based on science and the machine [...] Therefore, today’s architecture cannot express more than today, and any suggestion of the past is forbidden [...] Tradition is necessary, but we must keep in mind that it is only a good servant, but a very bad master.⁹

As can be seen, the positions between technology and tradition were divided, and what predominated was the position that sought a balance between the two. However, the voices defending progress struggled to make themselves heard. After the conference ‘Functionalism and *Brickism*’ by Luis Felipe Vivanco,¹⁰ Francisco Javier Sáenz de Oiza asked: “What is going to be the importance of the application of totally new materials and techniques like those that are available for us nowadays? [...] new architecture is mainly new for this reason.”¹¹

In one direction or another, the debate continued in the pages of Spanish journals throughout the 1950s.¹² But, undoubtedly, the most extensive and interesting article that was published around the tradition-technology duality is the well-known “Stocktaking” by Reyner Banham, which the magazine *Arquitectura* (Architecture) published just one year

after its appearance in *The Architectural Review*.¹³ The text was translated and proposed by Fernando Ramón Moliner, a Spanish architect then living in the United Kingdom, and a group of ten prestigious architects¹⁴ came together to hold a series of meetings – also ten – to discuss it. After these, Antonio Fernández Alba wrote up his own impressions on the subject. When finished, a copy was distributed among the other attendees of the meetings and they decided to publish it in the pages of the magazine. As not all the opinions were similar to that of Fernández Alba, it was decided that each participant would write a brief reflection on their ideas and that they would appear together in the magazine, in the same order as they had been reported.¹⁵

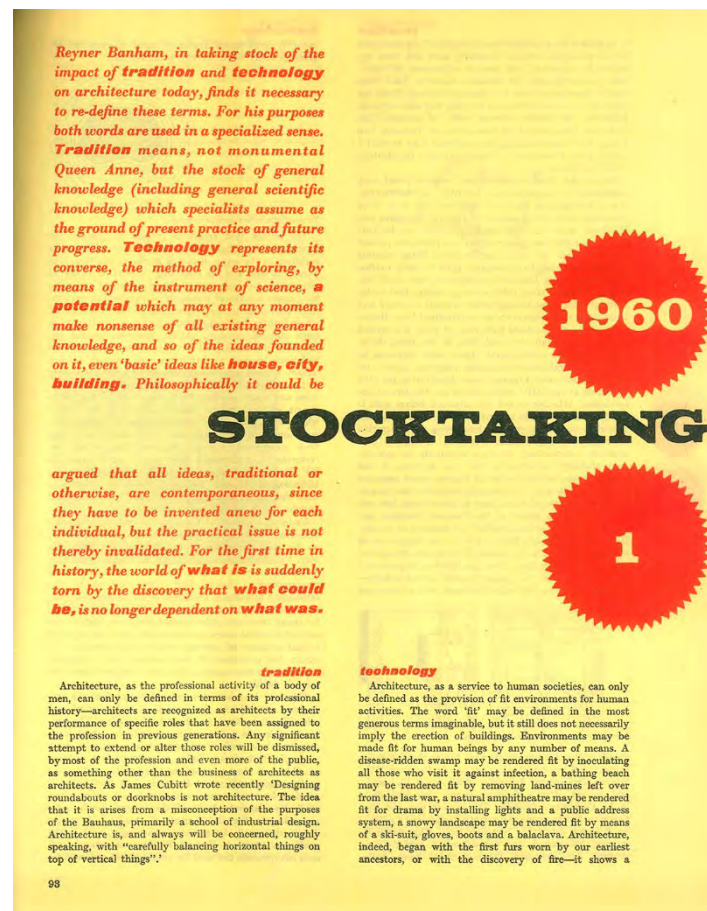


Figure 1. 'Stocktaking', by Reyner Banham
(Source: *The Architectural Review*, 127 (1960), 93).

In the original text, Banham tried to redefine the terms 'tradition' and 'technology' from the point of view of the architecture of the moment. For him, 'tradition' was not the direct copy of a series of ancient styles but related to the meaning of the English word 'lore', a term that refers to popular knowledge.¹⁶ Banham expounded the different traditionalist trends that, with different nuances, had been alternating and the internal contradictions that arose from them, as well as the possible advantages of these type of trends.



Figure 2. 'Tradition, Technology', by Reyner Banham
(Source: *Arquitectura*, 26 (February 1961), 2-3).

The article consisted of two independent texts – one for 'tradition' and the other for 'technology' – that were presented in parallel. In the one dedicated to technology, mechanization was considered "a powerful stimulus" for the professional activity of architects. The vehemence of Banham on the subject led him to affirm that "under the impact of these intellectual and technical upheavals, the solid reliance of architects, as a profession, on the traditions of that profession must eventually give way."¹⁷ But he was equally vehement when speaking of tradition – well-understood as a body of general knowledge, including scientific knowledge – which is the basis of the practice and, therefore, the seed of future progress.

In short, Banham did not specify the way forward in his article. His intention was not to clarify what was the best option, but to promote the awareness of the advent of 'technology' and, therefore, encourage the abandonment of the traditional consideration that "everything that exists depends on what it was" for a new argument that considered that "what could be no longer depends on what was."¹⁸

But what was the view of the Spanish architects convened to discuss the Banham article? Among the most significant responses, Antonio Fernández Alba acknowledged that "the

evolution of technology is a fact that cannot be ignored”, but also pointed out that, due to the special circumstances that Spain was experiencing, “the approach to the dilemma about a technological future as a substitute for the values of the inner world of free men, perhaps does not correspond to us.”¹⁹

Miguel Fisac was also not reluctant to embrace progress, as long as it was real progress: “To the fears of architectural tradition being absorbed by technology, I only raise objections to this technology if it is bad. Assuming it were good, I would have no qualms to oppose it.” Like Fernández Alba, Fisac thought that “unfortunately, this was not a current issue in Spain.” But he did not renounce technology in any way and presented the Spanish backwardness as a circumstance that was not entirely inconvenient: “the advantage of our technical development being fifty years behind in relation to other countries is that it gives us the possibility of industrializing in another way.”²⁰

Curro Inza also considered that, although Reyner Banham’s analysis showed “true acuteness”, it was “a bit circumstantial” for the Spanish case, as it corresponded to a “situation that is not ours, and about which I do not think it is even prudent to give an opinion without more information.” And that balance that characterized previous discussions returned: “tradition and recent technology are not two antagonistic elements [...] but rather related subjects that merge and complement each other very well.”²¹

Fernando Ramón, the instigator of the debate, focused on analysing the possibilities that Spain had of opposing an authentic tradition to the entry of technology. Finally, not finding any reason to oppose its entry, Ramón Moliner asked: “Why do not we give ourselves up to Technology, that generous adoptive mother?”²²

Defenders or detractors all agreed that the choice between tradition and technology had no real meaning in the Spanish case. Mainly because there was no possibility of technological development in any way comparable to other countries but also because they even doubted that they had a traditional culture strong enough, or with weighty enough arguments, to oppose progress as a source of architectural inspiration. However, that does not mean that the subject did not interest them, especially in the 1960s, where technology and progress maintained a constant presence in the pages of *Arquitectura* through the section ‘30da’ (30 days for architecture).

The sixties: technology comes from the Pacific

From the mid-1960s onwards, the then student Mariano Bayón marked a clear trend in the content of the section, through which he was able to transmit and share with the avid architects his own interest in the latest technologies applied to architecture. The initial objective of Bayón was to select and summarize the most interesting content from the foreign periodicals that came to his hands. Soon, the '30da' section became the most accessible way that Spanish architects had to be in contact with the global architectural landscape. Month after month, they 'drank' the information from its pages, so that, in a very little time, the section went from being an insert between the final pages of advertisements, to occupying a privileged place in the magazine and to becoming one of its biggest attractions.²³

But, as suggested a few moments ago, Mariano Bayón's selection had no pretensions to being fair in any way. If we analyse its contents, it is clear that it was strongly influenced by his personal taste for the most advanced architecture in its technological aspects. This can be detected immediately by reviewing the biographies he prepared on various architects, including Jørn Utzon, Richard Buckminster Fuller, Kenzo Tange, Alison and Peter Smithson, Jean Prouvé and Arne Jacobsen.

However, his desire to show the most recent avant-garde trends is even more evident when reviewing the examples and topics that he reported on: focusing on instilling in readers the confidence in a new architecture that would be able to overcome all the constraints of the traditional one. "More than ever, we are in need of a method that gives, in a clear and clean way to the work that creates our spaces, a solution as clear as a theorem, a shape as clear and convincing as the gears of an engine."²⁴

Mariano Bayón's articles in '30da' always pointed to the most advanced architectures and the change that was being made in architecture:

...the emergence of the new technological mentality and the unavoidable development of a technified society in its notions of uses and consumption are already practically outlining the profile of a construction industry disinterested in ideology[...] and interested in the problems of quality and quantity of a technicalisation similar to that which operates in other facets of life, such as industry or science.²⁵

30 d a *Hacia una tecnología integral*

MARIANO BAYÓN ALVAREZ

Publicamos en este resumen la noticia de varios ejemplos de trabajos cuyo denominador común es el de reunirse en torno a la búsqueda de una tecnología integral. De una tecnología que parte de la base de que la cantidad de energía resistente de la materia edificable necesita de formas de trabajo diferentes a la de la arquitectura adintelada, mediante un gasto mínimo que le dote de sentido, es decir, mediante la utilización máxima de las propiedades mecánicas de los materiales. Una arquitectura para la que el principio de la forma sea sustancial desde el punto de vista de la distribución tensional y no desde el punto de vista de la transmisión de una cierta carga ideológica, o de valores sentimentales, estilísticos o simplemente estéticos.

La consideración de estos principios deja en condiciones de inferioridad sarcástica a la gran mayoría de las producciones de la actual cultura arquitectónica. Desde este cruel panorama, tanto los últimos estertores del post-modernismo, con sus desenfrenados recursos pintorescos o sus sutilísimas y agotadas inconsistencias rítmicas, como los romanticismos sentimentales de la llamada "tercera generación", e incluso visiones aparentemente más evolucionadas como las procedentes de un brutalismo desencadenado de móviles cartelitas, aparecen todos ellos definidos en su justo término, como digresiones incongruentes de actividades que nada tienen que ver con lo puro y constructivamente arquitectónico, más cerca de la reacción, aunque el resultado, la obra arquitectónica, sea visible e incluso físicamente habitable.

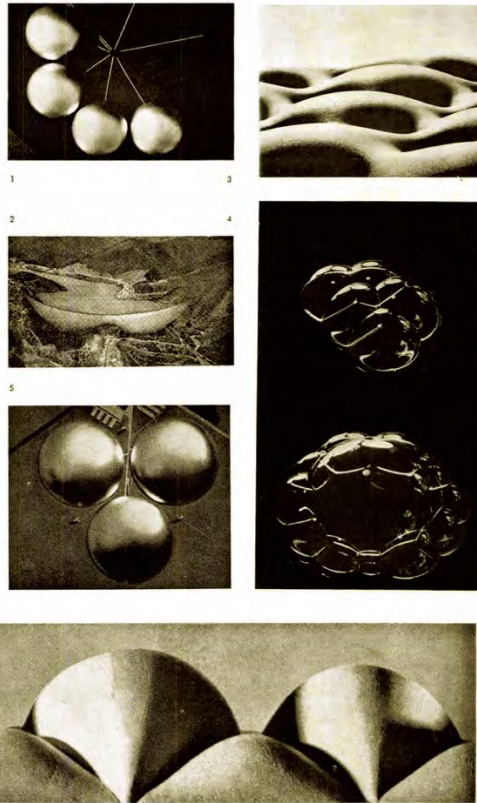


Figure 3. 'Towards an integral technology', by Mariano Bayón
(Source: *Arquitectura*, 102 (1967), 43).

His speech in defence of technology would reach the highest levels in the article entitled 'Towards an integral technology', in which he defended a type of architecture based on:

...a technology that starts from the point that the amount of resistant energy of the buildable material needs forms of work that differ from that of lintelled architecture [...]. An architecture for which the principle of the form is substantial from the point of view of stress distribution and not from the point of view of the transmission of a certain ideological load, or of sentimental, stylistic or simply aesthetic values. [...] The architect's intervention in the future will be marked not by the works that set him up as the holder of an artistic monopoly, but by his opening to research.²⁶

All these articles written by Bayón were illustrated with examples that appear to represent all world geography. However, if one carefully reviews the nationalities of the buildings and projects published, it is striking that, only behind the giants of America and Britain – which

in the Spanish case stand out above the rest of the nationalities, and not only in terms of technology, but in general in all subjects – and from nearby Italy, Mariano Bayón's interest moved towards the Pacific, particularly towards Japan and Australia. In fact, except for a first article previously published in *RNA*, announcing the awarding of the first prize to Jørn Utzon's project for the Sydney Opera House,²⁷ it would be Mariano Bayón who, from his section, stirred up a debate around said building, which would become a decisive theme in Spain due to a series of circumstances that we will relate below.

One building: the Sydney Opera House

Bayón's first text in this regard announced the expected construction of the roofs of the Opera House, whose final solution was "more suggestive and successful than the first."²⁸ Bayón defended the result of the competition and supported the fact that the Jury's choice had been based on an idea, which had no need to be completely resolved, given that the technology of the moment would help solve the difficulties that would arise. A year later, he would dedicate one of the issues to reviewing the work of Jørn Utzon,²⁹ especially the Opera House, which he described in detail, mainly in its more technological aspects, such as the geometric and structural design of the roofs and the motivation behind the specific distribution of the air conditioning ducts. Surely this interest in the project for the Sydney Opera House was connected with a certain parallelism that could be established with the city of Madrid, where in 1963 an international competition was called for the construction of an Opera House that would never be built, but that monopolized many pages and the attention of specialist journals.³⁰

But the most critical point of the debate was marked by Felix Candela and Rafael Moneo through the magazine *Arquitectura*.³¹ Felix Candela had achieved worldwide fame for the structures he had built in Mexico, but he was originally from Spain, from where he had emigrated after the outbreak of the Civil War. Candela had been a classmate of Carlos de Miguel, director of *RNA* and *Arquitectura* between 1948 and 1973. In fact, due to this relationship, he was one of the first exiles who saw his buildings on the pages of Spanish magazines. So, when Candela published 'The scandal of the Sydney Opera House' in the Mexican magazine *Arquitectura*,³² he immediately sent it to Carlos de Miguel, who reproduced it in the pages of its Spanish namesake.³³ Candela's text was a harsh criticism of the development of the competition and of the construction of the building and detailed the various circumstances that hindered the execution of the project. These went from what Candela considered a bad choice during the competition phase, through the problems that arose with the land where it had to be built and Utzon's obstinacy with the "structural honesty" of the roofs, to the exponential growth of the costs of the work and the erroneous

political decisions that were made. The only person who was saved from his criticism was Ove Arup, whom his friend Candela relieved of all responsibility in the process.



Figure 4. 'The scandal of the Sydney Opera House', by Félix Candela (Sources: *Arquitectura* [Mexico], 98 (1967), 103; *Arquitectura* [Madrid], 108 (1967), 29).

But Candela could not know that the article would be read by Rafael Moneo, at that time a young architect who was probably unknown to Candela but, thanks to his skills and analytical capabilities, had earned an unquestionable reputation in Spain as a learned, critic of architecture. And what Candela could not know either was that Rafael Moneo had been a great admirer of the work and the figure of Jørn Utzon since his student days:

[...] I had been attracted to Utzon for a long time. I remember a number of *L'Architecture d'Aujourd'hui* that had seduced us all a few years before. It featured a group of young architects from around the world and its cover was dedicated precisely to the project for the Sydney Opera House.³⁴

Moneo liked Utzon so much that when he was granted ministerial support to work abroad, he wrote to the architect asking to work in his studio, but the Dane did not respond to his letter:

[...] So after the summer I showed up at his studio [...] It was a time when it was a bit more difficult to travel, and he must have been impressed by that determined will of mine to go there ... The fact is that he accepted me and I

spent a whole year living in a boarding house in the then village of Hellebæk [...] near Utzon's house and studio."³⁵

Moreover, the arrival of Rafael Moneo at the studio of Jørn Utzon coincided with the moment in which the design team had just found the solution to building the vaults: a series of spherical triangles built with prefabricated elements that formed a set of 'ribs'. This idea, which resolved the distribution of the forces, demanded the definition of the coordinates of the spherical triangles in the original sphere. And that was precisely the job that Rafael Moneo had to do.³⁶ So we can only imagine the damage inflicted by Candela's fierce criticism.

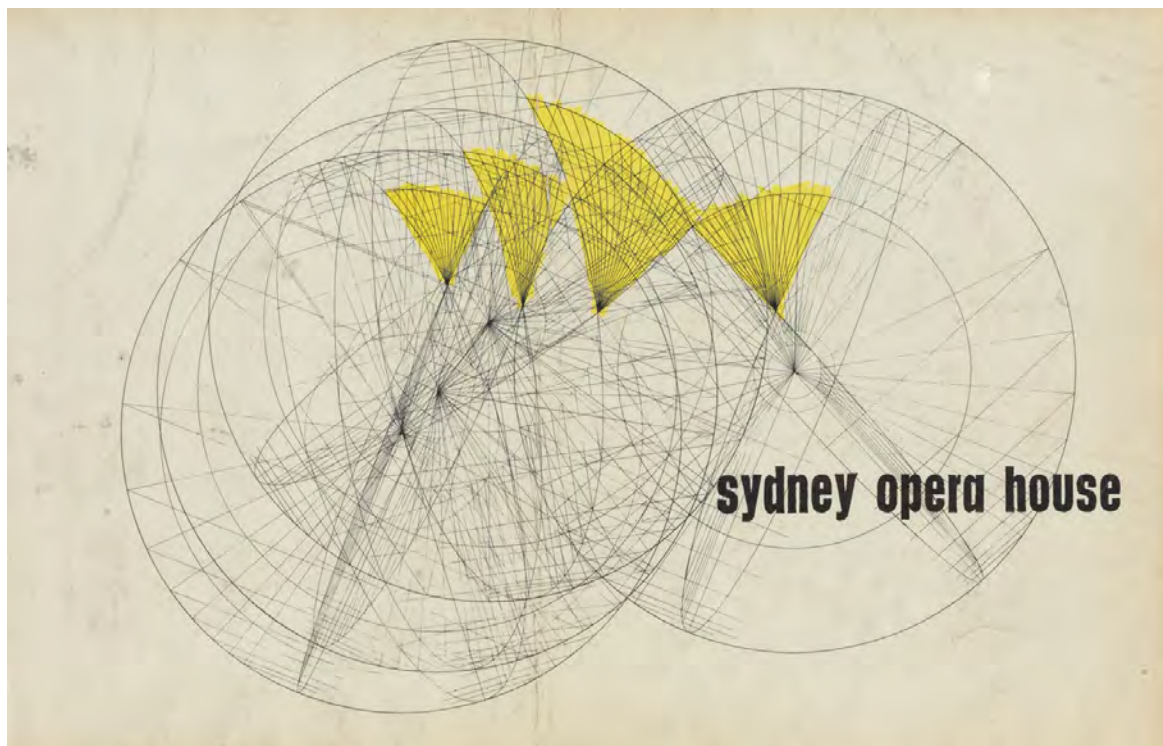


Figure 5. In the words of Rafael Moneo to the author of this paper, the drawing of the cover of the *Yellow Book Sydney Opera House* could be drawn by him.

Moneo's response was immediate. A month later he published a text in the same magazine:³⁷

The task of the architect is not limited to updating a building typology that is already established through new techniques. As history teaches us, it is in his hands to propose to society new images of itself. Candela is right when he stresses that these paths are expensive, even at times wasteful, but it does not detract from their value and it is important, therefore, not to forget it when talking

about the Sydney Opera House. And in admitting this role, nobody will ever think of denying the existence of architecture as a service.³⁸

Except for Candela, all the opinions on the Opera House that were expressed through the main Spanish architecture periodicals were positive and defended the work and its architect against its detractors. As formulated by Juan Daniel Fullaondo through the pages of *Forma Nueva-El Inmueble* (New Form-The Building):

This work gives prestige to the society that welcomes it, raising its cerebral life, enriching its culture, changes the ill-fated, pleonasmic and reactionary part of spiritual immobilism. Utzon, within all the possible criticisms (logical, on the one hand, within the complex problems he has undertaken) should not be other than congratulated.³⁹

As early as 1971, *Informes de la Construcción* (IC; Construction Reports) would return to the Sydney Opera House to deal, once and for all, with explaining its construction technique. The magazine presented its structure as “original and advanced” and as a technological and architectural showcase. It is certainly a very complete document, comparable with the publications that were published about the building in other much more recognized journals than the Spanish one.⁴⁰

One architect: Harry Seidler

But the Spanish gaze towards Australia in search of technology was not only for Utzon and the Sydney Opera House. In fact, there was an architect who took up more pages than the Dane: Harry Seidler, who was presented by Spanish magazines as a paradigm of the interest in industrialisation and prefabrication of architecture. In fact, the publication that devoted more pages to him was *IC*, which already in 1952 showed the Turramurra House in Sydney.⁴¹ In general, to Spain, it was Seidler's residential works that were the most interesting. In 1958, *Temas de arquitectura* (TA; Architecture Topics) presented Seidler's House of the Future, a steel home prefabricated at Sydney's Armco factory, that had been the centerpiece of the Architectural and Building Exhibition held at Sydney Town Hall in 1954 to coincide with the conference of the Australian Institute of Architects. *TA* presented it as an example of a 'Growing House' and well-understood prefabrication.⁴² But, again, the most extensive example would be from *IC*, which would devote seven full pages to describing to its readers the house that the architect and his wife built in Sydney.⁴³

Beyond residential buildings, Spanish periodicals were especially interested in his large-scale, quality works, such as the Olympic Stadium in Melbourne, which was published in 1955 in *RNA*,⁴⁴ and years later Australia Square in Sydney, to which *IC* devoted an extensive article in which his “beautiful structural solution” stood out.⁴⁵ Apparently, another of the architects whose technological solutions greatly interested the Spanish, Pier Luigi Nervi, had also been consulted on its design.

Attention to the work of Harry Seidler even meant that, on the publication of the book *Harry Seidler 1955/63. Houses, Buildings and Projects*,⁴⁶ Carlos Flores dedicated a monographic article to his work in the section ‘An architect in a book’ of *Hogar y Arquitectura* (Home and Architecture).⁴⁷ Curiously, the introduction to this book was written by Reyner Banham, the author of the aforementioned text ‘Stocktaking’, with which we finished off the discourse on interest in technology in the Spanish media.



Figure 6. ‘Harry Seidler’, by Carlos Flores
(Source: *Hogar y Arquitectura*, 58 (1965), 81).

Given this, the appeal that Harry Seidler and his work had in Spain could not be considered prominent, as he was not even close to being the most published architect in the Spanish media. His presence is relatively discreet compared to other international figures. However,

if we step away for a moment from the data from Spanish journals and open up the focus to review the presence of Seidler in the periodicals of other countries, it turns out that the interest shown by Spain in his work is very similar to that in Japan (a country much closer to Australia geographically). Obviously, the figures do not reach those of the British or German magazines, much less those of the US and France, but these countries always stand out as publishing more information on foreign architecture so it is not surprising that it was the same with the Australian output too. Nevertheless, the trend for publishing Seidler in the Spanish magazines of the 1950s and 1960s was clearly on the rise and began very soon after other leading publications of the time, which places them only a little lower, but in line with the general interest.

But the Spanish attention to Harry Seidler was not only reflected in the pages of the journals. There were even some architects who took him as a reference for their works. Josep Maria Fargas (Barcelona, 1926-2011), who together with Enric Tous (Barcelona, 1925-2017) had one of the most 'technological' trajectories of Spanish architecture in the second half of the twentieth century,⁴⁸ remembered him as one of his greatest influences, on the same level as Mies van der Rohe or Richard Neutra:

I have been inspired by: Richard Neutra, for the beauty and elegance of his works. Mies van der Rohe, for the spatial treatment (neoplasticism) and for the rigor, precision, simplicity, and purism of his latest proposals. And Craig Ellwood and Harry Seidler, for their formal simplicity, flexibility, and versatility, difficult to be equaled.⁴⁹

It is very interesting to compare some of their works with those of Harry Seidler and to verify that the formal and conceptual similarities are frequently present. For example, in the Casa Mestre (Platja d'Aro, Gerona, 1954-1956) we can find formal references to the Rose Seidler House (Wahroonga, Sydney, 1949-1950) not only in the roof system, but also in the way in which both houses come into contact with the terrain, through the construction of a 'rocky plinth'.⁵⁰

Conclusion

In short, we have made a journey in search of the technology that has taken us from Spain to its antipodes. During the 1940s and 1950s, the adoption of technology was not a fact. Tradition or technology? It was a question asked many times but that never got a clear answer. Technology interested Spanish architects, but in the post-war decades the country

did not have the conditions to apply certain techniques and they were perfectly conscious of that. During the sixties, technological conditions improved and Spanish architects began to look for references in other countries. Curiously, they found them in very distant places, such as Japan and Australia. It would seem much more logical if the Spaniards had looked to countries like England or the United States, much closer by and leaders in the debate in this regard. And it seems that they did rely on them when looking for texts to discuss, but not when choosing concrete examples on which to fix their attention. There do not appear to be any clear reasons why Spaniards who were interested in the progress of technology looked to Australia, beyond the coincidences that have already been pointed out around the Sydney Opera House. Perhaps the key is in the memories of Josep Maria Fargas:

We could not copy Mies, he was above everything, he made exposed bronze frames, huge windows ... How could you compete against that? You had to compete on another level and that level I found in these two architects [Harry Seidler and Craig Ellwood].⁵¹

However, what has been shown here is that, despite their economic difficulties, Spanish architects wanted to participate in the worldwide debate on the suitability of technology to the architectural tradition. In terms of their specific interest in Australia, one could hazard that, besides the previous, pertinent assessment by Fargas, it could be because progress was something that was so unattainable for Spaniards that they sought their technological references in faraway countries. Oddly, they felt closer to the furthest away. And, for Spain, there is nothing more distant than the Australian lands, which they watched for two decades gazing at what they did not have.

Endnotes

¹ This paper is a result of the project 'ArchiteXt Mining. Spanish modern architecture through its texts (1939-1975)' HAR2015-65412-P (MINECO/ERDF), funded by the Government of Spain through the 2015 Call for 'Excellence Projects' of the Ministry of Economy and Competitiveness (MINECO) and the European Regional Development Fund (ERDF).

² Juan de Zavala, 'Tendencias actuales de la arquitectura', *RNA*, 9 (1949), 264-269.

³ Paul Bonatz, 'Tradición y modernismo', *RNA*, 23 (1943), 390-397.

⁴ For further information, please see Ana Esteban-Maluenda, 'Tradición *versus* tecnología: un debate tibio en las revistas españolas', in José Manuel Pozo (ed.), *Arquitectura, ciudad e ideología antiurbana*, (Pamplona: T6 Ediciones, 2002), 97-106.

⁵ 'Arquitectura española', *BDGA*, 5 (1947), 3-6.

⁶ Alberto Sartoris, 'Orientaciones de la Arquitectura contemporánea', *Cuadernos de Arquitectura y Urbanismo*, 11-12 (1950), 48-55.

⁷ Juan Rivaud, 'Luz propia', *RNA*, 100 (1950), n.pag.

⁸ Mariano Rodríguez Avial, 'Arquitectura moderna y deshumanización del arte', *BDGA*, 18 (1951), 9-14.

- ⁹ Denison B. Hull, 'La libertad en la Arquitectura', *BDGA*, 20 (1951), 17-18.
- ¹⁰ In the context of the Sesiones de Crítica de Arquitectura (Sessions of Architecture Criticism), meetings between Spanish architects to discuss issues of shared interest that were held periodically in the 1950s and 1960s.
- ¹¹ 'Funcionalismo y ladrillismo', *RNA*, 119 (1951), 35-47.
- ¹² Juan Margarit, 'Técnica y cultura', *BDGA*, 36 (1955), 24-25.
- Juan R. Sepich, 'Arquitectónica y Técnica', *RNA*, 175 (1956), 1-4.
- ¹³ Reyner Banham, 'Stocktaking of the Impact of Tradition and Technology on Architecture Today', *The Architectural Review*, 127 (1960), 93-100.
- ¹⁴ Pedro Casariego, Carlos de Miguel, Miguel Fisac, Antonio Fernández Alba, Curro Inza, Julio Lafuente, Luis Moya, Fernando Ramón Moliner, Francisco Javier Sáenz de Oíza y Alejandro de la Sota.
- ¹⁵ Reyner Banham, 'Balance 1960. La tradición, la tecnología', *Arquitectura*, 26 (1961), 2-17.
- Antonio Fernández Alba, 'Para una localización de la arquitectura española de posguerra', *Arquitectura*, 26 (1961), 20-22.
- 'Comentarios al artículo de Reyner Banham', *Arquitectura*, 26 (1961), 22-32.
- Including the opinions of Luis Moya, Miguel Fisac, Fernando Ramón and Curro Inza.
- ¹⁶ This term had already been used by Charles Eames in a conference delivered at the Royal Institute of British Architects in 1959, when referring to the traditionalist reaction to the attitude that inclined towards sociology and technology as the determinants of architectural form.
- ¹⁷ Banham, 'Stocktaking', 94-95.
- ¹⁸ 'Comentarios al artículo de Reyner Banham', 26.
- ¹⁹ Fernández Alba, 'Para una localización de la arquitectura española de posguerra', 22.
- ²⁰ 'Comentarios al artículo de Reyner Banham', 28.
- ²¹ 'Comentarios al artículo de Reyner Banham', 29.
- ²² 'Comentarios al artículo de Reyner Banham', 26.
- ²³ For further information, please see Ana Esteban-Maluenda, 'Los 30da de Mariano Bayón: ¿Foco de difusión de las referencias arquitectónicas internacionales?', *DC. Revista de crítica arquitectónica*, 8 (2002), 108-123.
- ²⁴ Mariano Bayón, 'La arquitectura industrial', *Arquitectura*, 80 (1964), n.pag.
- ²⁵ Mariano Bayón, 'El edificio industrializado', *Arquitectura*, 89 (1966), n.pag.
- ²⁶ Mariano Bayón, 'Hacia una arquitectura integral', *Arquitectura*, 102 (1967), 43-44.
- ²⁷ 'Concurso para la Ópera de Sídney', *RNA*, 187 (1957), 15-20.
- ²⁸ Mariano Bayón, 'Australia. La Ópera de Sídney', *Arquitectura*, 70 (1964), n.pag.
- ²⁹ Mariano Bayón, 'Jørn Utzon', *Arquitectura*, 81 (1965), n.pag.
- ³⁰ Germán Castro, 'Un monumento para una época', *TA*, 65 (1964), 10-35.
- Fernando Chueca Goitia, 'El concurso del Teatro de la Ópera', *TA*, 66 (1964), 13-32.
- 'Concurso de anteproyectos para el teatro de la Ópera en Madrid', *TA*, 64 (1964), 21-34.
- 'Concurso del Teatro de la Ópera', *TA*, 67 (1964), 14-19.
- 'Anteproyecto para el teatro de la Ópera en Madrid', *TA*, 70 (1965), 42-56.
- ³¹ *Arquitectura* was the continuation of *RNA*, once the Dirección General de Arquitectura returned responsibility for the publication to the Institute of Architects of Madrid.
- ³² Félix Candela, 'El escándalo de la Ópera de Sídney', *Arquitectura* [Mexico], 98 (1967), 103-110.
- ³³ Félix Candela, 'El escándalo de la Ópera de Sídney', *Arquitectura*, 108 (1967), 29-34.
- ³⁴ Ana Esteban-Maluenda, 'Sustrato y sedimento. Los viajes en la formación y evolución del arquitecto: el caso de Rafael Moneo', in José Manuel Pozo (ed.), *Viajes en la transición de la arquitectura española hacia la modernidad*, (Pamplona: T6 Ediciones, 2010), 153-164.
- ³⁵ Ana Esteban-Maluenda, 'Sustrato y sedimento', 156.
- ³⁶ As Rafael Moneo told the author of this text in an unpublished conversation held at his studio in Calle Cinca in Madrid on 7 January 2010, the drawing on the cover of the yellow book is probably his.
- ³⁷ Rafael Moneo, 'Sobre el escándalo de Sídney', *Arquitectura*, 109 (1968), 52-54.
- ³⁸ Rafael Moneo, 'Sobre el escándalo de Sídney', 53.
- ³⁹ Juan Daniel Fullaondo, '¿La ópera más cómica?', *Forma Nueva-El Inmueble*, 17 (1967), 20.
- ⁴⁰ 'Teatro de la Ópera de Sydney', *IC*, 231 (1971), 22-32.
- ⁴¹ 'La casa Turramurra en Sídney', *IC*, 51 (1953), s.p.
- ⁴² 'Prefabricación. Casa creciente. Australia', *TA*, 2 (1958), 54-57.
- ⁴³ 'La casa Harry Seidler', *IC*, 226 (1970), 3-9.
- ⁴⁴ 'Estadio olímpico en Melbourne (Australia)', *RNA*, 159 (1955), 42.
- ⁴⁵ 'Complejo 'Australia Square' en Sidney (Australia)', *IC*, 227 (1971), 3-14.

⁴⁶ Harry Seidler, *Harry Seidler 1955/63. Houses, Buildings and Projects*, (Sydney/Paris/Stuttgart: Horwitz Publications/Vicent Freal et Cie/Verlag Gerd Hatje, 1963).

⁴⁷ Carlos Flores, 'Harry Seidler', *Hogar y Arquitectura*, 58 (1965), 81-88.

⁴⁸ For further information, please see David Hernández Falagán, *Tous & Fargas: optimismo tecnológico en la arquitectura catalana de la segunda mitad del siglo XX*, doctoral thesis, (Barcelona: Universidad Politécnica de Cataluña, 2016).

⁴⁹ Josep Maria Fargas, 'Perfiles en el tiempo', *Eupalinos*, 19 (2005), 27.

⁵⁰ For further information, please see Glenn Deulofeu, *Reconstrucción digital de cuatro casas de Fargas y Tous. 1954-1963*, doctoral thesis, (Barcelona: Universidad Politécnica de Cataluña, 2013).

⁵¹ David Hernández Falagán, 722.

The Visible Invisible: X-Rays and Claude Bragdon's Fourth Dimension

Marcus Fajl
University of Melbourne

Abstract

The discovery of the x-ray in 1895, which captured images of the unseen interiority of solid objects, quickly became the subject of intense popular fascination. This technology also became associated with occult phenomena, lending it significance to Theosophy. American architect Claude Bragdon subsequently adopted concepts inherited from x-ray technology into his architectural theories and drawings, which were based upon a singular foundation of Theosophical thought and an associated engagement with non-Euclidean geometry. This paper traces the intersections of x-ray technology and architectural practice across three of Bragdon's published works of architectural theory from 1913, 1915 and 1932; Bragdon's incorporation of a notion of 'x-ray vision' into architectural theory is isolated as the subject of historical interpretation. The earlier publications, which develop concepts and representational strategies focused on ornament and space evidence a conflicting Theosophical agenda resulting in compromised architectural theories that struggle to sustain consistent illustrated outcomes. The later publication reflects upon and revises earlier ideas, and abandons previous Theosophical notions of 'x-ray vision'. By developing illustrated outcomes and refocusing the written discussion upon relevant representational issues ignored in the earlier theories, this later publication evidences a more convincing engagement with the perceptual shifts and destabilising effect upon human vision associated with x-ray imaging; the most significant being Bragdon's adoption of axonometric as a conceptual and representational tool. By framing Bragdon's practice as primarily one of representation, and tracing this across his body of work, the paper finds resolution of several issues in his work by the 1930s, but also a graphic consistency sustained throughout his career. Refocusing his written theory away from Theosophical agendas towards the subjectivity of his representational methods is surmised as being the most important manifestation of the consequences of the x-ray upon his work. This is posited as a potentially viable avenue of further historical critique to address the exclusion of his practice within modernist historiography.

Introduction

The architectural practice of Claude Bragdon (1866-1946) was one component of a larger synthesis of creative practices and spiritual convictions. Based in Rochester, New York, he became committed to the notion of organic architecture emerging from Chicago initiated by Louis Sullivan. His published articles and lectures promoting and transforming Sullivan's ideas gained him a national audience amongst both architects and general readers. His fame was bolstered by the success of several architectural commissions in and around Rochester. Having abandoned architectural practice by 1923 to focus primarily on writing and stage design, he is mostly known for his publication of architectural theories with associated illustrations. Bragdon became committed to Theosophy and hyperspace philosophy, both of which associated the theoretical concept of four-dimensional geometry with a mystical significance. These esoteric spiritual and philosophical beliefs became a singular foundation for Bragdon's architectural theory, culminating in his most ambitious architectural manifesto *Projective Ornament* (1915) which argued for the development of modern architecture through the reform of ornament. By the mid-1930s, despite having earlier been recognised as a leading American modernist¹ his reliance on ornament was considered regressive, his work outdated and antithetical to the principles of the dominant International Style.² Almost entirely ignored by twentieth century critics and historians, his architectural theories and practice became forgotten figures in the conventional historiography of modern architecture.

Wilhelm Röntgen's discovery of the x-ray in 1895 suggested the limitations and subjectivity of human vision by producing images that reveal the interior of solid objects, rapidly becoming the subject of extensive popular fascination as a new visual medium, form of entertainment and display, and a source of literary speculation. X-ray technology was also immediately exploited by Theosophists and hyperspace philosophers as scientific 'proof' of paranormal and occult activity.³ Impacting upon a range of cultural, scientific and spiritual domains, x-ray technology became "an optical and philosophical revolution that swept the world at astonishing speed".⁴ Bragdon's spiritual and philosophical commitment to Theosophy and hyperspace philosophy lead to the notion of 'x-ray vision' becoming incorporated into his architectural theory. This manifest as specific visual outcomes within his drawings. This paper traces the resultant intersections between x-ray technology and Bragdon's architectural work, as evident in the written theory and illustrations across three publications of architectural theory and illustrations between 1913 and 1932. Bragdon's architectural theory synthesised his Theosophical beliefs into architectural theory, placing as much polemic import on his theoretical

sources as the theory itself. Bragdon's interconnected agenda - where architectural theory was both informed by, and used as a vehicle to promote Theosophical thought - forms the discursive framework through which the relevant historical junctures between technology and architecture are considered within this paper.

The Historiography of Modern Architecture, Claude Bragdon and the X-Ray

The impact of the x-ray upon modern architecture is an area of historical critique evidenced in several of Beatriz Colomina's writings,⁵ which argue that the logic of the x-ray informs an inverted body of modern architecture, where inside becomes outside via the use of glass as simulated transparency. Whilst acknowledging the findings of this existing critique, this paper necessarily takes a different approach. The focus is upon a singular and marginalised figure who developed a theory of modern architecture during an historical period (1913-15) when the technology of the x-ray was strongly associated with the Theosophical beliefs of paranormal activity which Bragdon incorporated into his architectural theories. This critique intends to reveal the ways in which Bragdon's spiritual association with the x-ray impacted upon his architecture. As historiography surrounding Bragdon is limited; this method intends to arrive at new ways of interpreting his practice which may address a sustained neglect of his significance in histories of modernism. Arguing for a developed historical repositioning of Bragdon is beyond the scope of this paper, which nevertheless concludes by identifying techniques developed by Bragdon in response to the x-ray that may offer connections to the later development of the modern movement with the potential of providing a further avenue of research reconnecting Bragdon's historical significance to a lineage of twentieth century architecture.

Pen and Ink Artist

One of Bragdon's greatest strengths was his drawing ability. *Projective Ornament* manifested in negligible built outcomes, and his drawings remain the sole source of evidence connecting his architectural theory with practice. In the 1890s his career as a graphic artist overshadowed his career as an architect.⁶ He designed high contrast pen and ink posters and book covers, an illustrative aesthetic required for the inexpensive reproductive processes of the times (Figures 1, 2 and 3). Through his graphic work, Bragdon studied principles of Japanese aesthetics such as counterbalanced composition and emphasising the abstracted qualities of line and form over a focus on realistic figurative depiction.⁷ These technical methods and compositional principles became integral to the design principles and representational methods within his pen and ink architectural illustrations employed later in his career central to his architectural projects.

These early illustrations foreground the significance of graphic communication to the later development of his architectural agenda.



Figure 1. Magazine Illustration, Claude Bragdon, late 1890s (Department of Rare Books and Special Collections, University of Rochester Library) **Figure 2.** The Rochester Post Express Poster, Claude Bragdon, 1895 (Department of Rare Books and Special Collections, University of Rochester Library). **Figure 3.** Poster for a Wilde Night, burlesquing the sensibility of Aubrey Beardsley's *Yellow Book*, Claude Bragdon, 1895. (Department of Rare Books and Special Collections, University of Rochester Library).

A Primer of Higher Space

Euclidean geometry had, since antiquity, formed the mathematical basis for describing objects in the world; this comprised a series of axioms which formed a logical geometric system. In the seventeenth century, the invention of analytic geometry transformed Euclidean principles into algebraic equations expressed as a co-ordinate system. The transformation of axiomatic logic into a symbolic and abstract system allowed mathematics to challenge the integrity of Euclid's system. By the mid-nineteenth century, Euclid's fifth postulate, concerned with parallelism, was interrogated by several mathematicians.⁸ Notions of n -dimensional space (or hyperspace) began to emerge, which posited that geometries with four or more dimensions were possible.

By the 1880s n -dimensional geometry became popularised, resulting in the emergence of hyperspace philosophy. Four-dimensional geometry, whilst theoretically feasible can only be imagined and represented, never built or experienced, as human perception is constrained to recognising space only in three dimensions. This aspect of hyperspace was exploited within the writings of Charles Hinton (1853-1907) which transformed this

mathematical theory into a philosophical framework. Hinton proposed that by learning to perceive, through the power of thought, spatial dimensions outside the constraints of one's sense perceptions, would lead to understanding a higher reality outside of the limitations of his concept of a materialist three-dimensional world, a process he called 'casting out the self'.⁹ For Hinton, four-dimensional perception was a mental, rather than visual exercise: "We can never see, for instance four-dimensional pictures with our bodily eyes, but we can with our mental and inner eye".¹⁰

Peter Ouspensky (1878-1947) built upon the work of Hinton by ascribing mystical associations to the concept of the fourth dimension as per his Theosophical and occult beliefs; proposing that the three-dimensional physical world was itself illusory and accessing higher dimensions would reveal transcendent psychic truths. He further postulated that perceiving ever-increasing spatial dimensionalities would result in increasingly higher transcendent revelations. An interest in Eastern religion led to developing Hinton's concept of 'casting out of the self' into a collective consciousness, whereby the revelations of dimensional transcendence revealed the illusion of selfhood and the reality of a universal humanity.¹¹

Bragdon was heavily influenced by Hinton and Ouspensky, establishing correspondence with both as he became more involved with organized Theosophy¹², building upon their foundational work to develop his own contribution to hyperspace philosophy. *A Primer of Higher Space* was published in 1913 and included thirty illustrated plates. Bragdon employed diagrams, drawn with orthographic projection to explain the transformations between 'lower space' geometries of the line, square and cube into the four-dimensional geometry of the tesseract, first proposed by Hinton (Figure 4). He proposed that our knowledge of space is incomplete and that spatial understanding requires further modification to be correctly known: 'What we think of space is probably only some part of space made perceptible'¹³.

Bragdon's text was accompanied by diagrams explaining how four-dimensional geometry may be described as two-dimensional representations (Figure 5). An illustration which connected clairvoyance with 'four-dimensional vision'¹⁴ was also included. The illustration compares an image of a human figure as seen by 'ordinary human sight' with a human figure 'as seen by clairvoyant (4-dimensional vision)'. It is rendered so that the skin is translucent, revealing the interior skeleton (Figure 6). The illustration does not mention the word 'x-ray', yet clearly borrows from the transparent rendering of solid objects associated with x-ray graphics. The x-ray was immediately exploited by Theosophists

who conflated radiographic technology with clairvoyant vision.¹⁵ Bragdon's illustration functions as Theosophical propaganda connecting x-ray technology with notions of the occult which held such currency at the time that when Röntgen first discovered the x-ray he initially kept his discovery secret, to avoid misconceptions of engagement with spiritualism or the occult.¹⁶ Elsewhere in *A Primer of Higher Space*, Bragdon employs the true notion of the fourth dimension, as a spatial dimension that can only be perceived mentally, never visually. The association of four-dimensional perception with clairvoyant vision akin to x-ray imagery contradicts an earlier assertion within the same publication that: "We must, however give up any attempt to picture to our imagination this four-dimensional space".¹⁷

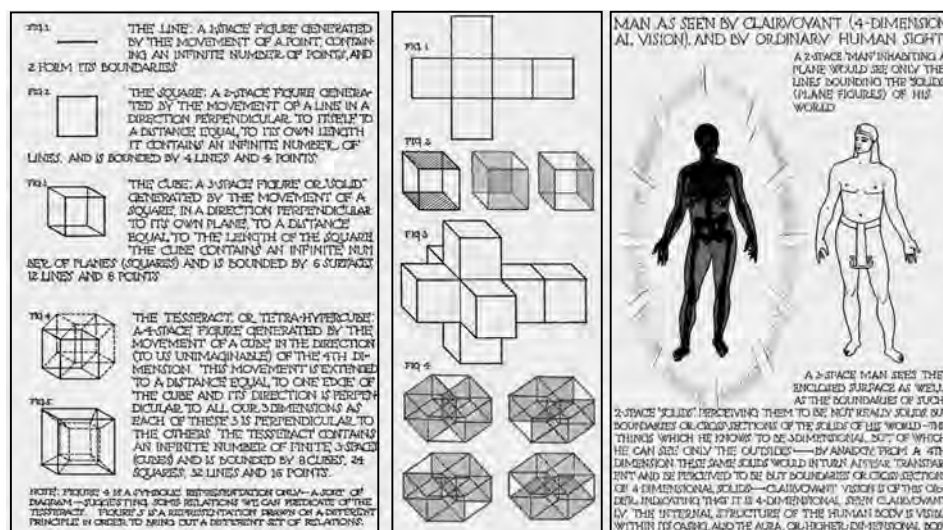


Figure 4. Transformation from line to tesseract in one, two, three and four dimensions, (*A Primer of Higher Space*, Claude Bragdon, 1913), **Figure 5.** Axonometric diagrams describing four-dimensional geometry, (*A Primer of Higher Space*, Claude Bragdon, 1913), **Figure 6.** Man, as Seen by Clairvoyant, (*A Primer of Higher Space*, Claude Bragdon 1913).

Man the Square, A Higher Space Parable

The use of 'lower-space' dimensional analogies to explain the concepts of higher-space dimensional perception was a narrative device common within hyperspace literature, first employed by Edwin Abbott in *Flatland: A Romance of many Dimensions* in 1884¹⁸. Bragdon included within this publication: *Man the Square, A Higher Space Parable*, an illustrated narrative which furthered this literary genre. The narrative describes a world where humans are cubes which rotate in space independently driven by the forces of individual personality, forming irregular cross - sections on a two-dimensional plane. The cubes can only understand themselves as dissimilar two-dimensional cross sections, remaining ignorant of the 'higher truth' of their three-dimensional unity.¹⁹ The notion of collective consciousness was thus supported by a parable relying on complex lower-

space analogies that could not have been clarified without Bragdon's accompanying graphic illustrations (Figure 7). *A Primer of Higher Space* and *Man the Square* became popular additions to hyperspace philosophy and literature; Bragdon's most significant contribution to these fields was due to his ability to clarify difficult geometric concepts via illustration.²⁰ The strength of Bragdon's graphic communication contributed to the significance of these publications serving as reference texts to understand the principles of four-dimensional geometry for the Avant Garde artists Marcel Duchamp and Kazimir Malevich.²¹

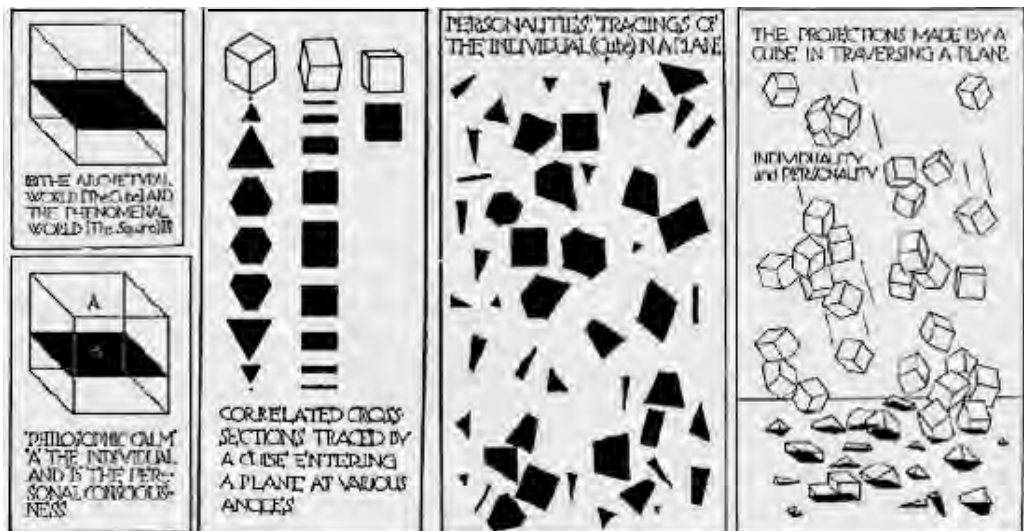


Figure 7. Bragdon's hyperspace illustrations (*Man the Square, A Higher Space Parable*, Claude Bragdon 1913).

Projective Ornament

Prior to the 1930s, American architects of the progressive movement, including Bragdon, Irving K. Pond, Frank Lloyd Wright and George Maher viewed ornament as capable of being invested with meaning through reinvention intended to best serve the needs of modern American society. Bragdon published *Projective Ornament* in 1915, based upon the work begun in *A Primer of Higher Space*. Bragdon developed a theory of architectural and social reform through the agency of ornament based on his Theosophical conception of four-dimensional geometry. Believing that new construction methods would lead to an inevitable solution to modern architectural form, Bragdon focused on ornament as the subject of his concept of modern architecture.²² Bragdon admired Louis Sullivan's ornamental compositions based on vegetal motifs, but believed they relied too heavily on the subjective impulses of the individual. Believing that most Americans lived divorced from nature, his version of an authentic organic architecture was based not on the appearance of nature, but rather the geometric and mathematic logic underpinning the natural world.

Projective Ornament proposed a system of ornament comprised of motifs generated from two-dimensional axonometric representations of four-dimensional geometries. Bragdon proposed that learning to see in four dimensions would allow people to become free from the constraints of their own subjectivity and selfhood and realise that consciousness was not individual, but universal. Learning to see in four dimensions would thus lead to revealing the illusions of the three-dimensional world, including the falsehood of the self. The publication included diagrammatic explanations for generating decorative patterns based on four-dimensional geometry. These were illustrated in axonometric projection and based on three-dimensional solids and four-dimensional hypersolids as 'folded down' to form graphic patterns as well as two-dimensional axonometric representations of four-dimensional geometries. (Figure 8).

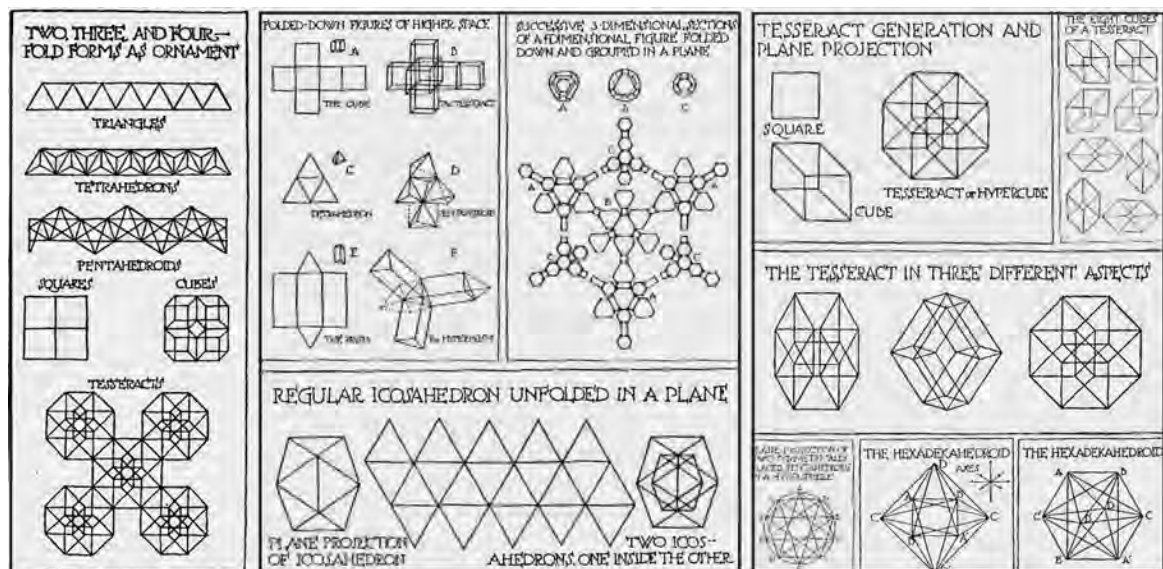


Figure 8. Diagrams illustrating processes for generating ornamental motifs based on four-dimensional geometry, (*Projective Ornament*, Claude Bragdon, 1915).

The implicit connection between four-dimensional perception and x-ray imagery made through the association of clairvoyance in *A Primer of Higher Space* is made explicit within *Projective Ornament*:

Were our sense mechanism truly three-dimensional, we should have X-ray vision and the surfaces of solids would offer no resistance to the touch. In dealing with four-dimensional space we are at liberty to imagine ourselves in full possession of this augmented power of sight and touch. The mind having ascended into the fourth dimension, there would follow a corresponding augmentation on the part of the senses... ²³

Earlier in *Projective Ornament*, Bragdon remains true to original notions of the fourth spatial dimension being perceived mentally and not visually: 'But this thou must not think to find with eyes of body but of mind'.²⁴ The transcendental logic of hyperspace philosophy which considered the fourth dimension as a supra-sensory realm *beyond* vision is contradicted by the erroneous introduction of the concept of 'x-ray vision'. This fantastical notion is further extended by proposing an augmented sense of touch, capable of passing through solid objects, suggesting the human body itself could become invested with the 'supernatural' powers of x-ray technology. Bragdon's Theosophical convictions create theoretical contradictions by infecting the logic of heightened mental perception within hyperspace philosophy with invented supernatural powers of sight and touch. Bragdon's conflating of conceptions of x-ray technology as spiritual phenomena in the service of a Theosophical agenda creates contradictions and inconsistencies that dilute the rigour of his theory of modern architecture, yet his writing articulates Bragdon as an historical figure devoted equally to his spiritual beliefs and architectural convictions; rigidly determined to merge both into singular theoretical propositions.

Bragdon's willingness to merge imaginative fantasises of supernatural potential of the x-ray with hyperspace philosophy are also explicable within an historical setting that evidenced a sustained cultural fascination with the x-ray, still evident in 1915. The technology was considered as a new type of visual medium employed as part of a culture of technological display alongside the emergence of photography and cinema and significant to visual culture of the late nineteenth and early twentieth century.²⁵ Bragdon was an avid collector of x-ray photographs, considered as a type of experimental photography at the time. The visual possibilities that the technology suggested were also adopted by writers of hyperspace literature. After 1895, Hinton wrote science fiction that associated hyperspace with visual qualities inherited from x-ray imagery. H.G Wells (1866-1946) incorporated hyperspace associations of x-ray images and invisibility (but not x-ray vision itself) into his science fiction, relying upon Bragdon's authority as a hyperspace philosopher to validate his story ideas.²⁶ Bragdon's use of the term 'x-ray vision' and suggestion of other sensory augmentation, are linked to a cultural environment that 'envisioned a kind of Superhero 4-D Man, who could pass through walls and do similar amazing feats'²⁷ because of the speculative possibilities of the fourth dimension.²⁸

The concept of 'x-ray vision' as a feature of four-dimensional perception within *Projective Ornament* results in the adoption of a specific method of illustration (Figure 9). By

translating the optical effects of x-ray graphics into a line-drawing technique, Bragdon arrives at a method of 'attenuated' line work which is justified in the following way:

There is justification for the attenuation of all lines towards their centre. It is an obedience to the optical law that when the light is behind an object it so impinges upon the intercepting object as to produce the effect of a thinning towards the centre. Because in X-ray vision some substances are opaque and some are translucent, we are at liberty to attribute opacity to any part we please...We are also at liberty to stretch, twist or shear the figures in any manner we like.²⁹

Bragdon's insistence on sustaining x-ray vision as a concept which determines an illustrative method creates further problems in maintaining the theoretical integrity of *Projective Ornament*. Whilst the method of illustration seems analogous to the graphic qualities of the x-ray, the freedom of subjective impulse in applying this method, whereby line attenuation may be applied according to individual choice as well as allowing the user free licence to manipulate and distort prescribed geometric motifs in any manner seen fit runs counter to a foundational principle of *Projective Ornament*. Bragdon states that the Projective Ornament technique was a reaction against Sullivan's method of ornamental design as being overly dependent on individual choice, therefore resulting in successful outcomes when undertaken by a designer with Sullivan's mastery, yet inappropriate for a designer of lesser skill. Bragdon's ambition to reform ornament via an objective and universal system, equally accessible by any user was an attempt to create a democratised system which both reflected democratic principles underpinning American society as well as broader conceptions of universal consciousness as a manifestation of spiritual democracy. Allowing significant degrees of individual and subjective impulse is contrary to the purpose of a system intended to operate with universal and democratic objectivity.

Where individual geometric motifs are demonstrated, they are drawn with white ink on a black background, suggestive of a photographic negative (Figure 10). This gives the illustrations the strongest visual connection to the x-ray. This becomes lost within the illustrations which demonstrate the potential uses of Projective Ornament (Figures 11 and 12). Bragdon's graphic affectation might therefore be reconsidered in an alternate way: *Projective Ornament* was informed by an interest in merging a range of pre-modern Western and non-Western abstract decorative traditions into a singular transnational modern language.³⁰ This method of illustration transforms the geometric precision of the

axonomic motifs into a graphic language with associations across a range of pre-modern Eastern and Western ornamental tropes. This illustrative device was used across all representations; appropriating no single historical source directly, yet evoking associations with multiple decorative traditions simultaneously

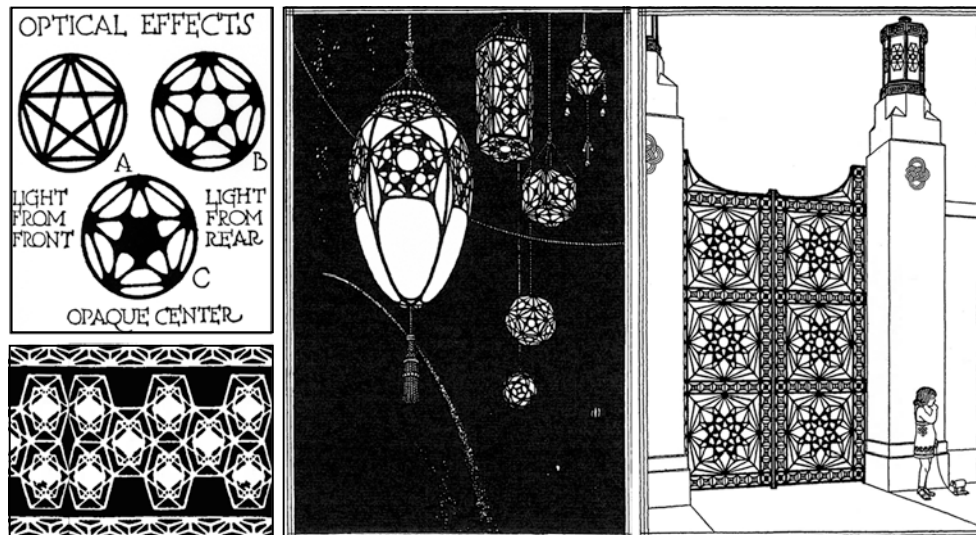


Figure 9 (top). Optical effects of 'x-ray vision' (*Projective Ornament*, Claude Bragdon, 1915). **Figure 10 (bottom).** Ornamental motif drawn as negative image, (*Projective Ornament*, Claude Bragdon, 1915). **Figure 11.** Illustrated example of possible application of Projective Ornament, (*Projective Ornament*, Claude Bragdon, 1915). **Figure 12.** Illustrated example of possible application of Projective Ornament, (*Projective Ornament*, Claude Bragdon, 1915).

The Frozen Fountain

In 1932, Bragdon published *The Frozen Fountain*, which revisited themes he had addressed in previous writings, including ornament. In relation to *Projective Ornament*, he states: "I now feel that my explanations were unclear and my illustrations not sufficiently convincing and the whole matter should be formulated anew."³¹ In this refigured ornament theory, the system as proposed in 1915 remains, however it is explained without the earlier proselytising Theosophical agenda, and the notion of 'x-ray vision' has been removed. The fourth dimension is described as a paradoxical world which is mathematically true, but impossible to visualise, other than through linear diagrams generated through orthographic projection.³² The illustrative method of linear attenuation from 1915 is maintained but not associated with theory; rather the manner of translating a line drawing into an illustrated ornamental motif is depicted graphically (Figure 14).

New illustrations of the design and application of ornament based on higher-space geometry are included (Figures 15 and 16). These illustrations are more detailed and

accomplished in terms of conception and execution than those published previously. Unlike similar drawings in *Projective Ornament* they are mostly rendered as white line work on black backgrounds. They employ the same types of geometric motifs evident in antecedent illustrations, but develop these into larger asymmetrical abstract, high-contrast compositions, echoing compositional and stylistic approaches from Bragdon's commercial artwork over three decades earlier (Figures 1, 2 and 3). These later compositional and graphic iterations evidence more graphic resemblance to the visual language of x-ray imagery than earlier drawings.

Examining these revised drawings alongside an x-ray of seashells, kept by Bragdon as part of a larger collection of x-ray images (Figure 17), reveals visual similarities, which in turn allow interpretations locating more significant theoretical intersections between x-ray technology and Bragdon's architectural practice: Bragdon's x-ray reveals an otherwise imperceptible geometric substructure of nature; rendering the surfaces of seashells as transparent allows invisible geometric relationships to become visible. This resonates with Bragdon's geometric concept of nature, as signified through a mathematical, rather than figurative depiction of nature. Furthermore, the x-rays clear refutation of the authenticity of external appearances infers that visual perception is limited³³, correlating with Bragdon's earlier contention that 'What we think of space is probably only some part of space made perceptible'³⁴.

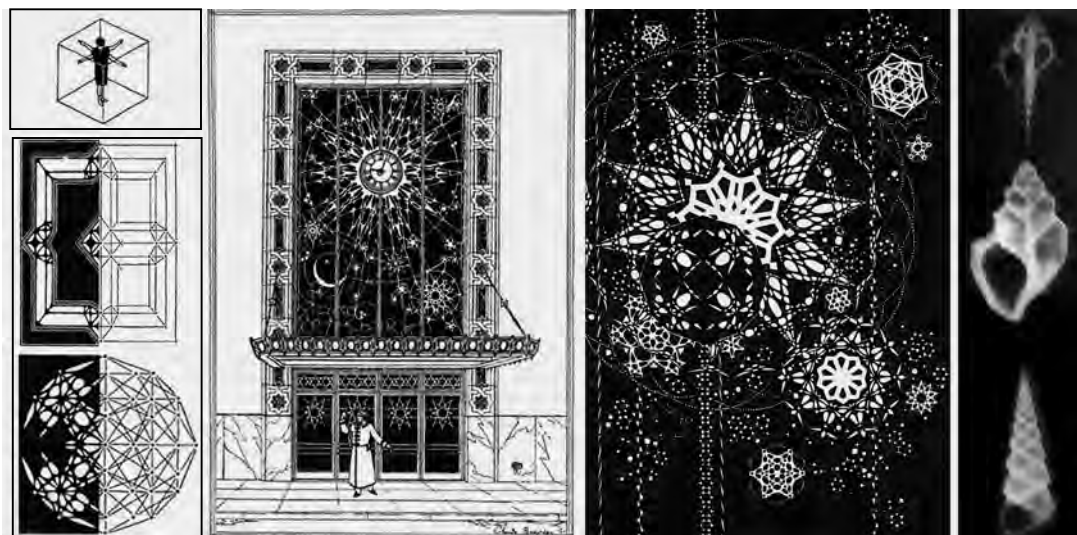


Figure 13. (top) Human form rendered as axonometric projection. (*The Frozen Fountain*, Claude Bragdon, 1932). **Figure 14. (bottom)** Ornamental designs based on four-dimensional geometries and their derivations, (*The Frozen Fountain*, Claude Bragdon, 1932). **Figure 15 and Figure 16.** Bragdon's revised illustrations depicting Projective Ornament, (*The Frozen Fountain*, Claude Bragdon, 1932). **Figure 17.** X-ray image of seashells collected by Claude Bragdon, 1910 (Department of Rare Books and Special Collections, University of Rochester Library).

Axonometric Projection

The Frozen Fountain contains a chapter discussing axonometric projection, a representational method central to Bragdon's architectural strategy since at least 1913, yet not included in his writings until 1932. He describes axonometric projection³⁵ as a method of representation which "truly renders the mental image – the thing seen by the mind's eye".³⁶ Bragdon's association of the mental 'vision' of the axonometric evidence a reengagement with the true principles of hyperspace philosophy, and thus integrate the conceptual significance of axonometry throughout his practice. Bragdon's earlier publications from 1913 and 1915 employ two, three, and four-dimensional geometric motifs throughout to illustrate central concepts. *The Frozen Fountain* revises this with a depiction of a human figure within an axonometric cube, (Figure 13). The shift from a focus upon these geometric motifs to the means of their representation, indicates that axonometric projection became central to his reconsideration of his body of work.

Bragdon's development of a methodology entailing the use of axonometric projection as a representational device central to a theoretical agenda held important theoretical significance. Since the Renaissance, perspective projection, relying on notions of 'systematic space' to emulate the optics of vision had been the privileged method of three-dimensional representation.³⁷ The emergence of x-ray technology challenged assumptions about the primacy of human vision, disturbing assumptions of the reality of perception and the nature of transparency and opacity. Bragdon's adoption of axonometry acknowledged that perspectival representation no longer depicted a singular reality of vision, and his choice of the axonometric, a "perceptively ambiguous",³⁸ mode of representation reflected the destabilising effect upon vision suggested by an emergent technology. Moreover, Bragdon's choice of rendering his axonometric motifs without shading or depth heightened a sense of spatial ambiguity whilst responding directly to the transparency of the x-ray image.

Yve-Alain Bois article outlining the history of the axonometric acknowledges Bragdon as the first twentieth century architect to employ the axonometric and to discuss its representational value. He dismisses the historical significance of this fact, as in his view, Bragdon's work bore no epistemological relation to the modern architectural movement (inaccurately describing Bragdon's work as Art Deco). Bois instead identifies the 'modern revival of axonometry' as 'precisely October to November of 1923' with the De Stijl exhibition of drawings by Theo van Doesburg and Cornelis van Eesteren.³⁹ Bois' account is oblivious to the fact that van Doesburg's work issued from an interest in the fourth dimension sustained throughout his career.⁴⁰ Recent scholarship has drawn parallels

between van Doesburg and Bragdon, despite the apparently disparate manifestations of their work.⁴¹ The misunderstandings within Bois' critique indicates a lack of knowledge of Bragdon's work; his assertion that Bragdon was a master of Art Deco suggests a stylistic assumption based on visual observation in the absence of historical and theoretical source material.

Desley Luscombe's analysis of Gerrit Rietveld's axonometric drawings of the Schroeder House describe graphic techniques employed by Rietveld to represent an interest in the fourth dimension as space via graphic devices intended to represent existent, yet invisible spatial qualities, and also as space-time, by employing a system of colouration intended to invoke a temporal quality within the drawing.⁴² Luscombe traces Rietveld's theoretical sources, identifying influences in common with Bragdon, such as Charles Hinton.⁴³ Rietveld produced a 'wireframe' axonometric drawing, rendered as transparent through an absence of shading to indicate solidity, which is described as 'revealing a viewing subjects 'x-ray vision'⁴⁴; echoing a representational method and perceptual concept employed by Bragdon in 1915.

Conclusion

Bragdon's theoretical engagement with the impact of x-ray technology, from the period of 1913 to 1915, within *A Primer of Higher Space* and *Projective Ornament* is compromised by inconsistencies and contradictions resulting from his determination to theorise architecture in accordance with his Theosophical beliefs; this results in a dilution of the coherency of his architectural theories. Bragdon's architecture was one element of several creative practices informed by his spiritual convictions; this creates an inherent sense of ambiguity in assessing these publications, whereby it is possible to interpret them either as Theosophical ideas portrayed through the medium of architecture, or an architectural theory informed by Theosophy. *Projective Ornament* is unique as a manifesto, as it functioned as a freely accessible instructional manual, with ownership of highly developed design strategies relinquished to the public. This democratic dispersal reflected a genuine interest in the advancement of social cohesion, and a spiritual concept of a democracy whereby consciousness was not individual, but universal; values promoted in the rhetoric of *Projective Ornament*, and reflected in his actions.

The revisions of his writings and drawings within *The Frozen Fountain* from 1932, locate meaningful intersections between the perceptual shifts associated with x-ray technology, and the development of Bragdon's architectural agenda. These manifest as legible theoretical, visual and representational outcomes; the most significant of these is his use

of the axonometric. Bragdon refocuses his theory away from the symbolic language of his drawings, towards the subjective effects of his representational methods; the shift this represents in his own thinking is perhaps the most sophisticated manifestation of the impact of the x-ray upon his body of work. His illustrations are highly accomplished, clarifying a connection between the x-ray and his architectural practice without need for textual justification. The silence of the text, in this regard, gives voice to the illustrations.

The previous section of this paper compares similarities with Bragdon's practice and the work of later Avant Garde architects included within the modernist canon. These projects dealt with conceptual and representational themes foreshadowed by Bragdon's earlier work. The axonometric later became universally adopted as a key representational motif within modernism; an historical development also prefigured by Bragdon. Despite Bois' assertion that Bragdon's early engagement with the axonometric held no historical import as it was disconnected from the later development of the modern movement, Bragdon's use of the axonometric as a representational device employed to support a conceptual agenda related to notions of space was an innovation that resonated throughout the development of modern architecture.

Bois' objection to considering Bragdon's relevance is justified according to stylistic difference. His work contravened nearly all principles of the International Style, most notably his focus upon, rather than rejection of ornament. This method of qualitative assessment accounts for the devaluation of Bragdon's architecture. Whilst Bragdon's work on hyperspace was influential upon the modern art movement⁴⁵, historical accounts describe a negligible influence upon modern architecture. Bragdon's pioneering use of the axonometric is the richest outcome of his engagement with x-ray technology, and his absence from the modernist canon is the most substantial historiographical concern. A further historical investigation into the representational and conceptual impact upon the history of modernism resulting from Bragdon's early use of the axonometric would therefore indicate a method of critique with potential to reposition his significance as an influential early modern architect, and transcend the limitations of stylistic difference which have contributed to his absence from modernist historiography.

Endnotes

- ¹ Sheldon Cheney, *The New World Architecture* (New York: Longmans Green, 2013),
- ² Linda Dalrymple Henderson, *The Fourth Dimension and Non-Euclidean Geometry in Modern Art* (Cambridge: MIT Press, 2013), 1.
- ³ Linda Dalrymple Henderson, 'X Rays and the Quest for Invisible Reality in the Art of Kupka, Duchamp, and the Cubists', *Art Journal*, 47,4 (1988) 323-340, 324.
- ⁴ Beatriz Colomina, 'X-Screens: Röntgen Architecture' *e-flux journal* 66 (2015) 1-13, 7
- ⁵ See Colomina, 'X-Screens: Röntgen Architecture', Beatriz Colomina, X-ray Architecture: Illness as Metaphor, *Positions*, 1 (2008) 30-35 and Beatriz Colomina, 'Skinless Architecture' *Thesis, Wissenschaftliche Zeitschrift der Bauhaus-Universität Weimar*, (2016) 123-124. These essays form the basis of Colomina's forthcoming book, *X-Ray Architecture*, to be released in June 2018
- ⁶ Jonathon Massey, *Crystal and Arabesque: Claude Bragdon, Ornament, and Architecture*, (Pittsburgh: University of Pittsburgh, 2009), 36.
- ⁷ Massey, *Crystal and Arabesque: Claude Bragdon, Ornament, and Architecture*, 34.
- ⁸ Henderson, *The Fourth Dimension and Non-Euclidean Geometry in Modern Art*, 105.
- ⁹ Linda Dalrymple Henderson, 'The Image and Imagination of the Fourth Dimension in Twentieth Century Art and Culture', *Configurations*, 17, 1-2 (2009), 131-160, 139.
- ¹⁰ Charles Howard Hinton, *A New Era of Thought* (London: Swan Sonnenschein & Co., 1888), 86.
- ¹¹ Peter D. Ouspensky *Tertium Organum: The Third Canon of Thought, a Key to the Enigmas of the World* (Rochester, New York: Manas Press, 1920)
- ¹² Massey, *Crystal and Arabesque: Claude Bragdon, Ornament, and Architecture*, 133.
- ¹³ Claude Fayette Bragdon, *A Primer of Higher Space: the fourth dimension; to which is added Man the square: a higher space parable* (Rochester, New York: Manas Press, 1912) 12.
- ¹⁴ Massey, *Crystal and Arabesque: Claude Bragdon, Ornament, and Modern Architecture*, 160.
- ¹⁵ C.W Leadbetter, *Clairvoyance* (Theosophical Publishing House, London, 1899) 11-12.
- ¹⁶ Throesch, *Before Einstein: The Fourth Dimension in Fin-de-Siècle Literature and Culture*, 8
- ¹⁷ Bragdon, *A Primer of Higher Space: the fourth dimension*, 16.
- ¹⁸ See: Edwin Abbott Abbott *Flatland, a Romance of Many Dimensions* (London: Seeley & Co, 1884)
- ¹⁹ Bragdon, *A Primer of Higher Space: the fourth dimension*, 19.
- ²⁰ Henderson, *The Fourth Dimension and Non-Euclidean Geometry in Modern Art*, 316.
- ²¹ Henderson, *The Fourth Dimension and Non-Euclidean Geometry in Modern Art*, 316.
- ²² Claude Fayette Bragdon, *Projective Ornament* (Rochester, New York: Manas Press, 1915) 2.
- ²³ Bragdon, *Projective Ornament*, 33.
- ²⁴ Bragdon, *Projective Ornament*, 11.
- ²⁵ Simone Natale, 'The Invisible Made Visible: X-rays as attraction and visual medium at the end of the nineteenth century', *Media History*, 17,4 (2011) 345-358.
- ²⁶ Throesch, *Before Einstein: The Fourth Dimension in Fin-de-Siècle Literature and Culture*, 140.
- ²⁷ Tony Robbin, *Shadows of Reality: The Fourth Dimension in Relativity, Cubism, and Modern Thought* (Cambridge: Yale University Press, 2013), 19.
- ²⁸ Robbin, *Shadows of Reality: The Fourth Dimension in Relativity, Cubism, and Modern Thought*, 19.
- ²⁹ Bragdon, *Projective Ornament*, 33.
- ³⁰ Massey, *Crystal and Arabesque: Claude Bragdon, Ornament, and Modern Architecture*, 163.
- ³¹ Claude Fayette Bragdon, *The Frozen Fountain, being essays on architecture and the art of design in space* (New York: Alfred A. Knopf, 1932) 73.
- ³² Bragdon, *The Frozen Fountain*, 95.
- ³³ Corey Keller, 'The Naked Truth or the Shadow of Doubt? X-Rays and the Problematic of Transparency', *Invisible Culture*, 7 (2004) accessed February 22, 2018, http://www.rochester.edu/in_visible_culture/Issue_7/title7.html
- ³⁴ Bragdon, *A Primer of Higher Space: the fourth dimension; to which is added Man the square: a higher space parable*, 12.
- ³⁵ Bragdon uses the term 'isometric perspective', a term effectively synonymous with 'axonometric projection'.
- ³⁶ Bragdon, *The Frozen Fountain*, 95.
- ³⁷ Erwin Panofsky, *Perspective as Symbolic Form* (New York: Zone Books, 2013), 49.
- ³⁸ Yve-Alain Bois 'Metamorphosis of Axonometry', *Daidalos*, 1, (1981) 40-60, 40.
- ³⁹ Bois 'Metamorphosis of Axonometry', 42.
- ⁴⁰ Henderson, *The Fourth Dimension and Non-Euclidean Geometry in Modern Art*, 462.

⁴¹Christina Malathouni, 'Architecture is the pattern of human mind in space: Claude F. Bragdon and the spatial concept of architecture', *The Journal of Architecture*, 18,4 (2013) 553-569

⁴²Desley Luscombe, 'Illustrating architecture: the spatio- temporal dimension of Gerrit Rietveld's representations of the Schröder House', *The Journal of Architecture*, 18,1 (2012) 25-56.

⁴³Luscombe, 'Illustrating architecture: the spatio- temporal dimension of Gerrit Rietveld's representations of the Schröder House', 42.

⁴⁴Luscombe, 'Illustrating architecture: the spatio- temporal dimension of Gerrit Rietveld's representations of the Schröder House', 27.

⁴⁵Henderson, *The Fourth Dimension and Non-Euclidean Geometry in Modern Art*.

The Technology of Axonometry in 1960s Britain: Kenneth Frampton and Peter Eisenman

Sally Farrah
University of Western Australia

Abstract

The Bauhaus school's utilisation of both the model medium and axonometric projection in the early-twentieth century perhaps best typifies the historical links between technology, rationalisation, and representational techniques. By the late twentieth century, however, the choice by the architect or theorist to utilise either medium has, in some cases, come to represent the exact opposite; an anti-technological ideological position. In light of this transition, this study explores the influence of axonometry as a technique of representation, and its influence on post-modern praxis in England and America. To illustrate, it locates the re-emergence of axonometry and isometry in 1960s Britain through two key cultural producers: Kenneth Frampton, and Peter Eisenman. Specifically, I will conduct a comparison of Frampton's use of axonometry in his co-edited volume with Douglas Stephen and Michael Carapetian entitled British Building: 1960-1964 (1965). This will be compared with Eisenman's thesis, entitled A Formal Basis of Modern Architecture, completed at Cambridge University in 1963, and supervised officially by Sir Leslie Martin, as well as unofficially by Colin Rowe. Eisenman employed isometry as the analytical method to examine canonical modern projects. By 1968 when designing House I, Eisenman would shift to wire-frame axonometry, which I demonstrate signifies a seminal development in his oeuvre from perceptual to conceptual representation. This paper hopes to address the following: what historical, social, and ideological meanings did the technology of axonometry acquire in the post-modern period? And through axonometry, how do both Frampton and Eisenman conduct their markedly different anti-technological critiques of modernism? By locating axonometry's first significant post-modern re-emergence in transatlantic culture, this paper provides a theoretical basis to examine contemporary revivals of axonometry in architectural and curatorial praxis.

Architectural projection as technology

In 1956, James Stirling deemed the ideological schism between European and American architects, as 'the issue of art or technology'.¹ This critique of the Modern Movement was referred to in journals as 'the crisis of rationalism' or the 'dilemma of functionalism'.² In Britain, this resulted in a departure from the technological 'Victorian idea of progress' to a humanist emphasis, whereby 'true progress lies in charity, welfare, and personal happiness'.³ Anti-technological positions emerged in both conservative circles - such as the New Humanism and Townscape⁴ - and the 'neo-avant-garde'⁵ New Brutalists. In this formative post-modern⁶ moment, by the 1960s, a generation of British architects emerged searching for an intellectual and rational theory of form.

To situate this anti-technological debate in a broader historiography, it is important to recognise what Marco Frascari terms the 'double-faced role of technology':⁷ that while technology aids the conceptualisation of architecture, it also aids modes of architectural representation. The rise of technological capabilities over the twentieth-century led to the denigration of the Renaissance activity of *disegno* - the act of simultaneously drawing and conceptualising - resulting in the splitting of processes of visualisation and intellection in architectural drawing.⁸ The post-modern projections of the 1960s, therefore, can be seen to represent one of two poles of *disegno*: 'the truthful representation of building', or architecture as 'an intellectual, artistic activity'.⁹ These complex relationship between the technology of projection and cultural values in architectural production results in the 'inevitably partial'¹⁰ aspect of representation, described by Dalibor Vesely as 'divided representation'; by Robin Evans as the 'translation' between drawing and building;¹¹ or the 'perspective hinge' by Alberto Pérez-Gómez and Louise Pelletier.¹²

A post-modern understanding of the historical links between the 'double-faced role of technology' and representation, allowed architects to employ 'inevitably partial' projection techniques either to serve a cultural 'participatory' function, or conduct an 'emancipatory' autonomous critique.¹³ Vesely has outlined the historical transition from the concept of *technē*, to technique, to technology: where *technē* is understood as the 'art of making'¹⁴ within a social context, technique became emancipated from any political or cultural context.¹⁵ These two anti-technological concepts of *technē* and technique can be evidenced by the post-modern projections of Kenneth Frampton and Peter Eisenman.¹⁶ This paper utilises the theme 'historiographies of technology and architecture' in a two-fold manner: it considers the representational site of drawing as an

architectural technology;¹⁷ and examines how various projection methods represent *anti*-technological positions of Frampton's collective representation of *technē*, or through Eisenman's autonomous representation of technique.¹⁸ While Frampton claims Eisenman's work denies 'the possibility of architecture being an essentially tectonic or institutional discourse',¹⁹ there are similarities to be found in their anti-technological engagement with the Modern Movement.²⁰ This is evident in Eisenman's thesis, entitled *A Formal Basis of Modern Architecture* (1963), which included analytic isometrics of works by Le Corbusier; Alvar Aalto; Frank Lloyd Wright; and Giuseppe Terragni,²¹ sharing similarities with Frampton's later selection of case studies in *Studies in Tectonic Culture* (1995), and recent curatorial project *The Stagecraft: Models and Photos* (2017).

The first part of this paper examines Frampton's *tectonic* axonometry in his co-edited volume, entitled *British Buildings: 1960-1964* (1965), compared to Eisenman's unsuccessful attempt to represent a *conceptual* isometry in his thesis. Both theorists have a connection to Colin Rowe in their formative moments, as Frampton's edited volume was dedicated to Rowe, while Eisenman's thesis was supervised by Rowe and evidences his direct influence, in Eisenman's 'architectural-historical', as opposed to his later 'linguistic'²² theoretical approach.²³ The second part highlights a seminal shift in Eisenman's output from his sketch-like thesis isometry, to his technical wire-frame axonometry first utilised in *House I* (1968-69).²⁴ Eisenman has reflected on this shift in representation in his oeuvre as significant,²⁵ and while Desley Luscombe has examined Eisenman's use of axonometry from *House VI* onward,²⁶ there is a paucity of critique on this important shift in representation which this paper investigates. While Rowe's anti-Townscape ideas influenced Frampton, the shift from analytical isometry to wire-frame axonometry in Eisenman's work will be discussed in parallel to Rowe's and Robert Slutzky's concept of 'phenomenal transparency',²⁷ that identifies a second "ideology" of axonometry²⁸ that emerges in Eisenman's oeuvre as the representation of conceptual autonomy.

While projections are simultaneously 'an autonomous concept and a mode of social production',²⁹ the spatial and theoretical 'depth'³⁰ which these projections illustrate pertains to either the collective axonometry of *technē*, or the autonomous axonometry of technique. The Framptonian faction consider projection as 'inherently ontological',³¹ and continue the Renaissance orthographic tradition where parallelism and measurability provided 'three-dimensional proof of functioning and buildability',³² whilst also upholding the traditional role of the drawing 'to engage the social'.³³ This tectonic discourse inherits humanist ideas, retaining the importance of the centrality of the body to architectural

experience, where the drawing is perceived as 'the embodiment of architectural ideas'.³⁴ On the contrary, Eisenman interprets axonometry's objectivity as a technical quality that 'favours the autonomy of the object'³⁵ and the representation of architecture's *conceptual* forms rather than perceptual form.³⁶ This post-modern group utilises axonometry against the tectonic 'nineteenth-century tradition',³⁷ liberating the architectural object from a historical or social context.³⁸ The comparison of Frampton's and Eisenman's projections that follows reveals dichotomies in their anti-technological positions between semi-autonomy and autonomy, *techne*-technique, percept-concept, and actual-virtual.³⁹

Axonometry of *techne* in *British Buildings: 1960-1964* (1965)

While Frampton would later define his tectonic theory as the tripartite relationship of skin-core dialectic (tectonics), *typos* (site), and typology,⁴⁰ two technologies of axonometry in his edited volume *British Buildings* (1965) visualise his theory: the exploded or interior projection displaying tectonics and typology (Figure 1), or the 'bird's-eye'⁴¹ axonometric showing *typos* and typology (Figure 2).

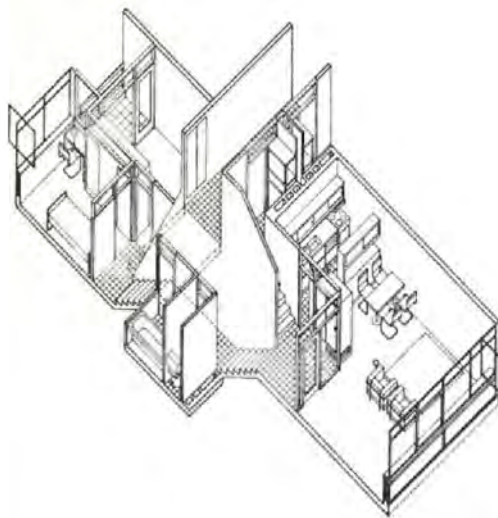


Figure 1. Flats at Green Park (1960) by Douglas Stephens and Partners (Carapetian, Frampton, and Stephens (eds.), *British Buildings*, 83).

Figure 1, produced by the firm during Frampton's employment between, demonstrates an emphasis on surface and the depiction of utility. This is the only project Frampton would design and realise as a practitioner, and the same projection was published prior, under his technical editorship of *AD*.⁴²

While Charles Jencks wrote that the dedication to Rowe 'caused some consternation because it was never explained or made explicit',⁴³ it is an important to mention Rowe's writing of the 1950s and its implicit impact on the ideological choice of both Frampton and Eisenman to employ axonometry. While Rowe utilised two-dimensional diagramming as inspired by his mentor Rudolf Wittkower,⁴⁴ his analyses focused on the importance of both elevation and plan, or in his terms 'character' and 'composition'.⁴⁵ Rowe's writings represented a search for a 'theory of contemporary vision'⁴⁶ and the desire to open an alternate path to the contemporaneous Townscape movement.⁴⁷ Isometry and axonometry, therefore, allowed Frampton and Eisenman the simultaneous representation of *both* character and composition. In this light, Frampton's and Eisenman's earliest projections forged an *intellectual* counter-culture to the *perceptual* picturesque tradition of Townscape, where the introduction of measurable *visual* depth aimed to introduce an *intellectual* depth.⁴⁸

The use of both interior or exploded axonometry in *British Buildings* (1965) combine 'abstract geometries of form with the contingencies of material habitation'⁴⁹ through the inclusion of elements such as furniture and stairs. Unlike wire-frame projection which positions an 'analytical framing of the viewer',⁵⁰ solid projection favour 'the perceptual framing of the viewer', where the articulation of materiality establishes scale, and also highlights the division of 'exterior-interior' illustrating the tectonic interplay of skin and core. Historically, the solid exploded axonometry in *British Buildings* (1965) serves a similar role to Auguste Choisy's nineteenth-century worms-eye axonometry,⁵¹ exploiting the 'spatial dynamism of tectonic space'.⁵² While the viewer 'does not exist in the world of parallel projection', one is enticed into the space, introducing 'a human sense of dwelling within a rational technical abstract representation'.⁵³

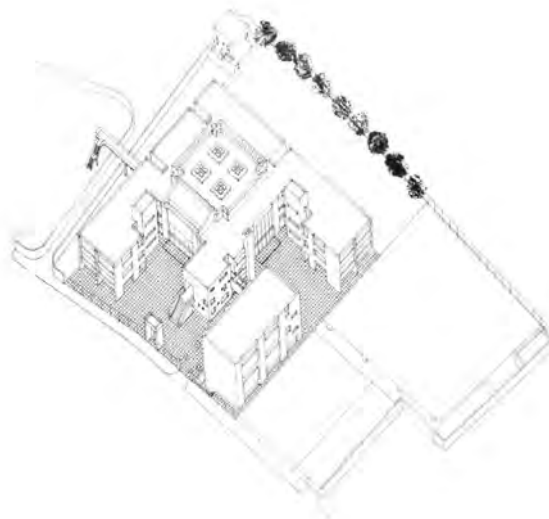


Figure 2. Secondary School (1964) by Alan Colquhoun and John Miller (Carapetian, Frampton, and Stephens (eds.), *British Buildings*, 91).

In an example of birds-eye axonometry from the edited volume, drawn by the firm of Alan Colquhoun⁵⁴ and John Miller (Figure 2), rather than materiality, scale is established through depicting the *topos* of vegetation and roads. These bird's-eye axonometrics, showing both context in elevation and plan, rigorously critique the Townscape visual concept of *genius loci*.⁵⁵ To conclude on the axonometry of *techne* evident in *British Buildings* (1965), these modes of exterior and interior solid axonometry represent the homology between the body, place, and technique that would later become central to Frampton's own writings on tectonics.⁵⁶

Isometry of *techne* in Eisenman's thesis (1963)

To summarise Eisenman's thesis, his counter-position to Townscape is clear as he proposes a system to 'deny the picturesque',⁵⁷ by excising 'perceptual references'⁵⁸ of form. Eisenman utilises isometric projection to promote his volumetric theory, and two-dimensional drawings represent precedents that do not adhere to his proposed rational framework. Two types of three-dimensional projections are evident in the thesis: solid isometry (Figure 3); and solid perspectives, most probably traced from photographs.⁵⁹

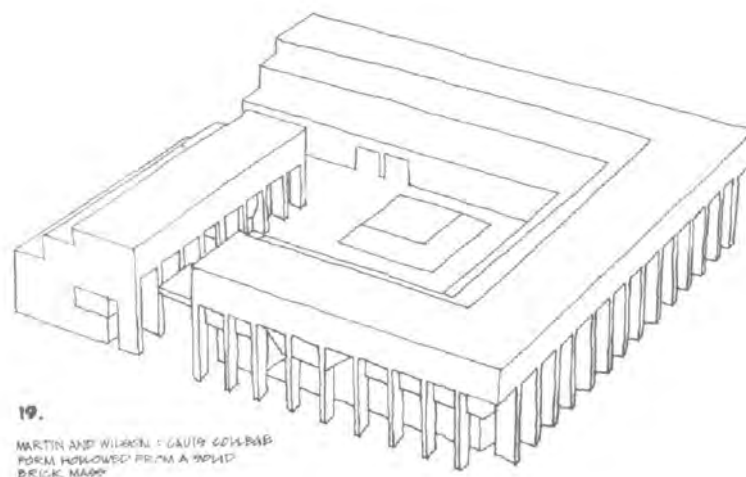


Figure 3. Typical isometric in Eisenman's thesis (Eisenman, *The Formal Basis of Modern Architecture*, 24).

Figure 3, a typical isometric in his thesis, omits the tectonic details of site, surface, and utility. Unlike the previous axonometrics (Figures 1 and 2), isometry distorts the plan, which when coupled with articulating only exterior surfaces, denies a functionalist

representation. Eisenman's thesis aimed to lay the theoretical foundations to his conceptual architecture that he would later develop in his *Houses* series (1969-1973).⁶⁰ Despite his exclusion of site, surface, and utility, I propose that these projections remain in the realm of the *perceptual*: firstly due to their opacity, and secondly the consequence of isometry's flattening in the vertical axis, which serves to anchor the forms to the ground, becoming 'fossilized in time and space'.⁶¹ Therefore, Eisenman's isometry does not present a conceptual or 'virtual' form, and remains depicting an 'actual'⁶² formalism.

From *techne* to technique: Eisenman's axonometry in *House I* (1967-68)

Between Eisenman's thesis and *House I*, Rowe and Slutzky would publish the first of two 'Transparency' papers, analysing paintings and façades to present a novel concept of 'phenomenal transparency'. Rowe and Slutzky would differentiate between a 'literal' and 'phenomenal transparency', the latter inspired by Gyorgy Kepes's definition of 'apparent transparency': that of 'a simultaneous perception of different spatial locations'.⁶³ In the following analysis, I will demonstrate how through the qualities unique to the technology of axonometry, Eisenman's successful proposition and representation of a *conceptual* architecture in *House I* critiqued three aspects of Rowe's and Slutzky's *perceptual* framework.

Similar to in his thesis, the drawings of *House I* omit site, surface, and utility. However, in the first projection for *House I* (Figure 4), Eisenman alters his drawing method in two ways: from solid to wire-frame projection to represent conceptual form and achieve reversibility; and from isometry to axonometry to achieve autonomy.

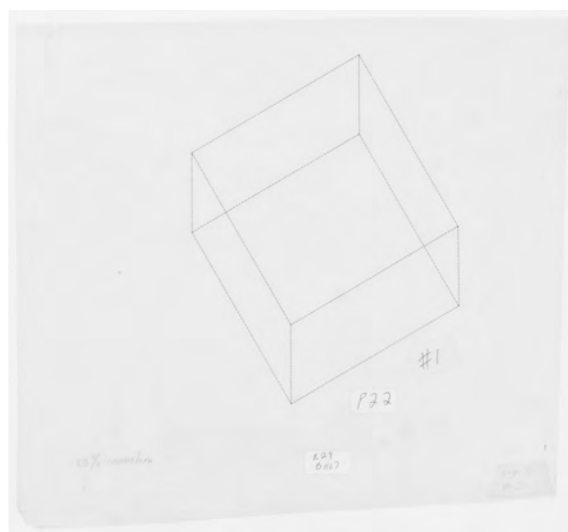


Figure 4. Axonometric for *House I* (Eisenman, CCA archives, c.1967).

Eisenman's shift from isometry's flattening to axonometry's true proportionality is the first suggestion of a shift from representing *perceptual* to *conceptual* form. Unlike the examples of tectonic axonometry that establish an anthropomorphic spatiality via their perceptual inclusion of scale, materiality, and/or context, axonometry negates isometry's horizontality, losing any connection to phenomenal space.⁶⁴ This observation is supported when comparing Figure 4 to sketches and plans of *House I*, which illustrate utility and materiality, and his sections include ground lines and scale devices. In contrast to the tectonic camp, Eisenman ascribes axonometry the purely *conceptual* role of 'unveiling invisible structures',⁶⁵ inspired by Rowe's preoccupation with the 'presence of the unseen'.⁶⁶ Furthermore, the shift from isometry's horizontality to axonometry's diagonality allows Eisenman to critique classical concepts of frontality or spatial hierarchy.⁶⁷ Unlike the Framptonian axonometry of *technē*, Eisenman's axonometry of technique emphasises 'play between orthogonal and the diagonal... to liberate architecture from the encumbrance of the tectonic of column-and-beam'.⁶⁸

In contrast to solid projection, the wire-frame method is analytical, due to its depiction of inter-spatial relationships rather than solely the optical.⁶⁹ Eisenman appropriates the wire-frame technique in an unconventional manner, as on closer inspection, Figure 4 uses only dotted lines. While technical drawing ascribes solid lines to *perceptual* barriers, and dotted lines to non-visual or *conceptual* barriers, Eisenman finally achieves the representation of *conceptual* architectural form. To demonstrate, Figure 5 shows alternate wire-frame projections of *House I* if the form included any solid perceptual elements.

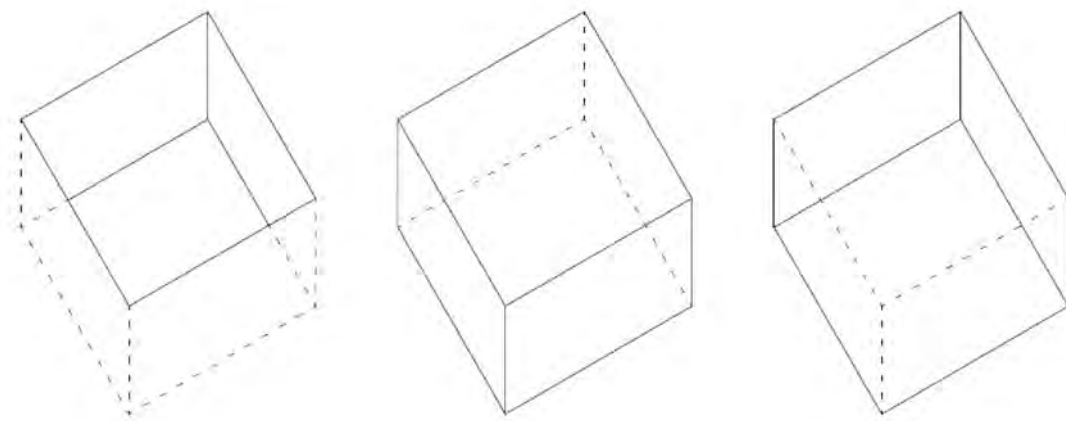


Figure 5. Axonometric of a void at ground level; solid top-down projection; solid bottom-up projection (Farrah, 2018).

A comparison of Figures 4 and 5 demonstrates that Eisenman's utilisation of only dotted lines is to also achieve spatial reversibility. This reversibility critiques Rowe's and Slutzky's 'Transparency' framework in two ways. First, where Rowe and Slutzky suggested the impression of depth in 'phenomenal transparency' was generated by two-dimensional figure-ground fluctuations,⁷⁰ *House I* critiques this 'purely optical'⁷¹ framework, and depicts a *three-dimensional* spatial reversal. Secondly, this reversibility critiques Rowe's and Slutzky's formal and perceptual framework, which assumed a fixed, frontal point of view,⁷² and positions many objective viewpoints. Eisenman simultaneously represents top-down and bottom-up views, hence there is no longer one privileged perceptual viewpoint, but many ambiguous conceptual viewpoints. Through his understanding of technical drawing methods, Eisenman projections are no longer *illustrations*, but rather, represent *theoretical* intentions.⁷³ Through the technology of axonometry, and the ability to represent conceptual three-dimensional form, Eisenman's oeuvre first enters the realm of architectural autonomy.

Furthermore, *House I* uses axonometry as a generative tool,⁷⁴ where Eisenman's later iterations introduce his concept of 'virtual or implied layering', which he suggests is 'not so much a literal recognition of the actual surfaces... but rather is meant to signify the virtual or implied layering which is produced'.⁷⁵ It is pertinent to look at this process to demonstrate how Eisenman achieves a conceptual *four-dimensional* representation in his third critique of Rowe's and Slutzky's framework (Figure 6).

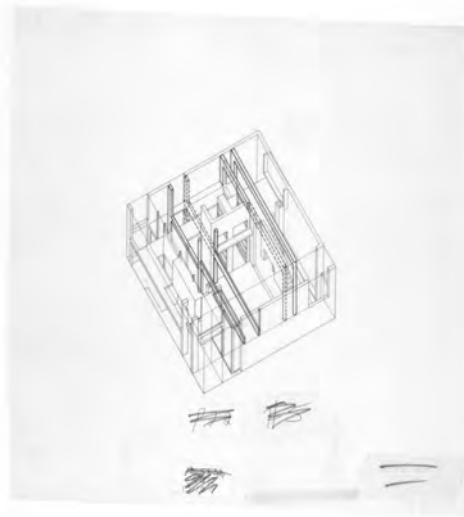


Figure 6. Exterior axonometric of *House I* (Eisenman, CCA archives, 1968).

This 'exterior axonometric' is markedly different from the 'birds-eye' projections in *British Buildings* (1965), with no suggestion of *topos*, typology, or tectonics. While the wire-frame no longer exhibits spatial reversibility, the addition of solid lines shows the volume now depicts both *perceptual* and *conceptual* elements. Again, like in Figure 4, there exist deliberate technical inconsistencies: for example, with the columns and beams touching the bottom-right elevation, some are drawn correctly dotted, while others are solid. This use of lineweight conventions thus represents two parallel systems: the physical house, and the cognitive house.⁷⁶

The final critique Eisenman conducts on Rowe's and Slutzky's analyses of facades and paintings, resulted in a 'two-dimensional phenomenology'⁷⁷ which, as I have previously demonstrated, Eisenman translates into *three* conceptual dimensions (Figure 4), here he displays his design process through axonometry to represent *four* conceptual dimensions (Figure 6).⁷⁸ Through this iterative process, through axonometry's depiction of planimetric and vertical manipulations, Eisenman's 'virtual or implied layering' come close to Kepes's definition of transparency cited by Rowe and Slutzky: as the 'simultaneous perception of different spatial locations'.⁷⁹ Through *House I*'s axonometry, Eisenman discovered a representation that - I would suggest - came closer to Kepes' concepts of 'transparency' than Rowe's and Slutzky's own two-dimensional studies. Eisenman realised that where Rowe's and Slutzky's analyses occupied a 'real space' and time, his conceptual ideas of 'virtual implied layering' could only exist within 'autonomous space'.⁸⁰ This is somewhat ironic, however, as this would be met by

criticism from Rowe in autonomy's divide between '*physique*' and '*morale*', as evident in his introduction to the exhibition *Five Architects* (1972) which exhibited *House I*.⁸¹

To summarise, through two technologies of architectural projection – the subversion of technical lineweight properties, and the depiction of an iterative process – Eisenman forged a novel pathway for post-modern axonometry to represent conceptual and autonomous theories. Through the examples of Frampton and Eisenman, this paper has demonstrated that comparisons of the same pre-digital projection methods, within the same architectural milieu, provide valuable understandings of the nuances within post-modern architectural theory and praxis. This study also suggests a framework in which to study other anti-technological critiques of historiography such as the representations of twenty-first century architects choosing to employ hand-drawing technologies.

¹ James Stirling, 'Ronchamp: Le Corbusier's Chapel and the Crisis of Rationalism', *Architectural Review*, 119, 3 (1956), 155.

² John Summerson, "The Case for a Theory of Modern Architecture," *RIBA Journal*, 64, 8 (1957), 307-313; and Alan Colquhoun, "Typology and Design Method (1967)," *Perspecta*, 12 (1969), 71-74.

³ Stirling, "Ronchamp," 161.

⁴ Frampton referred to the British Townscape as 'the humanisation of the modern movement'. Kenneth Frampton, "MARS and beyond: The British Contribution to Modern Architecture," *AAQ*, 2, 10 (1970), 53.

⁵ Mark Crinson and Claire Zimmerman (eds.), *Neo-avant-garde and Postmodern Postwar Architecture in Britain and Beyond* (New Haven: Yale University Press, 2010), 2.

⁶ Within this paper I borrow Gevork Hartoonian's definition of post-modern as "a historical unfolding informed by the failure of the project of the historical avant-garde and the nihilism of technology." Gevork Hartoonian, *Modernity and Its Other: A Post-Script to Contemporary Architecture* (Texas: A&M University Press, 1997), 3.

⁷ Marco Frascari, "The Tell-the-Tale Detail" (1984) in Kate Nesbitt (ed.), *Theorizing a New Agenda for Architecture: An Anthology of Architectural Theory 1965-1995* (New York: Princeton Architectural Press, 1996), 500.

⁸ Raymond Quek, "Drawing Adam's Navel: The problem of *disegno* as creative tension between the visible and knowledgeable," in Marco Frascari, Jonathan Hale and Bradley Starkey (eds.), *From Models to Drawings: imagination and representation in architecture* (London: Routledge, 2007), 58.

⁹ Jonathan Hill, "Weather architecture, weather drawing." In Frascari, Hale, and Starkey (eds.), *From Models to Drawings*, 210.

¹⁰ Dalibor Vesely, *Architecture in the Age of Divided Representation: the question of creativity in the shadow of production* (Cambridge, MA: MIT Press, 2004), 177.

¹¹ Robin Evans, *Translations from Drawing to Building and Other Essays* (Cambridge, MA: MIT Press, 1997); and Robin Evans, *The Projective Cast: Architecture and its Three Geometries* (Cambridge, MA: MIT Press, 1995).

¹² Alberto Pérez-Gómez and Louise Pelletier, *Architectural Representation and the Perspective Hinge* (Cambridge, MA: MIT Press, 1997).

¹³ Vesely, *Architecture in the Age*, 18. Central and inevitable to any critical architectural project is that one is "preoccupied by its status as representation, and its simultaneous commentary on that condition." Robert Somol and Sarah Whiting, "Notes around the Doppler Effect and other Moods of Modernism," *Perspecta*, 33 'Mining Autonomy' (2002), 74.

¹⁴ Gevork Hartoonian, *Ontology of Construction: On Nihilism of Technology in Theories of Modern Architecture* (Cambridge, NY: Cambridge University Press, 1994), 2.

¹⁵ Vesely, *Architecture in the Age*, 291.

¹⁶ See also Diana Agrest and Stan Allen, *Practice: Architecture, Technique and Representation* (London: Routledge, 2003), ix.

¹⁷ Marco Frascari deemed paper in architectural drawing as a “passive technology” and “one of the most significant technology presences in the building and design industry.” Marco Frascari, “A Reflection on Paper and its Virtues Within the Material and Invisible Factures of Architecture,” in Frascari, Hale, and Starkey (eds.), *From Models to Drawings*, 23-24.

¹⁸ In Tafurian terms, the positions of Eisenman and Frampton could be classified as the difference between the ideologies of “architecture as criticism” and “criticism as project.” Manfredo Tafuri, *Theories and History of Architecture*. Translated by Giorgio Verrecchia (London: Granada Publishing, 1980), 133. Hartoonian has observed Eisenman’s use of Tafurian “operative techniques.” Gevork Hartoonian, *Modernity and Its Other: A Post-Script to Contemporary Architecture* (Texas: A&M University Press, 1997), 42.

¹⁹ Kenneth Frampton, “Reflections of the Autonomy of Architecture: A Critique of Contemporary Production,” in Diane Ghirardo (ed.), *Out of Site: A Social Criticism of Architecture* (Seattle: Bay Press, 1991), 20. Hartoonian also understands Eisenman’s Deconstructivism as “dispensing with the tectonic dimension of architecture.” Hartoonian, *Modernity and Its Other*, 67.

²⁰ For example, see Kenneth Frampton, “The Dom-ino Syndrome,” *Oppositions* 15/16 “Le Corbusier 1905-1933” (1979), 59; and Peter Eisenman, “Aspects of Modernism: Maison Dom-ino and the Self-Referential Sign,” *Oppositions*, 15/16 (1979), 118-128.

²¹ The inclusion of Aalto and Wright was deemed compulsory by Rowe. Thomas Weaver, “Peter Eisenman in conversation with Thomas Weaver,” *AA Files*, 74 (2017), 157.

²² Peter Eisenman and Robert Somol (eds.), *Diagram Diaries* (London: Thames & Hudson, 1999), 54.

²³ Kenneth Frampton, “Eisenman Revisited: Running Interference,” in Arie Graafland (ed.), *Peter Eisenman: recent projecten = recent projects* (SUN, Amsterdam: 1989), 48.

²⁴ For critiques of Eisenman’s thesis text, see Louis Martin, “The Search for a Theory in Architecture: Anglo-American Debates, 1957-1973,” Ph.D. diss. (Princeton University, New Jersey, 2002); Arie Graafland, “Peter Eisenman: The Formal Basis of Modern Architecture,” *Footprint*, 1 ‘Trans-disciplinary’ (2007), 93-96; and Robert Somol, “Dummy Text,” in Eisenman and Somol (eds.), *Diagram Diaries*, 6-25.

²⁵ Eisenman, *Diagram Diaries*, 53.

²⁶ Desley Luscombe, “Architectural Concepts in Peter Eisenman’s Axonometric Drawings of House VI,” *The Journal of Architecture* 19, 4 (2014), 560-611. See also Desley Luscombe, “Illustrating Architecture: the spatio-temporal dimension of Gerrit Rietveld’s representations of the Schröder House,” *The Journal of Architecture* 22, 5 (2017), 899-932.

²⁷ See Colin Rowe and Robert Slutzky, “Transparency: Literal and Phenomenal,” *Perspecta*, 8 (1963), 45-54.

²⁸ Yves-Alain Bois, “Metamorphosis of Axonometry,” *Daidalos*, 1 (1981), 42. Also Agrest and Allen, *Practice*, 167.

²⁹ Edward Robbins, “The Social Uses of Drawing: Drawing and Architectural Practice,” in Edward Robbins (eds.), *Why Architects Draw* (Cambridge, MA: MIT Press, 1994), 7.

³⁰ Pérez-Gómez and Pelletier have called these ‘formal, programmatic, temporal, or experiential’. Pérez-Gómez and Pelletier, *Architectural Representation*, 3. Also “the discourse on depth and distancing remains crucial for architecture, particularly in the context of a technological world fuelled by an obsession to close (or ignore) the space between the body and the world.” Pérez-Gómez and Pelletier, *Architectural Representation*, 11.

³¹ Pérez-Gómez and Pelletier, *Architectural Representation*, 6. Frascari also considers the act of drawing as ‘poetical’ and ‘ontological’, and intimately related to the perceptual senses of the individual. Marco Frascari, “Lines as Architectural Thinking,” *Architectural Theory Review*, 14, 3 (2009), 211.

³² Massimo Scolari, “Elements for a History of Axonometry,” *AD* 5, 5-6 (1985), 72. Sciences that contributed to “the formation of modern technique and eventually to technology,” curiously, utilised the isometric or axonometric projection. These drawings, such as those found in mechanics, must be understood according to Vesely as not a “utilitarian or technical interest,” but rather “a metaphysical quest.” See Vesely, *Architecture in the Age*, 292-296.

³³ Stan Allen, “Constructing With Lines: on projection,” in Allen and Agrest, *Practice*, 26.

³⁴ Alberto Pérez-Gómez, “Architecture as Drawing,” *Journal of Architectural Education*, 35, 2 (1982), 6. For Frampton, Evans, Allen, Frascari, Pérez-Gómez, and Pelletier, axonometry’s measurability represent tectonic and constructive concepts, as the drawing can be reversible and

ambiguous in orientation, it cannot be 'spatially ambiguous'. Frampton has stated, "axonometric drawing has the virtue of maintaining the exact dimensions throughout and also indicating a spatial concept." Kenneth Frampton, email to author, 6 July 2017. See also Robin Evans, "Projection," in Eve Blau and Edward Kaufman (eds.), *Architecture and Its Image* (Cambridge, MA: MIT Press, 1989), 26; and Allen, "Constructing With Lines: on projection." Pérez-Gómez and Pelletier also consider the role of drawing as "the embodiment of architectural ideas," and note that "the architect seems condemned to make either poetic (perhaps romantic) drawings critical (perhaps senseless) ones." Pérez-Gómez and Pelletier, *Architectural Representation*, 313.

³⁵ Somol, "Dummy Text," 16.

³⁶ Luscombe considers this the "conceptual and analytical inquiry privileged through techniques of the axonometric." Luscombe, "Architectural Concepts," 561. Robert A. M. Stern has also noted the axonometrics ability to denote a "conceptual rather than a perceptual view of building." Robert A. M. Stern, "Drawing Towards a More Modern Architecture," *AD*, 47, 6. "America Now: Drawing Towards a More Modern Architecture" (1977), 383.

³⁷ Graafland, "Peter Eisenman," 95.

³⁸ Alan Christ, "Theo van Doesburg and the Undescriptive Qualities of the Axonometric," in James S. Ackerman and Wolfgang Jung (eds.), *Conventions of Architectural Drawing: Representation and Misrepresentation* (Cambridge, MA: Harvard University Graduate School of Design: 2000), 160.

³⁹ Rosalind Krauss, "Death of a Hermeneutic Phantom: Materialization of the Sign in the Work of Peter Eisenman," in Peter Eisenman, Rosalind Krauss, and Manfredo Tafuri (eds.), *House of Cards* (New York: Oxford University Press, 1987), 171.

⁴⁰ Kenneth Frampton, *Studies in Tectonic Culture: The Poetics of Construction in Nineteenth and Twentieth Century Architecture* (2nd ed. Cambridge, MA: MIT Press, 1996), 2.

⁴¹ Charles Jencks, "Recent British Architecture: Pop-Non Pop," in *Modern Movements in Architecture* (2nd ed. London: Penguin Books, 1985), 263.

⁴² Kenneth Frampton, "Maisonettes in Bayswater, London," *AD*, 34 (September 1964), 442-448. It is likely Frampton drew Figure 1 as in the same issue he drew an exterior axonometric for the cover of *AD*.

⁴³ Jencks, "Recent British Architecture," 260.

⁴⁴ Anthony Vidler, "Diagrams of Diagrams: Architectural Abstraction and Modern Representation," *Representations*, 72 (Autumn 2000), 15.

⁴⁵ Colin Rowe, "Character and Composition; or Some Vicissitudes of Architectural Vocabulary in the Nineteenth Century (1955)," *Oppositions*, 2 (1974), 42-60. I would suggest that Rowe's use of the term 'character', an eighteenth-century picturesque concept, is a critique of Townscape's lack of planimetric composition.

⁴⁶ Colin Rowe, "Review: Forms and Functions of Twentieth Century Architecture by Talbot Hamlin," *The Art Bulletin* 35, 2 (June 1953), 173.

⁴⁷ Rowe's criticism of architecture "inspired by a pictorial idea" that results in "a species of architectural scenery," can be seen as parallel to Frampton's critique of architecture reduced to "scenography... nothing more than a stage set." See Colin Rowe, "Character and Composition," 42-60; and Kenneth Frampton, "The Isms of Architecture" (lecture, Pidgeon Digital Archive, 1982). On Frampton's counter-position to Townscape, see also Sally Farrah, "Representation as Quotation: The Verbal and Visual Languages of Kenneth Frampton in *Architectural Design*, 1962-1964," in Gevork Hartoonian and John Ting (eds.), *Proceedings of the Society of Architectural Historians, Australia and New Zealand: 34, Quotation* (Canberra: SAHANZ, 2017), 143-154.

⁴⁸ Vesely, *Architecture in the Age*, 179. Jencks noted the utilisation of axonometry in *British Buildings* (1965) united the schemes in their awareness of architecture as an intellectual discourse. Jencks, "Recent British Architecture," 263. Similarly, Luscombe observed Eisenman's use of axonometry portrays "the intellectual contribution of the architectural act." Luscombe, "Architectural concepts," 560.

⁴⁹ Luscombe, "Illustrating Architecture," 899.

⁵⁰ Luscombe, "Architectural Concepts," 586.

⁵¹ Luscombe, "Architectural Concepts," 587.

⁵² Hilary Bryon, "Revolutions in Space: parallel projections in the early modern era," *ARQ*, 12, 3/4 (2008), 344.

⁵³ Bryon, "Revolutions in Space," 344. This same axonometric language is evident in Frampton's exhaustive account of Pierre Chareau's *Maison de Verre*, which in collaboration with Robert

Vickery and Michael Carapetian, he commenced in July 1965. See Frampton, "Maison de Verre," *Perspecta*, 12 (1969), 77-109.

⁵⁴ Colquhoun's writing of the 1950s and 1960s represents his anti-picturesque and anti-technological position. See Alan Colquhoun, "Letter: Twentieth Century Picturesque," *Architectural Review*, 116 (July 1954), 2; and Alan Colquhoun, "Symbolic and Literal Aspects of Technology," *AD*, 32, 8 (November 1962), 508-509.

⁵⁵ Kenneth Frampton, "Introduction to Character and Composition (1955)," *Oppositions*, 2 (1974), 41.

⁵⁶ Gevork Hartoonian, "Critical Regionalism: whatever happened to autonomy?" *Fusion* 4 (2014).

⁵⁷ Peter Eisenman, *The Formal Basis of Modern Architecture* (Baden: Lars Müller Publishers, 2006), 21.

⁵⁸ Eisenman, *The Formal Basis*, 15.

⁵⁹ I suggest these are traced photographs as Eisenman uses this technique in Peter Eisenman, "Real and English: The Destruction of the Box," *Oppositions*, 4 (1974), 6-34.

⁶⁰ Martin, "The Search for a Theory of Architecture," 536.

⁶¹ Krauss, "Death of a Hermeneutic Phantom," 171.

⁶² Krauss, "Death of a Hermeneutic Phantom," 171.

⁶³ Gyorgy Kepes, *The Language of Vision* (Paul Theobald and Co., Chicago: 1964), 77.

⁶⁴ Yves-Alain Bois, "From Minus Infinity to Plus Infinity: Axonometry, or Lissitzky's Mathematical Paradigm," in Jan Debbaut (ed.), *El Lissitzky: 1890-1941: architect painter photographer typographer* (Thames & Hudson: London, 1990), 31.

⁶⁵ Stefano Corbu, *From Formalism to Weak Form: The Architecture and Philosophy of Peter Eisenman* (London: Ashgate, 2014), 82.

⁶⁶ Peter Eisenman, "Bifurcating Rowe," in Emmanuel Petit (ed.), *Reckoning with Colin Rowe: Ten Architects Take Position* (New York: Routledge, 2015), 57.

⁶⁷ Luscombe, "Illustrating Architecture," 910.

⁶⁸ Gevork Hartoonian, "Peter Eisenman: in search of degree zero architecture," in Hartoonian, *Crisis of the Object: The Architecture of Theatricality* (London: Routledge, 2006), 59.

⁶⁹ Luscombe, "Architectural Concepts," 586.

⁷⁰ Detlef Mertins, "Transparency: Autonomy and Relational." *AA Files*, 32 (Autumn 1996), 5.

⁷¹ Mertins, "Transparency," 4.

⁷² Rosemary Haag Bletter, "Opaque Transparency," *Oppositions*, 13 (Summer 1978), 123-124.

⁷³ Bryon, 'Revolutions in Space', 345. See also Peter Eisenman, "Cardboard Architecture: House I', in Kenneth Frampton and Silvia Kolbowski (eds.), *Five Architects: Eisenman, Graves, Gwathmey, Hejduk, Meier* (New York: Oxford University Press, 1975), 15.

⁷⁴ Somol, "Dummy Text," 25.

⁷⁵ Eisenman, 'Cardboard architecture: House I', 15.

⁷⁶ Krauss, "Death of a Hermeneutic Phantom," 175.

⁷⁷ Mertins, "Transparency," 3.

⁷⁸ In Eisenman's words on Rowe's influence: "I both carried this education forward and needed to react against it." Peter Eisenman, "The Last Grand Tourist: Travels with Colin Rowe," *Perspecta*, 41 (2008), 137.

⁷⁹ Kepes, *The Language of Vision*, 77.

⁸⁰ Mertins, "Transparency," 9.

⁸¹ Colin Rowe, "Introduction," in Frampton and Kolbowski (eds.), *Five Architects*, 3-7.

Like Gordon Wilson, Minus the Heritage Protection: Auckland's Upper Greys Avenue Flats, 1954-1959

Julia Gatley
University of Auckland

Gina Hochstein
University of Auckland

Abstract:

The Gordon Wilson Flats in Wellington (1954-59) have been the subject of much heritage attention and debate in recent years, as a result of the building's increasing state of disrepair and attempts by the owner, Victoria University of Wellington, to have it removed from the Wellington City Council's heritage schedule, to clear the way for its demolition.

Auckland's Upper Greys Avenue Flats (1954-59) have recently come under a similar threat, with Housing New Zealand Corporation announcing, in March 2018, its intention to demolish this building, which is in many ways similar to the Wellington building, except that the Auckland one is not included on Auckland Council's heritage schedule.

This paper offers a history of the design and construction of the Auckland building. This necessarily includes reference to its Wellington counterpart. Both are high-rise slab apartment buildings, designed as state rental flats under the Government Architect, Gordon Wilson. Both were built alongside blocks of state rental flats dating from the 1940s and comprise mostly two-storey maisonettes. The paper responds to the conference theme by giving particular consideration to the developing technologies employed in the construction of the Auckland building.

The paper also considers the building's heritage value. The similarities between the Upper Greys Avenue Flats and the Gordon Wilson Flats suggest that the pair should have the same heritage status. The paper discusses the complexities embedded in this suggestion, including both the haphazard ways in which New Zealand's heritage lists and schedules have been constructed, particularly as regards the country's modern heritage, and the extent to which state rental flats are represented on them. It concludes that the demolition of

either the Gordon Wilson Flats or the Upper Greys Avenue Flats would amplify the heritage value of the surviving building.

Introduction

Between 1937 and 1949, New Zealand's first Labour government built approximately 30,000 state rental houses up and down the country.¹ Most were detached or semi-detached, and were owned by central government and rented to members of the public. In those same dozen years, Labour also built thirteen blocks of state rental flats. Five of them have been recognised as important in the development of modern architecture in New Zealand – Wellington's Centennial Flats, Berhampore (1939-40), Dixon Street Flats (1941-44) and McLean Flats (1943-44), and Auckland's Symonds Street Flats (1945-47) and Greys Avenue Flats (1945-47).²

In 1949, a new National government swept to power, and stayed there until 1972, other than the three-year term from 1957 to 1960, when Labour was briefly returned to govern. As a general rule, these National governments promoted private home ownership.³ They favoured making low interest loans available to working New Zealanders, to help them to buy their own homes, rather than building large numbers of state rental houses. They tried to pare back the scale of the state housing programme and portfolio, and started to sell off older state houses to those who were renting them. New legislation for company-share apartments provided a model by which state flats could also, in theory at least, be sold to tenants.⁴ But the state flats were not easy to sell, even when mortgage terms were generous, and none of those mentioned in this paper was converted to company share.⁵

New Zealand's population grew rapidly in the post-war period. Private house construction flourished. Even though National favoured private house construction, the speed of the population growth and the continual demand for housing meant that it could never stop building state housing. In the 1950s, the massive expansion of the suburbs from both public and private initiatives triggered increased concern about urban sprawl, and in the 1950s and 1960s, the new state housing outputs demonstrate less emphasis on detached and semi-detached houses, and an increased number of medium-density typologies, including star flats.⁶ Concern about urban sprawl also put the idea of high-rise housing back on the government's agenda, and in 1954, it requested designs for two such blocks of flats for inner-city sites that it already owned, one on The Terrace in Wellington and the other at the southern end of Greys Avenue in Auckland.

These were the sites on which the Gordon Wilson Flats and the Upper Greys Avenue Flats would be built.

Both blocks were to be built alongside state rental flats completed by Labour in the 1940s: the Upper Greys Avenue Flats to the immediate south of the Greys Avenue Flats (which are sometimes known as the Lower Greys Avenue Flats, to differentiate them from the 1950s building); and the Gordon Wilson Flats to the north west of the McLean Flats. Under Labour, in the 1940s, the Housing Division of the Ministry of Works had produced designs for both of these sites, but the government had delayed construction because of post-war shortages in building materials, particularly steel.⁷ Under National in the mid-1950s, the two blocks were re-designed, with both initially to comprise ten storeys and 81 units.⁸ Both were built between 1956 and 1959, by the Fletcher Construction Company, following the new designs. The two blocks are very similar, utilising the slab apartment typology developed in Germany and Holland in the early 1930s.⁹ Both comprise mostly two-storey maisonettes, as popularised by Le Corbusier's Unité d'Habitation in Marseilles (1947-53), but on a smaller scale and without his much-loved double-height living spaces.



Figure 1. The Upper Greys Avenue Flats, Auckland, 2017. Photo by Gina Hochstein. **Figure 2** The Gordon Wilson Flats, Wellington, 2017. Photo by Julia Gatley.

All the high-rise blocks of state rental flats dating from the 1940s and the 1950s were designed and realised under Gordon Wilson, the 1940s ones in his capacity as chief architect of the Department of Housing Construction (from 1943, the Housing Division of the Ministry of Works), and the 1950s ones in his capacity as Government Architect. Wilson was a keen modernist, and very interested in high-density housing, for its potential to both impact the city and provide alternatives to the suburban model of house and

garden, with plenty of fresh air and sunlight, even a city view. He died in 1959, aged 59, when these buildings were nearing completion, and the new Wellington block was named in his honour. Wilson had lived in Wellington, and for the Auckland building, the Auckland District Architect, Graham Dawson, also played an important role, particularly during the building's construction.¹⁰

While the Gordon Wilson Flats and the Upper Greys Avenue Flats are similar in many ways, the Wellington building has been written about at length and the Auckland building, hardly at all. The two also have differing heritage status. Neither is listed by the country's central heritage agency, Heritage New Zealand, but the Wellington City Council scheduled the Gordon Wilson Flats as a heritage building by 1995. Auckland Council has not scheduled the Upper Greys Avenue Flats. It did, however, schedule the Lower Greys Avenue Flats many years ago, and Heritage New Zealand also listed the lower blocks as a Category II historic place as long ago as 1981.¹¹

The Gordon Wilson Flats have been under threat of demolition since 2012. Thus far, the building's heritage scheduling has saved it from that fate. The Upper Greys Avenue Flats came under threat as recently as March 2018.¹² Without any formal heritage recognition, the Auckland building is unlikely to survive this threat.

For all these reasons, the paper provides a history of the design and construction of the Upper Greys Avenue Flats. This necessarily includes reference to the building's Wellington counterpart. The paper responds to the conference theme by paying particular attention to the developing technologies employed in its construction.

The paper also considers the matter of heritage value and status. Are the Auckland and Wellington buildings of equal heritage value? Should the Auckland building also have been recognised through the country's formal heritage identification processes? That the two are so similar suggests so. The paper discusses the complexities embedded in this suggestion, including both the haphazard ways in which New Zealand's heritage lists and schedules have been constructed, particularly as regards the country's modern heritage, and the extent to which state rental flats are already represented on them. It concludes that the demolition of either the Gordon Wilson Flats or the Upper Greys Avenue Flats would raise the heritage value of the surviving building.

Recognition of the Gordon Wilson Flats

Much has been written about the Gordon Wilson Flats in recent years, particularly by way of unpublished heritage assessments and reports. The building also earned an article in

the *Journal of the New Zealand Institute of Architects* in 1961, following its completion.¹³

Heritage assessment of the Gordon Wilson Flats began in the 1990s, with the Wellington City Council adding it to its heritage schedule (item #299) and including a two-page summary of its history and significance in its 1995 heritage inventory.¹⁴ Lengthier assessments have followed in the current decade. In 2010, the then owners, Housing New Zealand Corporation, commissioned heritage consultant Barbara Fill and conservation architect Russell Murray to write a heritage assessment.¹⁵ This 37-page report did not enter the public realm until 2015 or 2016, when its release was sought under the Official Information Act. The Wellington City Council produced its own 12-page heritage assessment in May 2012 (the version in circulation today includes photographs added in 2015);¹⁶ Auckland architects Archifact produced a 67-page assessment for property consultants Wareham Cameron & Co. in May 2015;¹⁷ the Architectural Centre Inc. provided evidence in support of the building in December 2015;¹⁸ Heritage New Zealand compiled a List Entry Record on the building in 2016, after Victoria University of Wellington's Christine McCarthy submitted a proposal for its heritage listing;¹⁹ and DOCOMOMO New Zealand approved its registration of the building in February 2017.²⁰

This recent flurry of assessments responded to and paralleled the threats to the building's future. During routine maintenance checks in 2012, safety issues were discovered.²¹ A seismic assessment found that façade elements could be dislodged by an earthquake or high winds, and, as a consequence, Housing New Zealand vacated the building of its tenants.²² It then sought to sell the building, with the neighbour to the immediate west, Victoria University of Wellington, purchasing it for \$6 million in September 2014.²³ The university wished to demolish it, to redevelop the site and improve its presence on The Terrace – the city side of its Kelburn campus – and more specifically to replace the flats with a new pedestrian route between its main campus and the city.²⁴ Rather than applying for resource consent to demolish the scheduled heritage building, the university applied to the Council to have it removed from the schedule, that is, to have it de-scheduled. In May 2016, the Wellington City Council approved this application.²⁵ Local lobby group, the Architectural Centre Inc., appealed the decision and in June 2017, the matter was heard in the Environment Court.²⁶ The Architectural Centre argued that the flats were a rare example of late 1950s high-rise state housing.²⁷ Two months later, the Environment Court concluded that “the Gordon Wilson Flats [have] significant heritage value and therefore should not be delisted.”²⁸

During the appeal process, the building was found to be more structurally sound than previously thought, and engineers indicated that it could be strengthened, while also allowing the introduction of the university's desired pedestrian thoroughfare.²⁹ But at the time of writing, the building remains empty, and with no sign of any maintenance or repair, its condition continues to deteriorate.

Recognition of the Upper Greys Avenue Flats

Unlisted and unscheduled, the Upper Greys Avenue Flats have not seen any such analysis or assessment. The building earned a mention in the Fletcher Construction Company journal, *Arrowhead*, in 1956, when Fletchers were awarded the contract to build it,³⁰ and a fuller article in *Home and Building* in 1959.³¹ The late Greg Bowron, who worked as a heritage consultant for Housing New Zealand in the early 2000s, examined a broad range of housing types built by successive New Zealand governments and identified exemplars of each typology, intended to guide the future heritage listing of state housing resources. With his premature death in 2007, the project idled. His work remains unpublished, with limited access through Housing New Zealand staff. In the scholarly work that has been published to date, books on state housing by Gael Ferguson,³² Ben Schrader,³³ and Bill McKay,³⁴ are all primarily concerned with the detached and semi-detached state houses and therefore give comparatively little attention to state flats, including this particular building, while one of the co-authors of the current paper has written widely on the blocks of state flats built in the 1930s and 1940s,³⁵ but not previously in any detail on the successor buildings of the 1950s. The best source to date is Jack Smith's 2014 history of the Fletcher Construction Company, *No Job Too Hard*.³⁶ It gives particular attention to the building's construction. The current paper is the first to consider the history and design of the Upper Greys Avenue Flats in an architectural and heritage context. In addition to published sources, it makes use of archival documents held at Archives New Zealand, the Fletcher Trust Archive, Housing New Zealand and Opus, the company that inherited records from the Ministry of Works when it was privatised.

The Upper Greys Avenue Flats were designed in 1954-55. The contract was awarded to Fletchers late in 1955, following a tendering process. Construction started in March 1956. At that time, Fletchers observed that the cost of each maisonette, including the value of the land, would be equivalent to that of an average state house, "but floor space will of course be less."³⁷ National's Minister of Housing, the Hon. Dean Eyre, laid the

foundation stone for this building and its Wellington counterpart within three days of each other in August 1957.³⁸ The Auckland building was completed in early 1959.

It is an 11-storey slab block, 63 metres in length and 40 metres high. The block runs north-east to south-west, meaning south-east and north-west aspects for the individual units – for fresh air and sunlight as mentioned. The building's 7,280 square metre floor area comprises 87 rental units, as distinct from the 81 proposed in 1954. Most of the units – 75 of the 87 – are two-storey maisonettes, each with a balcony on the north-west side.³⁹ The maisonettes are in linear formation, with five layers of 15 maisonettes in total. The other 12 units, on the ground floor, are single-storey bedsits.⁴⁰ At roof level, a communal laundry provides washing and drying facilities.⁴¹ The building's circulation is via a semi-detached lift tower on the street façade and two stairwells, one at either end of the building, with long galleries between, for access to the individual units.

The building combines *in-situ* and pre-cast reinforced concrete and timber: *in-situ* concrete shear walls and floor slabs between the units (Fletchers referred to this as an "earthquake proof spine");⁴² pre-cast concrete panels for the building's exterior cladding; and timber within each of the maisonettes for the framing, flooring and staircases. The maisonette planning was considered to be economical, because only every second floor had to be made from reinforced concrete, and half the number of elevator stops and galleries had to be provided.⁴³ The concrete floors and beams also served the function of tying the lift tower to the main building at every second level.⁴⁴ Underneath the super-structure, the building's foundation comprises a cellular raft and incorporates a basement, founded directly on grade, yet varying in depth along the length of the building. Without piles or any additional support system, the stability of the structure relies entirely on the weight and the geometry of the raft.⁴⁵

In constructing the Upper Greys Avenue Flats, Fletchers used a new and advanced type of crane from Germany. This, an Acrow Liebherr crane, had a long range and the capacity to reach the whole of the building. Never before had a crane with such flexibility, strength and efficiency been used on a project in New Zealand.⁴⁶ Wilson took advantage of the large range of the crane in making the decision to use pre-cast concrete panels for the building's exterior.⁴⁷ He was also aiming to minimise the building's future maintenance costs.⁴⁸ The panels were cast against Redalon (a proprietary system trade name) and brushed to give them an aggregate texture, to which paint was applied.⁴⁹ The painting of the exterior was discussed in July 1958. Wilson wanted "to reduce the appearance of this bulk by the introduction of one or two horizontal lines. Thus I think that

in place of the two lines discussed with you, we should have one placed in the centre of the panel".⁵⁰ A colour scheme of grey, red and white was chosen.

Post-war austerity was an everyday reality for all New Zealanders and from 1950, due to restrictions on the use of electricity, the government installed gas in state houses and flats.⁵¹ The 'Sapphire' gas heaters used in the Upper Greys Avenue and Gordon Wilson Flats were a new technology imported from Britain, with the dual role of heating the units as well as the hot water supply in each of them.⁵² In May 1959, the same kind of gas heaters exploded at the Wellington offices of the Broadcasting Department and the Tourist and Publicity Department. It was noted that there could be "political repercussions" if such heaters were to explode in state rental flats.⁵³ Thus, two months later, the gas supply to tenants' heaters was cut off.⁵⁴

Throughout the construction of the Upper Greys Avenue Flats, reference was made to the building's Wellington counterpart, and many decisions were made to reduce costs relative to those of the Wellington building. For example, the cement content in the *in-situ* concrete was reduced in the Auckland building; sheet glass was used for staircases instead of the Georgian glass used in the Wellington building;⁵⁵ a lead composition was used instead of asbestos cement, because it was "cheaper and more suitable";⁵⁶ and redwood was used instead of heart rimu, both because rimu was felt to have a "greater tendency to rot"⁵⁷ and because the redwood was cheaper.⁵⁸ Jack Smith has commented that while the Auckland building benefited from the Acrow Liebherr crane, the Gordon Wilson Flats used a crane with a gantry-mounted mast-type fixed-boom that was not as economic, practical or fast.⁵⁹ And originally the lift in the Auckland building was not intended to reach the roof-top laundries, but in 1957 Graham Dawson requested that the lift shaft be extended by 1.2 metres (4 feet) to reach the roof,⁶⁰ and when this was approved, mention was made of the fact that the lift extension in Auckland was cheaper than that in the Wellington building.⁶¹

As was the case with all state houses and state flats in the early decades, units within the Greys Avenue building were let to tenants according to a priority system that included ability to pay the rent. They were aimed at middle-income earners, but would also be allocated to lower earners if not filled by middle-income earners.⁶²

The Upper Greys Avenue and Gordon Wilson Flats were the last of the central government's high-rise state housing schemes. That the high-rise units cost about the same as individual state houses must have been a key factor. In 1960, it was government

policy “to build about 50% of the State rental programme in multi-unit housing schemes”.⁶³ This meant buildings of three or four storeys rather than ten or eleven. By 1969, the multi-unit state housing programme was further curtailed. That year, the Minister of Housing, the Hon. John Rae, stated that there was no longer a “programme to continue construction for blocks of flats in Auckland.”⁶⁴

Conclusions, and the Upper Greys Avenue Flats Today

Even though the original 1940s design for state flats in Greys Avenue included buildings for the site on which the “upper” flats would be built, in the 1950s, there was no suggestion that the original 1940s design would be followed. Perhaps the 1940s design was considered old-fashioned by the 1950s; or perhaps new technologies had rendered it obsolete. Certainly the Upper Greys Avenue Flats used technologies that were more advanced than those employed in the Lower Greys Avenue Flats. The 1940s building was of load-bearing reinforced concrete, punctuated by distinct window openings, whereas the 1950s one, as discussed above, comprised a combination of *in-situ* concrete, pre-cast concrete panels and timber, and larger windows, with the end result being “taller, slimmer and, with reduced mass and more extensive glazing, lighter, in both senses of the word.”⁶⁵ The different designs ensure visual distinction between the Labour-built blocks of the 1940s, and the National-instigated blocks of the 1950s.⁶⁶

The Upper Greys Avenue Flats and Gordon Wilson Flats are sibling buildings. They were designed and built at the same time, are of similar scale and follow the same typology of the slab apartment building comprising mostly maisonettes. This paper shows sustained efforts to reduce the cost of the Auckland building relative to the Wellington one, particularly at the level of material selection and specification. Access to a technologically advanced crane is the one aspect of the Auckland building’s construction that surpasses that of its Wellington counterpart.

While the two buildings are very similar, the Upper Greys Avenue Flats are the poorer relation in terms of heritage recognition. The Gordon Wilson Flats are protected under the Resource Management Act 1991, by virtue of being scheduled as a heritage building on the Wellington City Council’s district plan, whereas the Auckland building has no formal heritage recognition and thus no protection. The Environment Court confirmed the heritage status for the Gordon Wilson block, on the grounds of architectural quality and rarity. Given their similarities, the Upper Greys Avenue Flats must be considered to be equal in terms of architectural value.

Heritage recognition of any one building is more complicated than this, however. It is usually the case that a building can be scheduled or listed either because it is a good example – an exemplar – according to criteria covering architectural, social, historical, cultural and scientific values, or because it has been selected as the representative example of some kind of typical, ordinary or everyday heritage. One of the co-authors of this paper surveyed the heritage recognition of New Zealand’s public housing in a 2010 article and concluded that state flats – of which there are only a small number – are heavily represented on the country’s heritage lists and schedules compared with the state houses, of which there are tens of thousands.⁶⁷ Such a situation reflects the haphazard ways in which the country’s heritage lists have been built up over time, without any systematic or thematic analysis. The state flats that are scheduled or listed all have that status by virtue of being exemplars. The question that needs to be asked is whether all of the important blocks of state rental flats – all the surviving exemplars – should be scheduled or listed.

Not surprisingly, the Upper Greys Avenue Flats are suffering from similar problems to the Gordon Wilson Flats. A structural report on the Auckland building from 2013 identifies issues with the pre-cast concrete post and panel fixings.⁶⁸ These are part of every unit, on both the front and rear façades. The problem arises from the unreinforced slot where the steel flat is inserted. This is part of the structural detail of the concrete post and the connection to the concrete floor slab. The concrete surrounding the slot has the potential for “a sudden brittle shear failure”,⁶⁹ if overloaded, for example, by an earthquake. Hence the suggestion that the posts and panels may fall from the building in the event of a natural disaster.⁷⁰ At the Upper Greys Avenue Flats, it has also been suggested that there is some significant cracking in the concrete of the semi-detached stair tower.⁷¹

Housing New Zealand staff have been generous in meeting with the current authors, and our colleague Bill McKay,⁷² twice over the last several months to discuss the future of the Upper Greys Avenue Flats, including hosting us on a tour of the building. Rather than focusing on the maintenance issues, they emphasise that the building is no longer fit for purpose because the slab typology is ill-suited to the demographic most in need of inner-city state rental housing. Today’s occupants are far removed from the middle-income earners for whom the building was built. They include beneficiaries and former rough sleepers, many struggling with mental health issues and a history of drug dependency. Such occupants need to be accommodated individually, or as couples where appropriate, meaning the building’s two-bedroom units are under-utilised. In addition, the long galleries providing access to the individual units compromise both privacy and security.

It is easy to imagine the Upper Greys Avenue Flats revitalised as a desirable building and place to live, if occupied by a different demographic. But those current residents and those on waiting lists and on the streets are Housing New Zealand's priority, and its intention is to replace the building with a larger complex comprising more single-bedroom units and a higher degree of on-site security and community support.

It is our conclusion that with the loss of the Auckland building, the heritage value of the Gordon Wilson Flats will escalate considerably, because instead of being a rare example of late 1950s high-rise state housing,⁷³ it will be the only surviving example.

Acknowledgement

The authors would like to acknowledge the School of Architecture and Planning at the University of Auckland for a PBRF grant that enabled Gina Hochstein to travel to Wellington to undertake archival work for this paper at Archives New Zealand, Housing New Zealand and Opus.

Endnotes

¹ State house is the New Zealand name for houses that are owned by central government and rented to members of the public. The government agency with responsibility for such housing today is the Housing New Zealand Corporation.

² Julia Gatley, "Labour takes Command: A History and Analysis of State Rental Flats in New Zealand, 1935-49", MArch thesis, Victoria University of Wellington, 1997.

³ Gael Ferguson, *Building the New Zealand Dream* (Wellington: Historical Branch, Department of Internal Affairs, and Palmerston North: Dunmore Press, 1994), 177.

⁴ "Flats or Sprawl," *Arrowhead*, 2, no. 3 (February-March 1956), n.p.

⁵ Ferguson, *Building the New Zealand Dream*, 180.

⁶ Ferguson, *Building the New Zealand Dream*, 189; Julia Gatley and Paul Walker, *Vertical Living: The Architectural Centre and the Remaking of Wellington* (Auckland: Auckland University Press, 2014), 91; and "New Design for State Flats", *Home and Building*, 20, no. 9 (February 1958), 31.

⁷ Gatley, "Labour takes Command".

⁸ "Report to Parliament on Housing, Vol. 1, 1954-1963", Government Printer, Wellington, 1954. W5 Box 2627, Archives New Zealand, Wellington. See also "Report of the Director of Housing Construction," *Appendix to the Journals of the House of Representatives*, 1954, Vol. II, D1, 53.

⁹ Walter Gropius was an important leader in the development of the slab typology, with projects including a design at the Building Exhibition, Berlin (1931), and a staggered multi-storey block at Wannsee shore (1931), but none were realised. Sigfried Giedion identifies the Netherlands as the first country to build such projects, with the first being Bergpolder, Rotterdam (1933-34), designed by Willem van Tijen, with Johannes Andreas Brinkman and Leender van der Vlugt. Sigfried Giedion, *Space, Time and Architecture: The Growth of a New Tradition* 5th edn (London: Oxford University Press, 1967 [1941]).

¹⁰ Wilson's and Dawson's names both appear on the drawings for the Upper Greys Avenue Flats, dated 26 April 1954, AADU 576 Box 1, Archives New Zealand. A Mr. Hitchcock (in place of

Graham Dawson) is also mentioned in the archival documents. See, for example, Memo, Mr. Hitchcock, 4 December 1961, AALF W1559 6112 Box 4, Archives New Zealand.

¹¹ Heritage New Zealand, "Greys Avenue Flats", www.heritage.org.nz/the-list/details/583, accessed 4 March 2018.

¹² Corazon Miller, "Demolition Looms for Faded Flats", *New Zealand Herald*, March 2, 2018, A13.

¹³ "The Gordon Wilson Flats, Wellington: The Work of the Architectural Division, Ministry of Works," *Journal of the New Zealand Institute of Architects*, 28, no. 1 (February 1961): 1-8.

¹⁴ "Gordon Wilson Flats" in "Wellington City Council Heritage Inventory", Wellington City Council, Wellington, 1995, n.p.

¹⁵ Barbara Fill and Russell Murray, "Heritage Assessment: Gordon Wilson Flats, 320 The Terrace, Wellington", Unpublished report prepared for Housing New Zealand Corporation, Wellington, 2010.

¹⁶ Wellington City Council, "Gordon Wilson Flats", Unpublished heritage assessment, Wellington, May 2012.

¹⁷ Archifact Architecture and Conservation Ltd, "Gordon Wilson Flats, 314 The Terrace, Wellington: Heritage Assessment," Unpublished report prepared for Wareham Cameron & Co., Auckland, 2015.

¹⁸ Architectural Centre Inc., "Submission on Plan Change 81: Rezoning 320 The Terrace and de-listing the Gordon Wilson Flats; Outline of Oral Submission", 15 December 2015. Available online at: <http://architecture.org.nz/wp-content/uploads/2013/06/Architectural-Centre-DPC-81-Outline-of-submissions.pdf>, accessed 13 May 2018.

¹⁹ Heritage New Zealand, "List Entry Record, List Number 9783; Site Reference P170465", Unpublished report, Wellington, 2016. The listing proposal was submitted in December 2015.

²⁰ Gina Hochstein, "Upper Greys Avenue Flats", DOCOMOMO International Fiche approved by DOCOMOMO New Zealand, 27 February 2017. Available online at: www.docomomo.org.nz/wp-content/uploads/2008/09/Gordon-Wilson-Flats-DOCOMOMO-full-fiche-2017_Low_res.pdf, accessed 2 March 2018.

²¹ Lane Nichols, "Unsafe Flats: Get out in Seven Days," *Dominion Post*, 10 May 2012, www.stuff.co.nz/dominion-post/news/wellington/6897252/Unsafe-flats-Get-out-in-seven-days, accessed 28 December 2017.

²² Marc Daalder, "Ghost Flats: The Battle for the Gordon Wilson Building," *The Spinoff*, 17 August 2017, <https://thespinoff.co.nz/society/21-08-2017/ghost-flats-the-battle-for-the-gordon-wilson-building/>, accessed 28 December 2017.

²³ Daalder, "Ghost Flats."

²⁴ Brad Flahive, "Gordon Wilson Flats to Remain Standing as Court Upholds Heritage Appeal," *Dominion Post*, 10 August 2017, www.stuff.co.nz/dominion-post/business/residential-property/95648522/gordon-wilson-flats-to-remain-standing-as-court-upholds-heritage-appeal, accessed 28 December 2017.

²⁵ Daalder, "Ghost Flats." See also Laura Dooney, "Appeal Lodged Against Decision to take away Heritage Status of Wellington Flats," *Dominion Post*, 27 July 2016, www.stuff.co.nz/dominion-post/news/wellington/82525036/Appeal-lodged-against-decision-to-take-away-heritage-status-of-Wellington-flats, accessed 28 December 2017.

²⁶ [2017] NZEnvC 116, *The Architectural Centre v The Wellington City Council*. <http://architecture.org.nz/wp-content/uploads/2016/08/2017-NZEnvC-116-The-Architectural-Centre-v-Wellington-City-Council.pdf>, accessed 28 December 2017.

²⁷ Dooney, "Appeal Lodged Against Decision."

²⁸ "Gordon Wilson Flats," Architectural Centre website, <http://architecture.org.nz/gordon-wilson-flats/>, accessed 28 December 2017.

²⁹ Ben Schrader, "In Defense of the Gordon Wilson Flats and Post War Modernism," *Dominion Post*, 15 August 2017, www.stuff.co.nz/dominion-post/comment/95745934/ben-schrader-in-defence-of-the-gordon-wilson-flats-and-postwar-modernism, accessed 28 December 2017.

³⁰ "Flats or Sprawl."

³¹ "Greys Avenue Flats: The Ministry of Works Makes a Welcome Addition to Auckland Skyline", *Home and Building*, 22, no. 1 (1 June 1959): 62-64, 93-95.

³² Ferguson, *Building the New Zealand Dream*.

³³ Ben Schrader, *We Call it Home: A History of State Housing in New Zealand* (Auckland: Reed, 2005).

³⁴ Bill McKay, Andrea Stevens and Simon Devitt, *Beyond the State: New Zealand's State Houses from Modest to Modern* (Auckland: Penguin, 2014).

³⁵ Julia Gatley's work on state rental flats includes:

- "Building Progress: The McLean Flats and the Hanson Street Flats", *The Modern World: Architecture and Design in New Zealand, 1918-1970*. (Auckland: Unitec, 1995), n.p.
- "Privacy and Propaganda: The Politics of the Dixon Street Flats", *Fabrications: The Journal of the Society of Architectural Historians, Australia and New Zealand*, 7 (1997): 77-98 (<http://dx.doi.org/10.1080/10331867.1996.10525098>);
- "Labour takes Command";
- "Going Up Rather than Out: State Rental Flats in New Zealand, 1935-1949", in Barbara Brookes (ed.), *At Home in New Zealand: Houses History People* (Wellington: Bridget Williams Books, 2000), 140-54;
- "Modernism and the Quadrangular Courtyard: Wellington's Berhampore Flats, 1938-1940", in Christine McCarthy (ed.), *"Pleasing Homogeneity", "Dull Times", and "Animated Cocktails": New Zealand Architecture in the 1930s* (Wellington: Centre for Building Performance, Victoria University of Wellington, 2006), 32-38 ;
- "Shabby and Shambling: Decadent Housing in Greys Avenue", in Christine McCarthy (ed.), *"From Over-Sweet Cake to Wholemeal Bread": The Home & Building Years: New Zealand Architecture in the 1940s* (Wellington: Centre for Building Performance, Victoria University of Wellington, 2008), 46-52; and
- "The Heritage Identification of Modern Public Housing: The New Zealand Example", *Journal of Architecture*, 15, no. 5 (2010), 681-94 (<http://dx.doi.org/10.1080/13602365.2010.519960>).

³⁶ Jack Smith, *No Job Too Hard: A History of Fletcher Construction Volume II: 1940-1965*, (Wellington: Steele Roberts Aotearoa, 2014), 347.

³⁷ "Flats or Sprawl."

³⁸ That at the Gordon Wilson Flats was laid on 6 August 1957, and at the Upper Greys Avenue Flats on 9 August 1957. See Notes on the building provided by John Walls, Archivist, Fletcher Trust Archive, Auckland, 4 August 2017.

³⁹ This is different from the orientation of the Gordon Wilson Flats, which is sited closer to north-south, with the balconies on the east side and the galleries on the west.

⁴⁰ Smith, *No Job Too Hard*, 345.

⁴¹ Memo, General Manager, Wellington, to the Auckland Manager, State Advances Corporation, 7 October 1958. AALF W1559 6112 Box 4, Archives New Zealand.

⁴² "Flats or Sprawl."

⁴³ "Flats or Sprawl."

⁴⁴ Clendon Burns & Park Ltd, "Structural Report, Detailed Seismic Assessment, 139 Greys Avenue, Auckland," Unpublished report, December 2013, 4.

⁴⁵ Holmes Consulting Group, "Structural Assessment: Draft Report of Greys Avenue Housing New Zealand Accommodation Block," Prepared for Architectus, 2.

⁴⁶ Smith, *No Job Too Hard*, 347.

⁴⁷ Smith, *No Job Too Hard*, 347.

⁴⁸ Smith, *No Job Too Hard*, 347.

⁴⁹ Notes on the building provided by John Walls.

⁵⁰ Letter, Gordon Wilson, Government Architect, to the District Architect, Auckland, 18 July 1958. W453, Archives New Zealand. See also Letter, Roger Hay, Draughtsman, Ministry of Works, Auckland, to Gordon Wilson, Government Architect, 10 July 1958. W453, Archives New Zealand.

⁵¹ "Approval for Gas Supplies to State Houses", *Evening Post*, 26 May 1950. Memorandum titled Press Statement, from the Minister of Housing's Secretary, to the General Manager, State Advances Corporation, 21 May 1956.

⁵² Memo, General Manager, Wellington, to the Auckland Manager, State Advances Corporation, 7 October 1958. AALF W1559 6112 Box 4, Archives New Zealand.

-
- ⁵³ Memo, Manager to the General Manager, Wellington, State Advances Corporation, 15 May 1959, AALF W1559 6112 Box 4, Archives New Zealand.
- ⁵⁴ Letter, General Manager, State Advances Corporation, to the Commissioner of Works, Wellington, 15 October 1959. AALF W1559 6112 Box 4, Archives New Zealand.
- ⁵⁵ Contract Price Adjustment Schedule No 2, Fletcher Construction, 9 December 1955. AADU 576 Box 1, Archives New Zealand.
- ⁵⁶ Contract Price Adjustment Schedule No 4, Fletcher Construction, 28 March 1958. W453, Archives New Zealand.
- ⁵⁷ Contract Price Adjustment Schedule No 3, Fletcher Construction, 13 November 1957. W453, Archives New Zealand.
- ⁵⁸ Fill and Murray, "Heritage Assessment," 17.
- ⁵⁹ Smith, *No Job Too Hard*, 347.
- ⁶⁰ Letter, Graham Dawson, District Architect, Auckland, to the Government Architect, Wellington, 13 September 1957. W453, Archives New Zealand.
- ⁶¹ Letter, Manager to General Manager Wellington, State Advances Corporation, 19 November 1957. AADU 576 Box 1, Archives New Zealand.
- ⁶² Letter from Manager to General Manager Head Office, State Advances Corporation, 17 November 1959. AALF W1559 6112 Box 4, Archives New Zealand.
- ⁶³ Papers and notes collected by Greg Bowron, Housing New Zealand Corporation.
- ⁶⁴ Letter, Hon. John Rae, Minister of Housing, to the Director, Tileman New Zealand, 14 August 1969, Archives New Zealand.
- ⁶⁵ Julia Gatley, "Greys Avenue Flats – Lower and Upper," in Julia Gatley (ed.), *Long Live the Modern: New Zealand's New Architecture, 1904-1984* (Auckland: Auckland University Press, 2008), 46.
- ⁶⁶ Heritage New Zealand, "List Entry Record, List Number 9783.
- ⁶⁷ Gatley, "The Heritage Identification of Modern Public Housing," 681-94.
- ⁶⁸ Clendon Burns & Park Ltd, "Structural Report."
- ⁶⁹ Clendon Burns & Park Ltd, "Structural Report," 11.
- ⁷⁰ Clendon Burns & Park Ltd, "Structural Report," 11.
- ⁷¹ Holmes Consulting Group, "Structural Assessment," 4.
- ⁷² Bill McKay had spoken against the demolition on "Urban Issues with Bill McKay", on Katherine Ryan, "Nine to Noon", *Radio New Zealand National*, March 5, 2018. Available on www.radionz.co.nz/national/programmes/ninetonoon/audio/2018634710/urban-issues-with-bill-mckay, accessed 31 May 2018.
- ⁷³ Dooney, "Appeal Lodged Against Decision."

Potential for Interdisciplinary Collaboration Between Architecture and Social Science in Post War Urban Redevelopment

Morten Gjerde
Victoria University of Wellington

Emina Kristina Petrović
Victoria University of Wellington

Casimir MacGregor
Building Research Association of New Zealand

Abstract

In 1956, the American Institute of Architects called for increased integration of architecture with the physical, biological, and social sciences. The aspiration to include other forms of knowledge to complement the contemporary emphasis on technology is telling. It begs the question; was this an effort to consolidate and strengthen architectural technology by making it more scientific than in the past? To date it has been unclear whether such collaborations actually occurred, and if they did, whether they persisted. This paper evaluates collaborations between architecture, urban planning and social science during the post World War II period in the United States. Comparisons are made with the Chicago School of Sociology, which produced complex interpretations of how cities performed from the perspective of the people living there. Findings of the sociologists appear to have been insufficiently reflected upon in architectural and urban planning circles. By examining the technocratic aspirations to interdisciplinary collaborations between architecture and social science, it is possible to observe a disconnect between the doing and knowing in the range of relevant disciplines. This exploration reminds us of some of the important obstacles to interdisciplinarity. It also highlights that architecture and urban planning should not be considered without reference to the social world.

Introduction

In 1956, the American Institute of Architects (AIA) approached the National Science Foundation (NSF) with the suggestion that they help organise a conference on the 'relationships of the physical, biological, and social sciences'. Although the conference did not take place until 1959, a seminar on the same topic was held at the 1958 AIA Convention in Cleveland.¹ Communication and knowledge-sharing between architecture and other disciplines, such as sociology, were on the rise from the 1950s and can best be appreciated in the context of technocratic aspirations of the period. An outcome that increased communication and knowledge-sharing between the disciplines was a series of conferences and publications, where overlaps between architecture and the social sciences were discussed. Many of these continue today. This paper takes 1956 as a watershed moment and seeks to examine interdisciplinary collaborations between social science, architecture and urban planning practitioners in America between the 1950s and the late 1960s.

By exploring interactions between architecture, urban planning and social science (especially sociology) this paper seeks to better understand the relationship between technocratic implementation tools and corresponding disciplinary knowledge. The central question driving this investigation is how well-aligned the doing and the knowing are around ambitions toward interdisciplinary collaboration. In order to bring these developments to light, the paper examines the interactions and disconnections between urban planning and the social sciences in and around 1956 America. This period in American history was one of great transformation.² During these years the country's cities underwent significant change, ranging from increased urbanisation due to industrialisation and immigration to infrastructure renewal and expansion, including highway systems.³ Urban planning was seen as a tool to help manage the transformations and their impact on the ways people conducted their lives. Given that the physical changes to the American cities in the post-World War II period were needed mainly because of social transformation, the paper critically searches for evidence of overlaps between the social science and urban planning and architectural practices. First, it provides an overview of the influences within the development of architecture and urban planning in America. Second, it outlines the academic developments in architecture and urban planning during this time, with particular reference to the work of Catherine Bauer Wurster. The third section examines the Chicago School of Sociology and its now seminal studies on urban social life and how this knowledge related to urban planning practices. Our research suggests that while conditions for collaboration and exchange were conducive, in practice the uptake of social science knowledge was limited. Instead,

urban planning continued to rely on abstract notions connected with modernist theories of design,⁴ while social science efforts were mainly focused on documenting the complexities of urban life. It is possible to conclude that this dichotomy led to challenges for the two disciplines to overcome if they were to collaborate effectively.

Influences on architecture and urban planning developments

To better understand the architectural and urban planning developments of the post-World War II period, it is helpful to identify the key characteristics of the pre-existing historical context. For this study, two influences are the most relevant: 1) the regulatory context which defined some aspects of urban redevelopment, and 2) the arrival of the European modernist influences on urban planning.

From the nineteenth century, issues related to uncontrolled urban development have been extensively debated in literature.⁵ In many parts of the world these discussions gradually began to focus on possible interventions, and in the United States, the federal power to support such improvements increased with the Housing Act of 1937.⁶ This was the first act that created an opportunity for the federal government to build housing directly (although only as a model estates), and also empowered individual states to increase their housing stocks. In the first decade after the Act was introduced, a total of 165,000 new units were delivered.⁷ The Act was framed to provide financial assistance to the states 'for the elimination of unsafe and unsanitary housing conditions [and] for the eradication of slums'.⁸ Through the extensive efforts of Catherine Bauer and other proponents of modern housing, a loophole was also created that would allow housing to be constructed on bare land. In the first decade after the Act was introduced, 28% of all development was on previously undeveloped land.⁹ After publishing the *Modern Housing* (1934),¹⁰ Bauer directed her advocacy efforts toward this legislation in the hope that working families could have better access to quality housing. While the Act has at times been seen as a Pyrrhic victory of sorts, some recent works argue that it was 'a triumph of liberal activism that came through the legislative 'sausage-making' process surprisingly well.'¹¹ Many of the key features of the 1937 Housing Act were retained in the subsequent 1949 Housing Act.

Another influence was the relevance of the social sciences in modernist approaches to urban planning. The Congress for Modern Architecture (*Congrès Internationaux d'Architecture Moderne* or CIAM) confirmed this during their first meeting in La Sarraz in 1928, when the membership asserted the importance of 'putting architecture back on its real plane, the economic and sociological plane.'¹² CIAM can be seen as deliberately

aspiring to create an avant-garde, anti-traditionalist architecture, with 'efforts to reform society through architecture.'¹³ The question is, how did these sentiments evolve into practice?

The field of urban planning was reasonably well established as a professional discipline in the late-nineteenth and early-twentieth centuries, accompanied by legislation and professional education in the area.¹⁴ During this period cities were mainly understood through statistical analysis, with reference to land use activities, residential densities, income and demographic characteristics of the inhabitants. Rather than continue with this tradition, CIAM proposed changing the focus onto four urban functions: dwelling, work, recreation and transportation, in order to confront the perceived problems.¹⁵ These statements were subsequently reinforced in the Athens Charter, which was based upon the Town-Planning Chart from the fourth CIAM Congress, held in 1933 in Athens,¹⁶ and much later in José Luis Sert's *Can Our Cities Survive?* (1942).¹⁷

Unsurprisingly, this approach was challenged for oversimplifying the actual circumstances, with some of this criticism also coming from within CIAM. Arthur Korn and Cornelius van Eesteren both argued that production and class relationships, as well as prevailing social conditions, were poorly analysed. These were needed to inform and support predictions of users' need in various areas, as well as toward aesthetic principles.¹⁸ Additional critique was directed at this emphasis on four urban functions by Lewis Mumford, who declined to write the introduction for Sert's *Can Our Cities Survive?* He argued that 'the four functions of the city do not seem to me to adequately cover the ground of city planning: dwelling, work, recreation, and transportation are all important. But what of the political, educational, and cultural functions of the city design.'¹⁹

Such simplifications limited CIAM's ability to foster specific strategies to redirect attention toward social factors. In turn, this constrained their ability to bridge existing gaps between urban planning and social sciences. The weakness of this link with social sciences was perceived to extend across all modernist approaches to urban planning.

Academic developments in architecture and urban planning

As the intense slum clearances and redevelopments informed by the ideas of European modernists accelerated, plans for extensive redevelopment were drawn up and implemented in cities across the country.²⁰ Funding from two government initiatives, the GI Bill and the Housing Acts of 1937 and 1949, helped support large scale redevelopment.

While modernist design approaches became increasingly common, dissatisfaction with the built outcomes also began to grow. Questions began to surface around the appropriateness of these large scale redevelopments as solutions for the poverty and poor environmental conditions that had arisen during the Great Depression and the economic regimes of the period.²¹ Similarly, the simplicity and sterility of the *Ville Radieuse* and other modern utopian models were being challenged from within the profession by groups such as Team 10, a young group of CIAM upstarts and New Brutalists.²² Cities were much more complex than Le Corbusier would have us believe and many academic and practicing planners were eager to understand how people could influence and might be influenced by these complexities.

Business leaders and government officials also took interest in cities. With an awareness of scientific advances made by defence industries during the war, many began to look for ways that research could help improve society in times of peace. A rising consciousness of urban blight, shortages of affordable housing, general obsolescence of the urban fabric and awareness of increasing suburbanisation stimulated growth in research activities. As a consequence, government and private institutions would help establish and fund research focussed on hard and soft sciences in a number of leading universities.²³

The emerging Cold War and anti-communist fervour led academics toward 'techno-scientific thinking' in the 1950s. As academics and universities became aware of persecutions seemingly brought on by the target's political leanings, they retreated toward the centre. By re-focussing their thinking on the sciences, including the social sciences, academics and practitioners were provided with a rationale for not becoming more deeply involved in political discussions.²⁴ Historians of these developments, Ockman and Sachs, argue that the government demanded, through its actions, a maximum of technical ingenuity with a minimum of dissent and that this completed a process of depoliticising modern architecture in the United States.

These circumstances also led to changes in many of the nation's schools of architecture. There began to develop a second form of modernism, which sought to emphasise social over artistic concerns, with a view to enhancing opportunities for designers to collaborate with other professionals.²⁵

With increased funding to universities in the late 1940s and 50s, a number of schools, started to define architectural education as a specialist field, in a similar way to other

academic disciplines.²⁶ Schools invested in research to enhance their specialist knowledge and to develop the necessary expertise. It had become clear to them that a culture of experts in architecture would lead change in the future, along incremental steps of technological modernisation.

Foundations for collaborative engagement around planning and design of cities had been laid at Harvard University with the establishment of the Graduate School of Design. Shortly after his arrival in 1935, Joseph Hudnut amalgamated Harvard's schools of architecture, landscape architecture and city planning into a single new graduate school, continuing the trends seen elsewhere in the university away from siloed thinking toward increased coordination between and amalgamation of academic subjects.²⁷ This model fitted well with Hudnut's pedagogical philosophies, which considered design to be a collaborative effort shared equally by experts, interpreting their aesthetic and functional ideas into space and form.²⁸ This model would later become the model for architectural programmes throughout the country, with the three most relevant to this discussion being the University of Pennsylvania (Penn), the Massachusetts Institute of Technology (MIT) and the University of California at Berkeley.

William Wurster and Catherine Bauer were an interesting thread through these programmes. Bauer had only briefly studied architecture but became familiar with European housing during her extensive travels in 1930. She came to admire contemporary housing in Germany and Scandinavia, which was designed to confront the challenging economic conditions and the harsh local environments. She encountered housing that had been carefully designed for people with a range of different needs and expectations in these countries. She also came to understand that technical, economic and social research was being carried out to inform the designs and to understand the effects the settings once completed were having on the people who used them. By her own admission, what she had seen during her travels came as an epiphany of sorts and changed her from being 'an aesthete to a housing reformer'.²⁹ Following this, she went on to advocate for architects to be more considerate of people's social and psychological needs in their work. Bauer wrote well and was invited to express her ideas regularly in publications such as the *New York Times* and *Fortune* magazine.

The research she conducted for these articles led to contact with a number of architects and planners, including Adolf Loos and Clarence Stein. She also became acquainted with urban theorist and historian Lewis Mumford while gathering information about European housing communities for a series of articles they were to write together. In

1934, Bauer went on to publish *Modern Housing*, an extensive and well-researched review of housing programs and projects for the pre- and post-WWI periods.³⁰ Based in large part on what she had discovered during her European visits, Bauer's strong beliefs around social equity and the rights of individuals to access housing that could accommodate their needs were clearly laid out. She wrote that 'good housing for the average citizen is not a normal product of a capitalist society. It can be achieved, even partially, only when there is an active demand by workers and consumers, which is strong enough to over-balance the weight of real estate and allied interests on the other side'.³¹ Through her published work, Bauer gained a strong and positive reputation for her knowledge about issues affecting housing. Only she, it seemed, had a full enough picture to be able to write comparative and authoritatively on the subject. This was the basis for her significant contributing to the writing of the 1937 Housing Act. After 1937, Bauer left politics to continue her comparative studies of housing in Europe before eventually ending up in Berkeley with a lectureship in public social service in 1940.

Soon after her arrival there, Bauer met Wurster, who at that time was pursuing a career in architectural practice. Wurster's housing projects were considered highly responsive to place and client needs. After marrying him, Bauer accompanied Wurster to Harvard, where he was to take up doctoral studies in city and regional planning. Bauer had a strong influence on Wurster's professional ethos, and he saw his studies as a way of becoming more closely acquainted with her expertise and professional passions. Then, in 1945, Wurster was offered the role of Dean of architecture at MIT, which he accepted, taking him away from his studies. While he never returned to complete his degree, his interests in planning and social sciences would go on to influence his pedagogical approaches at MIT and later at Berkeley.

The architecture school at MIT included a division of city planning and housing, which emphasised relationships between planning and the social sciences and the practical application of political and economic theory.³² While they were linked in the organisational structure of the school, Wurster took steps to articulate the planning programme on the basis that the needs of the planning profession were quite different to those of architects. This set up the conditions for collaborations to occur between experts from different fields as he reorganised the curriculum around the design studio. Students were encouraged to take responsibility for researching problems falling within the domain of their expertise in large scale, complex projects and then to share their findings with other members of the team. Wurster felt that architects could have an exciting and key

role in shaping human environments but that this could only be made manifest by working collaboratively with others and by treating their collaborators as equal peers.³³

The planner Kevin Lynch was appointed jointly to MIT's architecture and planning programmes by Wurster. Along with championing collaboration between these disciplines, Lynch pursued an agenda of finding out the needs of users at the project and urban scales. The research findings that eventually made their way into the seminal publications *The Image of the City* and *Good City Form* were developed through his work with students in design studio and seminar courses. Lynch was also a member of the Joint Centre for Urban Studies, which had been established between the planning departments of Harvard University and MIT in the 1950s with funding from the Ford Foundation. In a relatively short time, the Joint Centre became the preeminent source of new knowledge in city planning and urban studies.³⁴ The centre had a mission of pursuing basic research and of influencing, through its research, urban development policies at local, national and international levels.

Like MIT, Penn's multidisciplinary pedagogical model was modelled on Harvard's GSD. A point of difference however, was that the GSD was built around the Bauhaus-derived ideas of Gropius and the architecture-centric views of urban development promoted by CIAM and Sert, whereas the social sciences had displaced these ideas in Penn's Graduate School of Fine Arts (GSFA). In pursuing a social sciences-based approach, institutional leaders looked increasingly toward research being done at the University of Chicago.³⁵ The design studio at Penn was central to the education of all architects, planners and landscape architects. These studios were linked closely to courses taught in other subject areas, guided by the philosophy that topics such as sociology should be studied while students are immersed in their design work in order that the information is made more relevant. Research was supported by the cross disciplinary Institute for Urban Studies, which had been established to provide the GSFA with what Robert B Mitchell had characterised as the 'equivalent of a medical school teaching hospital.'³⁶ The scientific resources of the university could thereby be pooled to provide ongoing attention to the rapidly changing issues confronting cities at the same time as generating basic social scientific knowledge.

A final example of how architecture programs were changing in the post-war years to broaden the conception of design across all scales was at the University of California at Berkeley. Wurster was recruited to Berkeley from MIT in 1950 and, with Bauer's interests in social issues to help guide him, he completely reshaped the environmental design

programmes there over the following nine years. Planning, landscape architecture and architecture were each situated in separate parts of the university at the time and Wurster brought them together into a larger, renamed College of Environmental Design. Dropping the term architecture from the name of the college was not uncontroversial but it heralded the term environmental design, which today has broad acceptance and is expressive of the broad range of individual disciplines involved in shaping human surroundings.

Through this set of changes, architectural and planning education in the United States increased its own identity as a discipline, the role of research within the discipline, and at least theoretical readiness for collaboration with other the social sciences.

The rise of social science in response to urban transformations: the Chicago School of Sociology

The increased concern of American architecture and urban planning in post-WWII America with 'techno-scientific thinking' was also found in social sciences, such as sociology attempting to be more scientific in its approach. While architectural technologies sought to transform the world around them, others such as social scientists sought to understand the transformations that were happening around them. The concern in this section is to examine how social scientists (in this case sociologists) sought to understand the transformations that were taking place and how this related to architecture and urban planning in this period. In order to explore these issues, this paper focuses on the so called 'Chicago School' which refers to a specific group of sociologists at the University of Chicago, the main period of which was the turn of the 1900s until the 1950s.

The legend of the Chicago School is generally known within the discipline of sociology and other cognate social sciences for two key elements. First, it focused on urban environments as a form of social laboratory. At the time, Chicago's population was undergoing considerable change, it became increasingly urban through migration from surrounding rural areas, other American cities and immigration from Europe. The growth in population led to increased development and changes to the urban environment. The second key characteristic of the Chicago School was its approach to sociology – where it sought a more scientific approach through the use of more systematic methods such as ethnography to capture the experiences of people living in city.³⁷

A key figure of the early days of the Chicago School was Robert E. Park, an American who had initially studied with John Dewey the philosopher. This was followed by doctoral

training in Germany, where he studied with Georg Simmel in Berlin, and Wilhelm Windelband (a philosopher) and Alfred Hettner (a geographer) at the University of Heidelberg. Along with Ernest Burgess and Louis Wirth, Park focused his research on urban ecology. In Wirth's view, a sociology of the city is to discover the forms of social interaction and organization that emerge in relatively permanent, compact settlements of large numbers of heterogeneous individuals.³⁸ For Wirth and other members of the Chicago School, cities were seen as urban ecologies, defined by a range of features including loss of primary relationships, weaker social control, a greater division of labour and that urban dwellers treat others instrumentally. Wirth suggested that urbanism is created by the relationship between: (A) numbers of population, (B) density of settlement, (C) heterogeneity of inhabitants and group life. Thus, the early Chicago School tended to examine the city in terms of changing patterns of spatial arrangement of populations and institutions.

This view of the urban environment was very different from the next generation of the Chicago School, which was led by Everett C. Hughes, Herbert Blumer. They sought to understand the urban environment from the perspective of symbolic interactionism, inspired by the work of George Herbert Mead. For Mead, reflexivity was crucial to the self as a social phenomenon. Mead provides an opportunity for the individual to carry on internal conversations in reference to an environment that has symbolic meanings and that influences the self. Mead commented on the role of objects and the reflexive nature of the self; '[a]nything—any object or set of objects, whether animate or inanimate, human or animal, or merely physical—toward which he acts, or to which he responds, socially, is an element in what for him is the generalized other; by taking the attitudes of which toward himself he becomes conscious of himself as an object or individual, and thus develops a self or personality.'³⁹ The symbolic interactionist perspective of the urban environment within the second generation of the Chicago School contrasts with the first generation in that focused on urban ecologies. An understanding of the urban environment from a symbolic interactionist perspective means that the relation people have with the built environment is often positioned inwards towards self-understanding and experience. This is contrasted with the earlier ecological perspective where cities were seen as a complex web of dynamic processes where city, land, culture and population operated as an in separate whole.

In these two early engagements with the urban built environment, the Chicago School of Sociology sought to create knowledge within the academy and to document, as a witness, the mass urbanisation, migration and industrial development that was happening

around them. This intense interest in social issues within the city led to spot maps of Chicago being created, which outlined places of specific behaviours, including alcoholism, homicides, suicides, and poverty.⁴⁰ While this desire by the Chicago School to highlight pressing social issues within the urban environment, there is little evidence for its members collaborating with urban designers, planners and architects in order to reform the urban environment materially. Given their intense interest in cities, the questions must be asked; why not?

Broady suggests that sociological research and insight fell out of favour amongst planners and architects especially within the 1950s-1960s.⁴¹ Sociologists (who at the time were situated mainly at universities) often lacked opportunities and financial support, which inhibited the contribution they could make to urban planning. However, Broady also suggests that one reason for the disconnect between sociology and urban planning was due to their different understandings of time. Sociologists rarely predict the future. As can be observed with much of the Chicago School, it was more concerned about documenting the present, such as the study of Polish immigrants in Chicago by Znaniecki and Thomas in 1918.⁴² In contrast, planners must use whatever evidence they have access to in order to anticipate the future. However, as the work of Jane Jacobs⁴³ would later highlight, this was not always the case.

Sociological engagement with urban planning, particularly the earlier work by Patrick Geddes and Lewis Mumford, tended to stress a 'survey before plan' approach. In this sense, social research including surveys, help to establish the 'facts' that could inform planners about how to achieve social goals for the city – this view of sociology is much criticised by the profession as mere market research. Further, it could be argued that the perspectives of Chicago School, such as the symbolic interaction was concerned with knowledge and experiences of the city, which made it difficult for the professions, such as architecture, planning and urban design to engage with sociological research as they sought to plan space, rather than understand a person's relation to space. This is an interest that would develop later in the domains of architecture and urban design.

However, if during the pre-1956 period American sociological knowledge is reduced to a mere survey tool, this would also suggest that it undermines sociology's contribution to theoretically based analysis of urban life. Theory about cities, and urban life more generally, are important for urban design, planning and architecture as these professions need to understand *how* cities function. However, such insights can only come from accurate empirical observations of a particular phenomenon, which then leads to

development of theories that can help explain what is happening and why. It can therefore be suggested that the lack of collaboration between sociologists, architects and urban planners has been about this contrast; too much simple fact finding and not enough analysis leading to useful and productive theory. Planners supported architectural determinism, the orthodoxy at the time, which states that physical structures determine social relationships³⁸. This can be contrasted with sociologists who document experiences of living in cities and how cities are shaped and shape our social relationships.

Conclusion

What emerges through this paper is that, while social scientists and planners in the post World War II period in the United States may have each been interested in people and cities, they viewed the relationships between them from different perspectives. Social scientists were engaged with understanding how people made use of and were impacted by the form of cities. However, it appears that urban planners continued to be less interested in the evidence that social scientists could provide to help them in their work. Planners remained fixed in their interest in how physical space could be manipulated and transformed a priori. Social science has a tendency to look back in order to assemble evidence on which theories can be based, while planning must look forward. Thus to be effective in this, planners need theories on which to base their proposals for urban change and these theories are mostly useful when clearly articulated and responsive to social need – social need in the present, but also the future. It is perceptions of time that differentiates distinguishes between urban planning and social scientific disciplines.

In looking for answers as to why there was little collaboration between the design professions and social science, it is important to look to the wider context in which several sources discredit the notion of value-neutral technocracy during the 1950s to 1970s. This can help explain why social science had limited impact on planning policies at the time. In value-neutral planning, technical expertise is discredited, as it is clear that any planning decision could be justified through expert technical testimony. In practice, and despite a mandate to be responsible to no sector, planners sought to substantiate policies that tended to favour the elite sectors of society. From this it has been argued that when civil servants (planners) collaborate with social scientists, it is to use them to justify preselected policies, rather than help create socially progressive policies. Social scientists' data would be misappropriated and examined from different perspectives until they were found to support the desired conclusions. On these levels, it can be seen that planners continued to serve the needs of the dominant capitalist economy.

Endnotes

- ¹ Gary T. Moore, 'Environment and behavior research in North America: history, developments, and unresolved issues,' in *Handbook of environmental psychology*, Vol. 2, Eds. Daniel Stokols and Irwin Altman (Malabar, Florida: Krieger Publishing Company, 1991, first published in 1987), 1365; Marilia Bonnes and Gianfranco Secchiarioli, *Environmental psychology: a psycho-social introduction* (London: Sage Publications, 1995, Originally published in Italian as *Psicologia Ambientale* in 1992), 5.
- ² Michael Pacione, *Urban Geography: A Global Perspective* (Abingdon, UK: Routledge, 2009): 320-328.
- ³ Lewis Mumford, *The City in History* (San Diego, CA: Harcourt, 1961): 543-555; Spiro Kostoff, *The City Assembled* (London: Thames & Hudson, 1992): 231-239.
- ⁴ David Gosling, *The Evolution of American Urban Design* (Chichester, UK: Wiley Academy, 2003): 37-47.
- ⁵ Frederick Engels, *The condition of the working class in England: from personal observation and authentic sources* (London: Granada, 1969; first published in 1844); George Godwin, *Town samps and social bridges* (New York: Humanities Press; Leicester University Press, 1972; first published in 1859); Charles C. Reade, *The revelation of Britain: a book for colonials* (Auckland: Gordon and Gotch Proprietary, 1909).
- ⁶ United States Housing Act of 1937, 75th Congress, 1st Session, Chapter 896, September 1, 1937, pp.888-899. D. Bradford Hunt, 'Was the 1937 US Housing Act a pyrrhic victory?,' *Journal of Planning History*, 4, 3 (August 2005): 195-221; Marry Barron, 'A history of anniversaries: the 1937 US Housing Act,' *Journal of Housing & Community Development*, (September/October 2007): 26-30.
- ⁷ Hunt, Was the 1937 US Housing Act a pyrrhic victory?, 213.
- ⁸ United States Housing Act of 1937,888.
- ⁹ Hunt, Was the 1937 US Housing Act a pyrrhic victory?, 212-213.
- ¹⁰ Catherine Bauer, *Modern housing* (Boston and New York: Houghton Mifflin Company, 1934).
- ¹¹ Hunt, Was the 1937 US Housing Act a pyrrhic victory?,197.
- ¹² Extract from the Declaration of the first congress, la Sarraz, 1928 published in José Luis Sert, *Can Our Cities Survive?: an ABC on urban planning, their analysis, their solutions*, (Cambridge: Harvard University Press, 1944, first published in 1942), 242.
- ¹³ Eric Mumford, *The CIAM discourse on urbanism, 1928-1960* (Cambridge, Massachusetts; London, England: the MIT Press, 2000), 2.
- ¹⁴ James G. Coke, 'Antecedents of local planning,' in William I. Goodman and Eric C. Freund, eds, *Principles and practices of urban planning* (Washington: International City Managers' Association, 1968), 7-28.
- ¹⁵ Extract from the Declaration of the first congress, la Sarraz, 242.
- ¹⁶ Le Corbusier, *The Athens Charter* (New York: Grossman Publishers, 1973; originally published in French in 1943).
- ¹⁷ José Luis Sert, *Can Our Cities Survive?: an ABC on urban planning, their analysis, their solutions*, (Cambridge: Harvard University Press, 1944, first published in 1942).
- ¹⁸ Mumford, *The CIAM discourse on urbanism*, 64 & 61
- ¹⁹ Mumford, *The CIAM discourse on urbanism*, 133.
- ²⁰ D. Scott Brown, 'Urban design at fifty: a personal view,' in A. Krieger and W. S. Saunders, eds, *Urban Design* (Minneapolis MN: University of Minnesota Press, 2009): 61-87.
- ²¹ A.Sachs, Research for architecture: building a discipline and modernising the profession, Unpublished PhD (Berkeley: University of California Berkeley, 2009): 256.
- ²² Scott Brown, 'Urban design at fifty,' 61-87.
- ²³ E.L.Birch, 'Making urban research intellectually respectable: Martin Meyerson and the Joint Centre for Urban Studies of Massachusetts Institute of Technology and Harvard University 1959-1964,' *Journal of Planning History*, 10, 3 (2011): 219-238.
- ²⁴ Joan Ockman, ed., *Architecture School: three centuries of educating architects in North America* (Cambridge: MIT Press, 2012): 134-135.
- ²⁵ Ockman, *Architecture school*; Sachs, Research for architecture, xi-xii.
- ²⁶ Ockman, *Architecture school*, 140.
- ²⁷ Ockman, *Architecture school*, 102.
- ²⁸ Sachs, Research for architecture, 54.

-
- ²⁹ Catherine Bauer Wurster, 'The social front of modern architecture in the 1930s,' *Journal of the Society of Architectural Historians*, 24, 1 (1965): 48-52.
- ³⁰ Bauer, *Modern housing*.
- ³¹ Bauer, *Modern housing*.
- ³² Sachs, Research for architecture, 62.
- ³³ Ockman, *Architecture school*, 141.
- ³⁴ Birch, 'Making urban research intellectually respectable,' 219-238.
- ³⁵ Scott Brown, 'Urban design at fifty,' 61-87.
- ³⁶ Birch, 'Making urban research intellectually respectable,' 223.
- ³⁷ W. Lutters and M. Ackerman, 'An Introduction to the Chicago School of Sociology,' (1996), Available at: https://userpages.umbc.edu/~lutters/pubs/1996_SWLNote96-1_Lutters,Ackerman.pdf
- ³⁸ Louis Wirth, Urbanism as a way of life, *American Journal of Sociology*, 44, 1 (1938): 1-24.
- ³⁹ George Herbert Mead, *Mind, Self, and Society* (Chicago: The University of Chicago Press, 1934), 154.
- ⁴⁰ Ruth Shonle Cavan, The Chicago school of sociology, 1918-1933, *Urban life*, 11, 4 (1983): 407-420.
- ⁴¹ Maurice Broady, The social context of urban planning, *Urban Affairs Quarterly*, 4, 3 (1969): 355-378.
- ⁴² William Isaac Thomas and Florian Znaniecki, *The Polish peasant in Europe and America: Monograph of an immigrant group*, Vol. 2 (University of Chicago Press, 1918).
- ⁴³ Jane Jacobs, *The death and life of great American cities* (New York: Vintage, 1961).

Overdue for Change: Australian university libraries after World War II

Philip Goad
University of Melbourne

Hannah Lewi
University of Melbourne

Andrew Murray
University of Melbourne

Abstract

The 1957 Murray Report on Australian Universities noted the growing necessity for new university facilities and made special mention of the 'urgent need' for substantial new library buildings. Following this report, and with support from the Commonwealth Government, a new era of university library building began, in line with the broader post-war expansion of the Australian education landscape. In this period of rapid growth, the library had two distinct roles. In the case of existing sandstone universities, new libraries were used as symbols of change, indicating modernity and the advance of technology in traditional settings. In new universities, the library often became the literal 'heart' of the new campus, providing a civic identity and gathering space.

In both instances, the library was a commanding presence in the changing campus landscape, exemplified by a wide variety of formal solutions that explored new expressions of monumentality. The key role that the library played in the post-war university building project in Australia has yet to be explored and this paper charts its shifting nature and the invocation of technology, or sometimes its complete absence, alongside the opportunity for integrating major works of public art. While the function of the library saw limited change during this period, its expression changed dramatically. From early experiments in light-weight, curtain walled structures to the monumental concrete libraries of the 1970s, the civic presence of the new university library was closely tied to its material expression. This paper will look at a range of key buildings including the University of Melbourne's Baillieu Library (1959), University of New England's Dixon Library (1961), University of Sydney's Fisher Library (1962), Australian National University's Menzies Library (1963), and the Eddie Koiki Mabo Library (1968) at James Cook University in Townsville.

Introduction: Expansion and Expertise

The postwar era in Australia saw significant expansion in the number of universities and in the size and complexity of their campuses. At the heart of the modern university, as in its historical antecedents, was the provision of a central library that was open to all students and academic staff. The library, as a building type, presents an encapsulation of many of the key aspirations and contradictions in the design and realisation of the modern university. Like the public library, the university library had to fulfill both symbolic and technical functions, which were translated through a varied range of architectural responses. This paper explores the provision of libraries on Australian university campuses from the 1950s to the 1970s as creating the core resource for scholarship and teaching, often expressed through monumental modern architectural language and, at the same time, having to respond to rapidly escalating functional and technological needs.

In 1935 the Munn-Pitt Report was released on the state of Australian libraries generally. Ralph Munn, Director of the Pittsburgh Public Library, was damning in his findings and noted: "Most Australians have had no contact with a progressive and complete library system and know nothing of its functions or facilities."¹ The Munn-Pitt Report is often cited as a turning point in Australian library discourse, triggering a wave of changes to library systems. It was the suggestions of inferiority, particularly to the American system, that saw academics and administrators travelling extensively to visit and learn from elite American universities such as Yale and UCLA.²

Postwar university libraries were shaped by professional librarians, many who were either recent émigrés or leading overseas librarians headhunted to fill positions created by a rapidly expanding tertiary sector. They brought with them significant knowledge and expertise in library design, planning and organisation. For example, Andrew Osborn, Deputy Librarian at Harvard University was appointed Head Librarian at the University of Sydney's new Fisher Library in 1959. There, he dramatically shaped the plan for the new library. ANU Librarian J.J. Graneek was the former librarian at Queens University in Belfast³ and Dietrich Borchardt, University Librarian at the University of Tasmania from 1953 to 1965 and founding librarian at La Trobe University in 1965, had emigrated to Australia via New Zealand in 1939. The exchange between library personnel went both ways, and head librarians travelled frequently during this period. Borchardt initiated a series of exchanges with international librarians and frequently represented Australian libraries internationally,⁴ and Harrison Bryan, Head Librarian at the University of Queensland

undertook a year-long study tour of Great Britain and the US, which exposed him to current best library practice that he subsequently implemented on his return.⁵

One significant example of this new knowledge exchange, which directly affected the design of university libraries, came in 1951 when Dr. John Ely Burchard, founding Dean of the MIT School of Humanities and Social Sciences, undertook a four month tour of Australia, financed by the Smith-Mundt Act, to collect general information on Australian architecture.⁶ Burchard was a university library design expert, having recently published the significant book *Planning the University Library Building*,⁷ and the occasion of his visit – between Munn-Pitt Report and the lead up to 1957 Murray commission – was extremely timely. Burchard toured the country extensively, giving talks and consulting with institutions in most of the capital cities, including on new university libraries.⁸ During this time he was invited by National Librarian Harold White to provide advice on the plans for a future National Library in Canberra and Burchard made a series of suggestions to the planning committee, articulating what he saw as central to successful library design. In particular, he stressed the need for careful planning to allow for “long range utility”⁹ and “his preference for a more striking exterior, featuring an extensive use of glass on all elevations.”¹⁰ Burchard’s suggestions were adopted by the National Library, but his general advice, including the need for adaptive planning and ‘striking exteriors’ with the extensive use of glass, was to also affect the design of the first new university libraries in the 1950s.

At the time of Burchard’s visit, the majority of Australian university libraries were in an unsatisfactory condition as there had not been a major update or purpose-built library building constructed since 1940. In contrast to the central position occupied by the library in the contemporary campus, the early history of Australian university libraries typically saw collections camped temporarily in administration buildings, and in most cases, they remained without permanent buildings until the postwar funding boom. The focus of most libraries in the early twentieth century was, by necessity, on the collection of books and cataloguing systems rather than the physical building. Grand library spaces were envisaged from the beginning, but often, whatever limited funds became available were directed towards teaching spaces, particularly laboratories.¹¹ The University of Sydney was an exception, establishing the Fisher Library, a fine Walter Vernon-designed Gothic edifice in 1909, some sixty years after the university was founded. Other major universities did not have such luxuries. The University of Western Australia placed its library in the administration block attached to the ceremonial Winthrop Hall (1932), where it remained in a “temporary” location until 1964.¹² The University of Melbourne similarly planned for the library to be located in a wing of the main quadrangle but this did not eventuate, and was

instead shunted between locations before a permanent home was constructed in 1959.¹³ Until the University of Tasmania relocated to its new Sandy Bay site in 1961, the library occupied part of the main hall, doubling as a meeting room and a venue for student socials.¹⁴ The University of Adelaide did not receive a new library in the postwar years. It already had the gracious Walter H Bagot-designed and Classically-styled Barr-Smith Library, completed in 1932, and it remains the central library, though with a significant 1958 addition, which brought the library up to date. The University of Queensland had a purpose-built library building completed in 1940 but it was not occupied until 1949 and proved to be entirely inadequate for student needs. It was not until 1973 that the University received a satisfactory new library facility. The Munn-Pitt Report brought these deficiencies to the surface, which in 1965 led Harrison Bryan, Head Librarian at the Fisher, to conclude that “Australian university libraries were indeed in 1935, and for a long time to come, undistinguished in quality and indifferently conducted.”¹⁵

Another major policy and governmental impetus that led to a wave of new campus library building was the influential Murray Report of 1957 that recognised the wide disparity in the standards of libraries and their services currently offered in Australian Universities. The report stated:

It should be unnecessary to stress the importance of the library to the whole framework of university education.. The library must be found by the student to be a place where he is welcomed and encouraged to pursue a personal and independent search for knowledge and understanding, where his capacities for independence of thought and judgment are enlarged, and where, above all, he is treated as a scholar, to be provided with the peaceful and uncrowded conditions conducive to scholarly work.¹⁶

A special issue of *Vestes: The Australian University Review* in March 1960 followed up the Murray Report with a comprehensive audit of the state of libraries on campus, while also reinforcing their pivotal role in academic life and highlighting Australia’s lack of investment: “Quite generally Australian and New Zealand universities have yet to demonstrate their belief in this old-world and older-new-world philosophy of the library as the heart of the institution.”¹⁷ Andrew Osborn continued that, despite lack of resources:

[T]he cost is worth the effort, for who will question the major part that the Bodleian and the Harvard University library play in the pre-eminence of Oxford

and Harvard? Libraries are indexes of a university's stature - just as they are of a city's or a country's.¹⁸

Three years later, in 1963, the University of Western Australia Librarian Leonard Jolley contributed another emotive claim for the value of library learning to university life:

The library is the central organ of the university - not merely because, like the electric sub-station it is essential to the functioning of other departments, but because in itself it sums up all that is essential to the concept of a university... A university is not just a collection of books, but the collection of books is a dynamic part of a university. It is a third force.¹⁹

However, despite such aspirations and clearly defined needs, by the beginning of the 1960s most existing university libraries were still housed in inadequate buildings, with outdated provision of supporting technologies, and outgrown capacity for storage, administration and teaching areas due to rapidly growing student numbers, and, importantly, the expanding range of courses and degrees beginning to be offered at many universities.

Development of a Type: Function and Flexibility vs Expressive Monumentality

Campus architects, planners and governing bodies worked with professional librarians to best respond to the inadequacies that had been starkly identified in the Murray Report and by the universities themselves. Between 1958 and 1978, more than twenty-five libraries were built across Australian university campuses. In that time, a loose set of types developed, in part according to architectural fashions of the day, in part according to perceived notions that the library deserved monumental status and was itself a place-making or locus point for the university, and in part, based on shifting notions as to what constituted flexibility in terms of growth.

In functional terms, the university library could be simply defined: catalogue, information, returns and processing; student reading and study spaces; and book collections. In spatial terms, this could be interpreted in similarly straightforward terms: undifferentiated floor spaces, which contained all these functions; catalogue and reading/study spaces in one block and book collections or book stacks housed in an architecturally differentiated tower or block. If there was to be a reading room of grand proportions, it could be created as a double height volume within generalised space or housed within the block that was

separate from the stack block/tower. What this meant was that 'technology' as an idea in the architecture of the university library was reserved inevitably for dealing with the challenge of flexibility of internal arrangement and planning for expansion.

Library provision on the Australian campus was however rendered compromised by a lack of sufficient funding, which is not unusual in any public spending program. The question of economics was further complicated by the ever-escalating expansion of degree programs, which took the form of a seemingly insatiable appetite for growth in terms of book and journal acquisitions. The ensuing need for space and uncertainties about how the future of library and knowledge-organisation would take shape were at times daunting:

There were murmurings on some of the older campuses that the library's building requirements appeared inexhaustible and only partially humorous suggestions that the whole site would eventually be covered by libraries. While academic librarians had no real answer to this charge, most assumed that the development of micrographic and computer technology and the cooperative planning, which has for so long been a source of conference papers and meetings, would in time lessen the need for further extensive buildings.²⁰

Adrian Forty defines one fundamental expression of flexibility in architecture's history as that of "flexibility by technical means":²¹ meaning the use of moving parts, the design of flexible construction and planning systems and so on. In the case of the modern library, two kinds of technological responses to the problem of expansion arose: the first in the form of a faith in flexibility within building planning, programming, and constructional techniques as seen in many of the libraries discussed here; and the second in the form of the faith in and slow uptake of automated, computerised systems of book and storage organisation and retrieval systems within these architectural forms, which would streamline book accessibility and storage spaces.

Flexibility was a watchword of Modernism in the 1950s. As Peter Collins said in 1965; "Flexibility, is of course, in its own way a type of functionalism."²² Forty writes: "Against the presumption that all parts of the building should be destined for specific uses, a recognition that not all uses could be foreseen at the moment of design made 'flexibility' a desirable architectural property."²³ Walter Gropius had earlier set out two prescient convictions in the early 1950s that: "i) the architect should conceive buildings not as monuments but as receptacles for the flow of life which they have to serve, and ii) that his conception should be flexible enough to create a background fit to absorb the dynamic features of our modern

life.”²⁴ The university library, conceived in a time of rapid university expansion, necessitated architectural acknowledgement that requirements were complex and changeable – in the immediate rather than far-off future.



Figure 1. Baillieu Library, University of Melbourne (1959) – architect: J.F.D Scarborough.
Source: Melbourne University Archives.

The Modular Skin

The first major university library to be constructed after World War II was the Baillieu Library at the University of Melbourne (1959, Ar: J.F.D. Scarborough). Axel Lodewycks, Head Librarian, recalled the planning process: “From the beginning ... it was envisaged that the flexible design should allow for changes in layout at any stage before or after completion of the building”.²⁵ Designed over three major levels and punctuated internally with occasional double height volumes, its glazed curtain wall façade signalled not just the University’s embrace of modernity but also acceptance that the building would be expandable to the north or even vertically. Lodewycks put his faith in allowing for: “complete adaptability to changing conditions of use and for alterations within the building or extensions at any level and in any direction over the site”.²⁶

The adoption of a repetitive curtain wall system would be followed at the Morris Miller Library, University of Tasmania (1961, Ar: J.F.D. Scarborough). Head Librarian, Dietrich Borchardt, oversaw its construction and held a clear intention to plan the building “from the inside out”, and that its design should not be a matter of “style or fad”.²⁷ Scarborough concurred that there would be no need for a monumental reading room.²⁸ Similarly, the Dixon Library, University of New England (1961, Ar: E.H. Farmer, NSW Government Architect) and the Hargrave Library at Monash University (1962, Ar: Bates, Smart &

McCutcheon) were both curtain walled buildings terminating in blank brick walls, seemingly poised for expansion at any moment. The taut skin of the buildings with their structural elements pushed out to the edges provided further flexibility within the floorplate. As Conrad Hamann observed of the Hargrave Library: “The openness, the thin lines and skin-like walling provide the barest interruption to a flow of space perceived as both universal and unifying.”²⁹

In their use of simple rectangular massing and extensive use of curtain wall glazing, these design solutions for the modern campus library were following commercial office building designs of the early 1950s, where, as Reinhold Martin has described:

Modernist experiments with spatial flexibility through modular assembly were exhaustively reworked and redeployed. The universal space associated with the steel frame and the planning grid was assimilated into a finely modulated field. This modularity, and the flexibility that it implied, became the very image – and the instrument – of the organizational complex.³⁰

However, with libraries also being asked to be the heart and soul of the new university campus, there was a place for expressions of monumentality, rather than only designing over-scaled filing cabinets that would purely function as flexible receptacles for knowledge storage and retrieval. Even libraries like the Baillieu included art and sculpture (for example Norma Redpath’s sculptural relief in the foyer) as integral to their design and to add ornament to their functionality. This search for more expressive forms paralleled international dialogues, when by the 1960s modern architecture’s quest for total flexibility was beginning to be recognised as chimerical. Herman Hertzberger, for example, among others provided an early counter-argument to perceived bland modular functionalism, by arguing that flexibility can “never produce the best results for any given situation”.³¹ Hertzberger continues:

Flexibility became the catch-word, it was to be the panacea to cure all the ills of architecture. So long as the design of buildings was neutral, it was thought, they could be put to different uses, and they could therefore, in theory at least, absorb and accommodate the influences of changing times and situations...but neutrality in fact consists of absence of identity, in other words, the lack of distinctive features. The problem of changeability, then, is not so much a matter of having to adapt and modify distinct features, but of having those distinct features in the first place!³²

Moves to monumental expression

A transitional design which signalled a move away from the curtain wall type was the Sulman Award-winning Fisher Library at the University of Sydney (1962, Ar: NSW Government Architect). There, a copper-clad stack tower was offset against a lower, symmetrically delineated glazed prism with floor plates which extended out to provide shading to the floors below, appearing as an elegant pavilion from the university lawns below. It was the first sign that the post-war university library might earn honorific status on campus, and act as a contemporary foil to the sandstone Gothic Revival Blacket buildings nearby.



Figure 2. Fisher Library, University of Sydney (1962) – architect: NSW Government Architect.
Source: *Cross-Section* Archive.

At ANU, two libraries indicated aesthetic willingness for architects to explore contextual and historic reference as a way of imparting identity and monumentality to a new campus. The Menzies Library (1963, Ar: J.F.D. Scarborough with Collard Clarke & Jackson) had a stone-faced stack block as the backdrop to a separate lower concrete vaulted and parasol roofed volume that sat on a dramatically battered local rock-faced wall. Adding further to its ‘special’ status and master planner Grenfell Rudduck’s wish that the Menzies Library be the “academic focal point of the University” and be built almost as the geographical “centre of the campus,”³³ was the insertion of dynamic steel and copper abstract art screens by artist Lyndon Dadswell beneath the flaring vaults of the parasol roof. Symbolic of its importance, the library was opened by Prime Minister Robert Menzies and Queen Elizabeth II to much fanfare (The Duke of Edinburgh likened the assembled be-gowned academics to a “rose garden”).³⁴

If the Menzies Library was a genuine attempt to realise an convincing language of monumentality for the ANU campus, then the Chifley Library (1963: Ar.: T.E. O'Mahoney with Bunning & Madden) went in the other direction. Encircled by an arcaded colonnade, its walls punctured by protruding tall oriel windows and topped by a mansard roof, the Chifley seemed effete by comparison. One of its only redeeming features was inside: the foyer had striped columns and a magnificent John Coburn painting terminating the entry axis. O'Mahoney's classicizing design – a form of stylised palazzo – was in fact a provincial cousin of his much larger commission at the time, the vast marble-clad and colonnaded National Library of Australia (1964-8, with Bunning & Madden).



Figure 3. Reid Library, University of Western Australia (1964) – architect: Cameron, Chisholm & Nicol.
Source: *Cross-Section* Archive.

Such grand gestures, especially a form of colonnaded Classicism would inform several 1960s libraries, including at the Robert Menzies Library, UNSW (1966, Ar.: Fowell, Mansfield, Jarvis & Maclurcan), the South Australian Institute of Technology, later the University of South Australia at Mawson Lakes (1970, Ar.: Peter Scrymgour), and La Trobe University (1967, Ar.: Yuncken Freeman). At La Trobe the library was, for example, regarded as a key formal gesture, sited at the heart of the new campus plan and used by all disparate departments. The second level contained the main entrance and all reader services were connected to the larger campus by an elevated walkway network:

...it was agreed that the Library should be at the centre of the academic building complex and that it should be possible for a healthy person to walk from any

academic area of the campus to the entrance of the Library within five minutes.³⁵

Despite several relocations of functional areas in the course of two major extensions, the overall design for the library building and its services has remained much as it was originally planned.

The most notable example of the monumental architectural expression was the Reid Library at the University of Western Australia (1964, Ar.: Cameron, Chisholm & Nicol), where the structural virtues of reinforced concrete were brought into full tectonic expression to define a grand floating roof and a generous balcony terrace. It was the complete palace of culture for the postwar Australian university, and at the same time, carefully modulated so that expansion could occur (and did in 1972) without damage to its heroic image of library as the home of classical learning. The materiality of concrete had, until the Reid Library, been little explored by university architects for its expressive potential. Thereafter, concrete became the material *de-rigueur* for university libraries in the late 1960s and 1970s, and these became invariably giant, shading bunkers for the collection of books.³⁶ A transitional type from monument to bunker that deserves note was the University Library (later the Eddie Koiki Mabo Library) at James Cook University (JCU) (1968, Ar.: James Birrell). With its over-sized parasol roof, three-level high off-form concrete walls and almost primitive cut-out windows and semi-circular porch openings at the building's corners that suggest deep shade and cool retreat from Townsville's dry heat, Birrell's library has a haunting sense of monumentality. Its very direct, even crude simplicity speaks to the undulations of the age-old landscape which surrounds the campus – big strokes for a big landscape – and it also echoes the form of Roy Grounds's contemporaneous National Gallery of Victoria, Melbourne (1961-8). Inside, sections of the original carpet – big, broad orange and red stripes – are played off against a central terrazzo open stair graced by a burnt orange and brown ceramic mural by artist Peter Travers and complemented by a series of off-form concrete arches that leap elegantly, even delicately across the interior volume.



Figure 4. Eddie Koiki Mabo Library, James Cook University, Townsville (1968) – architect: James Birrell.

Source: James Birrell Archive, James Cook University Library Archives Collection.

Moves to flexibility

If Birrell's library at JCU was also a signature building at the centre of a new campus, so too was the library at Macquarie University (1967, Ar.: NSW Office of the Government Architect, Peter Hall project architect) where concrete as an expressive repetitive element became the language of the greater campus. At Macquarie, giant off-form in-situ concrete panels that housed bookshelves behind became signals of the building's function. The concept of panels – but prefabricated and removable – would not only impart monumentality but also assist with the challenge of flexibility. This was the case with the University of Queensland Central Library (1973, Ar.: Robin Gibson) where:

The precast external elements have been designed for removal and re-use of two sides while on the remaining sides they have been designed as load bearing elements. The library has been designed as a complete modular building...To maintain maximum flexibility, there are no internal load bearing walls except two service cores.³⁷



Figure 5. Central Library, University of Queensland (1973) – architect: Robin Gibson.
Source: Fryer Library, University of Queensland Photographic Collection, UQFL466.

Some university architects were more sanguine about notions of change, preferring instead to recommend that the library did not require a purpose-built building and could instead simply take up generic space within an ever-expanding system of generic university buildings. Such was the case at Royal Melbourne Institute of Technology when Bates, Smart & McCutcheon inserted the library across a series of floors in its megastructural Casey Wing (Building 10) (1967-9), instead of locating it, as was originally planned, in its own building at ground level on a newly pedestrianized Bowen Street.³⁸ So too did R.J. Ferguson at Murdoch University, where the library (1975), albeit centrally located, occupied two floors of Ferguson's group of non-hierarchical and architecturally consistent forms. The library was 'space' within a larger context of the university as a whole where space was functionally flexible but aesthetically consistent. Thus, the perceived desire for the visibility and comprehensibility of the university library as a visual landmark on the Australian university campus alongside the need to cater for uncertain future growth and new ways of using the library produced necessary tensions between monumentality and flexibility.

The 1970s and Beyond: Austerity and Technology

In 1975, the Australian Universities Commission issued its Sixth Report recommending ambitious federal support of the continued expansion of funding into 1976-78, with eleven major libraries proposed. However, these plans were hit by the general international economic downturn that year with the following Federal Budget halting public expenditure and consequently all the Commission's recommendations.³⁹ Thus expansiveness and expressive monumentality quickly gave way to austerity through the late 1970s. By 1981, only a handful of the promised eleven new libraries were completed in this period, including

the central library for the University of New South Wales; extensions to Macquarie University Library (expanded in the late 1970s with a further building staged as a series of interlinked rectangles in plan); and extensions to the University of New England's Dixon Library.⁴⁰ At the University of New South Wales, a further ten-floor extension was built to expand book capacity from 300,000 to 1.25 million, and 3000 seats, with further room for expansion in the top two floors. The multi-storey addition was described as more like a large department store in arrangement and atmosphere: at the time, it housed the largest centralized collection of books in Australia.⁴¹

Austerity years gave cause for prudence in terms of universities scrutinising more carefully what was the optimum size for a new library or extension, and how best to maximise the balance between storage and student spaces. With the capacity for storage intimately connected to library briefs, a paucity of funding enforced solutions other than new building programs and this included reducing and redistributing collections. Austerity and further professionalization of librarianship also affected design strategies and brief programming during the 1970s. Numerous reports were spawned on the calculation and optimization of spatial efficiencies.⁴² Other studies looked to international research, including the United Kingdom's Atkinson Report (1976), and some case studies of new libraries were published in Australian and international journals that were instructive on how to spend expansion funds more wisely.⁴³

If future needs could not be catered for through new buildings, then other forms of technology became the hope of future organisational structures to cope with flexible expansion. From the early 1960s, Australian academic libraries looked to technical innovations from America, in particular the Library of Congress (with the introduction of the Machine-Readable Cataloguing (MARC) system). Partial automation began at ANU, for example, in 1964, but was not completed until some ten years later.⁴⁴ And although computerised systems were of great interest, due to a number of factors, it wasn't until well into the 1970s that automation was convincingly implemented into many university libraries with, for example, the University of Sydney introducing computer cataloguing in 1971, electronic book detection in 1972, and searchable online databases in 1976.⁴⁵ Others were slower to enact new systems, so the effects on the design of internal organisational systems and plans, book storage and retrieval systems and user areas did not have an impact until the 1980s.

With the much more profound uptake of digital services and digitisation programs and online accessibility in the last twenty years, the physical format of the book has been

challenged. Yet, as Lisa Petrides, a pioneering academic in the knowledge sharing education sector, comments, despite the ubiquitous availability of web-based information today, without traditional libraries “many students, faculty, and practitioners are not able to access a significant portion of valuable research, data, and resources that could inform and advance their practice.”⁴⁶ Today’s campus libraries still provide much needed student spaces for teaching and learning outside of disciplinary and faculty amenities. And with the rise of a massive international student market in Australia from the mid-1990s, these kinds of social, as well as learning spaces, are back in surprisingly high demand. This is evidenced by the construction of new libraries, ongoing retro-fitting of libraries, the building of new disciplinary satellites, the upgrading of exhibition spaces for historical archives within collections and so on. As such, the architecture of university libraries still reflects inherent tensions between the need for flexibility in an attempt to cater for the unpredictable impacts of future technology and the desire for expressive monumentality – whether symbolic of creative, entrepreneurial drive or the maintenance of long-held campus traditions.

Endnotes

¹ Gough Whitlam, ‘The Munn-Pitt Report – 50 Years On’, *The Australian Library Journal*, 35, 1 (1986), 40.

² F.D.O. Fielding, ‘The Bubble Bursts: The Collapse of the Library Building Boom’, in Harrison Bryan, John Horacek (eds.), *Australian Academic Libraries in the Seventies: Essays in Honour of Dietrich Borchardt* (St. Lucia: University of Queensland Press, 1983), 69.

³ Peter Alexander Vidot, *The History of the Australian National University Library 1946-1966* (Canberra: ANU Library 1996), 26.

⁴ Julie Marshall, ‘Dietrich as I Knew Him’, *Australian Academic and Research Libraries*, 29, 2 (1998), 114.

⁵ Neil Radford, ‘Harrison Bryan, AO, MA, HonDLitt, HonLLD, FASSA, FLAA (1923-2008)’, *The Australian Library Journal*, 57, 2 (2008), 91.

⁶ ‘Dr J.E. Burchard to Discuss Library Plans’, *The Canberra Times*, 25 August 1951, 4.

⁷ John Ely Burchard, *Planning the University Library Building: A Summary of Discussions by Librarians, Architects, and Engineers* (Princeton, N.J.: Princeton University Press, 1957).

⁸ ‘Library expert touring state’, *Advocate* 16 October 1951, 4.

⁹ ‘National Library Criticised’, *The Central Queensland Herald*, 3 July 1952, 24.

¹⁰ Commonwealth of Australia, Parliamentary Standing Committee on Public Works, *Report Relating to the Re-Submission of the Proposal to Erect the National Library and Roosevelt Memorial at Canberra, Australian Capital Territory*, 23 September 1952, 19. Accessed 12 February 2018.

https://www.aph.gov.au/Parliamentary_Business/Committees/House_of_Representatives_Committees?url=reports/1952/1952_pp116.pdf

¹¹ Richard Davis, *Open to Talent: The Centenary History of the University of Tasmania* (Hobart: University of Tasmania, 1990), 64.

¹² Fred Alexander, *Campus at Crawley: A Narrative and Critical Appreciation of the First Fifty Years of the University of Western Australia* (Melbourne: F.W. Cheshire, 1963), 220.

¹³ K.A. Lodewycks, ‘The Baillieu Library’, *University of Melbourne Gazette*, September (1959), 1.

¹⁴ Davis, *Open to Talent*, 64.

¹⁵ Harrison Bryan, *Australian University Libraries: Today and Tomorrow* (Sydney: Bennet, 1965), 11.

-
- ¹⁶ Committee on Australian Universities, *Report on the Committee of Australian Universities (Murray Report)* (Canberra, ACT: Government Printer, 1957), 178.
- ¹⁷ Andrew D. Osborn, 'The Turning Point for University Libraries', *VESTES: The Australian University Review*, 3, 1, (1960), 21.
- ¹⁸ Osborn, 'The Turning Point for University Libraries', 25.
- ¹⁹ Leonard Jolley, 'Teaching Function of the University Library', *VESTES: The Australian University Review*, 7, 3 (1963), 206.
- ²⁰ Fielding, 'The Bubble Bursts', 64.
- ²¹ Adrian Forty, *Words and Buildings: A Vocabulary of Modern Architecture* (London: Thames and Hudson, 2000), 143.
- ²² Peter Collins, *Changing Ideals in Modern Architecture, 1750-1950* (London: Faber and Faber, 1965), 234.
- ²³ Forty, *Words and Buildings*, 142.
- ²⁴ Walter Gropius, 'Eight Steps towards a Solid Architecture', *Architectural Forum*, February (1962), 157.
- ²⁵ Lodewycks, 'The Baillieu Library', 1.
- ²⁶ Lodewycks, 'The Baillieu Library', 1.
- ²⁷ University of Tasmania, 'History of the Morris Miller Library' <http://www.utas.edu.au/library/libraries/libraries/morris-miller-library>
- ²⁸ University of Tasmania, 'History of the Morris Miller Library' <http://www.utas.edu.au/library/libraries/libraries/morris-miller-library>
- ²⁹ Conrad Hamann, 'Recollections of a Plan: Architecture at Monash', in F.W. Kent and D.D. Cuthbert (eds.) *Making Monash: A Twenty-Five Year History* (Clayton, Vic.: Monash University Gallery, 1986), 39.
- ³⁰ Reinhold Martin, *The Organizational Complex: Architecture, Media and Corporate Space* (Cambridge, Mass.: MIT Press, 2003), 5.
- ³¹ Herman Hertzberger, 'Functionality, Flexibility and Polyvalence', in Herman Hertzberger (ed.) *Lessons for Students in Architecture*. (Rotterdam: Uitgeverij, 1991), 146.
- ³² Hertzberger, 'Functionality, Flexibility and Polyvalence', 146.
- ³³ Vidot, *The History of the Australian National University Library*, 12.
- ³⁴ Vidot, *The History of the Australian National University Library*, 32.
- ³⁵ Dietrich Borchardt, 'The University Library', in William Breen (ed.) *Building La Trobe University: Reflections of the first 25 years, 1964-1989* (Bundoora, Vic.: The University, 1989), 56.
- ³⁶ These include the Auchmuty Library, University of Newcastle (1967, Ar.: Laurie & Heath); University of Wollongong Library (1971, Ar.: Laurie & Heath); T.L. Robertson Library, Curtin University (1972, Ar.: Public Works Department Western Australia).
- ³⁷ '3 on the campus', *Architecture in Australia* 65, 1 (1976): 58-63.
- ³⁸ Philip Goad (ed.), *Bates Smart: 150 years of Australian Architecture* (Melbourne: Thames & Hudson, 2004), 191.
- ³⁹ Fielding, 'The Bubble Bursts', 66.
- ⁴⁰ Fielding, 'The Bubble Bursts', 66-67.
- ⁴¹ Fielding, 'The Bubble Bursts', 86.
- ⁴² For example: Verner W. Clapp, and Robert T. Jordan, 'Quantitative Criteria for Adequacy of Academic Library Collections', *College and Research Libraries*, 50, 2 (1989).
- ⁴³ For example: Keyes B. Metcalf, 'From a Librarian's Point of View', *The Architects' Journal* 159, 17 (1974), 901-910.
- ⁴⁴ Vidot, *The History of the Australian National University Library*, 58.
- ⁴⁵ John Shipp (ed.), *The Fisher Library Centenary 1909-2009* (Sydney: The University of Sydney Library, 2009), 35.
- ⁴⁶ Lisa Petrides, 'The Role of "Open" in Strategic Library Planning', *Education Policy Analysis Archives*, 24, 36 (2016), 3.

“An index of real effect”: Early Photographic Reproductions in Australia’s Building Press

Paul Hogben
University of New South Wales

Abstract

This paper examines the appearance of half-tone photographic imagery within Australia’s building press in the late nineteenth century. In June 1888 the Building and Engineering Journal of Australia & New Zealand started publishing images of buildings that had been reproduced from photographic negatives, with the Australasian Builder and Contractors’ News following suit later that year. Although the publication of line drawings remained dominant, the new photo-mechanical imagery heralded a mode of architectural illustration that excited editors for its authority as “an index of real effect”. Considerably more expensive to reproduce than line drawings, half-tone images allowed for a more realistic portrayal of buildings in terms of composition, materiality, decoration and detail. Even though photography of local architectural subjects pre-existed the late 1880s, it was at this time that the architectural photograph entered the space of mass reproduction within the building press in Australia, thus beginning a new tradition of architectural representation in that country. This paper identifies what these images were, who they were connected to, and the enthusiasms and challenges that surrounded their appearance.

In her study of photography in the architectural practice of Henry Hobson Richardson, Mary N. Woods pinpoints the specific figures, commentators, technologies and media sites pertinent to the appearance of some of the earliest photographic images to appear in the American architectural press.¹ She explains how Richardson understood the visual results of different technologies of photographic reproduction and this gave him the advantage of securing and benefitting from as best quality images of his work that could be published in architectural portfolios and in architectural periodicals, especially that of the *American Architect*. This paper undertakes a similar study in its examination of the appearance of the first photographic reproductions to appear within Australia’s building press. Woods’ analysis dates back to the 1870s, whereas the first photographic images to be reproduced

in the building press in Australia date from 1888 within the *Australasian Builder and Contractors' News* and the *Building and Engineering Journal of Australia & New Zealand*.²

A central theme of Woods' study is that of the "photograph as tastemaker", which is derived from the view of the editors of the *American Architect* that over the course of the late nineteenth century the mass reproduced photograph had "supplanted the critic as the arbiter of architectural taste."³ This thesis however is not so easily tested in this paper, due, firstly, to the limited period under focus, 1888 to 1892, which is characterised by the sporadic publication of photographic reproductions in the journals, and secondly, the range of images that did appear were too heterogeneous in nature, emanating from a variety of sources, to possess the power or unity to constitute a formulation of taste on their own. Despite this difference, like Woods' study this paper describes editorial views about the value and appeal of photographic reproduction and the challenges that were associated with it and identifies those architects who were ahead of their peers in the photographic reproduction of their work.

The *Australasian Builder and Contractors' News* and *Building and Engineering Journal* appeared in what is historically known as the "boom period" of nineteenth-century Australia, an unprecedented time of urban growth concentrated on city land development and building activity. As Stuart King and Julie Willis have described, this period has been of varying interest to architectural historians because of the eclectic and richly textured nature of the architectural creations of the time, sometimes understood as constituting a "boom style".⁴ What has eluded historians however is the role played by the two journals in the circulation of images during this period, catering as they did for the thirst for information about new building projects, technology and architectural responses. This paper goes some way in addressing this consideration by focusing on the advent of photographic reproduction in the journals and the enthusiasm that surrounded it as a new mode of architectural illustration.

Illustrations and the colonial building press

A previous study of mine identified the significance of tender information as a currency and condition of existence of Australia's building press across the second half of the nineteenth century.⁵ Another feature that grew in significance were visual illustrations of new buildings, either projected or completed, which were initially printed from wood engravings produced by commercial engravers and printers such as Calvert Brothers and De Gruchy & Leigh. Published in Melbourne, the early building periodicals contained one or two illustrations of quality per issue, notably of cottage designs, which involved elevations and plans, and of

facades and perspectives of prominent new city buildings. In 1869 the short-run *Building Times* quickly distinguished itself through its elaborate double-page illustrations, including a De Gruchy engraving of what it claimed was the first “correct” drawing of Melbourne Town Hall to be published.⁶ With the appearance of the *Australasian Builder and Contractors’ News* and the *Building and Engineering Journal*, in April 1887 and June 1888 respectively⁷, the space given to illustrations increased dramatically. Each journal had a section devoted to the description and illustration of new buildings, the latter of which typically consisted of either reproduced drawings of buildings situated in their urban or garden setting, or buildings shown in elevation and plan, or single interior views of a building. Smaller illustrations were embedded into articles themselves and were also used in some of the larger advertisements that were published.

The first photographic image to appear in the journals was of a model of a harbour steamer as the subject of a paper by Henry Selfe.⁸ The first photographic images of buildings graced the inaugural issue of the *Building and Engineering Journal* in June 1888. Selected perhaps to represent the geographic ambitions of the journal, these were images of the Royal Exhibition Building (which was being prepared as a venue for the upcoming Melbourne Centennial Exhibition) (Figure 1), St Mary’s Cathedral in Sydney, the Roma Street Railway Station in Brisbane, an aerial view of Launceston, and a “very characteristic” Maori carving, all reproduced with the permission of William C. Woolcott of the Tourists’ Bureau in Sydney.⁹



Figure 1. Royal Exhibition Building, Melbourne
(*Building and Engineering Journal*, June 16, 1888, 1,
State Library of New South Wales)

The fact that the *Building and Engineering Journal* began its life so heavily loaded with photographic reproductions expressed the course it was to take in becoming a leading site

for architectural photography. It promised to be “a practical, progressive, and independent journal” that catered for the needs and interests of the building and engineering trades through direct and unbiased communication.¹⁰ It was published by the Sydney printing firm of Jarrett & Co., which had released a steady stream of quality booklets and pamphlets throughout the late 1870s and 1880s.¹¹ The firm’s move to new premises in Clarence Street was accompanied by the appearance of the new journal as well as Jarrett & Co.’s entry into the architectural and building job printing marketplace. An advertisement for its services ran:

Architects Contracts, Skeleton Specifications, Clerk of Works Reports, and other Professional and Building Trade Forms Printed or Lithographed direct from the Manuscript. PLANS LITHOGRAPHED. Line drawings accurately copied by Photo Lithography. Paintings, Washed Drawings, or Existing Structures, exactly reproduced in Monochrome by a special PHOTO PROCESS.¹²

This “special” process was also responsible for the photographic illustrations featured in the *Building and Engineering Journal*, which, in terms of the first issue, the editors confessed were “not as yet so perfect in detail as we desire, but that is a mere question of manipulation, and we can guarantee to our readers that in future issues they will be greatly improved in this respect, and the selection of subjects be carefully made.”¹³ They were prepared to dedicate the necessary resources to realising the potential of the reproduction of photographic images of actual buildings as a mode of architectural illustration, stating:

The immense value of the photographic reproduction of drawings has long been recognised, because by that means every line as drawn by the artist is exactly shown in the copy. The advantages from an architectural point of view of the photographic reproduction of actual structures is no less marked, but hitherto the great difficulty and expense of such work has much limited, and in many cases altogether barred its application. We have however, determined to produce a paper in some degree worthy of Australasia, and for that reason will spare no trouble and expense in our illustrations, and by the introduction of large scale views of executed details, as well as those of entire buildings, will try to make these photo reproductions practically useful, as well as artistically beautiful.¹⁴

For the creation of these photo reproductions Jarrett & Co. used a photo-engraving process that involved projecting a negative through a transparent screen of finely gridded lines onto a photosensitive plate. This generated a pattern of micro dots on the plate that reflected the dark, light and grey areas of the original. This plate was then treated for printing, creating an image that appeared to the eye to possess the same qualities of the original in terms of line and tone. In trying to explain this, the editors of the *Building and Engineering Journal* invited its readers to closely inspect the published photographic images with the use of a magnifying glass to discover “that what seems to be the line of a column, or the finish of a cornice, is in reality no line at all, but only an effect produced by the contrast of light and shade, just as in the photographic original from which it was taken.”¹⁵ This was otherwise known as half-tone printing, a process that allowed for the mass reproduction of photographic images in the print media. Conceived in the 1850s, this process gave birth to the first printed photograph to appear in a newspaper, an image of Steinway Hall in Manhattan, published in New York’s *Daily Graphic* in December 1873.¹⁶ Half-tone images made their debut in Australian newspapers in the late 1880s. The first ‘news’ photograph appeared in the *Sydney Mail* in September 1888 portraying a railway accident at Young in New South Wales.¹⁷ In July that same year, the *Illustrated Sydney News* published its first photographs, portraits of James Martin, President of the NSW Cyclists’ Union, and C. R. Wood, amateur cycling champion of New South Wales.¹⁸ The *Building and Engineering Journal* and the *Australasian Builder and Contractors’ News* belong to this moment in history as two of the first periodicals in Australia to publish half-tone photographic reproductions. While the introduction of this process herald the beginning of the demise of the illustrated newspaper genre in Australia¹⁹, for the building press, half-tone photographic reproduction was considered a kind of epistemological breakthrough in the way knowledge of architecture and buildings could be obtained.

“An index of real effect”

Mary N. Woods describes how the editors of the *American Architect* considered the photographs they published as objective and accurate representations of buildings.²⁰ The photograph had the capacity to represent the “reality” of a building more than what an architectural rendering could: “it focused attention on the completed building rather than on the draughtsman’s skills and artistry.”²¹ This same view was held by the editors of the *Building and Engineering Journal*, who, in referring to photographic images in their publication, stated:

These reproductions, then, are—in fact, must be—truthful pictures of every detail of the actual building, and for that reason are more valuable as an index

of real effect than is any drawing, wherein, as our readers know, even an inferior design may be made to *look* well by superior draughtmanship.²²

Another way the editors described the type of photographic reproductions they published was “Photo-Nature” and “reproductions from Nature”.²³ Here they echoed ideas that were associated with the use of photography within the scientific disciplines where photography was seen to provide a faithful record of external reality which could be used for the analysis of different phenomena.²⁴ The photograph could record things that lay beyond the limits of human observation and by the 1870s photographic technology was able to capture movement.²⁵ For the editors of the *Building and Engineering Journal* the “Photo-Nature” of its reproductions related to the documentation of buildings in a way that provided a clear and truthful view of their actual composition, materials, decoration and details. There was also the possibility of publishing images of the hidden elements of buildings, such as their structural framework, as photography could be used to record and document stages or events of construction. The monochromatic nature of the photographic reproduction however did possess its limits. For instance, the photographic images of the interior of Melbourne’s new Federal Coffee Palace that were published in August 1888 were said to “convey to some extent the beauties of the grand staircase though lacking the colour which renders the reality so charming.”²⁶

The notion of the photographic reproduction as “an index of real effect” was tangentially treated by Edgar C. Bell, a member of the Amateur Photographic Association of Victoria, who presented a lecture on the topic of photography to the Victorian Architectural and Engineering Association in October 1888. Bell explained the different branches of photography: portrait and landscape photography, photo-telescopic and stereoscopic photography, “instantaneous” photography and architectural photography. “Architectural subjects”, he said, “are in some cases the simplest to deal with, but in others many difficulties crop up.”²⁷ Among the challenging aspects were determining the optimum standpoint from which to photograph a building to reduce visual distortion within the image and studying the most effective time of day to take photographs in relation to light conditions and the appearance of shadows. In this way Bell articulated the ways an architectural photograph contained implicit acts of framing and degrees of control. He concluded his paper by briefly discussing the idea of the “apparatus that cannot lie”, stating how the “active individual” behind the camera had the power to manipulate and “twist” the apparatus “until the true is rendered false so that we cannot believe it.” The architectural photograph was a good example, where “vertical lines of a building appear parallel. They all seem plumb to the eye, yet there must be a vanishing-point for them as for horizontal lines. The

operator swings the camera back, taking a diagonal section of a cone of rays, so as to falsify the truth for our understanding.”²⁸

Bell's lecture was well received and subsequently published in both the *Building and Engineering Journal* and the *Australasian Builder and Contractors' News*. Even though he raised some critical issues about the way the camera and image could be manipulated in the practice of photographing buildings, these were minor notes to the general positivism that underpinned the discussion. The editors of the *Building and Engineering Journal* also upheld a positivism about photographic reproduction as a way of allowing readers to see and get a greater measure of buildings through the medium of the press. A key issue was the clarity and visual appeal of photographic imagery and this involved not only the use of reliable and up-to-date photo-engraving and printing technology but also the supply of quality photographic material from external sources. There is no evidence to suggest that the editors commissioned photographs for the journals, rather readers were invited to send in photographs of “any important or characteristic work” for publication. This constituted the principal source of supply, but not the only one. The following sections describe these sources and the types of photographic images that appeared in the late 1880s and early 1890s.

Images of new buildings

Once photographic reproductions started to appear in the journals it was not long before the first photographic images of newly completed buildings were published. This began with two images of the Gordon Coffee Palace on King Street in Melbourne, designed by George de Lacy Evans, and published in the July 1888 issue of the *Building and Engineering Journal*.²⁹ One image was of the street facade of the building and the other was a close-up view of the main entrance showing the details of the decorative features and structural piers. This was followed in August by a photographic feature on the new Federal Coffee Palace in Melbourne, designed by Edward George Kilburn and William Ellerker in association with William Pitt. Kilburn had photographed the building himself and provided his own negatives to the journal, which consisted of a perspective of the overall building (Figure 2), an image of its arcaded entrance, four interior views and one of the iron framework of the dome that was erected above the building's corner turret.³⁰ The double-page perspective view was a high-quality reproduction which the editors noted “affords an excellent and truthful idea of the whole exterior of the block.”³¹



Figure 2. Federal Coffee Palace, Melbourne
 (*Building and Engineering Journal*, August 11, 1888, 94-95,
 State Library of New South Wales)

Another large photographic illustration of a new commercial building was of the 138-foot, nine-storey 'Prell's Building' on the corner of Queen Street and Flinders Lane in Melbourne, published in July 1889 (Figure 3).³² Designed by F. M. White and Son, this was one of the loftiest office buildings in Melbourne at the time, consisting of about 140 rooms serviced by four passenger elevators. Printed over a double-page spread, the quality of this reproduction was not as high as that of the Federal Coffee Palace perspective, with some of the street features appearing as if they were hand drawn.



Figure 3. 'Prell's Building', Melbourne
 (*Building and Engineering Journal*, July 6, 1889, 3-4,
 State Library of New South Wales)

Aside from commercial edifices, other types of buildings were illustrated photographically, including new churches and residential buildings. Images of these buildings showed the pattern and texture of brick walls and tiled roofs and the visual contrast of different materials. The strength of the photographic image to represent these things as opposed to a lithographic illustration was cast into stark relief in October 1888 when the *Building and Engineering Journal* published a photograph of the new Our Lady of the Sacred Heart Church in Randwick, by Sheerin & Hennessy (Figure 4a), and a drawing of the 1867 Collins Street (Tercentenary) Independent Church, by Reed & Barnes, with the distinctive brickwork of the latter only slightly shown in parts of the image (Figure 4b).



Figure 4a (left). Our Lady of the Sacred Heart Church, Randwick, Sydney
Figure 4b (right). Collins Street (Tercentenary) Independent Church, Melbourne, 1867
 (*Building and Engineering Journal*, October 20, 1888,
 State Library of New South Wales)

The role of Edward Kilburn in supplying the *Building and Engineering Journal* with negatives of contemporary work is worth a further note here. Not only did he provide negatives of his own practice's work, he also contributed a negative of a photograph he had taken of the Congregational Church in Malvern, by Billing & Son, which was claimed by the editors to have produced a superior print with "very beautiful detail."³³ He was also responsible for contributing the negatives of the first photographic images of interiors of new buildings to be published in the journals, of the Federal Coffee Palace and an image of the billiard room within his own residence, 'The Elms', in North Brighton in Melbourne (Figure 5). Possibly selected to illustrate the built-in pipe organ (built by Kilburn himself), the publication of this singular image unaccompanied by other

images of the house was a complete display of representational modernity: a modern domestic space shown through the modern means of photographic reproduction.



Figure 5. Billiard room and organ, 'The Elms', North Brighton, Melbourne
(*Building and Engineering Journal*, September 1, 1888, 158,
State Library of New South Wales)

Son of the photographer, Douglas Kilburn, Edward would have been exposed to photographic techniques and technology at an early age and by the late 1880s he was leading the architectural profession in taking photographs of his own work and the work of others and supplying negatives to the press for publication. His attraction to photography as a way of documenting buildings was also clearly seen in the many photographic images of American architecture he acquired during his travels in the United States in 1889.³⁴ Apart from the instances when Kilburn was mentioned as the source of images, there was little information provided on the provenance of the other images of new buildings that were published in the two journals in the late 1880s. It can be assumed that commercial photographers were likely involved in the production of some of the original images, commissioned either by architects, builders or their clients to photograph a building for use as a record and also for publicity purposes.

Foreign buildings

Although principally focussed on domestic affairs, both the *Building and Engineering Journal* and the *Australasian Builder and Contractors' News* also aimed to present news and information from other countries, and for this they cited and re-printed articles and excerpts from British, European and American periodicals. This desire to be engaged internationally was also reflected in their visual content, both in the reproduction of architectural drawings and photographic images. However, access to and the availability

of engravings and photographic negatives of foreign buildings had an impact on this. Early photographic representations of foreign buildings tended to feature historic buildings and were mostly dependent on the photographic collections of local contributors. Leading the way was the *Building and Engineering Journal* which in 1888 published photographic reproductions of a variety of buildings in Belgium, France, Italy and England. The descriptive commentary that accompanied each of the images indicates that the writer (likely one of the journal's editors) had a good understanding of the buildings, their details and surroundings. For the writer, the publication of these images was an opportunity to present certain opinions and pedagogical advice that benefitted from the ability of photographic representation to capture buildings in detail. For example, "Modern Brussels" (rather than the older parts of the city) was considered worthy of "careful study", especially the Bourse which "though in parts it may shock the taste, and outrage the *amor prope* of the classic architect, yet the general effect is very fine, and the details and workmanship of high order"³⁵ (Figure 6a). Another building considered worthy of "careful study" was Venice's Ducal Palace despite concerns about the overall proportion of the upper part of the building³⁶ (Figure 6b).



Figure 6a (left). The Bourse, Brussels (*Building and Engineering Journal*, July 28, 1888, 63, State Library of New South Wales)

Figure 6b (right). Ducal Palace, Venice (*Building and Engineering Journal*, August 18, 1888, 115, State Library of New South Wales)

The next surge of photographic images of foreign buildings occurred in 1892 on the pages of the *Australasian Builder and Contractors' News* in connection to the first instalment of a long series of articles written by the architect and vice-president of the Royal Victorian Institute of Architects, Arthur E. Johnson, entitled "Notes on Travel."³⁷ In this series Johnson described the many buildings he and his travel companion, Gerard Wright, had visited

during a trip through Sicily, Italy, Germany and Belgium in 1891. Obtaining numerous photographs of the buildings they saw, Johnson used these images to illustrate a lecture he gave to the Institute as well as providing the collection to the journal's editor to select from for publication with his articles. Unfortunately his photographic prints did not make ideal material for reproduction, for without the negatives, the editor claimed, "even in London or New York" it would be impossible "to do full justice to the character and beauty of these wonderful buildings as depicted in the photographs."³⁸ Nevertheless, staff were prepared to go through the "tedious process required for photographs" to reproduce a selection of images for the journal.³⁹

Other photographic reproductions of foreign buildings were published on a more individual and idiosyncratic basis, such as two images of heavily ornate rooms within the Schloss Neuschwanstein in Bavaria and an exterior view of the Writers Buildings in Calcutta.⁴⁰ Many of these images were provided by the Melbourne and Sydney printing firm of Troedel & Co. who likely had photographic engravings already available.⁴¹

Advertising

The third type of architectural photographic reproduction to appear in the journals was contained in advertisements, specifically in advertisements for Ernest Wunderlich and the first application of his moulded zinc ceiling panels in Australia. These were published in late 1888 issues of the *Australasian Builder and Contractors' News* and featured two views of ceilings within Beale & Co's new piano showroom on George Street in Sydney, with the advertisements also highlighting the name of the showroom's architect, John B. Spencer (Figure 7).⁴² High quality reproductions, Wunderlich had obviously commissioned superior originals for the publicity campaign. Surprisingly though, this was the only use of photographic imagery to be found within the advertising published in the extant copies of the journals from the late 1880s and early 1890s.



Figure 7. Advertisement for Wunderlich's new moulded zinc ceiling panels
(*Australasian Builder and Contractors' News*, November 24, 1888, n.p.,
State Library of New South Wales)

Conclusion

The brief appearance of photographic reproductions in journal advertisements testifies to the expense that was involved in the process of transferring photographic material onto the pages of the journals in the late 1880s and early 1890s. This had been recognised editorially since mid-1888 and by early 1893 the appearance of photographic imagery had dropped to the point where there were only few images of buildings published that year and the next and of a comparatively low quality. The onset of a recession severely impacted the financial position of many architectural and building operatives and the journals themselves as they rationalised their production costs to survive in difficult economic times leading to their amalgamation in April 1895 under a joint name.

Even though an expensive undertaking, interest in photographic reproduction within Australia's building press was initially very strong. Editors were prepared to bare this expense to endow their publications with imagery they understood as being a superior "index of real effect", that is, imagery that provided a clear representation of "actual structures" in terms of their composition, materiality, decoration and detail. They explained this as a kind of epistemological imperative but also one that was driven by the currency photographic imagery lent to the journals in providing them with a seductive representational modernity. Despite this attraction, photographic imagery failed to supersede drawing engravings as the dominant mode of architectural illustration within the journals, due, firstly, to the comparative costs of reproduction and, secondly, to the fact that architects generally remained in the practice of producing drawings rather than

commissioning photographs of their buildings for publication. This paper however has identified some of the first architects connected with the publication of photographs within Australia's building press, especially Edward Kilburn, who deserves further attention for the connection he and his practice had to the photographic image.

It was important that this paper recognise and respect the range and heterogeneity of the first photographic reproductions to appear in the *Australasian Builder and Contractors' News* and *Building and Engineering Journal* and to appreciate the particularity and exceptionality of the images. For these reasons it has not been possible to see or to argue for the existence of a greater unifying theme or themes. Now that this exercise is complete and that the moment of appearance has been reviewed it is possible to understand subsequent developments within the building press and the architectural periodicals that were founded in the early twentieth century in the light of this enthusiastic but difficult beginning.

¹ Mary N. Woods, 'The Photograph as Tastemaker: The *American Architect* and H. H. Richardson', *History of Photography*, 14, 2 (1990), 155-163.

² The name *Building and Engineering Journal of Australia & New Zealand* will henceforth be shortened to *Building and Engineering Journal*.

³ Woods, 'The Photograph as Tastemaker', 155.

⁴ See Stuart King and Julie Willis, 'Mining Boom Styles', in AnnMarie Brennan and Philip Goad (eds.), *Proceedings of the Society of Architectural Historians, Australia and New Zealand: 33, Gold* (Melbourne: SAHANZ, 2016), 334-345.

⁵ Paul Hogben, 'The Tender Information Economy of the Colonial Building Press in Australia', *Fabrications*, 20, 2 (2011), 108-127.

⁶ 'Melbourne Town Hall', *Building Times*, 1, 1 (October 1, 1869), 6.

⁷ The *Australasian Builder and Contractors' News* began publication with a prospectus in April 1887.

⁸ See *Australasian Builder and Contractors' News*, 2, 51 (April 28, 1888), 271.

⁹ 'Our Illustrations', *Building and Engineering Journal*, 5, 1 (June 16, 1888), 1.

¹⁰ 'Editor's Note Book: Our Journal', *Building and Engineering Journal*, 5, 1 (June 16, 1888), 2.

¹¹ Among these were the concert programme for Sydney's International Exhibition of 1879 and a guide book entitled *Beautiful Manly: Its Approaches, Surroundings, Charms and History, with Visitors' Guide to all Places of Beauty, Rest and Sport*, published in 1885.

¹² See advertisement for Jarrett & Co. published in Supplement to the *Building and Engineering Journal*, 5, 203 (July 28, 1888), 1.

¹³ 'Our Illustrations', *Building and Engineering Journal*, 5, 1 (June 16, 1888), 1. The editor of the *Building and Engineering Journal* at the time was John Leck Bruce, an architect who had arrived in Sydney from Glasgow in May 1888. Frederick Charles Jarrett, owner of Jarrett & Co., was associate editor.

¹⁴ 'Our Illustrations', *Building and Engineering Journal*, 5, 1 (June 16, 1888), 1.

¹⁵ 'Our Illustrations', *Building and Engineering Journal*, 5, 203 (July 28, 1888), 51.

¹⁶ See "A Wonderful Process. Our 'Granulated Photographs'", *Daily Graphic*, December 2, 1873, 202. "Granulated photography" was associated with William Augustus Leggo, a Quebec engraver who was responsible for enabling the world's first half-tone photographic reproduction in a weekly pictorial paper – an image of His Royal Highness Prince Arthur published in the *Canadian Illustrated News* on 30 October 1869. See 'Leggo, William Augustus (1830-1915)', in Hannavy (ed.), *Encyclopedia of Nineteenth-Century Photography*, vol. 2 (New York: Routledge, 2008), 840.

-
- ¹⁷ See Sally Young, 'Press Photography in Australia, 1880-2015', in Fay Anderson and Sally Young with Nikki Henningham, *Shooting the Picture: Press Photography in Australia* (Carlton, Victoria: Miegunyah Press, 2016), 2-3.
- ¹⁸ See 'The Sports of Australia. Cycling', *Illustrated Sydney News*, 25, 7 (July 26, 1888), 10, 12.
- ¹⁹ See Peter Dowling, '1861-1862: Seminal Years in the Publishing History of Illustrated Newspapers in Colonial Australia', *La Trobe Journal*, no. 88 (2011), 26.
- ²⁰ Woods, 'The Photograph as Tastemaker', 155.
- ²¹ Woods, 'The Photograph as Tastemaker', 161.
- ²² 'Our Illustrations', *Building and Engineering Journal*, 5, 203 (July 28, 1888), 51.
- ²³ See 'Our Illustrations', *Building and Engineering Journal*, 5, 1 (June 16, 1888), 1; 'Our Illustrations', *Building and Engineering Journal*, 5, 203 (July 28, 1888), 51.
- ²⁴ From the mid-nineteenth century various applications of photography for the purposes of scientific study were developed. See Ron Callender, 'Scientific Photography', in Hannavy (ed.), *Encyclopedia of Nineteenth-Century Photography*, vol. 2, 1255-1258.
- ²⁵ Callender, 'Scientific Photography', 1257.
- ²⁶ 'Description: The Federal Coffee Palace, Melbourne', *Building and Engineering Journal*, 5, 205 (August 11, 1888), 101.
- ²⁷ 'A Paper on Photography', *Australasian Builder and Contractors' News*, 3, 77 (October 27, 1888), 361.
- ²⁸ 'A Paper on Photography', 361.
- ²⁹ *Building and Engineering Journal*, 5, 203 (July 28, 1888), 58-59.
- ³⁰ *Building and Engineering Journal*, 5, 205 (August 11, 1888), 85, 90-91, 94-95, 98-99, 104.
- ³¹ 'Description: The Federal Coffee Palace, Melbourne', 101.
- ³² *Building and Engineering Journal*, 7, 252 (July 6, 1889), n.p.
- ³³ 'Congregational Church, Malvern, Victoria', *Building and Engineering Journal*, 5, 222 (December 8, 1888), 526.
- ³⁴ Kilburn's American photographs are held by the Architecture, Building and Planning Library at the University of Melbourne, digital copies of which can be found in Miles Lewis' online research database: www.mileslewis.net/kilburn/.
- ³⁵ 'Our Illustrations. The Bourse at Brussels', *Building and Engineering Journal*, 5, 203 (July 28, 1888), 51.
- ³⁶ 'Descriptions. The Ducal Palace at Venice', *Building and Engineering Journal*, 5, 206 (August 18, 1888), 112.
- ³⁷ The entire series was published in instalments across 1892, 1893 and 1894.
- ³⁸ 'Illustrations to Mr. A. E. Johnson's "Notes on Travel"', *Australasian Builder and Contractors' News*, 11, 281 (September 24, 1892), 156.
- ³⁹ 'Illustrations to Mr. A. E. Johnson's "Notes on Travel"', *Australasian Builder and Contractors' News*, 11, 278 (September 3, 1892), 117.
- ⁴⁰ See 'Dining Room of Castle of Neuschwanstein', *Building and Engineering Journal*, 5, 209 (September 8, 1888), 188-89; 'Study in Castle of Neuschwanstein, Bavaria', *Building and Engineering Journal*, 5, 212 (September 29, 1888), 274-275; 'Writers Buildings, Calcutta', *Building and Engineering Journal*, 5, 216 (October 27, 1888), 370.
- ⁴¹ Many of lithographic and photographic reproductions published in the *Building and Engineering Journal* in the late 1880s were credited to Troedel & Co.
- ⁴² See advertisement in the Supplement to the *Australasian Builder and Contractors' News*, 3, 81 (November 24, 1888), n.p.

Big Data and Architectural History

How to Characterise Architects Using Big Data

Adrian Humphris

Geoff Mew

Abstract

Analysing large sets of data is often used to uncover hidden patterns, unknown correlations, market trends, customer preferences and other potentially useful information. It is increasingly popular and much more relevant as data has become more widely accessible and computing technology has advanced.

Could this approach tell us more about the characteristics of New Zealand architects? In researching our book 'Raupo to Deco' we created a large set of data about architects and the buildings they designed. Local authority permit records, newspaper tender notices, and many other sources were incorporated - this allowed us to identify architects, the time frames they worked in, the types and numbers of buildings they designed, and the connections and relationships between individuals and practices. We also used genealogy techniques to work out birth and death dates and to track where they practiced over time.

We have continued to build this dataset, broadening it to cover the whole of New Zealand. Currently we have more than 25,000 individual building tenders for buildings between 1840 and 1940, and information on more than 1,500 'architects' over the same period.

This paper illustrates some aspects of how we can present a view of 'an architect' over time. How many were there? How old were they and how long had they been practicing, and did this change over time as the industry developed? Did architectural output match the building cycle, or were architects insulated from regular booms and busts? And how specialised were architects in different areas of design, and did this also change over time? We also discuss some of the advantages and pitfalls of dealing with a large data set, and explore how we can ensure the validity and accuracy of the results.

Background

New Zealand architecture in the broadest sense has only been described in three major works, *Colonial Architecture in New Zealand*¹, *Looking at the Architecture of New Zealand*², and *A History of Architecture in New Zealand*³. The latter has been progressively revised in an attempt to keep up with current trends. All the authors were or are architectural historians who have used conventional research techniques to compile their works and have concentrated on the built environment with little emphasis on the characters of building designers.

Our book, *Raupo to Deco: Wellington Styles and Architects 1840 - 1940*, was an attempt to look more closely at the personalities of Wellington architects as well as the buildings they designed. However we also largely used conventional methods of research for data accumulation and assembly. These included reviewing prior literature, both published and unpublished on the individual architects selected for inclusion, summarising their work from sources such as their practice records, tender notices and building permit records and consulting available definitions of different architectural styles over time. Unlike the authors of detailed biographies of some New Zealand architects, such as those on William Mason, Benjamin Mountfort and Frederick de Jersey Clere⁴, we did not attempt to portray our architects in comparison with their contemporaries, nor did we attempt to exhaustively list all their individual works.

A further project, currently underway, is a more in-depth study of a selection of nationally recognised architects who practised between 1840 and 1940. In order to do this, we perceived a need to expand our Wellington database to cover New Zealand in the most efficient and objective way possible. In this paper we describe some of the methods used and illustrate some of the results achieved from compiling and working with large data sets.

Compiling a big data set

During the writing of *Raupo to Deco* a new potential tool that could be adapted for architectural research was introduced by the National Library of New Zealand. This was the online search engine Papers Past, which was first made available in 2001.⁵ Papers Past provides access to millions of pages of digitised New Zealand newspapers dating back to the 1840s, and thanks to the use of optical character recognition allows researchers to search via keywords and phrases to find specific references.⁶ At first the number of newspapers and geographical area they cover was small, but this has increased over time

so that now most national and many of the regional papers are now available online, although for varying time period prior to the mid-1950s.

We have used a range of search terms and innovative approaches to find the information needed to compile our data set. Of primary interest are the tender notices posted by architects; however many other articles and adverts relate to or feature information about architects. Searching ranged from broad; “tender” and “architect” (preferably with a name for the latter), through to specific searches by names and initials in the case of particular architects. Collating the results has allowed us to build a list of all the tenders placed by a particular architect as recorded in the papers.

Additional information gained relates to the types of buildings designed, their general location, approximate date of construction, and possibly the qualifications of the architect. Using this approach we have obtained information on over 25,000 New Zealand buildings and 1,500 architects or architectural firms in practice during the 1840 to 1940 period. Although the numbers appear large, they only just qualify as big data.

Big data and other research approaches

Manovich, in Gold (2012) defines big data as “data sets whose size is beyond the ability of commonly used software tools to capture, manage, and process the data within a tolerable elapsed time.” The size and inter-related nature of this information means traditional research methods and tools are unable to deal with them. New computer-based ways are needed to analyse and understand them. The big data approach, that is using a large data set to define concepts and detect otherwise less obvious trends, is well accepted in digital humanities, but has not been applied to architectural research to any great extent⁷. The main reason for this is the general lack of sufficient quantities of objective raw data needed to build up a big enough database.

Manovich (2012:466) contrasts two separate approaches to research; using either surface data (for example studying summary information concerning a huge group of people) or deep data (which would be detailed in-depth research about a few individuals or small groups). He questions the outputs of both approaches, and whether the same insights and results can be obtained from both approaches.

Traditional research methods and studies seem to have followed the deep data approach, researching a single architect or firm, or a small group of architects. This approach appears

to be well practiced, particularly in tertiary research, with post-graduate theses exploring the lives and architecture of specific architects. Some work does look at change over time, for example Peter Richardson's 1997 thesis on New Zealand government architecture⁸, however these works tend to be tightly defined around a specific theme or subject.

In our research we are specifically concerned with surface data, and believe this allows us to be more objective in our analyses and outcomes, but more importantly allows us to answer broader questions about the development of the architectural profession that may not be possible were we taking a deep data approach.

We would argue our approach is quantitative rather than qualitative. This helps eliminate any subjectivity that may arise. Amassing a data set of tenders by architect is entirely objective in the raw state and is not subject to any biases of the collectors. A definition of architectural research by James Snyder is systematic research directed to the creation of knowledge. But it is accepted that all research is reductionist in some form.⁹ The idea of objectivity is to keep potential bias or interference by the researcher out of the process of data arrangement and manipulation - but inevitably some generalisation will occur.

If one could collect every plan by William Gray Young, for example, one could then make definitive, objective statement about them/him - but few architects have left complete records of their works or lives. Most architectural researchers do the best they can with all the resources they can find. The end product reflects combinations of their writing skills, the time and money available for their project, the amount of material available, and their research ability - all largely subjective. Clearly an objective database should be a fundamental starting point, particularly if it can be boosted with further objective material.

Thus we have not stopped at just amassing the above-described data from Papers Past but have gone on building a more extensive dataset using additional information both obtained from Papers Past and other sources.

The wider data set

Our data is split into three related sets; building information [linked to architect], then information about the architects and architectural firms themselves. The key attributes captured are shown in Figure 1 below.

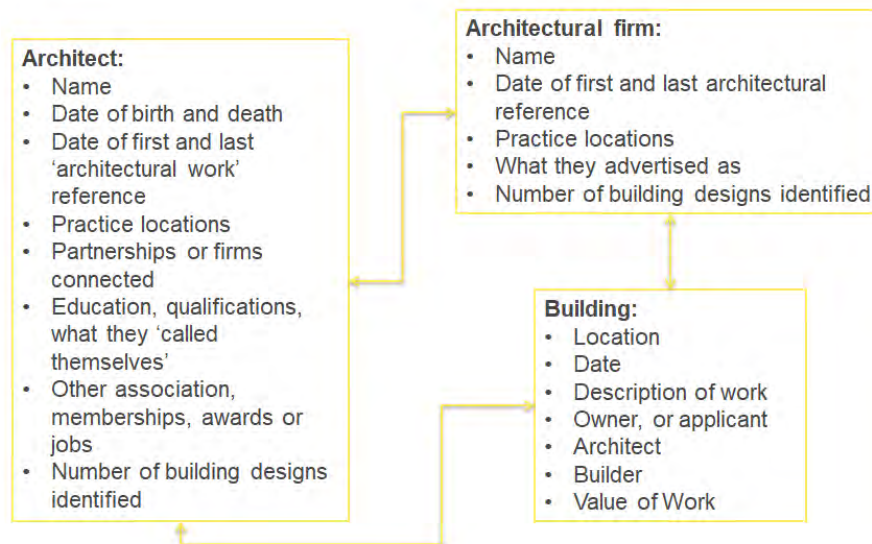


Figure one: Data attributes and relationships captured. This is the complete sets of attributes we are using, and the relationships they share.

For a number of these attributes we have had to consult sources such as the Department of Internal Affairs Births, Deaths and Marriages website, various directories and almanacs, New Zealand Institute of Architects records and local authority records. Depending on our source, not all the fields may be populated - for example newspaper tenders rarely provide the owner/builder or value of the work, whereas building permit applications generally do. Similarly it is sometimes not possible to find precise dates of birth and death for individual architects. Because of this we aim to use different subsets of data to answer different questions. Thus we may only calculate average ages using the architects we have specific birth dates for. It is hoped that as our research progresses, data capture will be increasing complete, but we have to assume currently our sample size is large enough to be representative of the whole.

We are also in the midst of moving our data to a platform that better allows the manipulation and analysis that we want to carry out. Due to the original research needs our data is assembled in Microsoft Excel, as this was more than suitable for our original purposes. However Excel has limited capability for the more complex sorting and pattern identification we now want to do; similarly it cannot easily be linked to other data sets (for example GIS or economic data) to allow us to visualise our results or extend our research. The current plan is to create an SQL database structured to allow us to easily interrogate our data, and integrate with other data sets.

One other assumption we have made is that construction of new buildings will give a suitable representation of an architect's output, so we have not been capturing every single record of alterations and additions (although we have included 'significant' alterations, such as an additional wing to an existing building, or a complete rebuild of a structure). Therefore we have assumed the number of architects who spent their careers doing alterations only was negligible.

Examples of data manipulation

One of the strengths of our approach is the ability to do analyses across the whole time period our data set covers. Rather than having to identify the year of interest then research and collate information, we can interrogate and combine our data for any time period. In the following example we have calculated some basic data about architects between 1876 and 1936, looking at 20-year intervals.

Year	Architects	Practices	Architect average age	Youngest architect	Oldest architect	Average length practice
1876	144	5	38.6	17	71	10.0
1896	259	17	43.5	19	83	14.7
1916	387	42	40.6	18	77	13.1
1936	304	38	52.8	20	89	23.6

Table one: Summary data for New Zealand architects, 1876-1936, at 20 year intervals

The figures in this table however still require extra traditional research to explain the results. For example does the average age of architects decrease as architectural courses become available locally and increasing numbers of students graduate from them, then increase as this new generation of architects settled in to long and established careers? And is there a move from small partnerships or individual architects practicing to the establishment of larger firms over time?

As well as comparative analysis we can also investigate the relationship between individual architects and architectural firms. In this case we have used Frederick de Jersey Clere as an example. The following table gives the number of designs identified either for Clere himself, or for architectural partnerships where Clere was a partner.

Architect or Partnership	Date range	Total designs
Frederick de Jersey Clere	1872-1952	167
Atkins & Clere	1883-1888	68
Clere & Richmond	1891-1895	35
Clere, Fitzgerald & Richmond	1895-1899	64
Clere & Swan	1900-1902	27
F de J Clere & Son	1911-1920	34
Clere & Busby	1913-1917	4
Clere & Williams	1918-1923	32
Clere & Clere with J F Munnings, Joint Architects [one-off design]	1923	1
Clere & Clere	1923-1962	126
Clere & Clere & Hill	1937-1939	6

Table two: Number of designs attributed to Frederick de Jersey Clere (either individually or where Clere was in partnership).

We can then take this data and analyse it over time, as shown in Figure two.

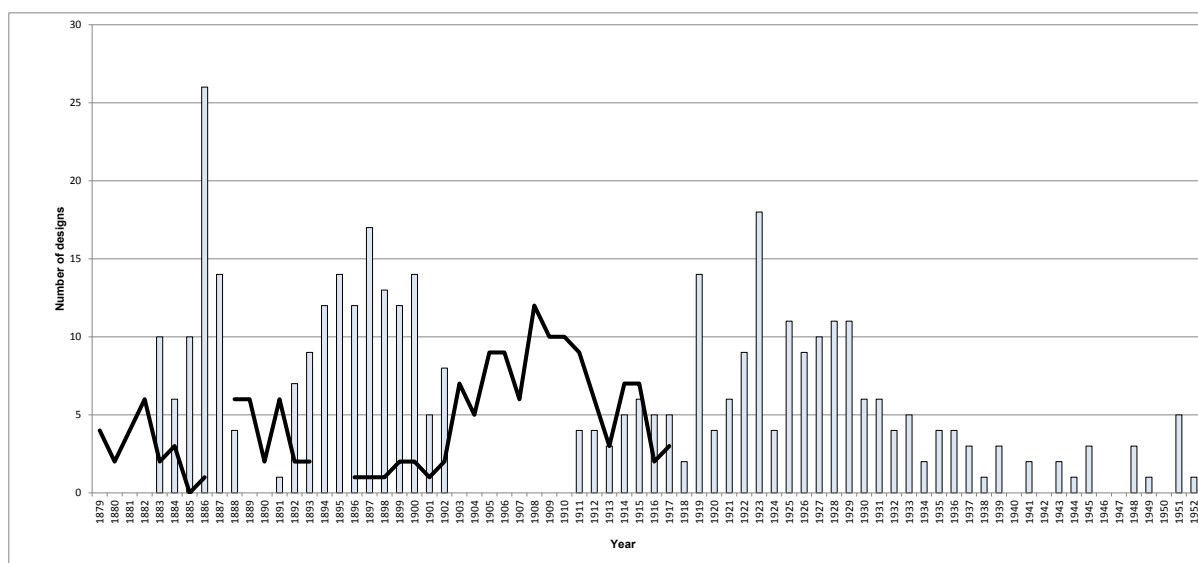


Figure two: Output for Clere over time, either tendering individually (line graph) or in partnership (bar graph). Note in particular the 1910s, where Clere was tendering individually as well as involved in multiple partnerships concurrently. Other than the early 1900s the data suggests Clere spent the majority of his career in partnership with other architects.

A consistent problem with architects in partnerships is determining which of the partners actually designed specific buildings. Two solutions are commonly adopted; either the total number of buildings is attributed to the senior partner, or the number is attributed to the

generic partnership. Ideally the plans for all buildings designed by a partnership should be individually examined for authorship but this is seldom practicable and in many instances impossible due to lack of records.

Our third example of data manipulation is comparing types of buildings designed by different architects over their careers. In this case we are comparing Clere with Herbert Thomas Barnes, an architect who practised from the 1910s, mainly in Wellington. The following two Figures look at both the annual output of designs as well as the types of buildings.

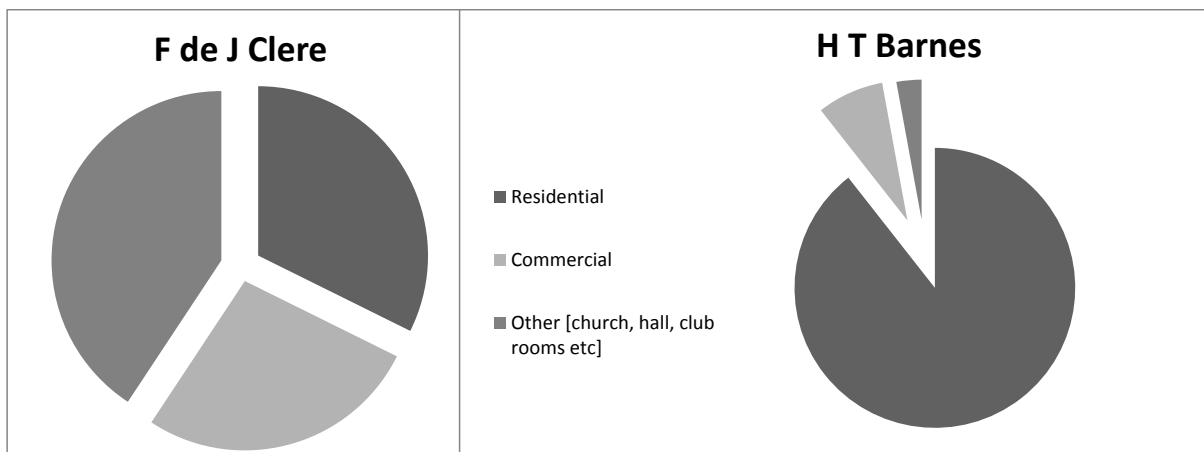


Figure three: The pie diagrams show that Clere was involved designing a broader range of buildings types, particularly church buildings, compared with the output of HT Barnes. Barnes is shown to have concentrated on the design of residential buildings.

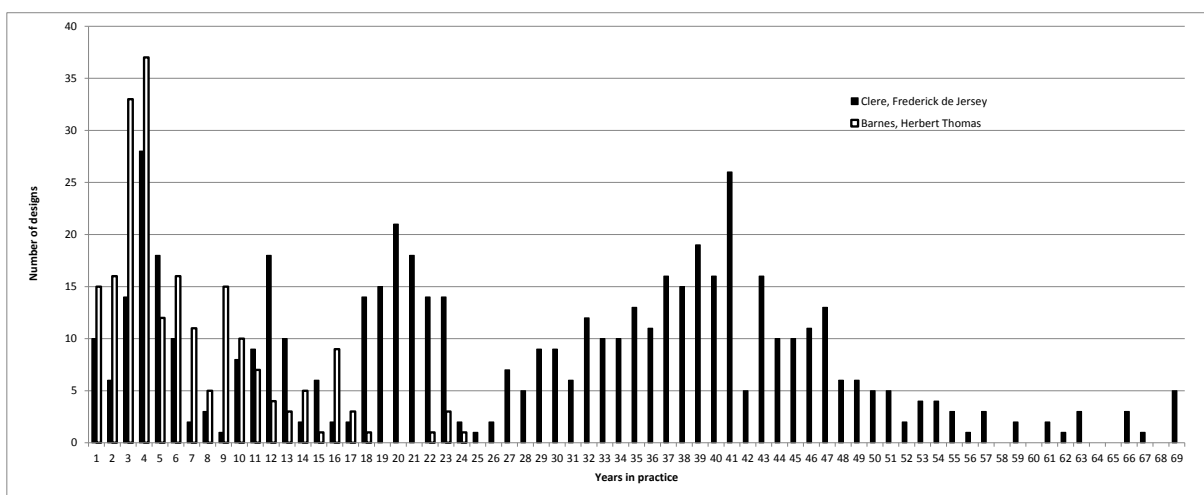


Figure four: This graph aligns the date Clere and Barnes started in practice (although Clere was active from the 1870s to 1950, whereas Barnes started in the 1910s and stopped in the late 1930s). Clere's longer practice can clearly be seen; the first few years for both were busy before tailing off somewhat. Clere has regular peaks; possibly due to his involvement in partnerships?

Our final example focuses on where architects practiced, and whether this changed over time. For example does the distribution of architects correlate with population growth across the country? Does it relate to other events? For example did numbers of architects in Wellington increase once Wellington became the capital in 1865, and there was a subsequent relocation of government as well as business head offices? And how settled were architects; did they set up practice and stay in one place, or did they move around the country to find work? And did this change over time?

Table three shows the proportions of architects in practice by decade. This is a high level summary; we are hoping to also use our data to analyse at a much more specific level as well. While we have presented the data here in a table, our aim is to map data to show geographical trends.

	Distribution of architects (%)										
Decade	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940
Auckland	50.0%	44.4%	29.6%	29.0%	13.9%	17.6%	15.2%	16.3%	17.3%	22.2%	18.6%
Wellington	50.0%	44.4%	18.5%	18.8%	14.6%	24.2%	28.9%	33.0%	37.7%	42.5%	50.6%
Christchurch	0.0%	11.1%	25.9%	15.9%	17.2%	11.5%	10.2%	9.2%	9.1%	5.2%	6.4%
Dunedin	0.0%	0.0%	7.4%	11.6%	17.9%	7.9%	9.1%	3.9%	5.2%	6.3%	6.4%
Other centre	0.0%	0.0%	18.5%	24.6%	43.0%	38.8%	36.5%	37.6%	30.7%	23.8%	17.9%

Table three. Distribution of architects by decade, 1840-1940. The table shows the proportion of architects practising in the four main centres, as well as outside of those cities.

Conclusions

The current state of our project indicates that the assemblage of big data on architects and their buildings in New Zealand will provide a new, objective, kind of research tool for investigating both general and specific historical trends.

Taken over time, a portfolio of the types of buildings designed by a particular architect can be assembled with a reasonable degree of accuracy - although checking that a specific tender resulted in a completed building by other means is recommended. Thus variation in output over time can also be assessed and related to that of other architects from the same or different regions.

The work to date shows that, although tender notices provide objective data on architects and their buildings, more information from other reliable sources must be added to form a comprehensive database.

¹ Stacpoole, John (1976). *Colonial Architecture in New Zealand*. Wellington: AH & AW Reed

² Hodgson, Terence (1990). *Looking at the Architecture of New Zealand*. Wellington: Grantham House Publishing

³ Shaw, Peter (2003). *A History of New Zealand Architecture*, Third Edition. Auckland: Hodder, Moa, Beckett Publishers Ltd

⁴ Stacpoole, John (1971). *William Mason. The First New Zealand Architect*. Auckland: Auckland University Press

McLean, Susan (2003). *Architect of the Angels, The Churches of Frederick de Jersey Clere*. Wellington: Steele Roberts Ltd.

Lochhead, Ian (1999). *A Dream of Spires, Benjamin Mountfort and the Gothic Revival*. Christchurch: Canterbury University press

⁵ <https://paperspast.natlib.govt.nz/about>

⁶ Papers Past provides similar access and functionality to that provided by Trove, the National Library of Australia online search; <https://trove.nla.gov.au/>

⁷ One study we are aware of was carried out by Juan Pablo Bonta in the mid-1990s. He analysed the indexes of nearly 400 architecture books and journals, spanning 150 years, analysing the frequency and subjects of architects and articles to interpret architects' standings within the profession over that period. Bonta, Juan Pablo (1996), *American Architects and Texts*. Cambridge Ma: MIT Press.

⁸ Richardson, Peter (1997), "Building the Dominion: Government Architecture in New Zealand, 1840-1922." A Thesis Submitted for the Degree of Doctor of Philosophy in Art History. Christchurch: University of Canterbury

⁹ Groat, Linda and David Wang. 2013. *Architectural Research Methods*. New York: Wiley.

Sight and Sensation: Observations on I.M. Pei's Approach to Composition

Michael Jasper
University of Canberra

Abstract

This paper examines I.M. Pei's approach to the problem of form and space generation. Although Pei has not set out a comprehensive statement on his process for conceiving architectural form, there are specific ambitions discussed throughout published interviews and evidence of definite circulatory, spatial, and volumetric devices in the built work. The paper reveals clues to Pei's sensibility in this work, a sensibility which, it is argued, privileges dynamic, nonperspectival relations accommodating multiple viewpoints as distinct from what the architect himself characterises as static conditions resulting from single vanishing point perspective. As an underlying proposition, and in order to provisionally place Pei's work within architecture's larger historical trajectory, the idea of a nonperspectival conception of space as formulated by Giulio Carlo Argan is used in an analysis of the composition techniques in Pei's thinking and practice. In order to test this proposition, the paper considers published interviews and undertakes an initial examination of the Everson Museum of Art (Syracuse, 1961-1968), the National Gallery of Art East Building (Washington D.C., 1968-1978), and the Morton H. Meyerson Symphony Center (Dallas, 1982-1989). The paper asks such questions as: Which concepts of space are at work in the projects? What differences in strategy and effect are revealed in the three projects and do they align with Pei's stated ambition to create an architecture of movement formed by multiple viewpoints? More pointed is the question: Do the projects realise different kinds of space and if so is one better aligned to theories of sight or sensation? In addressing an underlying SAHANZ 2018 conference theme concerning the relationship between conceiving and shaping architectural space, the paper reveals untheorised aspects of Pei's manner of composing built form, and makes a modest contribution to scholarship on post-1950s architectural theory.

Introduction

In 1960, after twelve years leading the in-house architecture office at Webb & Knapp, Inc., architect I.M. Pei (b. 1917) decides it is time to open his own office, albeit initially within Webb & Knapp. Operating as I.M. Pei & Partners, the firm grows from its privileged start, supported by the broad range of potential clients Pei encountered with William Zeckendorf while at Webb & Knapp, to one of the most respected and successful of New York practices over the subsequent twenty-nine years and up to Pei's withdrawal from the firm in 1989.

A few years earlier, historian-theorist Giulio Carlo Argan (1909-1992) publishes what might appear to be a curious essay to introduce in relation to Pei. It can be argued, however, that Argan was transmitting ideas 'in the air' and palpable at the time and now useful for a fuller understanding of the origin and significance of Pei's work. The title of Argan's essay, "The Importance of Sammicheli in the Formation of Palladio", doesn't hint at the theoretical leap Argan claims to discover via Palladio. The leap that is, following Argan, between perspective interpretations of architectural form and what Argan comes to call nonperspective (*aprospettico*) or elastic (*elastica*) conceptions of space.¹

In the "Formation of Palladio" paper, Argan provides a high level examination of spatial concepts and strategies of form disposition at work in Palladio. Argan argues that Palladio has a way of conceiving architectural form that is different from a classical point of view, the latter marked by what Argan calls "the traditional perspective concept" of space.² Palladio's nonperspectival or elastic concept of space has its origin, suggests Argan, in the military architecture of Sammicheli. Argan sets out to reveal features of that provenance and its consequences for the theorisation of architectural form and space, the main object of his essay. What is of interest today, and for readers of this paper, are the specific morphological effects and conceptual qualities contained in Argan's categorisation of the two ways of conceiving space and their potential for theorising, making, and interpreting works of architecture.

An indication of the relevance in Argan's categorisation of two manners for conceiving space can be found in a shift he locates in Palladio. Argan claims that Palladio's newness can be found in the latter's establishment of "a new viewpoint in architectural theory... [one in which a new] relationship is established between building and environment, new because it is ... completely non-perspective."³ The building for Palladio, continues Argan, "does not sum up or represent the space [as in classical theories], it exists within it, and

the space, which is no longer thought of as structure [...] counts as pure phenomenal reality, as a sensed and shifting assemblage of effects of light and atmosphere.”⁴

This idea of built form is one that is no longer always already within space and in an a priori relationship. Rather, architectural space and in turn form is now considered a product of a sensed and shifting assemblage of other phenomena. This is the important newness of Palladio and the feature Argan takes to apply to a building on its own as much as to a larger complex of open space and built form.

For Argan, classical architecture's perspectival conception of space achieves unity through abstract proportional associations, assuming an a priori geometric structure as a precondition, one bounded and made tangible through the continuity of the wall plane. This is in contradistinction to a nonperspective or elastic conception of space understood as a physically discontinuous realm, whose unity is a posteriori and perceptual, relying on the body's movement and the ground plane rather than the wall. The latter is thus capable of infinite extension in its swerve from the vertical surface to the ground plane.

One way of seeing architectural form leads most readily to an ensemble of homogeneous relationships; the other finds its manifestations in heterogeneous states. A perspective conception of space for Argan leads to a system of parts in favour of a larger whole, with spatial units such as rooms as well as linking elements attached one to the other via perspective connections in a striated plan. Palladio's nonperspective idea of space propels spatial units to the surface - in plan though more powerfully in certain projects in section and elevation - with parts never coalescing into a whole. In this non-perspectival point of view, spatial units follow a logic of “unrelatedness or absoluteness among singular forms,”⁵ continues Argan, finding one manifestation in Palladio's en suite plan disposition.

It is worth citing Argan at greater length to better understand the context and implications of this last statement.

Our contention is that Palladio not only is turning away consciously from the perspective interpretation of architectural form but is also deliberately disconnecting and disintegrating it, to produce, out of the destruction of all a priori relationships, the quality of unrelatedness or absoluteness in the individual forms.⁶

Here Argan further broadens, without development or further explanation, the formal-spatial reach of the Palladian leap. This characterisation of Palladio's potential impact as displaying a blurring and aposteriori resolution, though only a temporary one for Argan given that parts never coalesce, remains for him suspended in a state of disintegration. To push the latent implications in Argan's essay even further is to suggest that Palladio could actually motivate the disintegration of form as a consequence of the absolute independency of building parts.

CONCEPTUAL ASPECTS	Space is structured	Space sensed amid a shifting assemblage of light and atmosphere effects
	Space as geometric structure or grid	Space as datum or field
	Transitional conditions abound	Elements are confronted one to another with no transition
	Realised in the continuity of the wall plane at the horizon	Rendered as a ground of undulating levels
	Homogeneous configurations in a closed form	Heterogeneous dispositions in an open configuration
	Architectural form generated by a space concept	Singular spaces generated by architectural forms
	PERSPECTIVE CONCEPT OF SPACE (economy of sight)	ELASTIC CONCEPT OF SPACE (strategy of sensation)
FORMAL PARAMETERS AND DEVICES	A form generation process with a bias toward isolation and hierarchy	A strategy of assemblage with a preference for blurring and enfolding
	Rooms are distributed in a striated plan	Rooms are arranged in en suite patterns of interstitial space
	Spatial units are attached via perspective connections, generally plan based	Spatial units are propelled to the surface in plan and elevation
	A system of parts in favour of a larger whole	Parts never coalesce into a whole, retaining their independence
	Logical relationships established with exterior conditions	Significance is largely internal according to a logic of absoluteness
	Form relationships exist a priori	Relationships among forms are settled a posteriori

Table 1. Conceptual and formal aspects of a perspective concept of space versus an elastic conception of space

Table 1 attempts to summarise the distinguishing conceptual and formal properties contained in Argan's dense prose and set out aspects of the underlying sensibilities aligned with what he argues are two ways of conceiving architectural space. Acknowledging that such differences are never pure, and before turning to the work of Pei, Table 1 is intended to serve as a map of the key elements and themes evident in Argan's text further developed below.

Three Propositions

Three propositions underlay the larger research ambitions. To extend Argan's categories, and to introduce the first proposition, it can be claimed that an architectural temperament on the side of a perspectival conception of space is aligned with notions of the painterly plane and an economy of sight. Moreover, it is suggested, again following Argan, that a sensibility more attracted to the values and effects of an elastic conception of space, with its attendant conceptual and formal implications, is one bracketed by theories of assemblage understood as the rendering sensible of forces in a strategy of sensation. And it is acknowledged that, while Argan doesn't explicitly develop the sight versus sensation dialectic, it is nascent in his essay.

Secondly, it is postulated that each of these terms and their associated descriptors refers to a different architectural sensibility in twentieth century discourse. In other words, it is suggested that an analysis of projects according to this pair of terms and their concomitant traits may contribute to revealing aspects of mid and late twentieth century practice little considered or invisible to date.

Finding traces of each in the thinking and work of Pei, it is conjectured finally that these differences can contribute to understanding the formal and conceptual stakes in his work still awaiting analysis. Stated differently, if for the purpose of this paper we accept the interpretive lens of a perspectival concept of space versus an elastic conception of space, transcribed provisionally as a polarity of sight and sensation as described above, then there are heuristic and generative potentialities that may come out as a result of an examination of Pei's approach to composition.

In order to test these propositions, and recognising that the following will only begin to frame a larger study, three projects from different periods of Pei's career are briefly considered below. The projects selected for this paper, together and individually, mark central decades of Pei's professional life, the 1960's, '70's and 80's. Everson Museum of

Art, marking the 1960's, is frequently and not unreasonably claimed by commentators and also Pei himself as a breakthrough project. The National Gallery of Art East Building followed and explores, as indeed Pei argues, fundamentally different form concerns and makes manifest a different idea of space. The Meyerson Symphony Center again reveals different preoccupations and devices, emphatically introducing other spatial themes that Pei continued to explore in the late decades of his professional life.

In a paper of this length, much is abandoned for later consideration and much left out. It is thus perhaps useful, before moving to the case studies, to point out what is not being considered. This paper does not consider Pei's Mile High Center and the question of simultaneity it raises. The paper does not examine this early project as an illustration of what Colin Rowe describes as Pei's mannerist skills, accepting instead as reasonable Rowe's confrontation of Pei's Mile High Center and Giacomo da Vignola's Villa Farnese in Caprarola.⁷ Also, there is no investigation of a recurrent and important turn by Pei to structure as form generator. Evident in the Bank of China Tower (Hong Kong, 1982-1989), Jacob K. Javits Convention Center (New York, 1979-1986), and the Miho Museum (Shiga, Japan, 1991-1997), structural determinants would be another appropriate thematic when interrogating Pei's manner of seeing form and space.

To further clarify, in this paper no attempt is made to integrally articulate the range of potential relationships between Argan the taxonomer of concepts of space and Pei the practitioner. Rather the paper more narrowly isolates the idea of a nonperspectival (*aprospettico*) or elastic (*elastica*) conception of space, and starts to use that term to cast a light on one aspect of Pei's work as a way of extending the logic of Argan's claim to see if and how one might apply a nonperspectival interpretation of architectural form. In other words, here the much more modest and limited notion of Pei's approach to form-space generation is seen as revealing aspects of a specific architectural sensibility, one rendered in a narrow interpretation of the kind of visual and spatial values, stated or implicit, at work.

Pei provides an appropriate preliminary candidate for this study. Pei is relevant today in part because of the renewed professional and scholarly interest in his work that emerged during the 2017 centenary celebration of his birth. There is also some logic to the chronological overlap and thematic alignments with Argan as this paper hopes to suggest.

A brief note on source materials: this paper has relied selectively on over fifteen years of published interviews with Pei contained in the key monographic studies. The interviews, dating from the mid 1980s and over the 1990's, were with Carter Wiseman, Janet Adams Strong, and Gero von Boehm and published in 1990, 1998, and 2000 respectively.⁸ Project information is from these same publications supplemented with data and documents contained on the Pei Cobb Freed office website.⁹ The website contains a great deal of relevant information including summary project histories, photographs, and drawings for all key projects since the firm's founding.

As regards authorship, at its founding in 1960 I.M. Pei & Partners was a medium sized New York firm with seventy employees. The firm grew to some three hundred and fifty at the time of the Grand Louvre project in the 1980's. As is not uncommon in firms working on large scale, complex, architectural-urban projects, design principal and administration principal responsibilities were divided across different partners, with individual architects given responsibility for detailed investigations into key aspects. On the three projects discussed below, Pei is identified in office records and in the *Complete Works* as design principal.¹⁰

Analysis

In this section, preliminary observations are made around three projects in light of the framework set out above. Comments are limited to published statements and project documents as cursory evidence of the space aesthetic or sensibility on display and following the categorisation of ways of conceiving space opened by Argan.

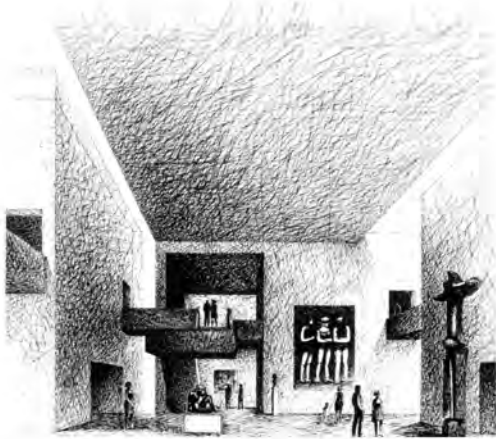


Figure 1. Presentation sketch of sculpture court, Everson Museum of Art, Syracuse, New York, 1961-1968 (<https://www.pcf-p.com/projects/everson-museum-of-art/>, accessed 25-02-2018 © Pei Cobb Freed & Partners Architects LLP). **Figure 2.** Rendered presentation elevation, Everson Museum of Art, Syracuse, New York, 1961-1968 (<https://www.pcf-p.com/projects/everson-museum-of-art/>, accessed 25-02-2018 © Pei Cobb Freed & Partners Architects LLP).

Historians, commentators, and Pei himself, often place the Everson Museum of Art as a breakthrough or beginning project. In terms of chronology and brief type it is a departure; it was the first of the cultural projects. Located on the edge of downtown Syracuse, and without a significant collection to house, the project was intended to launch the revitalisation of the area into a cultural precinct. The project had a slow gestation primarily for financial reasons according to project histories.¹¹

Two initial aspects can be identified: one, the detachment of the ceiling plane visible in the concept sketch, and a clear feature of the building as built; two, the pinwheel plan that extends centrifugally from the sculpture court into the large site via sunken courtyards, low terracing, and selective planting. This manipulation of the ground gives presence and extends, given the relatively modest footprint, the building's hold on the site.

For the purposes of this study, however, it is Pei's claim that the design was influenced by his interest in Cubism that draws first attention: "I admit that some of my work was influenced by Cubism, such as ... the Everson Museum..."¹² Beyond Pei's many references in interviews to Cubistic influences in his thinking, should we take Pei at his

word and if so, which are the distinguishing principles and devices evident in the project? On which side of the Arganian polarity, if either, does the project fall?

The rendering of the interior sculpture court provides a point of departure. (Fig. 1) The separation of volumes and the use of light sleeves or skylight bands in plan and section result in more than an apparent sliding of the building's interior, one move duplicating the centrifugal motions of the pinwheel plan. It perhaps shares aspects of that autonomy that Argan identified in his essay on Palladio. The project's specific state of "unrelatedness or absoluteness in the individual forms"¹³ is emphatically suggested in published renderings from the period and more so in elevation or section than in plan.¹⁴

When asked some thirty years after the fact, and in support of this reading, Pei sketches not the plan, as he so often does, but the elevation, highlighting the importance of the four gallery hoods and other museum elements extending out into the site. (Fig. 2) The four gallery hoods pin wheel out from the double height internal sculpture court, isolated and absolute in their material presence according to period photographs and as suggested in the presentation rendering. Too easily might one claim that they illustrate Argan's "mere manufacture"¹⁵, building form and its setting conceived as "completely nonperspective", with space conceived as "pure phenomenal reality, as [that is] a sensed and shifting assemblage of effects of light and atmosphere."¹⁶ Photographs of the just completed project on the office website suggest this condition.

This use of specific tower forms at Eversons is also aligned, according to Pei in conversation with Boehm, with the manner in which Cézanne builds up a painting, though this is harder to defend.¹⁷ Though perhaps, continuing this line of inquiry, the hooded towers separated and each different one from the other do establish a kind of shifting assemblage of absolute objects; although not flattened as in a Cézanne painting but one still given to similarly charging the air with effects of light and atmosphere.

The longer views afforded to it, and the more charged natural setting, may have provided the National Center for Atmospheric Research (Boulder, Colorado, 1961- 1967) that came immediately before the Everson Museum of Art, greater potential to achieve such ambitions. But the Everson Museum of Art, even with its modest setting, is equally telling of Pei's particular approach.

National Gallery of Art East Building

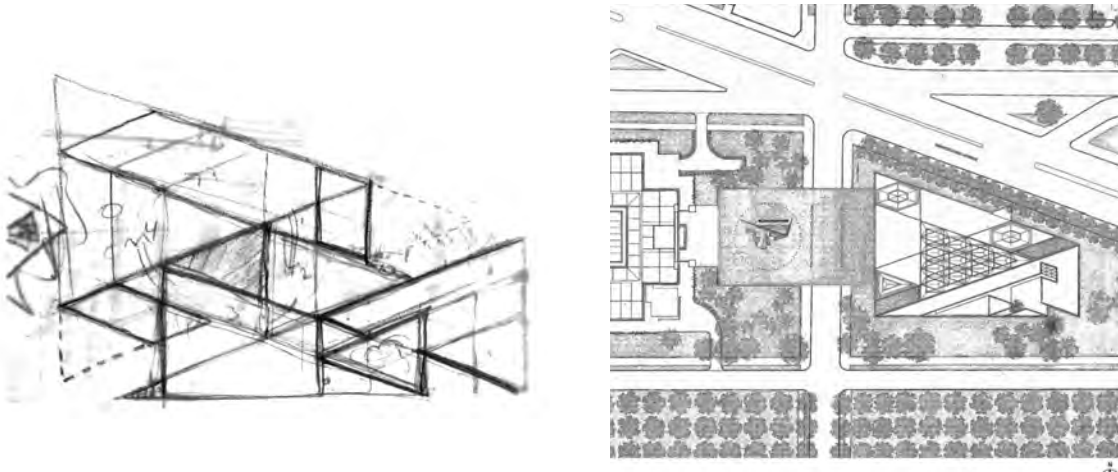


Figure 3. Concept sketch, National Gallery of Art, East Building, Washington D.C., 1968-1978 (<https://www.pcf-p.com/projects/national-gallery-of-art-east-building/>, accessed 25-02-2018 © Pei Cobb Freed & Partners Architects LLP). **Figure 4.** Site plan, National Gallery of Art, East Building, Washington D.C., 1968-1978 (<https://www.pcf-p.com/projects/national-gallery-of-art-east-building/>, accessed 25-02-2018 © Pei Cobb Freed & Partners Architects LLP).

The commission for the National Gallery of Art East Building came to Pei in 1968 and the decade-long project occupied the office for much of the 1970's. Occupying a rhomboid shaped site on the Mall in Washington D.C., the building is an extension to the National Gallery of Art, providing contemporary administration, conservation, museum storage facilities, public amenities, and a study centre. (Fig. 4) The extension more than doubled the available exhibition space, adding 56,000 m² (600,000 ft²) to the original 42,000 m² (450,000 ft²) building.

In an interview with Janet Adams Strong some twenty years after the project's completion, Pei emphasises the idea of space when talking about the East Building. "The introduction of an additional vanishing point... allowed me to move beyond Mies and [the] limited spatial possibilities of an orthogonal grid – which is not to say we were better architects but only that we were able to build upon what had gone before."¹⁸

The appearance of the diagonal in Pei's early sketch (Fig. 3) may seem an obligatory response to site conditions. According to historians, previous studies for this site over the decades had all assumed a small rectangular building as the

appropriate response to an addition to the original building.¹⁹ As he discusses in interviews with Boehm, however, Pei's initial response was to resist the triangle. As he describes it, Pei sought to "overcome" the triangle.²⁰ So there is, perhaps, a tale of overcoming, but rather than it being the triangle which is finally overcome, it is the limitations Pei came to feel in the orthogonal grid that perhaps most distinguishes the East Building in relation to Pei's shifting aesthetic temperament and in particular, the regular, orthogonal grid of Mies, so much studied by the younger Pei.

Evidence of overcoming an obligation to Mies, and the liberation Pei found through the triangular grid in the third vanishing point, can be seen at various stages of the East Building project and in turn suggest that an elastic conception of space is at work.

There are many formal aspects one could focus on when examining the East Building: the development and character of the flexible museum pod-towers, diamond shaped and modelled into elongated hexagons; the internal void around which the study centre was formed; the ambitions to manipulate light while avoiding shadows when developing detailed designs for the atrium skylight. For the purposes of this paper, however, it is the implied multi-point perspective in Oles' 1969 view from the entry that is most telling. And Pei reinforces this aspect: "I knew that if I could only bring the extra vanishing point into play I could create more exciting spaces."²¹

A sequence of three renderings over the development phase dated 1969, 1970, 1971 contribute to telling the story of this space. The dynamic swirl of space pulling up from the main entry and the lower level connector into the atrium garden is clearly felt in Oles' renderings. Reproduced in the *Complete Works*, one can imagine that the perspectivist was pushed by Pei to visualise the resultant space as dynamic. This ambition was more fully crystallised when the architect made the decision to open up the ceiling via skylights, departing fully from the Everson Museum of Art and a perhaps Cubist aesthetic.²² This decision to change the ceiling from coffered concrete to triangulated glass fundamentally changed the project and pushed the character of the space in a different direction from the Everson Museum of Art. The shift can be attributed in part to the triangular grid and three vanishing points which, as Pei had noted in an earlier interview: it marks an approach different from the orthogonal grid organising the early museum.²³

Meyerson Symphony Center

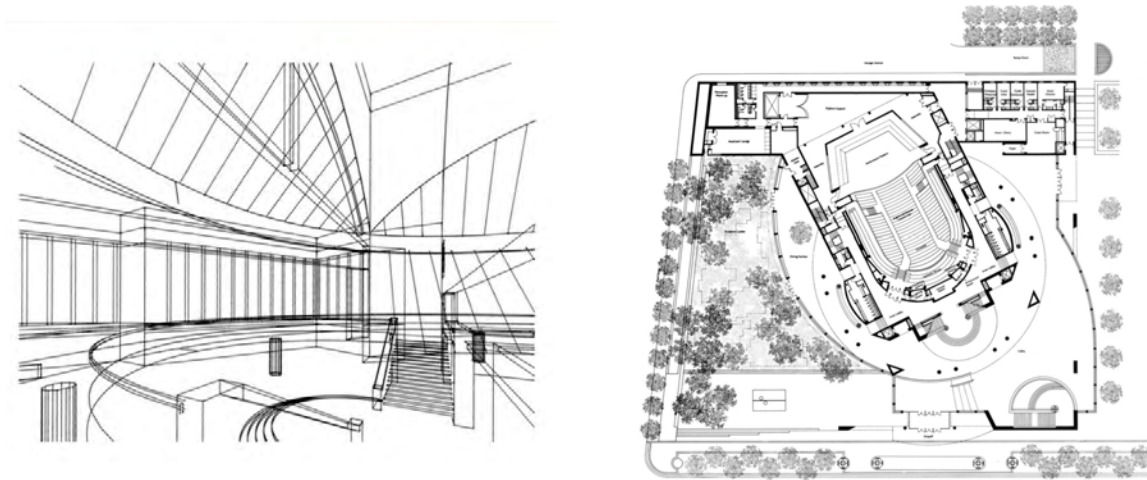


Figure 5. Concept sketch with an early use of computer aided drawing, Morton H. Meyerson Symphony Center, Dallas, Texas, 1981-1989 (<https://www.pcf-p.com/projects/the-morton-h-meyerson-symphony-center/>, accessed 25-02-2018 © Pei Cobb Freed & Partners Architects LLP). **Figure 6.** Ground floor plan, Morton H. Meyerson Symphony Center, Dallas, Texas, 1981-1989 (<https://www.pcf-p.com/projects/the-morton-h-meyerson-symphony-center/>, accessed 25-02-2018 © Pei Cobb Freed & Partners Architects LLP).

You cannot look and understand it [the lobby of the Meyerson Symphony Center]. You have to walk and, as the space unfolds, you're drawn.²⁴

The search for an architect for the Meyerson Sympony Centre was started as early as 1980, shortly after the National Gallery of Art East Building's completion. According to office records, Pei was awarded the commission in 1981. As in the Everson Museum of Art, it was intended to revitalise an emerging arts district, in this case on the edge of Dallas' downtown. The project opened in 1989, coinciding with Pei's withdrawal from the practice he founded to focus on smaller scale projects without the pressures of the large office. Different from almost every other project attributed to Pei as lead designer, the Meyerson Symphony Center had a second architect – Russell Johnson of Artec – independently responsible for the design of the symphony hall and in fact engaged prior to Pei's being on board. Others have written at length on the disquiet and somewhat compromised relations between the acoustic ambitions of Johnson and the visual and spatial ones of Pei.²⁵

For the purposes of this paper, it is Pei's conception of space in the project's development that is of interest. "I knew that if ... I could explore curved surfaces with their infinite number of vanishing points, I could create even more exciting spaces..."²⁶ This statement by Pei, published a little over a decade after the Meyerson Symphony Center's completion, neatly encapsulates the ambition, at least retrospectively, for the architect. It is made with defensible context if one reflects on the architect's experience in a series of projects that experiment with curved surfaces including the Choate Rosemary Hall Science Center (Wallingford, Connecticut, 1985-1989), the Creative Artists Agency (Los Angeles, 1986-1989), and the German History Museum (Berlin, 1996-2003).

Whatever the sequence or influence, the Meyerson Symphony Center signals a different conception of space at play, one that departs even further from the static, one-point perspective Pei so often dismissed in interviews. The multipoint perspective put into motion - thanks in part to the triangulations and resulting triangular grid of the East Building - are clearly not enough for this project. Pei's way of thinking about space led to a further differentiation in comparison to early projects, and in consequence, a revised architectural sensibility can be claimed to be at stake.

For the purposes of this paper, and returning to Pei's comments that opened this section, observations are limited to the major entry lobby for which Pei had most control. A cursory review reveals a number of key features. A preoccupation with curving surfaces and their infinite vanishing points may be the purest realisation of Argan's elastic space conception. Oles' published study drawings evidence the trajectory of ideas and support this reading, now transitioned from the East Building's hand-drafted views to Pei's first use of computer aided drawings.²⁷ (Fig. 5) A more emphatic concern with creating a shifting assemblage of effects of light and atmosphere also pulls Argan back into play. And in pulling Argan back in, the Meyerson Symphony Center does share some of his elastic space qualities and values (see Table 1): space is a shifting assemblage of light effects, dispersed in a heterogeneous disposition, the result of a strategy of assemblage with a bias to blur edges over a process favouring isolation and hierarchy.

Perhaps most provocatively, and as Pei himself suggests, the Meyerson Symphony Center operates according to another idea of space, one facilitated by computer aided drawing. It is neither Cubist nor Neo-Plasticist; it is neither perspectival nor elastic. It is, to go quickly and recognising the need for further elaborations, both beyond sight and exceeding sensation. Perhaps in its exploitation of infinite viewpoints it is a variation on an idea of space still to be examined.

Concluding Observations

Out of this cursory consideration, and having framed the elements of the study, it is possible to return to the previously stated propositions. It is evident that no single concept of space is present in the three projects considered. There is however evidence, depending on the element considered, of a bias toward one or another sensibility. The shorthand translation of perspectival and elastic conceptions of space into tendencies toward sight and sensation was only alluded to in a general way and requires further development. Whether these categories have specific value in relation to mid twentieth century practice and discourse is also still to be properly tested. There does seem to be resonance with Pei's work, especially in the case of the National Gallery of Art East Building. And there appears to be merit in further interrogation of Pei's embrace of the dynamic richness in multipoint perspective generally and the triangular grid in particular.

Meyerson Symphony Center's exploration of curved surfaces and infinite vanishing points escapes Argan: this seems clear. If not an evolution – Pei himself positions its provenance squarely with the German baroque - then it does require a third concept of space that can be provisionally called scenographic. This is in response to Pei's own characterisation of it as depending on the need for one to walk to unfold, or draw in, the building space.²⁸ It is also consistent with Argan's description of an aspect of Palladio's way of seeing architectural form on the one hand and manner of conceiving the problem of space on the other. Space is no longer conceived as existing a priori but comes into being as a "product"²⁹ of relationships that require movement or time to set up. Further elaboration will need to await subsequent study, one worth pursuing especially in light of the other projects that Pei realised in his late phase of activity.

There is therefore, and as a form of provisional conclusion, a heuristic and generative utility realised in extending forward Argan's categorisations of a perspective concept of space and an elastic conception of space as an interpretive lens in relation to the projects considered. It is also a contribution to the study of architecture's recent past and its contemporary expression. More broadly, and to return to opening conference themes, it is a contribution to the examination of relationships between conceiving and making architectural space, one deserving further elaboration

Image credits

Figures 1-6 © Pei Cobb Freed & Partners Architects LLP.

Table 1 © the Author.

Endnotes

¹ Argan, Giulio Carlo. 1955. "L'importanza del Sammicheli nella formazione del Palladio," in *Venezia e l'Europa. Atti del XVIII Congresso Internazionale di storia dell'arte, Venezia 12-18 settembre 1955*. (Venezia: Casa editrice arte Veneta, 1955), 387-389. An English translation is published in 1970 as: "The Importance of Sammicheli in the Formation of Palladio" in Creighton Gilbert (ed.), *Renaissance Art* (New York: Harper & Row Publishers, 1970), 172-179. In notes that follow, page references are given firstly to the English translation followed by the Italian in italics.

² Argan, "Formation of Palladio," 175/388.

³ Argan, "Formation of Palladio," 173-4/387.

⁴ Argan, "Formation of Palladio," 174/387.

⁵ Argan, "Formation of Palladio," 175/388 translation modified.

⁶ Argan, "Formation of Palladio," 175/388.

⁷ Colin Rowe and Robert Slutzky, "Transparency: Literal and Phenomenal, Part II," first published in *Perspecta* 13-14 (1971), 287-301, reprinted with introductory comments in Colin Rowe, *As I Was Saying: Recollections and Miscellaneous Essays, Volume One, Texas, Pre-Texas*, Cambridge (Cambridge, Mass., London: The MIT Press, 1996), 77-83.

⁸ Carter Wiseman, *I.M. Pei: A Profile in American Architecture* (New York: Harry N. Abrams, Inc., 1990). Gero von Boehm, *Conversations with I.M. Pei: Light is the Key* (Munich, London, New York: Prestel Verlag, 2000). Philip Jodidio and Janet Adams Strong, *I.M. Pei Complete Works* (New York: Rizzoli International Publications, Inc., 2008).

⁹ Pei Cobb Freed & Partners Architects LLP office website: <https://www.pcf-p.com/>.

¹⁰ Jodidio and Strong, *Complete Works*, 354.

¹¹ Bruno Zevi, *Leoh Ming Pei* (Paris: Fernand Hazan, 1988), 58.

¹² Pei cited in Boehm, *Conversations*, 45.

¹³ Argan, "Formation of Palladio," 175/388.

¹⁴ See the pencil rendering of the elevation reproduced in Boehm, *Conversations*, 46.

¹⁵ Argan, "Formation of Palladio," 174/387.

¹⁶ Argan, "Formation of Palladio," 174/387.

¹⁷ Pei cited in Boehm, *Conversations*, 61.

¹⁸ Pei interview with Strong, 26-09-1996, in Jodidio and Strong, *Complete Works*, 146.

¹⁹ Jodidio and Strong, *Complete Works*, 134.

²⁰ Pei cited in Boehm, *Conversations*, 67.

²¹ Pei in discussion with Strong, 26-09-1996, cited in Jodidio and Strong, *Complete Works*, 136.

²² Jodidio and Strong, *Complete Works*, 138, second rendering.

²³ Pei cited in Boehm, *Conversations*, 68.

²⁴ Pei cited in Jodidio and Strong, *Complete Works*, 191.

²⁵ Wiseman, *I.M. Pei*, 270. See also Pei's comments about the use of curved shapes: "The curvature in Dallas makes the space more fluid and sensuous." Pei in an interview with Strong of 26-09-1996, cited in Jodidio and Strong, *Complete Works*, 191.

²⁶ Pei discussing the East Building, interview with Strong, 26-09-1996, cited in Jodidio and Strong, *Complete Works*, 146.

²⁷ Jodidio and Strong discuss this in *Complete Works*, 191.

²⁸ Pei interview with Strong, 26-09-1996, in Jodidio and Strong, *Complete Works*, 191.

²⁹ Argan, "Formation of Palladio," 175/388.

Engrained Modernity: Robin Gibson's Pinkenba Grain Elevator

Lloyd Jones
University of Queensland

Abstract

In 1966, four concrete wheat silos and one grain elevator were erected by the Queensland State Wheat Board in Pinkenba, an industrial suburb near the mouth of the Brisbane River. The distinctive complex (known collectively as a grain elevator) was designed by consulting architect Robin Gibson (1930-2014). Although primarily a machine of industry, the static monumentality of the grain elevator has lent them particular building-like qualities which has historically attracted architectural interest. In the early 20th century, European protagonists of the modern architectural movement including Walter Gropius and Le Corbusier circulated images of North American grain elevators in key publications. Their understanding of the type was derived solely from a reading of these images, and consequently the functional aspects of the grain elevator are not considered in their texts. This has since been regarded as a betrayal of modern architectural values by architects such as Melvin Charney and Reyner Banham, who argue a pragmatic understanding of the type was of greater value to architectural theory. While the discourse has struggled to reach a consensus on the correct interpretation of the type, Gibson carefully responded to both formal and functional considerations in the design of the Pinkenba grain elevator. This resulted in a unique variation of the type which is both functional and distinctly architectural. However, as the main publication of the project was heavily image based, it is at risk of being considered for its form alone. This paper will thus explore the functional aspects of the complex critical to an understanding of the scheme. The Pinkenba grain elevator is not a project typically associated with Gibson's work but marks a turning point in his career as the practice moved to larger, more complex commissions. This paper will also discuss the influence of the scheme on Gibson's later works.

Introduction

In 1966, a bulk grain handling facility consisting of four concrete wheat silos and one grain elevator, was erected by the Queensland State Wheat Board in Pinkenba, an industrial suburb of east Brisbane.¹ These facilities are known collectively as grain elevators in international discourse and although typically understood as the domain of structural engineers, the design of the Pinkenba complex was subcontracted to consulting architect, Robin Gibson (1930-2014). This was one of the first major projects for Gibson's practice, whose best known work is the Queensland Cultural Centre (1974-1998), located in South Brisbane. Prior to the Pinkenba grain elevator, Gibson had mainly worked on smaller commissions such as retail fit outs and residential works. A high degree of carefully detailed resolution was required for these projects, and as a result, Gibson refined a particular skill set of design versatility using a limited material palette and simple structural expression. By applying these attributes to the Pinkenba facility, Gibson endowed what was essentially a machine, with striking architectonic form.



Figure 1. Pinkenba grain elevator.
(Photograph by Lloyd Jones, 2017).

The Pinkenba grain elevator is part of a lineage of architectural curiosity with the type. In the early 20th century, several protagonists of the European modern movement used images of North American grain elevators in their publications as built examples of pure form. Walter Gropius is credited with the initial dissemination of these images which were later reused by the likes of Walter Behrendt, Eric Mendelsohn and most notably Le Corbusier in his seminal publication, *Vers une Architecture*.² Collectively, they embraced the unadorned, geometric forms of the grain elevator, which they upheld as visual primers for the modern architecture of the 20th century. However, as very few of the European modernists had actually visited a grain elevator, their interpretations were limited to descriptions of monumentality, rhythm and

form, for which they offer no functional explanation.³ From the 1960s, architects such as Reyner Banham, Melvin Charney and William J. Brown criticised the modern architects' appraisals as one-dimensional. In their texts, they argue an understanding of the functional characteristics of the grain elevator is the correct interpretation of the type and provide an explanation of the internal mechanics and construction techniques of the grain elevator. Consequently, architects and critics have struggled to unanimously define the significance of the grain elevator in architectural theory.



Figure 2. A typical grain elevator, Biloela Queensland.
(Photograph by Lloyd Jones, 2017).

As the only known example of a grain elevator designed with direct architectural involvement, the complex at Pinkenba is a unique variation of the type. In the design for the Pinkenba complex, Gibson carefully responded to both formal and functional considerations. However, as the major publication for the project was a photographic book, the scheme is at risk of being interpreted through form alone, much like the modernists' reading of the grain elevator four decades previously. In reality, there were deliberate pragmatic objectives to the design that this paper will discuss. By positioning the Pinkenba complex as a balance between the theoretical positions of the European modernists and the later writers, this paper will offer a fresh perspective of the type in architectural discourse. It is not a project typically associated with Gibson's work but marks a turning point in his career as the practice moved from the domestic scale to larger more complex commissions. As a result, many of the architectural solutions first explored in the project reemerge in Gibson's later works.

Robin Gibson and the Pinkenba Grain Elevator

Robin Gibson studied architecture at the Brisbane Central Technical College and the University of Queensland where he graduated with a diploma in 1954.⁴ He then travelled overseas and worked in London practices, James Cubitt & Partners and Casson Conder before returning to Brisbane in 1956 to establish an office under his own name. Initial projects for the firm were retail fit outs, including shops for Miss Shirley's Shoes, in the Brisbane CBD (1961) and Surfers Paradise (1964) as well as residential projects such as the Mocatta Residence located in Yeronga, Brisbane (1966). These projects demonstrated an interest in simple, but beautifully detailed architectural design for which Gibson received institute awards and local recognition. One of the first major projects for the fledgling practice was an administration building for C.I.G. (Commonwealth Industrial Gases) in Rocklea, Brisbane, opened in 1965. Built at a larger scale than his previous works, the C.I.G. Building is the first to expand Gibson's interest in formal architectural composition. On the project, Melbourne University publication *Cross-Section* writes, "The ordering of functions to effect architectural expression reinforced with apt detailing in an apparently effortless and simple manner is, of course, the result of tremendous care and attention."⁵

Prior to the Pinkenba grain elevator, Gibson had also undertaken a number of purely industrial projects for C.I.G. including an oxygen and acetylene manufacturing facility in Rockhampton (1965).⁶ The ability to meet the quick construction cycles of industrial projects, as well as the interpersonal skills necessary to foster good client relationships were required to compete in this arena. These were both qualities Gibson had and as a result, it is not surprising that his office was engaged by the engineering firm, R.J. McWilliam and Partners as consulting architects for the Pinkenba project. R.J. McWilliam and Partners had been independently commissioned by the Wheat Board to design the facility and as Gibson used their firm exclusively as their structural engineers, former staff members of Gibson's office believed their commissioning as sub-consultant was simply a case of reciprocal business.⁷

At first glance, the grain elevator at Pinkenba resembles virtually every other example of the type built locally and internationally. It is comprised of the conventional elements in familiar forms - cylindrical concrete storage silos, a rectilinear conveyer gallery above and vertical elevator shaft at one end. Typical of Gibson's design process, the silos and elevator are not a radical departure from existing technologies and materials. The silos were constructed using the same slip form concrete construction technique used to erect grain elevators in North America since the 1900s and previously used in Queensland during the 1920s to erect a maize storage facility in Atherton.⁸ Rather, Gibson's architectural contributions to the

Pinkenba facility were a series of subtle gestures that when combined resulted in an unusually sculptural solution.

In a typical grain elevator, the elements of the grain handling process are often clumsily stacked on top of one another. In some instances, other functions are even built within the concrete cylinders making it difficult to determine whether the silos contain grain, men or machinery.⁹ Gibson's formal solution was to delineate each of the components of the grain handling process, giving them distinct significance within the overall composition. The shapes chosen to represent these processes were not arbitrary, and domestic forms previously used in the design of grain elevators such as pitched roofs and individual windows were abandoned in favour of strict geometries in line with the modern idiom. This was assisted by a fanatical approach to detailing typical of the office, which ensured each of the components were crisp in their resolution. In a particularly dramatic gesture, the waffle slab of the conveyer gallery is perched above the silos on four delicate conical supports giving the illusion that it is floating. The rigidity of this element contrasts with the sinuous forms of the concrete silos below adding to the visual interest of the complex. On the project, Australian architect Jennifer Taylor writes, "With this strictly practical exercise Gibson gave the buildings a raw strength that relates to the best of the industrial vernacular."¹⁰



Figure 3. Under the Conveyer house of the Pinkenba grain elevator.
(Robin Gibson Collection, Fryer Library, University of Queensland Library).

The Pinkenba grain elevator was not well published when constructed.¹¹ The one major publication of the project was in English photographer, Harry Sowden's book *Towards an Australian Architecture* (1968), two years after Stage I of the complex was completed.¹² As a photographer new to the country, Sowden used the book as an exercise to meet architects

in a professional capacity and ultimately establish his business.¹³ He selected projects from across the country of varying scales and types to include in the book, and the Pinkenba grain elevator was one of only two strictly industrial projects.¹⁴ Photographed in black and white, and in the purest form of the original four grain silos with square conveyer gallery, Sowden's images are mesmerizing and celebrate the complex as a composition of pure, unadorned form. While a short blurb is included in the book, outlining some of the functional systems of the complex, it is the photographs that are most captivating. As a result the Pinkenba grain elevator has been considered in Australian architectural discourse almost exclusively for its exterior form alone. This interpretation of the grain elevator experienced through images with particular focus on monumental geometric composition, has historical precedence dating back to the origins of the modern movement.

Grain elevators as modernist rhetoric

Five decades prior to the construction of the complex at Pinkenba, images of grain elevators emerged in the publications of European protagonists of the modern architectural movement. Walter Gropius first used grain elevator images during a 1911 lecture and slide show, *Monumentale Kunst und Industriebau Lichtbildervortrag* [Slideshow Lecture on Monumental Art and Industrial building].¹⁵ The use of photographs were a major component of this presentation and the grain elevator images were featured alongside photographs of other industrial buildings. Unfortunately, as senior architectural lecturer at the University of Brighton, Catalina Mejia Moreno, laments whatever spoken criticisms Gropius offered during the lecture, have been lost to the ephemeral space of the theatre.¹⁶ However, Gropius' original lecture notes still exist, and translations are provided in Mejia Moreno's piece, such as the following,

Corn silo of the Rolands Mill in Bremen by Hilderbrandt & Günthel. The ratio of height to width seems a little unfortunate. The drums are here out of sheet metal, while the latter out of concrete or brick. This should be mentioned precisely because also here the material is indifferent has little to say for the great monumental main form and the artistic rhythm.¹⁷

The aforementioned caption is one of the more detailed from the presentation which along with other quotes from the lecture, indicate that Gropius' experience of the type was restricted to an appreciation of the qualities of monumentality and rhythm – essentially what could be derived from a reading of the images. Function and even materiality are given supporting roles in the photographic composition of the grain elevator, much like Sowden would do with the Pinkenba facility five decades later.

Gropius' grain elevator images were later disseminated to a wider audience in his 1913 article, "Die Entwicklung Moderner Industriebaukunst" for the *Jahrbuch des Deutschen Werkbundes*.¹⁸ Following this article, Le Corbusier 'borrowed' several of Gropius' images and republished them in the inaugural issue of *L'Esprit Nouveau* before introducing them to an international audience in the 1923 book, *Vers Une Architecture*.¹⁹ Here, they are used exclusively to illustrate a chapter titled, "Mass" within a larger section, "Three Reminders to Architects".²⁰ Despite being mechanical objects, Le Corbusier, like Gropius, found architectural qualities of geometry and monumentality in the primitive forms of the grain elevator. The unadorned cylindrical towers of the storage bins along with the blocky shapes of the elevators and conveyer galleries were to Le Corbusier, the "correct and magnificent play of masses brought together in light" suggesting that the uncontrived beauty of these primary forms used by engineers to store grain, was proof that these same forms could be applied to any functional purpose to create beautiful architecture.²¹ To reinforce this further, Le Corbusier deliberately manipulated the grain elevator images used in the book, using a gouache paint to remove entire roof forms and auxiliary structures when they were deemed at odds to the unadorned geometries he was promoting.²²

While Le Corbusier must have understood that the purpose of the grain elevator is to store grain, the relationship between the functional characteristics of the type and the composition of form are not explored in *Vers une Architecture*. As the authors of seminal post-modernist book, *Learning from Las Vegas* observe, Le Corbusier "claimed the steamship and the grain elevator for their forms rather than their industrial image."²³ In *Vers une Architecture*, the captions accompanying the images label them as simply American or Canadian grain elevators and in some instances even these basic attributions have been found to be inaccurate.²⁴ The body of text is no more descriptive, and refers to them almost as an afterthought in self-assured uppercase as the "FIRST-FRUITS of the new age."²⁵ Rather than provide pages of descriptive text, Reyner Banham suggests in his book *A Concrete Atlantis* that Le Corbusier believed, "the ultimate conviction, credibility, or reassurance lay in the pictures, not the words".²⁶ This reliance on photographic evidence has itself been considered a form of rhetoric as photographs were considered an impartial medium, which expressed the literalness of the industrial buildings being upheld.²⁷ However, later writers have used Le Corbusier's deliberate manipulation of the images to discredit the arguments of the modern movement and thus their formal interpretation of the grain elevator. As critic William J. Brown writes, "Here form was *made* to follow function, even if it was not the original intention of the engineer."²⁸ A shift in the discourse from the 1960s sought to explain these functional characteristics and reposition the grain elevator in architectural history.

Critique of the modernist architects

From the 1960s grain elevator writers have argued the one-dimensional appraisal by the European modernists was insufficient to accurately represent the grain elevator in architectural history. As cultural geographer George O. Carney argues, the farmers and grain elevator operators he met while working on the grain fields of North America as youth had, “never heard of Corbu or Gropius nor were euphoric that elevators were ‘touchstones of modernity.’”²⁹ Texts such as Banham’s *A Concrete Atlantis* explore the history of the grain elevator and explain how factors such as the liquid like qualities of grain and explosive characteristics of grain dust informed the development of the materials and forms used in their construction.³⁰ Banham argues these aspects were crucial to an architectural understanding of the type and is disappointed by the lack of acknowledgement of the importance of these qualities by the modernist architects writing, “I was struck by the cultural width of the Atlantic, by the sheer gulf of space and missed understandings that separates these structures... ..from those who had never stood as close to them as I did and who admired their images under quite different lights.”³¹ While Banham’s book encourages a more complete explanation of the type, his objectives were primarily to draw interest to the historical and architectural significance of the grain elevators in Buffalo, which by the 1970s and 1980s were now long abandoned monuments of industry and threatened by development. As such, he does not explain how the functional processes which he upholds as fundamental to the reading of the grain elevator could then be applied by architects in future designs.

One of the few architectural critics to address how a greater knowledge of the grain elevator could influence built architecture was Canadian artist and architect Melvin Charney. His 1967 paper titled, “The Grain Elevators Revisited” is also critical of the modernists’ interpretation of the type and upholds the grain elevator as an exploration of technological process. Throughout the text, he questions whether the images supplied in the modernist publications when accompanied by such rudimentary explanations were actually capable of influencing physical structures writing, “Virtually none of the architects who admired them knew how they worked, and they were therefore unable either to appreciate their systems of organization or to draw conclusions that might have served them in their own designs.”³² He argues for a reappraisal of the grain elevator, not as a design image but as an understanding of the complex interaction between the components of the technological systems used to handle grain. This, he believed, was a far more valuable interpretation of the type, and had the potential to influence architecture in other areas writing, “but we must opt for them not as formal images. It is the process of which they are an image that is

important. In this way, the grain elevators may yet again suggest to architects a way out of their self-imposed limitations.”³³



Figure 4. Connections of the Pinkenba grain elevator.

(Robin Gibson Collection, Fryer Library, University of Queensland Library).

The grain elevator as industrial process

This understanding of process was fundamental to Robin Gibson’s design for the Pinkenba grain elevator. While the grain silos are the major visual component of the scheme, they were perhaps the simplest element of the complex to realise.³⁴ The complexity came from positioning the critical components and designing the network of conveyers necessary to link the various mechanisms of the complex. Gibson’s architectural role was to give form to the engineering diagrams and planning requirements for the facility which included infrastructure to unload wheat delivered by rail which had to then be stored and loaded onto ships at a later date.³⁵ To achieve this, Gibson rotated the elevator shaft 45 degrees to the main axis of the silos. This enabled simple right-angled connections with existing and planned components of the site such as weighbridges, dust collection facilities and additional grain storage without compromising the conveyers running above the storage silos. Gibson also understood that the design of the facility was not static and would evolve over time with the introduction of new grain handling technologies. Strategies were thus built into the initial programme that have allowed expansion to take place as the requirements of the complex changed. Between 1966 and 1972 the initial four silos were joined by a further eight and the grain conveyers extended from predetermined cut-outs in the rear of the conveyer gallery to service these silos.

As the only known grain elevator with direct architectural involvement, this project provides an opportunity to test Charney's arguments, that understanding the functional processes of the grain elevator has the potential to influence architecture in other areas. The Pinkenba facility was the first of Gibson's projects which was built at a scale large enough to experiment with the interlinking of a number of complex components. As Gibson's reputation grew, so did the scale and complexity of his commissions. As a result, the movement of people through these projects became a major theme in the institutional and cultural works dominating Gibson's career over the next thirty years. This is most evident in the Queensland Cultural Centre where large numbers of people were required to navigate the different cultural institutions with the added complexity of keeping them separate from heavy vehicle traffic on a busy urban site. To achieve this, Gibson designed a network of viaducts and passageways at various levels of the scheme, to ensure pedestrians were able to move between the major buildings of the complex with ease and safety. These viaducts are not hidden within the buildings but are instead expressive components of the design, such as the staircases of the Queensland Performing Arts Complex (QPAC) which are articulated on the building façade and add to the visual spectacle of visiting the theatre and the major pedestrian artery spanning the width of Melbourne Street linking the Queensland Art Gallery and Museum with QPAC. The expressiveness of these forms are not dissimilar to the network of conveyers used to articulate the movement of grain throughout the Pinkenba facility.



Figure 5. Staircase, Queensland Performing Arts Complex.
(Robin Gibson Collection, Fryer Library, University of Queensland Library).

Conclusion

Although primarily a tool of industry, the static monumentality and geometric form of the grain elevator lend them particular building-like qualities which for over 100 years has drawn

architectural curiosity. This curiosity has resulted in a discourse of conflicting opinions regarding the correct place the grain elevator should occupy in architectural theory. Fundamentally, the discourse focuses on balancing the value of the functional and formal characteristics of the grain elevator. Although the modernists' failure to grapple with the functional aspects of the forms appeared as a betrayal of the overarching values of the movement, their interest is not misguided. Grain elevators continue to be featured in architectural publications as objects of unadorned form including architect Phillip Cox and photographer David Moore's 1988 photographic book, *The Australian Functionalist Tradition* where grain elevators are referred to as an "unconscious aesthetic" that become objects of "strange beauty and awe" when placed in the Australian landscape.³⁶ However, as interest in the machine age waned in the post-war period, the orthodoxies and symbols upheld by the modernist architects were challenged in international dialogues. The grain elevator was one such casualty and several writers have argued that the grain elevator should be advocated as more than an object of formal curiosity. As David Tell muses, had Le Corbusier "not placed the painted photographs into the central chapter of his 1923 manifesto, grain elevators would never have become iconic."³⁷

While the literature has struggled to reach a consensus between the formal and functional qualities of the grain elevator, the significance of Gibson's Pinkenba complex is the successful integration of these two characteristics. The compositional contributions of Gibson's input, combined with a rigorous attention to detailing using strong primary forms has ensured the Pinkenba grain elevator remains distinctively architectural within the industrial landscape at the mouth of the Brisbane River. Here the unadorned geometric forms advocated for by Le Corbusier are used consciously to reflect the streamlined efficiency of the grain handling process. These forms are beautifully captured in Sowden's book *Towards an Australian Architecture* and it is arguably for this reason that the project has been featured in later architectural publications such as Jennifer Taylor's *Australian Architecture Since 1960*.³⁸ However, it is equally important to consider the complex pragmatically. For Gibson's office, the project was primarily an exercise in functionalist planning, and the success of the scheme was wholly dependent on simplifying the movement and storage of wheat around the complex. This was achieved by deliberate strategies in Gibson's design and allowances in the program for expansion have ensured the project remains a key piece of infrastructure for its current owners.³⁹

More than any other Queensland architect of the period, Gibson remained committed to the unadorned forms of the modern movement. From the late 1960s, these were increasingly realised using a *béton brut* aesthetic, first explored at the monumental scale in the Pinkenba

grain elevator. As the only known grain elevator with clear architectural input, the project offers an insight into how an understanding of industrial process can subsequently influence the design of architectural works in more traditional areas. Projects that followed in Gibson's oeuvre demonstrate an interest in expressing the circulation requirements of complex projects. His projects also reflect an interest in pragmatics and efficiency that have prompted contemporary architectural writers such as Robert Riddel to consider Gibson's work as exhibiting a "restrained modernism of functional quality without complexity."⁴⁰ Undoubtedly the Pinkenba grain elevator contributed to this legacy. For these reasons, the Pinkenba grain elevator occupies an important, yet overlooked place in Gibson's catalogue and marks a significant moment in the critical history of the grain elevator.

Endnotes

¹ University of Melbourne Dept. of Architecture, "Wheat silos for State Wheat Board – Pinkenba", *Cross-Section*, 169 (November 1966), 1.

² William J. Brown, "How Not to Read Pictures: The History of Grain Elevators in Buffalo, Photography, and European Modernist Architecture 1900 to 1930", *Communications*, 18, (1993), 223-233.

³ Eric Mendelsohn is the only European modernist known to have made the pilgrimage to North America with the intention to visit the grain elevators. See - Mendelsohn, Eric, *Amerika: Biderbuch eins Architekten*, (Berlin: R. Mosse, 1926).

⁴ Michael Keniger, "Gibson, Robin", in Julie Willis, Phillip Goad (eds.), *The Encyclopaedia of Australian Architecture*, (Port Melbourne: Cambridge University Press, 2012), 271-72.

⁵ University of Melbourne Dept. of Architecture, "CIG Building Rocklea", *Cross Section*, 155 (September 1965), 3.

⁶ Unidentified, "Oxygen Compression Station at the Commonwealth Industrial Gases Limited Acetylene Works in Rockhampton, Queensland, 1965", State Library of Queensland Collection Reference: 6523 Royal Australian Institute of Architects Photographs and Plans.

⁷ Personal communication with Bill Heather (August 2017); Personal communication with Allan Kirkwood (September 2017).

⁸ "The Storage of Maize: Silos in Queensland", *Weekly Times*, (Saturday 2 August 1924), 27.

⁹ Reyner Banham, *A Concrete Atlantis: US Industrial Building and European Modern Architecture 1900-1925*, (Cambridge Massachusetts, London England: The MIT Press, 1986), 153.

¹⁰ Jennifer Taylor, *Australian Architecture since 1960*, (Sydney: Law Book, 1986), 124.

¹¹ The only known publication was in Melbourne University journal, *Cross-Section* ("Wheat Silos for Queensland State Wheat Board - Pinkenba." *Cross Section*, no. 169 (1966)).

¹² Harry Sowden, *Towards an Australian Architecture*, (Sydney, London: Ure Smith, 1968).

¹³ Glen Murcutt interview with Adrian Boddy, in Adrian Boddy, *Max Dupain and the photography of Australian architecture*, Volume 2, Masters by research thesis, (Queensland University of Technology, 1996), 82.

¹⁴ The other being a car factory in South Australia by Caradoc, Ashton, Fisher, Woodhead & Beaumont Smith.

¹⁵ Catalina Mejía Moreno, "The "Corporeality" of the Image in Walter Gropius Monumentale Kunst und Industriebau Lecture", *Intermedialités*, (2014), 24-25. doi:10.7202/1034165ar.

-
- ¹⁶ Mejia Moreno, "Corporeality".
- ¹⁷ Walter Gropius, "Monumentale Kunst und Industriebau", unpublished lecture manuscript, trans. Tilo Amhoff, Berlin, Bauhaus-Archiv (1911).
- ¹⁸ Walter Gropius, "Die Entwicklung Moderner Industriebaukunst", in *Jahrbuch des Deutschen Werkbundes*, (Jena: E. Diederichs, 1913).
- ¹⁹ Le Corbusier, *Vers une architecture*, 1st ed. (Paris: G. Crès et Cie, 1924).
- ²⁰ Le Cobusier, *Towards a New Architecture*, Trans. Frederick Etchells, (London: The Architectural Press, 1946), 25-33.
- ²¹ Le Cobusier, *Towards a New Architecture*, 31.
- ²² Dave Tell, "The Rise and Fall of a Mechanical Rhetoric, or, What Grain Elevators Teach us About Postmodernism", *Quarterly Journal of Speech*, 100, 2, (2014), 163-185.
- ²³ Robert Venturi, Denise Scott Brown, and Steven Izenour, *Learning from Las Vegas*, (Cambridge, Mass.: MIT Press, 1972), 136.
- ²⁴ William J. Brown, *American Colossus: The Grain Elevator, 1843 to 1943*, (Brooklyn, NY: Colossal Books, 2015).
- ²⁵ Le Cobusier, *Towards a New Architecture*, 33.
- ²⁶ Banham, *A Concrete Atlantis*, 230
- ²⁷ Brown, "How Not to Read Pictures", 230.
- ²⁸ Brown, "How Not to Read Pictures", 230.
- ²⁹ George O. Carney, "Grain Elevators Reply to Keith E. Roe", *Material Culture*, 27, 3 (1995), 34.
- ³⁰ Banham, *A Concrete Atlantis*, 113.
- ³¹ Banham, *A Concrete Atlantis*, 168.
- ³² Melvin Charney, "The grain elevators revisited", *Architectural Design*, (July 1967), 331.
- ³³ Charney, "The Grain Elevators Revisited", 331.
- ³⁴ Personal communication with Bill Heather August 2017.
- ³⁵ Personal communication with Bill Heather August 2017.
- ³⁶ Phillip Cox, David Moore, *The Australian functional tradition*, (Victoria: Five Mile Press, 1988), 118.
- ³⁷ Tell, David, "The Rise and Fall of a Mechanical Rhetoric", 167.
- ³⁸ Taylor, *Australian Architecture since 1960*, 124.
- ³⁹ GrainCorp, "GrainCorp, Pinkenba (Brisbane)", www.graincorp.com.au/LiteratureRetrieve.aspx?ID=89217
- ⁴⁰ Robert Riddel, "Brisbane's Gold Medal Modernist: Robin Gibson (1930-2014)", *Fryer Folios*, 11, 1 (November 2017), 22-25.

Historiographies of Image-Technologies in Architecture at the Turn of the Twentieth and Twenty-First Centuries

Akari Nakai Kidd
Deakin University

Sanja Rodeš
Deakin University

Abstract

This paper aims to trace the historiographies of image-technologies as a means of evaluating how major technological developments in the sphere of media are bound to the development of architecture of the same period. It focuses on the essays of Walter Benjamin (1931, 1936, 1955) and Hal Foster (2002, 2011) that reflect on the image-technologies emerging at the turn of the twentieth and twenty-first centuries, respectively, aiming to open a dialogue between their essays and the two historical periods. It is perceived that examination of Benjamin's and Foster's historiographies of image-technologies can provide further insight into the changing relationships of architecture, image and media technologies, specifically through two historical processes; first, the intersection between image-technologies and the subjugation of architecture and; second, the intersection between image-technologies and the commodification of architecture. The relevance of this is to provide a critical perspective on the increasing penetration of technology in architecture around the turn of the centuries, and by extension, the paper effectively expands the understanding of the changing manifestations between architecture and technology. This paper is meant as a contribution to an already rich field of scholarship attending to the interaction between contemporary architecture and image-technologies. Through the explicit development of a historical dialogue between Benjamin and Foster, the paper argues that much of contemporary writing on the interaction between image-technology and architecture remains deeply bound up in questions raised at the turn of the twentieth century. Furthermore, despite the overwhelming conflation of image and media technologies with contemporary architecture, the overview of this conflation is still often negative, and as this paper argues, reductive, particularly witnessed in Foster's essays. We argue for expanding beyond the predominately negative critiques of image technologies to create

broader understanding of the increasingly complex intertwined relationships between architecture and image-technologies.

Introduction

Recent discourses in visual studies and cultural geography, as well as architectural and historical scholarship are re-working the relationship between architecture and its visualization. These discussions, notably by Iain Borden as well as Maria Antonella Pelizzari and Paulo Scrivano, shift away from interpreting architectural images and its associated image-technologies (i.e. photography, moving-imagery, and lately, digital visualizations, or renderings) as purely documenting buildings (representational)¹ towards a more “interdisciplinary approach” that considers things like the “context of production and media distribution of images.”² This concern allows us to recognize image-production and image-technologies as a vital part of architecture, where architectural processes necessarily involve, as Benjamin Buchloh notes, “an endless process of transforming the tectonic and spatial into the spectacular”³ through images. Although these discourses appear very contemporary in character, this paper examines how some specific concerns and critiques that seem most contemporary return to questions that lie at the beginning of the twentieth century.

Due to the scope of this paper, we do not set out to provide a comprehensive and authoritative account of a historiography of image-technologies, rather it aims to look at two critical moments of transition in the history of image-technologies. The turn of the twentieth and twenty-first centuries appear to us as key moments in history that witnessed profound transformation in image-technology and its impact on the way people perceive and experience architecture (Figure 1). These moments are punctuated by historical works of literature, namely the writings of Walter Benjamin (1931; 1936; 1955)⁴ and Hal Foster (2002; 2011). On one hand, we explore essays that preceded some major works by Benjamin, namely ‘A Short History of Photography (1931),’ which preceded ‘The Work of Art in the Age of Mechanical Reproduction (1936),’ and equally, many of the themes and insights of *The Arcades Project* can be found in the already published “resumes” of 1955 also known as ‘Paris, Capital of the Nineteenth Century (1955).’ On the other hand, we also discuss two works published by Foster around the turn of the twenty-first century, in which he examined contemporary architecture along with art, namely Foster’s *Design and Crime (And Other Diatribes)* (2002) and *The Art-Architecture Complex* (2011).

This paper does not attempt to condense Benjamin's writing or the ninety years of photographic history, or to present Foster's voice as the most representative of the relationship between contemporary architecture and image-technologies. Rather, the paper aims to make selective use of Benjamin and Foster's essays and provide further insight into the changing relationships of architecture, image and media technologies. What follows will proceed thematically and identify two historical processes mediated by image-technologies; first, the subjugation of architecture and; second, the commodification of architecture. It will do so through an explicit development of a historical dialogue between what is witnessed in the writings by Benjamin that consider the image-technologies emerging at the turn of the twentieth century and the critique presented in the writings by Foster, at the turn of the twenty-first century.

In the discussion, the paper argues how despite the overwhelming conflation of image and media technologies with contemporary architecture, the overview of this conflation remains largely negative and reductive, particularly in Foster's essays. We seek to, at best constitute, and encourage other scholars interested in the contemporary analysis of the relationship of image-technologies and architecture - to prioritize the increasing complexity of these relationships in the present moment and by doing so, extend the analysis of relationships of architecture and image-technologies today beyond the negative critique.

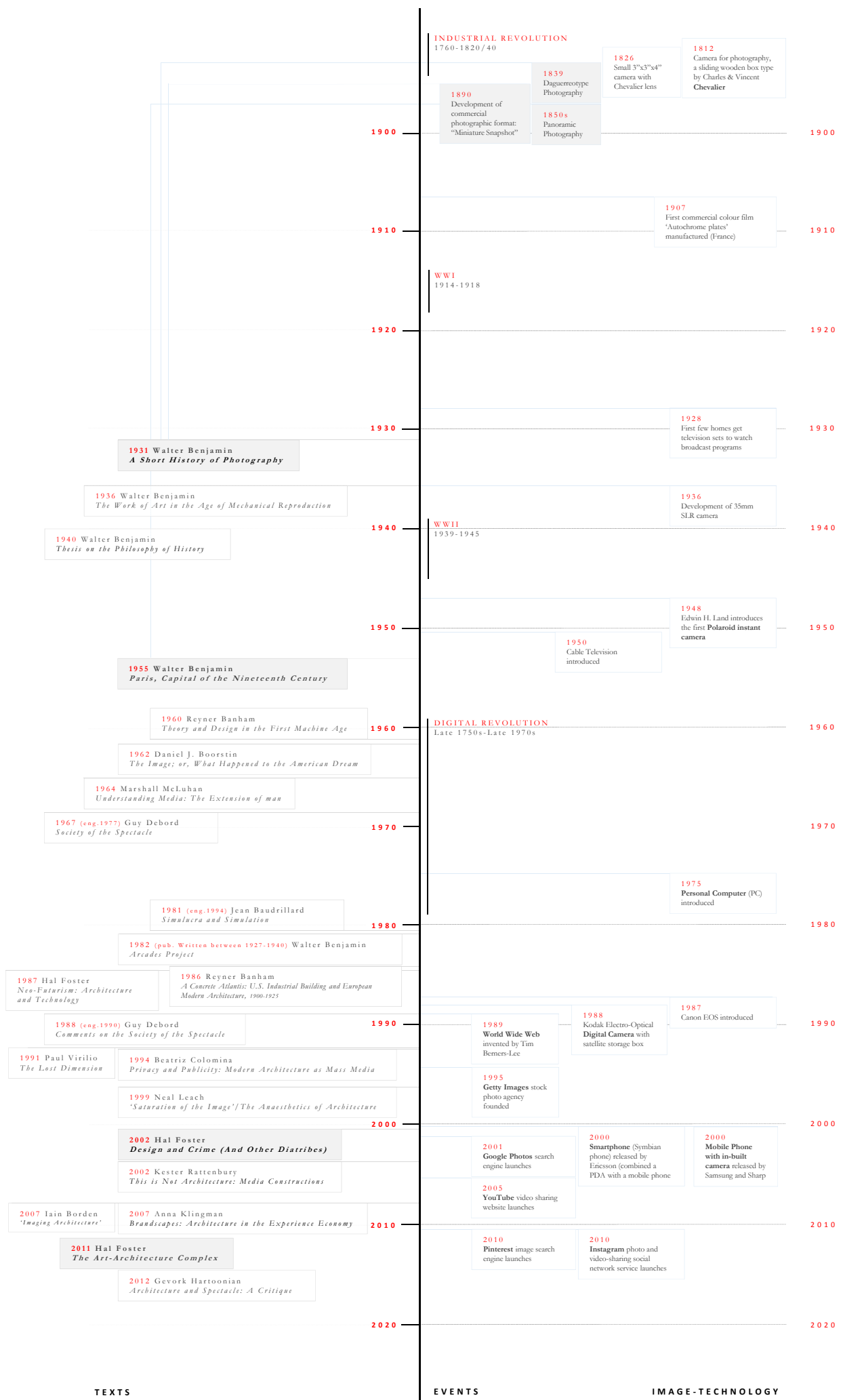


Figure 1: Timeline of selected historiographies of image-technologies and image-critiques in relation to advancement of image-technologies. Constructed by authors.

Intersections between Image-Technologies and the Subjugation of Architecture

The potential role of the image and image technologies for architecture is recognized historically by Walter Benjamin, as he observes: “one cannot say that they [images] reproduce architecture. They produce it in the first place.”⁵ Similarly, Iain Borden, interpreting Charles Jencks’ textualizing of images notes “the image is not object-centred... it reproduces not architecture but social meaning through a depiction of architecture.”⁶ These considerations elevate the role images’ play in architecture; not simply as re-productions or re-presentations of- architecture, rather, towards thinking images as capturing more of- and beyond the ‘real’ architecture. Specific to the process of production and construction of architectural images, Beatriz Colomina offers insight (through her analysis of Le Corbusier’s image-practice) towards embracing the technology of printed media as “a new context of [architectural] production, existing parallel with the construction site.”⁷ In this sense, architecture involves the careful construction of a work “built as image,” most often by the architect.⁸ Concurring with Colomina, Kester Rattenbury argues how this new form of architectural construction (beyond representation of architecture) “establishes the paradigms of high-code architecture and affects how architects see the world and which things get described as architecture.”⁹ Such arguments recognize architectural image-technologies and image-production (of the ‘unbuilt’) as having power to shape physical built environments, thereby confirming Kenneth Frampton’s assertion of image as “agent of mediation.”¹⁰ The role and power of image-technologies is thereby highly significant to architecture, and as such has been noted at the beginning of the twentieth century, most notably in the writings of Walter Benjamin.

Through the selective use of Benjamin’s early works – especially ‘A Short History of Photography’ and ‘Paris, Capital of the Nineteenth Century,’ the following discusses the privileged place of photography in the 1840s which necessarily established a “presence in time and space”¹¹ of a work of architecture – that was deeply mediated by technology. According to Benjamin, among the most significant developments in image-technologies was the emergence of the daguerreotype process, first introduced in the 1830s. Through this process, only non-moving objects could be captured on the plate; the poor light-sensitivity of the plates had made long exposure times necessary. During this necessary extensive period of the exposure, Benjamin observes, “the model grew, so to speak, into the image...” and moreover, “[t]he procedure itself caused the model not to live out of the moment, but rather right into it.”¹² Here, we can think of the architectural figure not as

defined and fixed object but as subject that emerges from the image-site itself, where these one-off images were, as Benjamin writes, “set up to last.”¹³

Reviewing David Oetavius Hill's Gregyfriars cemetery photographic work (1848) (Figure 2), Benjamin illustrates how the image-site “looks like an interior, a cloistered, enclosed space, where tombs, leaning on firewalls, soar out of the meadows.”¹⁴ Here, Benjamin is interested in the internal logic and articulation of the image as an architecture of its own, carefully framed, set up and posed – resembling something between a theatre set and a “well-drawn or well-painted”¹⁵ artwork. Here, the location and site of the architecture is of vital importance as Benjamin further writes: “But this location [of Gregyfriars cemetery] could never have had such a great impact had there not been strong technical reasons,” which made it seem “desirable to position the recordable subject in as remote as possible a place, where nothing stands in the way of peaceful exposure.”¹⁶ Benjamin's writing produces a profound illustration of early image-technology that involves a careful construction and ‘set up’ of the architecture within its photographic-site. In the process, the power of the image subjugates architecture to the specific limits of image-techniques by turning them into objects for our gaze.

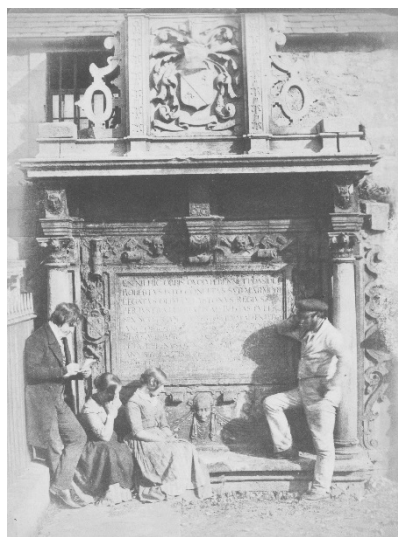


Figure 2: David Oetavius Hill and Robert Adamson, *Gregyfriars Churchyard*, 1848 (Walter Benjamin, ‘Small History of Photography (1931),’ in Esther Leslie (ed. and trans.), *On Photography*, (London: Reaktion, 2015): 69)

Eugène Atget's (1857-1927) work is also worth discussing in the context of image-technologies and architecture, namely his project, *Old Paris* which begun around 1898 (Figure 3). Benjamin writes on Atget's photographic work documenting the architecture and streets scenes of Paris for architects, stone masons, and iron workers. The work

consisted of small and intimate architectural elements from door handles to shop windows and monuments, making an inventory of the city - all empty of human bodies: “The Porte d’Arcueil by the fortifications is empty, the triumphal steps are empty, the Place du Tertre – as it indeed should be – is empty.... The city in these images is cleared out like an apartment that has not yet found a new tenant... a medicative alienation between environment and person.”¹⁷ Aura, Benjamin writes, in Atget’s photography, is pumped out; Atget’s nineteenth-century Paris is emptied of human life, an alien zone, and subject to technological alteration.



Figure 3: Eugène Atget Shop sign au Rémouleur on the corner of the rue des Nonnains-d’Hyères and rue de l’Hôtel-de-Ville, 4th arrondissement July 1899. Copyright of Musée Carnavalet, Paris/Roger-Viollet, (<http://www.atgetphotography.com/The-Photographers/Eugene-Atget.html>)

These representations of the city were, once again, deeply mediated by technology (a tilt-shift technique). And again, Benjamin notes, “[t]he technical reason lies in the long exposure time, which demanded utmost concentration by the subject being portrayed.”¹⁸ Atget’s work on *Old Paris*, as illustrated by Benjamin, project an architecture that has a specific time and space – a specific context and ‘aura’ to which it belongs and importantly, architecture is here taken as subject (in equal terms to human subjects) within the city scape of Paris. Although taken as subject in images, architecture in the process of intersecting with these image-technologies is reduced to an artefact to be manipulated, stripped off of any contextual reference. Hence, we argue the impact of image-technology on architecture is not simply about instrumentalization or the achievement of an end. Instead – the relationship between architecture and image-technologies is increasingly complex and intertwined where architectural images hold capacity to impact our relation to architecture before we experience it firsthand.

Early photography had, Benjamin describes quoting Emil Orlik, “a more penetrating and longer lasting effect on the viewer than more recent photography.”¹⁹ However, Benjamin contends that by the 1900s, image-technology had advanced in terms of “reproducing” unique objects, including architecture. With the loss of the ‘one-off’ image-technique that daguerreotype and calotype processes introduced, “the technique of reproduction detach[ed] the reproduced object from the domain of tradition.”²⁰ For this very reason, Benjamin’s writing warns of the rise of architecture’s subjugation to the methods and techniques of image-making; turning architecture into image-subjects.

Only half a century later, the advancement of image-technologies at the end of the twentieth century saw development of computer programs and digitalization which had a profound impact on architecture. Foster’s *Design and Crime (And Other Diatribes)* (2002), and *The Art-Architecture Complex* (2011) provide a detailed insight into how contemporary technology helps in the production of architecture with outstanding forms, and as a tool which allows manipulation to provoke “the heightened visuality” of the architecture.²¹ He positions technology as a crucial element for what he calls a global style in architecture, and as a part of the lineage initiated with Rayner Banham, where Banham believed that it was crucial that Pop design do more than simply express contemporary technologies, but also “elaborate them into new modes of existence.”²² Foster argues that contemporary technologies facilitated the existence of high tech materials and outstanding, digitally manipulated building forms and surfaces. He sees contemporary architecture as subsidiary to “mediated envelope” or “datascape,”²³ and thereby also notes the process of subjugation of architecture to image and media technologies. Considering that Benjamin warned of subjugation of architecture to methods and technologies of image-making, Foster’s note on the subjugation of contemporary architecture can be seen as a more advanced stage of the same process of subjugation warned by Benjamin earlier.

Foster positions technological advances, particularly as related to image, and their penetration into architecture and design, as central to his critique. These technological advances include computer aided software and designs, advanced construction technologies and materials, and the development of digital media. Furthermore, he warns the end of the twentieth century is the time of “total design”, neo-Art Nouveau, which is about image, where this image is almost “subject-less”, and perpetuates “a new kind of narcissism.”²⁴ Foster refers back to Benjamin’s work which argued for a similar claim, however in a very early stage: “Transfiguration of the solitary soul appears its goal ... Art Nouveau is summed up by The Master Builder [of Henrik Ibsen] – the attempt by the

individual to do battle with technology on the basis of his inwardness leads to his downfall.”²⁵ Specifically, through both *Design and Crime* (2002) and *The Art-Architecture Complex* (2011), Foster positions Benjamin’s ideas as critical to explain some of the early manifestations of the relationship of art and mechanical reproduction.²⁶ Writing at the turn of the twenty-first century, Foster’s work reflects a more complex position of art and architecture within the contemporary context of capitalism, digital technologies and globalisation. He notes how contemporary technology helps in the production of architecture which becomes a brand and stands out from its immediate context,²⁷ arguing that such architecture has media as a primary site. Such account further positions media technologies as crucial for understanding contemporary brand architecture.²⁸

Although technology advances have multiplied significantly from the beginning towards the end of the twentieth century, and their involvement in the contemporary architecture and design remains complex and multilayered, Foster warns of the subjugation of design to image (and ultimately, capital), which is in line with Benjamin’s early writings. Technology in Foster’s critique is seen as a tool which allowed, very similarly to image, for manipulation, and which is in service of “design out of ‘the cultural logic’ of advanced capitalism, in terms of its language of risk taking and spectacle-effects.”²⁹ This is particularly evident in his critique of the Guggenheim museum in Bilbao, designed by Frank Gehry (opened in 1997), where Foster sees technology as able to facilitate the provisional CATIA (computer-aided three-dimensional interactive application) design of the museum, and of the construction of the museum itself.³⁰ Nevertheless, while the critique of the relationship between image and media technologies and architecture as allowing for manipulation is rightfully argued, the complexity of these relationships outside of the processes of manipulation remains largely unexplored.

Intersections between Image-Technologies and the Commodification of Architecture

Benjamin’s writing illustrates how the structure of experience on the beholder of the image changed, under advancements of new technologies, specifically in architecture being “transported” through, what Benjamin calls, “visiting cards” where it meets the beholder in miniaturized form. Here, we can isolate one passage in order to illustrate this experience. Benjamin writes, “[e]veryone can observe for themselves how much easier a picture – in particular, though, a sculpture and, even more so, architecture – can be comprehended in photography compared to reality.... Ultimately, mechanical methods of reproduction are a technique of miniaturization and they help provide people with a

degree of mastery over the works, without which those works would no longer find any application at all.”³¹ The advanced techniques fundamentally brought challenges to architecture because it captures and defines reality in terms of media, where it indeed begins to value appearance over true physical experience.

According to Benjamin, the image-experience of the beholder shifted as the technological advances of photography extended the marketability and, eventually separated photography from art to become a commodity. Referring back to Benjamin, Steiner writes, “Photography for its part has, since the middle of the century, enormously expanded the scope of the commodity trade by putting on the market in unlimited quantities figures, landscapes, events.... To increase turnover, it renewed its objects through fashionable changes in photographic technique that determined the later history of photography.”³² While Benjamin, as Caygill notes, “lingers on the moment of transition, before the socio-technical imagination becomes governed by the framework of the market...,”³³ his writings also suggest that architecture was heading towards a commodity in its own right, and that through rapid rise of technology – architecture and architectural images were soon moving towards mass production/endless repetition. Such accounts illustrate the structure of the changing experience of observing and experiencing architecture, under the pressure of new technologies.

Almost a century later, in *Design and Crime* (2002), Foster presents a critique of the same process of commodification of architecture and art, which is in its developed phase. His writing is critical of the design at the end of the twenty-first century, for which he argues it represents the conflation of the sign and commodity. Foster warns of the deterritorialising of the image and space, mediated by the advancement in digitalization of photography, and with computing in architecture. He refers to Bruce Mau Design as an example, whose main attempt as a graphic support for the new Seattle Public Library designed by OMA was the suggestion to integrate architecture and information; the real with the virtual.³⁴ As architecture is loosened from its structural principles, and almost everything can be designed and built, Foster’s writing discusses how this allows for designs such as Gehry’s Guggenheim in Bilbao and similar computer aided architectures to emerge. As a result, and in Foster’s words, “this deterritorializing is the path of capital.”³⁵

Foster rightfully believes in the importance of turning to history in order to analyse the roots of phenomena related to visual culture and image (and, as one could add, image-related technologies), rather than excessively prioritising the present moment by

understanding these phenomena as novelty. By looking at history, he parallels the equality of image and subject with commodity fetishism, as outlined by Karl Marx in *Capital*, emphasising that such fetishism is in its advanced stage in the contemporary moment.³⁶ Using this approach, Foster argues for such image “having life of its own,” the “fetishistic image-anthropomorphism... the projection of the human into the nonhuman.”³⁷ Thereby, Foster argues for the commodity fetishism of a contemporary architecture and art which is saturated by images, and perpetuates a similar point in *The Art-Architecture Complex* (2011). In Foster’s latter book, he analyses this complex in relation to the space of an art installation and architecture, which, as he holds, does the observing for the viewers; “it takes our thoughts and sensations, process them as images and effects, and delivers them back to us for our appreciative amazement.”³⁸ He sees these as a more contemporary version of the old problem of fetishisation.

The critical position which Foster has with image-technologies pushes against the overwhelming conflation of these technologies with contemporary architecture, where Foster focuses on one aspect amongst a multitude of these relationships. This paper admits the difficulties in engaging with the complexities of the contemporary technologies of representation and their relationship with architecture, however, often for the same reasons, it sees that full complexity of the relationship remains largely unexplored. Foster attempts to engage with contemporary digital technologies in *Design and Crime* (2002), briefly examining the digital image, admitting that he only has “impressions to offer.”³⁹ He sees the digital image as a “luminous scrim of information... to be manipulated at will. But what one manipulates on the screen is data (Latin for ‘given’), which suggests that we do not produce this information as much as we manipulate its given-ness.”⁴⁰ Although offering only impressions in his writing, Foster perpetuates the argument by which digital technologies and image allow for manipulation, admittedly without the tools to fully analyse the complexity of this medium.

Of course, preceding Foster’s works, there has been writings and critical reflections upon architecture as “fully ensnared” within a contemporary condition described as an “ecstasy of communication.”⁴¹ Paul Virilio comments on the modern era of speed and instantaneity and this turn towards image focussed architecture.⁴² Drawing on medium theorists such as Marshall McLuhan, Virilio analyses media innovation and its impact on modes of representation (images). Particularly, he argues the influence of new image-technologies as involving a process of “derealization and dematerializing of the object.”⁴³ Indeed, this view projects the effects of new visual mediums as contributing to the discontinuous and disembodied form of architectural experience.

In addition, Neil Leach is critical of architects' obsession with the image which has reduced "design ... to the superficial play of empty, seductive forms."⁴⁴ This "process of aestheticization," driven by the excess and surfeit of images, has in turn reduced the image empty of content. In agreement with Leach, Foster addresses the implications when architecture becomes the image, or as Gevork Hartoonian puts it, when architecture becomes "the site of spectacle."⁴⁵ Moreover, Guy Debord and Jean Baudrillard analyse the reality and its 'copy', defined by the spread of mass media and hegemony of governments in controlling mid-twentieth century capitalist societies, which were, as they believe, manipulated and alienated by the 'pseudo' world of commodities, consumption, false desires and images.⁴⁶ With their largely pessimistic point of view, these authors provoke further pessimism and critique from more contemporary architecture authors, who often see their work as an authority. It is necessary to challenge these authoritative positions, and further expose the limitations of negative and reductive analysis within the phenomena of spectacle and simulacra/simulation.

Both writings of Benjamin and Foster effectively reflect on the process of commodification of architecture due to development of technologies for mass reproduction, and later due to digital technologies and advanced media. Despite the insightfulness of critique, it is relevant to note the binary structure perpetuated in the analysed texts in this paper (particularly by Foster) which positions image-technologies as a negative influence on architecture. Within such structure, there is no room for understanding the potential opportunities these technologies represent for architecture, and there is a danger of a reductive understanding of the impact of contemporary image-technologies on architecture.

Intersections between Architecture and Image-Technologies beyond Commodification and Subjugation

Authors such as Ari Seligmann (2008) and Anna Klingmann (2007) examine architectural publicity, and architecture as a part of brandscapes and experience economy, respectively, in an attempt to extend the analysis of the relationship between image-technologies and architecture. Seligmann particularly offers an understanding of the potential opportunities image-technologies and advanced media bring to architecture. He believes that architecture moving out of the background due to increased media attention is positive, and stresses the need for the existence of institutions and additional venues to media that would further deal with architectural publicity in terms of its nature and potential. For example, he sees the Guggenheim in Bilbao as a 'spectacular' public

building that offers possibilities for enjoyment and entertainment, along with providing common places for public gatherings, thereby positioning it outside of the negative critique. Seligmann further believes that there is a benefit to architecture having increased publicity and which opens itself to further attention, since this also increases the possibilities for further architectural debates.⁴⁷ In addition, Klingmann observes, 'it is commonly assumed that architecture would somehow be degraded if it were too closely associated with commerce—a misconceived attempt at framing architecture as a purely artistic activity....'⁴⁸ In analysing architecture as a part of brandscapes, she sees this architecture as necessarily positioned within the wider economic context and argues against analysis of architecture as a work of art, outside such context. Architecture as a brand arguably cannot be considered outside of its relationship with image and media, which calls for further analysis that would acknowledge this relationship rather than dismiss it. Importantly, Seligmann and Klingmann's works extend the analysis of the relationships between architecture, image and media technologies beyond the negative critique.⁴⁹

From a different perspective, Barbara Stafford (1996), offers extensive analysis of the benefits of the visual in contemporary culture.⁵⁰ In arguing these benefits, she notes the difficulty in comprehending contemporary image-technologies due to the speed of their development, and suggests the need for the "new imagist" who would be an interdisciplinary expert equipped in understanding contemporary visual and image (technologies).⁵¹ Stafford notes the negative 'image bias', and reminds us that working with surfaces does not necessarily qualify as superficiality.⁵² This must be extended to the architectural discipline, where additional examination would separate superficiality, or what can be referred as lack of 'meaning' in architecture, from being perceived as equal to architecture's engagement with media or image.

Previous arguments reflect the need to engage with contemporary image-technologies, and with the penetration of such technologies in architecture beyond the reductive analysis. It is necessary to extend the analysis of contemporary relationships between image-technologies and architecture beyond the concepts of manipulation or commodification to fully comprehend both the scope of these relationships, and contemporary architecture as often bound to these technologies.

Conclusion

In this paper, we have aimed to present the historical dialogue between the writings by Benjamin and Foster, the former which recognized the impact of image-technologies

early on (Benjamin), and the latter who reflected on the development of the same process and impact of these technologies on art and architecture in both twentieth and twenty-first centuries (Foster). The context in which Benjamin's essay is situated contrasts with that in which Foster writes at the beginning of the twentieth century. Benjamin warns of the intersection between image-technology and architecture because of the sense of "loss" of authenticity and aura that at that present moment, early photography embodied, and which was lost through the advanced techniques which led to snapshots. His writing illuminates image-technological advances as a form of novelty and innovation. However, since Benjamin's essays, many image-technological advances have penetrated into arts and architecture, and we are now in a more complex relationship. The paper argues how despite the overwhelming conflation of image and media technologies with contemporary architecture, critique in Foster's essays is inherently a dead-end in analysis rather than productive and embracing current advances in image-technology.

The tracing of image-critiques presented through this paper, looks at issues spanning from architecture in images, imaging architecture to image in architecture. What ties them together is their insistence for architecture to critically engage with image-making processes, and most importantly, image-technologies, as architecture is increasingly becoming defined and shaped through imagery. Nevertheless, if only looked through the lens of negative critique which reduces the so-called image-architecture to commodity, or image-technologies as tools for manipulation, the critique does not provide a path for constructive analysis. It is thereby necessary to challenge the binary structures to fully understand the increasingly complex relationship contemporary architecture holds with image-technologies and techniques for representation. There is a need for a discussion which takes into account the complexity of these relationships, and as such aims to unravel contemporary architecture (including projects by highly regarded architectural companies such as OMA, MVRDV, or Diller, Scofidio + Renfro) as frequently bound to, and often inseparable, from image-technologies. It is thereby necessary to acknowledge the existence of representative examples of architecture which engages with image-technologies, and to also acknowledge the need for research into the different ways their architecture engages with the complexities of image and media. This paper argues that the positions architecture occupies in relation to media and image-technologies are prolific, and while the present study is timely, it is also continuously expanding with the advancement of image-technologies.

Endnotes

- ¹ See Iain Borden, 'Imaging Architecture: The Uses of Photography in the Practice of Architectural History,' *Journal of Architecture*, 12 (2007): 55-77.
- ² Maria Antonella Pelizzari and Paulo Scrivano, 'Intersection of Photography and Architecture-Introduction,' *Visual Resources*, 27, 2 (2011), 109.
- ³ Benjamin Buchloh, quoted in Pelizzari and Scrivano, 'Intersection of Photography and Architecture-Introduction,' 109.
- ⁴ Walter Benjamin, 'The Work of Art in the Age of Mechanical Reproduction (1936),' in Hannah Arendt (ed.), Harry Zohn (trans.), *Illuminations* (London: Fontana Press, 1992), 211-44; Walter Benjamin, 'Small History of Photography (1931),' in Esther Leslie (ed. and trans.), *On Photography*, (London: Reaktion, 2015): 79- 84; Walter Benjamin, 'Paris – Capital of the Nineteenth Century (1955),' in Peter Demetz (ed.), Edmund Jephcott (trans.), *Reflections: Essays, Aphorisms, Autobiographical Writings*, (New York: Schocken Books, 1978), 146-162.
- ⁵ Walter Benjamin, *The Work of Art in the Age of Its Technological Reproducibility And Other Writings on Media*, in Michael W. Jennings, Brigid Doherty, and Thomas Y. Levin (eds.), *Walter Benjamin*, (London: Harvard University Press, 2008), 71.
- ⁶ Borden, 'Imaging Architecture,' 71.
- ⁷ Beatriz Colomina, quoted in Pelizzari and Scrivano, 'Intersection of Photography and Architecture-Introduction,' 108. See also Beatriz Colomina, 'Architectureproduction,' in Kester Rattenbury (ed.), *This Is Not Architecture: Media Constructions*, 207-221 (New York: Routledge, 2002), and Beatriz Colomina, *Privacy and Publicity: Modern Architecture as Mass Media* (Cambridge, Mass.: MIT Press, 1994).
- ⁸ Beatriz Colomina, 'Media as Modern Architectures,' in Thomas Demand, *Serpentine Gallery* (London: Serpentine Gallery; Munich: Mosel, 2006), 20.
- ⁹ Kester Rattenbury, 'Introduction,' in Kester Rattenbury (ed.), *This Is Not Architecture: Media Constructions*, (New York: Routledge, 2002), xxiii.
- ¹⁰ Kenneth Frampton, *Commodification and Spectacle in Architecture: A Harvard Design Magazine Reader*, William S. Saunders (ed.), (Minneapolis: University of Minnesota Press, 2005), 17.
- ¹¹ Benjamin, 'The Work of Art in the Age of Mechanical Reproduction,' 214.
- ¹² Benjamin, 'Small History of Photography,' 72.
- ¹³ Benjamin, 'Small History of Photography,' 72.
- ¹⁴ Benjamin, 'Small History of Photography,' 71.
- ¹⁵ Orlik, quoted in Benjamin, 'Small History of Photography,' 72.
- ¹⁶ Benjamin, 'Small History of Photography,' 71.
- ¹⁷ Benjamin, 'Small History of Photography,' 84.
- ¹⁸ Benjamin, 'Paris – Capital of the Nineteenth Century,' 15.
- ¹⁹ Benjamin, 'Small History of Photography,' 72.
- ²⁰ Benjamin, 'The Work of Art in the Age of Mechanical Reproduction,' 219.
- ²¹ Hal Foster, *The Art-Architecture Complex* (London: Verso, 2011), 2.
- ²² Foster, *The Art-Architecture Complex*, 5. For Reyner Banham's writings and essays on images, see Reyner Banham, *A Concrete Atlantis : U.S. Industrial Building and European Modern Architecture, 1900-1925* (Cambridge, Mass.: MIT Press, 1986), Reyner Banham, 'The New Brutalism', *Architectural Review* 118 (December 1955): 354-61.
- ²³ Foster, *The Art-Architecture Complex*, 15.
- ²⁴ Hal Foster, *Design and Crime: And Other Diatribes* (London: Verso, 2002), 25.
- ²⁵ Foster, *Design and Crime*, 26.
- ²⁶ Foster, *Design and Crime*, 75-8, and Foster, *The Art-Architecture Complex*, 210, 270-1, 267, 286.
- ²⁷ Foster, *The Art-Architecture Complex*, 36.
- ²⁸ Foster, *The Art-Architecture Complex*, 14.
- ²⁹ Foster, *Design and Crime*, 41.
- ³⁰ Foster, *Design and Crime*, 34-42.
- ³¹ Benjamin, 'Small History of Photography,' 88-89.
- ³² Benjamin, 'Paris – Capital of the Nineteenth Century,' 151.
- ³³ Caygill, Howard. *Walter Benjamin: The Colour of Experience*, (London: Routledge, 1998), 147.
- ³⁴ Benjamin, 'Paris – Capital of the Nineteenth Century,' 162, cited by Caygill, *Walter Benjamin: The Colour of Experience*, 147.

-
- ³⁵ Foster, *Design and Crime*, 24.
- ³⁶ Foster, *Design and Crime*, 96, 101; see also 'The Fetishism of the Commodity and its Secret' in Karl Marx and Ernest Mandel, *Capital : A Critique of Political Economy*, trans. Ben Fowkes, vol. 1 (New York: Penguin Books Limited, 1990), 163–177.
- ³⁷ Foster, *Design and Crime*, 101.
- ³⁸ Foster, *The Art-Architecture Complex*, xii.
- ³⁹ Foster, *Design and Crime*, 96.
- ⁴⁰ Foster, *Design and Crime*, 97.
- ⁴¹ Jean Baudrillard, referred to by Neal Leach in: Neal Leach, 'Saturation of the Image,' in Neal Leach (ed.), *The Anaesthetics of Architecture*, (Cambridge: The MIT Press, 1999), 1.
- ⁴² Paul Virilio, *The Lost Dimension*, trans. Daniel Moshenberg (New York: Semiotext, 1991).
- ⁴³ Douglas Kellner, "Virilio, War and Technology," in John Armitage (ed.), *Paul Virilio, from Modernism to Hypermodernism and Beyond*, (London: Sage, 2000), 116.
- ⁴⁴ Leach, *The Anaesthetics of Architecture*.
- ⁴⁵ Gevork Hartoonian, *Architecture and Spectacle A Critique* (London: Ashgate, 2012), 3.
- ⁴⁶ Guy Debord, *Society of the Spectacle*, 1 vols. (Detroit: Black & Red, 1983). Guy Debord, *Comments on the Society of the Spectacle*, trans. Malcolm Imrie, Verso Classics (London ; New York: Verso, 1998), and Jean Baudrillard, *Simulacra and Simulation*, trans. Sheila Faria Glaser, *The Body in Theory* (Ann Arbor: University of Michigan Press, 1994).
- ⁴⁷ See Ari D. Seligmann, 'Architectural Publicity in the Age of Globalization' (PhD diss., University of California, 2008).
- ⁴⁸ Anna Klingmann, *Brandscapes: Architecture in the Experience Economy* (Cambridge: MIT Press, 2007), 7.
- ⁴⁹ See Klingmann, *Brandscapes*, and Seligmann, 'Architectural Publicity.'
- ⁵⁰ Barbara Maria Stafford, *Good Looking: Essays on the Virtue of Images* (Cambridge: MIT Press, 1996),
- ⁵¹ See 'The New Imagist' in Stafford, *Good Looking*, 68-81.
- ⁵² Stafford, *Good Looking*, 7.

Technology, Craft Culture and Sustainability: The Case of Pre-modern Chinese Architecture

Mengbi Li
Victoria University

Abstract

Although the term of 'sustainable development' was coined in the late twentieth century, this essay suggests that its concept has long appeared in pre-modern ethics of construction, and propagated through the traditional craft culture. The term 可持续发展 (sustainable development) is an imported word that came into use at the end of the twentieth century. This investigation shows that as early as pre-Qin dynasty (before 221 BCE) the idea of sustainability in architecture has been propagated in diverse forms and formed specific craft culture. The craft culture was not only referred to as conventions followed by craftsmen, but was also argued to be a benchmark of measuring the ruling class's taste and morality. Insightful discussions on technology and architecture have been expanded from the code of craftsmen to the way of governing a nation. Many authors, including literati, thinkers, philosophers, officials, politicians and craftsmen, have contributed to these discussions as well as the formation of this specific craft culture.

This essay traces this large body of historical literature and related praxis, and analyses the thoughts behind them. The representative historical literature includes Yijing, Huainanzi, Benjing xun, Shang shu, Chao Ye Qian Zai, Mozi, and The Tang Code. Based on the investigation and analysis, this essay suggests that technology means more to architecture and sustainability than the mere skills of dealing with structures and fabrication. A deeper understanding of technology and craft culture allows us to know what we should do beyond what we can do.

Introduction

The term of 'sustainable development' was coined in the late twentieth century. The Brundtland Commission proposed the important report, *United Nations World Commission on Environment and development: Our Common Future* in 1987.¹ After the proposal, the term 可持续发展 (sustainable development) was introduced into China and started to appear in modern Chinese as an imported word. Although sustainability is a

new concept which becomes a popular topic in recent decades, this essay suggests that a scholar discussion may have been long existing, especially in the domain of technology and architecture. For example, in pre-modern China, the discussion can be traced to as early as pre-Qin dynasty (before 221 BCE). Based on a large body of historical literature and related practices, this essay suggests that there were similar concerns, discussions and even corresponding policies that have appeared in the history of technology and architecture. This strand of thought can be synthesized into three aspects of discussions.

First is a deep concern for the adverse result of technological development. Scholars and practitioners reminded people that the developed technology may lead to an increasing consumption of materials and resources. These concerns have appeared in an early period around the pre-Qin dynasty and resulted in a propagation for the careful use of materials. Second, around the Han to Tang dynasties, whether advanced technology can really bring a better life was questioned. Ironic allegories were composed and popularly cited in various literature. Finally, these ideas embodied as philosophical evaluation of a series of abstract subjects, for example, the ethics laying in craft culture, the value of a craft works, how to weigh the importance of different industries and a moral pursuit of architecture.

These historical discussions may present certain limitation due to the remote time range, but this does not prevent them from serving as a mirror to highlight the crucial issues that are still worthwhile to be conceived today.

Thrift and aesthetics

Novelty, especially when it was based on individual caprice, was thought extravagant and even immoral in pre-modern Chinese craft culture. Wasting time, money or energy on useless decoration or arbitrary crafts was an immoral behaviour. Focusing on practical value and avoiding being distracted by the pursuit of novelty or technical advancement were regarded as a great virtue for a craftsman. As early as the pre-Qin dynasty, thrift was recognised as a general moral asset. This expectation of good character was not restricted to craftsmen and plebeians, but it was also applied to rulers and indeed the emperor.

Various means were applied to propagate the notion that spending energy and time on creating tempting novelties was wasteful, because they were regarded as frivolous indulgences for residents and craftsmen. This idea was first conceived by intellectuals then propagated among the working classes through legends and folklore. Soon after,

corresponding laws and standards were enacted. As early as the Spring and Autumn period, the influential politician and philosopher Guan Zi was developing this idea. He noted that no matter how skilful a craftsman might be, he should not be addicted to fancy styles, because fancy buildings or craftwork would spoil the population and introduce an extravagant lifestyle. Therefore, a moral craftsman would not produce novel and attractive works that were impractical.² Guan Zi showed particular concerns over the pernicious influence being exerted by attractive novelty. He proposed that people using novel crafts or buildings to captivate the emperor should be punished and even exiled or executed.³

Accordingly, craftsmen preferred to put more effort into the quality of their works and adhering to tradition, than into pursuing originality. *Kaogongdian* 考工典 (Book of diverse crafts) is one of the most comprehensive series of books on Chinese traditional design theories and coding. It clarified the principle that materials should be efficiently used, that craftsmen should be cautious in applying appropriate standards and avoid overindulgence.⁴ Showpieces and impractical works were discouraged. Instead, craftsmen were required to check carefully the order and quality of their work. The code warned craftsmen that they must not waste materials and indulge in individualism.⁵ Since the Spring and Autumn period (770—476 BCE), there had been a decree that craftsmen should carve their names on their works.⁶ This rule was termed *wule gongming* 物勒工名 (works should be with the craftsman's name). In the laws of the Tang dynasty (618—906 CE), it was clearly ruled that carving names of craftsmen on their works was compulsory, to show their contribution. For works of improper or bad quality, the craftsman would be regarded as an offender and punished under law.⁷

Advanced technology, novelty and good life

The relation of a good life to the advanced technology, and to the material novelty was questioned. A series of ironic allegories about the great craftsmen appeared among literature. These stories were varied, but they shared a common motif that material innovation and advanced techniques could be risky and deluded. Craftsmen could immerse themselves in pursuing novelty, but they ran the risk of incurring an unfortunate fate. For example, *Chao Ye Qian Zai* 朝野僉載, a collection of stories of the Sui and Tang dynasties (581—906 CE), tells how a famous craftsman made a magic timber eagle. This creation was very ingenious, because the eagle could take off once it was knocked three times. This craftsman rode the timber eagle to the place where he wanted to go. He used

it as a vehicle to visit his wife, as he worked far from home, and his wife finally fell pregnant.

Inventions may not always bring happiness. The craftsman paid the cost for his novel object—the magic timber eagle. The craftsman's parents lived with his wife at home but did not know of their son's regular visits, so they felt concerned with the pregnancy and asked his wife. In order to clarify, the wife told the father about the craftsman's magic wooden eagle. The curious father found the eagle and sat on it. The father knocked the eagle more than ten times, so the eagle carried the father far away to the territory of another state, Wu. People of Wu took the father landing from the sky for a devil, so they beat the craftsman's father to death.⁸

Another legend was recorded by Wang Chong (27—ca. 100 CE)⁹ in his book, *Luheng* 论衡 (literal meaning: discourses in the balance). It tells how a skilful craftsman made a carriage that could be automatically driven by a puppet. The craftsman sent the carriage to his mother as a present, but unfortunately, the carriage was driven away by the puppet with the mother in it. As the carriage had never returned, his mother was never seen again.¹⁰ In the classical book, *Mo Zi*, a talk between Mo Zi and the famous craftsman, Gongshu Ban, ran along the same lines. Gongshu Ban made a wooden magpie which could fly for three days without landing, and Gongshu Ban was proud of his magic. Mo Zi argued that such works lacked practical value and should not be celebrated. Instead Mo Zi was more willing to praise the carpenter who could use the same amount of timber to make a good quality wheel so that it could be used to transport heavy goods.¹¹

Value judgement

The aforementioned trend of ideas and aesthetic philosophy was reflected as the value judgement of specific subjects. For example, novel technology was not always admired, yet a cautious examination was required. An idiom was used to describe the craft works that are seductive but not of benefit to one's morality. The idiom is *qiji yinqiao* 奇技淫巧 (diabolic tricks and wicked crafts). In *Shangshu: taishi* 尚书·泰誓下 (Book of Documents: Great Speech (part 3)), the emperor of the Shang dynasty (ca. 1600—1050 BCE) was criticised for being a fatuous ruler. The book emphasises how the emperor enjoyed using craft novel works to please beautiful ladies.¹² This behaviour was regarded as symptomatic of an extravagant life. Kong Yingda (574—648 CE) annotated the meaning of each word. *qiji* 奇技 means strange skills or techniques, and *yinqiao* 淫巧 means pursuing difference and novelty.¹³

In the Qing dynasty (1644—1912 CE), this term *qiji yinqiao* was associated with patriotism and was utilised as a political tool. When products from overseas were imported into China, the conservative wing of the government thought that the attractive but exotic commodities from abroad would affect Chinese ideology and ruin the Chinese economy, thus they tagged these goods as objects of *qiji yinqiao*. Guan Tong 管同 (1780-1831 CE) reminded people of the potential harm of these commodities, writing in his *Jinyong yanghuo yi* 禁用洋货议 (A Proposal of Banning Imported Commodities) that in the old times when sagacious emperors were on the throne, there were strict rules upon crafts. Craftsmen who tried to pursue *qiji yinqiao* could be severely punished.¹⁴ Guan Tong cited history, and said that the term was used to incite in people a passion to fight against the novel and attractive goods imported from abroad.

To avoid pursuing material novelty was not only regarded as a virtue for craftsmen, but also was generally applied in all walks of life, even including by the emperor. *Shangshu* suggests that if the emperor was able to value practical objects rather than novel works, the country would save considerable amounts of money so the people could live a better life.¹⁵ If one indulged in material pleasure, such as ordering the construction of luxury buildings, one's ambitions would be frustrated. Similarly, if one deceived people, one's morality would be in jeopardy.¹⁶ Guan Zi 管子 (719–645 BCE) also pointed out that, even though there were enough skilful craftsmen, people still felt there was a lack of accommodation. This was because the rulers did not set a good role model and indulged in funding new and luxury construction projects. Rulers, especially emperors, should avoid indulging in novelties.¹⁷ Sensual pleasures could be alluring, but if rulers managed the treasury of a country in their own self-interest, people would suffer and the country would be in trouble.¹⁸ Mo Zi also stated that expanding territories and gaining more wealth was only one way of improving the economy, he encouraged kings also to be thrifty. Mo Zi praised thrift as a great virtue, saying architecture should guarantee basic needs and morality rather than pursue novelty.¹⁹

Along with the idea of renouncing luxury and impractical novelty in architecture, the profound realisation and moral pursuit conveyed by architecture were highly admired. The material and nonmaterial components of craftwork were distinguished by using different words. The physical and tangible part was called *qi* 器 (tools or objects) and the philosophical and intangible part attached to the objects was called *dao* 道. These two terms come from *Xici* 系辞 commentary of the *Yijing* 易经 (Classic of Changes or Book of

Changes). The definitions appeared in the book and their relationship was explained. *Dao* fits the Western interpretation of 'metaphysics'. *Yijing* defines that *dao* is on a higher plane than the real world. 'Dao is above, an abstract world and ultimate reality'.²⁰ '形而上者谓之道，形而下者谓之器'²¹ (*Qi*, tools or material objects, refers to the concrete things of this world. *Qi* is below). In later books, such as *Er Cheng quanshu* 二程全书 (The Book of Cheng Hao 程颢 and Cheng Yi 程颐) and *Shengshi weiyang* 盛世危言 (Fragile Prosperity), the relationship between *qi* and *dao* was further explained. '道为本，器为末'²² (*Dao* was regarded as the essence, while *qi* was treated as the arms and legs). Similarly, the meanings, philosophy and morality conveyed by architecture were more admired than its physical form.

In pre-modern China, industries were classified according to their consumption of resources. Agriculture was regarded as the essence of the country, while other industries relating to crafts such as architecture were treated as *moye* 末业 (the lowest hierarchy of trade). Within architecture, building public infrastructure, especially defence facilities such as city walls and moats, was prioritised, but residential buildings, especially palaces, were morally regarded as least important. Mo Zi proposed that rulers should pay most attention to agriculture and treat it as the primary industry. He believed that construction projects were major devourers of the national treasury and therefore in need of stringent control.²³ Other influential thinkers and politicians who held the same opinion include Han Feizi 韩非子 and Shang Yang 商鞅. They proposed policies to boost agriculture and restrain other industries such as construction.²⁴ Han Feizi established a solid theoretical foundation for the principle of '重本抑末论' (a theory of boosting the primary industry and restraining the minor ones). Shang Yang applied the idea to the development of the State of Qin.²⁵ This state later gained power and finally unified China, making way for the Qin dynasty (221—206 BCE). After gaining tremendous traction in practice, the idea gradually became a deep-rooted ideology in pre-modern China and was passed on to later dynasties.²⁶

This strand of ideas was also embodied as the rejection of luxury. The idea can be found in various sources, from textbooks to allegories. For example, *Zengguang xianwen* 增广贤文 (Enlarged Writings of Worthies: A Collection of Chinese Proverbs) was an education book for children. In the book, among a list of precepts, it provided the standard for assessing architecture '勿营华屋，勿作营巧'²⁷ (do not build luxury buildings and do not create useless decoration). Similarly, *Huainanzi: benjing xun* 淮南子：本经训 (literal

meaning: fundamental norm in the writings of the masters south of the *Huai*) displays an ideal image of the residential environment. It tells how in olden times respectable, saintly ancestors could, in a delicate but thrifty way, pursue morality and fulfil their basic needs.²⁸ Without luxury ornamentation or decoration, being sheltered in a moral way was very simple. A good house should never be overbuilt. Harmful moisture from the land, rainfall and haze from the sky should be kept out of the room, and all four sides should protect the interior from strong winds. This should be sufficient. There was no need for decoration or any change to the landform for the building. The woodwork and other elements used for construction should neither be elaborately processed nor over decorated. The hall did not need to be large, just sufficient for conducting rituals and holding liturgies. The rooms should be sufficiently quiet and clean for sacrifices to the high gods and for ceremonies devoted to the spirits and deities.²⁹ The book further warns against extravagant accessories, which spoil people and ruin their spirits:

声色五味，远国珍怪，瑰异奇珍，足以变心易志，摇荡精神，感动血气者，不可胜计也。³⁰ Now, sounds, colours, and the five flavours, precious and strange things from distant courtiers, things that are extraordinary, different, and surprising are enough to cause alterations and changes in the heart and will, agitate and unsettle one's essence and spirit, and stir up the blood and the *qi* so that it becomes impossible to keep control of them.³¹

Scholarly discourses are explored by this paper through reviewing Chinese historical literature. These discourses accentuated thrift, morality, value judgement and aesthetics. It is noted that the quest of sustainability does not imply conservative or anti-progressive attitudes. Instead, it takes a more prudent attitude towards upgrade and novelty. Conservatively opposing innovation rejects attempts and suppressing changes, but sustainability requires more cautious and responsible actions and calls for foresighted consciousness. The outset of the later is not from the fear of change, but is motivated by a core value of thrift and critical rethink of aesthetics. It was a moral choice towards architecture instead of a political stance of conservation. Such moral value is not exclusive to pre-modern China. It also has profound contexts in other cultures. For example, Thomas Aquinas' thoughts convey his advocacy of prudent practice.³² This shared value has certain historical foundation that allows it to extend to today's societies. It is compatible with our quest for sustainability and low-carbon living.

Architectural technology is not only about materials, construction process or techniques, but it is also about the humanistic ideas embedded in it. Aesthetic orientations largely influence the direction of technological development. An aesthetic orientation that admires thrift may not directly contribute to the development of energy saving technology, but it would not stimulate excessive construction. A rethink of whether more advanced technology can really bring us a better life is meaningful. There is no lack of such discussion in the history of architecture and probably there would never be a generally agreed answer, but the existing of the question per se is necessary. The critical review that it leads to is important for a more responsible development of technology. Although these historical thoughts together with the arguments that support them may not be accepted for this and that in our modern society, but their potential positive potency should not be hidden on our way of pursuing low carbon living and sustainability.

Endnotes

- ¹ The definition of “sustainable development” is “Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” WCED, U. N., “Our Common Future,” World Commission on Environment and Development Oxford University Press (1987).
- ² “古之良工，不劳其智以为玩好。是故无用之物，守法者不失” from Guan Zi 管子, *Wufu 五辅*, Guan Zi 管子 10 (475–221 BCE).
- ³ “若民有淫行邪性，树为淫词，作为淫巧，以上焰君上而下惑百姓，移国动众，以害民务者，其刑死、流” from *ibid*.
- ⁴ “物致用，必谨其度” from *Konggong Zongbu: Huikao 考工总部·汇考* Vol.4 from He, Qingxian 何庆先, *Zhongguo lidai kaogongdian 中国历代考工典 [Paradigm for craftsmen of past dynasties in China]* (Nanjing: Jiangsu guji chubanshe, 2003).
- ⁵ “毋耗于材” and “毋纵己私” from *ibid*.
- ⁶ “物勒工名，以考其诚” literally means craftsmen should carve their names on their works in order to claim their credit. *Yueling 月令 [Proceedings of government in the different months]*, Li ji 礼记 [The book of rites].
- ⁷ “物勒工名，以考其诚，功有不当，必行其罪” *Tanglv yishu 唐律疏议 [Tang code]*.
- ⁸ “鲁般者，肃州炖煌人，莫详年代，巧侔造化。于凉州造浮图，作木鸢，每击楔三下，乘之以归。无何，其妻有妊，父母诘之，妻具说其故。父后伺得鸢，击楔十余下，遂至吴会。吴人以为妖，遂杀之。般又为木鸢乘之，遂获父尸。怨吴人杀其父，于肃州城南作一木仙人，举手指东南，吴地大旱三年。卜曰：般所为也！赍物具千数谢之。般为断一手，其日吴中大雨。国初，土人尚祈祷其木仙。六国时，公输般亦为木鸢以窥宋城” from Zhang, Wu 张鹭, *Chao ye qian zai 朝野僉载* (Beijing: Zhonghua shuju, 1997 (first written between 618–906 CE)), 153.
- ⁹ Wang Chong was a materialism philosopher in the East Han dynasty.
- ¹⁰ “言巧工为母作木车马，木人御者，机关备具，载母其上，一驱不返，遂失其母” Wang, Chong 王充, *Ruzeng 儒增*, Lunheng 论衡 [Discourse Balanced] 8 (ca. 86 CE). Also see the record of the original text and translation into modern Chinese from Wang, Chong 王充, *Beijing daxue lishixi Lunheng zhuyi xiaozu zhushi 北京大学历史系论衡注释小组注释 [Annotation by the Luheng Annotation Team, Department of History, Peking University]* (Beijing: Zhonghua shuju, 1979), 466.
- ¹¹ “公输子削竹木以为鸢，成而飞之，三日不下。公输子以为至巧”；“子之为鸢也，不若匠之为车辖，须臾刘三寸之木而任五十石之重” from Mo Zi 墨子, *Lu wen 鲁问 [Questions posed about Lu State]*, Mo Zi 墨子 49.
- ¹² “作奇技淫巧，以悦妇人” *Taishi (xia) 泰誓(下) [Great speech (part 3)]*.
- ¹³ “孔颖达 疏：‘奇技谓奇异技能，淫巧谓过度工巧。二者 大同，但技据人身，巧指器物为异耳’” Kong, Yingda 孔颖达, *Kong Yingda Shu 孔颖达疏 [Annotation by Kong Yingda]*.
- ¹⁴ “昔者，圣王之世，服饰有定制，而作奇技淫巧者有诛” from Guan, Tong 管同, *Jinyong yanghuo yi 禁用洋货议 [A proposal to ban imported commodities]* 26 (1780—1831).
- ¹⁵ “不贵异物贱用物了民乃足” from Lvao 旅葵 *[The house of Lv]*.
- ¹⁶ “玩人丧德，玩物丧志” from *ibid*.
- ¹⁷ “今工以巧矣，而民不足于备用者，其悦在玩好” from Guan Zi 管子, *Wufu 五辅*.
- ¹⁸ “淫声谄耳，淫观谄目，耳目之所好谄心，心之所好伤民，民伤而身不危者，未之尝闻也” *ibid*.
- ¹⁹ “其为宫室何以为？冬以圉风寒，基以圉羞雨。凡为宫室加固者，鲜祖不加者去之” quoted from *Jieyong 节用 [Thrift]* in Mo Zi 墨子, *Mo Zi 墨子*. Also see Schwartz's interpretation from Schwartz, Benjamin Isadore, *The World of Thought in Ancient China* (Harvard University Press, 2009), 148–149.
- ²⁰ Li, Chenyang and Perkins, Franklin, *Chinese Metaphysics and Its Problems* (Cambridge University Press, 2015), 17.
- ²¹ *Zhouyi: Xici 易经·系辞 [Classic of changes: the great commentary]*.
- ²² Cheng, Hao 程颢 and Cheng, Yi 程颐, *Er Cheng quanshu 二程全书 [The book of Cheng Hao 程颢 and Cheng Yi 程颐]* (960–1127 CE); Zheng, Guanying 郑观应, *Shengshi weiyan 盛世危言 [Fragile prosperity]* (1893).

²³ “子墨子曰：国有七患。七患者何？城郭沟池不可守而治宫室，一患也”；“民力尽于无用...民无食，则不可事。故食不可不务也，地不可不立也，用不可不节也” from Mo Zi 墨子, *Qi huan* 七患 [Seven types of adversity].

²⁴ “仓廩之所以实者，耕农之本务也，而綦组锦绣刻划为末作者富” from Han, Fei 韩非, *Wudu* 五蠹, Han Feizi 韩非子; “夫明王治国之政，使其商工游食之民少而名卑，以寡趣本务而趋末作” from Han, Fei 韩非, *Guishi* 诡使, Han Feizi 韩非子.

²⁵ Nie, Zhihong 聂志红, *Zhongguo jingji sixiang shi xieyao* 中国经济思想史概要 [History of Chinese economic thought] (Zhongguo minzhu fazhi chubanshe, 2012).

²⁶ A range of policies were observed from the Qin dynasty to the Tang dynasty, such as “zhongben yimo 重本抑末 [developing the essential industries and restraining the minor ones]” and “quanke nongsan 劝课农桑 [encouragement and innovation in agriculture]”. From the Song dynasty to the Qing dynasty, industries relevant to crafts were regarded as inferior. See the historical study of the notion of thrift from Wang, Na 王娜, “Relationship between Modern Technology and Luxury Consumption from the Perspective of Philosophy” (PhD Thesis, Dalian University of Technology, 2013).

²⁷ Zeng guang xian wen 增广贤文 [Enlarged writings of worthies: a collection of Chinese proverbs] (1368–1644 CE), 504.

²⁸ Also see the analysis offered by Tuan, Yi-Fu, *Morality and Imagination: Paradoxes of progress* (Univ of Wisconsin Press, 1989).

²⁹ “是故古者明堂之制，下之润湿弗能及，上之雾露弗能入，四方之风弗能袭；土事不文，木工不斫，金器不镂；衣无隅差之削，冠无觚赢之理；堂大足以周旋理文，静洁足以享上帝、礼鬼神，以示民知俭节” from Liu, An 刘安, ed., *Huainanzi* 淮南子; Liu, An 刘安, “Benjing xun 本经训 [Fundamental norm]”. The translation is based on Major, John S. et al., “The Huainanzi: A Guide to the Theory and Practice of Government in Early Han China,” New York: Columbia University (2010).

³⁰ Liu, An 刘安, “Benjing xun 本经训 [Fundamental norm]”.

³¹ Major, John S. et al., “The Huainanzi: A Guide to the Theory and Practice of Government in Early Han China,” 283.

³² Thomas Aquinas, *Summa Theologiae* (2005); Thomas Aquinas, *Treatise on the Virtues* (University of Notre Dame Press, 1992).

Building Construction and Meaning:

The Origin and the Occupation of Chinese *Tingtang*

Pengfei Ma
University of New South Wales

Abstract

This paper attempts to answer two questions: what was the essential technological feature of Chinese timber structure, and how did it accommodate unique Chinese living? Timber structure, as the dominant traditional structural system, had a long-lasting impact on the entire built environment of pre-modern Chinese history, as well as on that of East Asia and beyond. Although the origin of Chinese timber structure can be traced back to pre-historic times, material describing the technical characteristics of China's timber structural system are very scarce, especially against the background of the vast amount of ancient literature in China. Even in the comprehensive document explaining the Northern Song building standards, Yingzao-fashi (营造法式 State Building Standards), commissioned by the imperial court in 1103 C.E., there was no elaboration on the technical nature and functions of the structural systems installed at the time. However, such knowledge must have been in demand in building practice and shared as widely accepted rules by designers and builders, albeit tacitly. Focusing on a specific structural type, Tingtang (厅堂 hall), this paper explores the features of timber framework based on the unique architectural expression of Yingzao-fashi. The relationship between building types and structural types is then examined through a historical review of the building forms Ting (厅) and Tang (堂). Finally, this research will discuss how parallel space, as the basic spatial form of Chinese architecture, services various urban buildings and living demands.

Timber Framework in Yingzao-fashi

Load-bearing timber framework, a network of interlocking wooden supports forming the skeleton of the building, is considered China's major contribution to architectural technology. For several thousand years timber framework was consistently the dominant structural form of buildings in pre-modern China as well as East Asia, regardless of function and size. Despite its dominant position, very little Chinese

literature considers detailed structural features and construction standards until the Northern Song period (960-1127C.E.). Northern Song dynasty was one of the cultural peaks of pre-modern China, especially in aspects of art and literature, although it has been the smallest regarding land area among all the united empires that established on the vast Central Plains. Its reign extended to the south-eastern coast of China, but in the north, it merely occupied some part of Hebei, Shanxi, Shaanxi and Gansu provinces compared with current geopolitical boundaries of today China. Northern Song dynasty was also an era of administrative sophistication and complex social organisation, leading to disordered management of construction activities. To standardise the state-run construction, a state building standard was enacted by the contemporary central government.

Yingzao-fashi (营造法式 State Building Standard), published by the Northern Song court in 1103 C.E., was an enforceable building standard manual issued for official construction of the entire empire including palaces, religious and office buildings as well as official dwellings. It was compiled by Li Jie 李诫, an imperial superintendent of the Department of Construction. The 1078-page work, consisting of 357 chapters and 3555 clauses, regulated construction procedures, modular systems, and the allocation of materials and labour in official construction launched and organised by the governments, central or regional. To standardise construction and make the regulations practicable, it also listed the typical patterns of various building components and structures, which made it a technical reference as well. *Yingzao-fashi* was a seminal architectural work influencing the contemporary and following construction and architectural development in urban China.

Yingzao-fashi described two major structural types within its text: *Diange* (殿阁 palace) and *Tingtang* (厅堂 hall) and presented many typical patterns of them with illustrations attached.¹ Surprisingly, even this classic architectural work did not elaborate on the technical characteristics, classification, and functions of the timber structural systems. However, Chinese designers and builders must have tacitly understood the features and scope of these structural types, since familiarity with them was in demand in building practice. A possible explanation is that structure selection benefitted from the subconscious knowledge of the construction participants who had both experience and the explicit building instructions firmly in mind. Due to the lack of historical records, we can only guess at the likely process adopted by the construction sector to achieve the structurally sound design.

The formal features of the *Diange* and *Tingtang* can be summarized through illustrations of *Yingzao-fashi*. The magnificent buildings of royalty or divinity, such as halls of the palaces and temples, were normally built in a *Diange* framework, which lent them an air of nobility. *Yingzao-fashi* depicted the typical patterns of the *Diange* framework using illustrations called *dipan* (地盘 floor plan) and *ceyang* (侧样 side

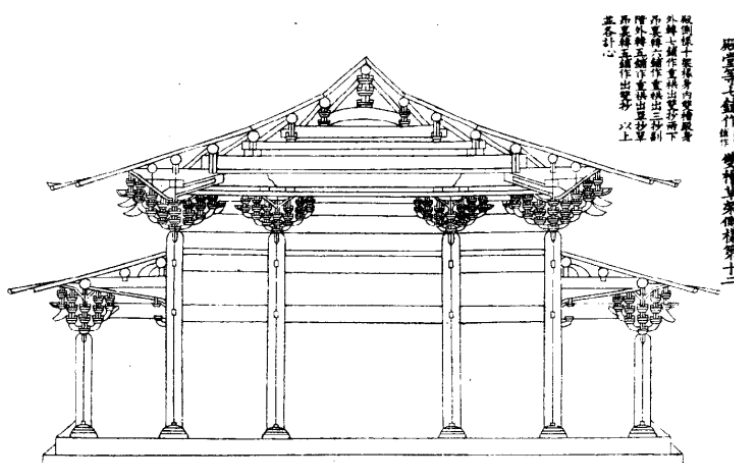


Figure 1. A *Ceyang* illustration of the *Diange* framework (Li Jie, *Yingzao-fashi*, 31 vols, [Beijing: The Commercial Press, 1954], 6).

sample), roughly equivalent to the plan and transverse section of modern architectural drawing respectively (Figure 1).² As the *ceyang* indicates, the *Diange* columns were all at the same height with a set of complicated brackets on each column head. The lowest beam rested on eave and column brackets and ran the full transverse distance. The ceiling was placed under the lowest beam and covered the whole rectangular plan, which enclosed a perfect cuboid space with columns. In contrast to *Diange*, *Tingtang* in *Yingzao-fashi* was introduced by a specific illustration of a transverse timber frame (Figure 2). That image embodied the basic characteristics of *Tingtang*. Columns increase in height from the exterior to the interior and beams are connected at one end to the top of the lower column with the other end inserted into the body of the higher column. There were no ceilings and no beams across the whole transverse dimension in *Tingtang* framework.

Although the *Tingtang* structure is clearly distinguished from *Diange* in the illustrations, the essential distinction between them has been one of the core topics in current scholarship on the structures of *Yingzao-fashi*, largely presented by Chinese scholars. Researchers suggest the prototype of the *Diange* framework may have been a clay-timber building *Tai* (台 terrace), prevalent in the first millennium B.C.E. of China.³ On the other hand, the *Tingtang* framework maintained a close relationship with the *Chuandou* (穿斗 through tenon) construction, a structural form applied widely within the vernacular dwelling houses of South China.⁴ In particular, modern scholar Zhang Shiqing 张十庆 re-classified the structural types of Chinese architecture based on different modes of tectonic thinking and further elaborates the technical features of *Diange* and *Tingtang*. According to his research, *Diange* represented a form produced through the accumulation of building elements vertically, while *Tingtang* referred to a

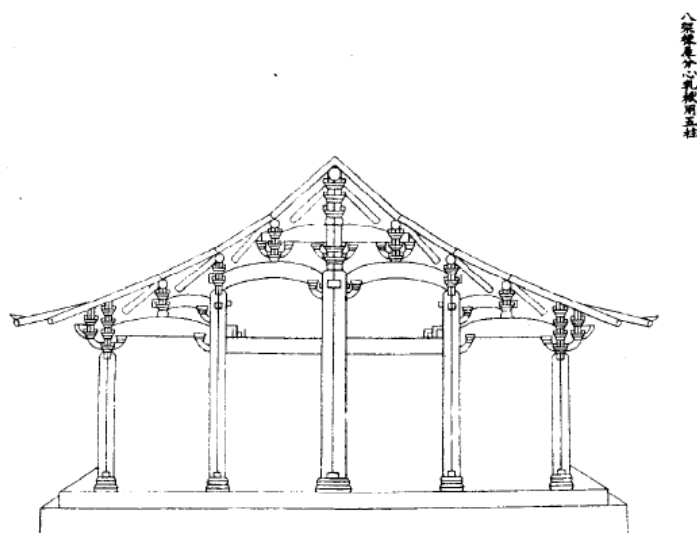


Figure 2. A sample of the transverse frame of *Tingtang* (Li Jie, *Yingzao-fashi*, 31 vols, [Beijing: The Commercial Press, 1954], 11).

structure formed by securing transverse timber frames using purlins and lintels longitudinally (Figure 3).⁵ As for both *Diange* and *Tingtang*, the structures were enclosed by brick or clay walls of what is now called curtain walls, ensuring the structures remains strong against wind and possibly seismic loads. The south wall was usually the only one with windows and entrances. *Diange* and *Tingtang*, as distinct construction tactics, essentially represent two original ways of tectonic thinking about shaping a timber structure and ensuring that it was durable.

Yingzao-fashi is the oldest extant work of literature on Chinese architecture, and modern scholars treat it as a key reference in understanding Chinese construction in a period of great prosperity. Though *Yingzao-fashi* was early introduced to the West

around the 1920s, research on the publication beyond China, especially regarding timber structure types, has been limited over the last three decades.⁶ A reason for this deficiency is that *Yingzao-fashi* has not been translated into a western language, but over the past decade, Chinese academia has enthusiastically embarked on studying the structural system recorded in this treatise. Chinese researchers have devoted much attention to the text and illustrations of *Yingzao-fashi* and contributed to the interpretation of technical terms and formal features of the structures. Uncovering the technical legitimacy of these structures is the primary goal of these researchers. However, the relationship between timber structures, contemporaneous technology, and Chinese modes of life in both family and society, has attracted little attention among scholars.

The *Tingtang* Structure and Architectural Expression

Yingzao-fashi offers eighteen illustrations in its attachment of exemplars of the *Tingtang* framework, all named as ‘the beams and columns between two bays’. If we see these illustrations as drawings of transverse sections of the whole structure, similar to *Ceyang*, it is noteworthy that, compared to *Diange*, *Yingzao-fash* failed to list any *dipan* (floor plan) for *Tingtang*. From a modern architectural viewpoint, it is impossible to identify a structure only with a section or elevation. How did the Chinese builders achieve this? It is probably because that illustration was not merely a kind of elevation or section drawing (which derives from modern architectural expression) but a specific diagram, accepted by builders and artisans at that time, intended to identify the entire structure. Such a diagram reflected the essential feature of the *Tingtang* framework.

A building with a *Tingtang* framework, in essence, was produced by the longitudinal connection of transverse frames. The space between two single timber frames, called *Jian* (间 bay), was normally used as a unit to estimate the building scale in China. The width of a building in the *Tingtang* framework normally depended on the number of bays, which was indicated through the front facade, the main visual focus of a Chinese building. In this case, builders and common people preferred to describe the general scale of a Chinese building by the number of bays provided, for example “a 5-bay building (五间房)”. Meanwhile, building depth and height were established by the dimension of the transverse frames crossing the plan. (Figure 3). Once the designer and builder confirmed how many bays the building would be and what type of transverse frame would be adopted, the massing of the whole structure would be set up in three-dimensions. There was no need to consider the plan layout since this had already been determined by the number of bays and the position of the transverse

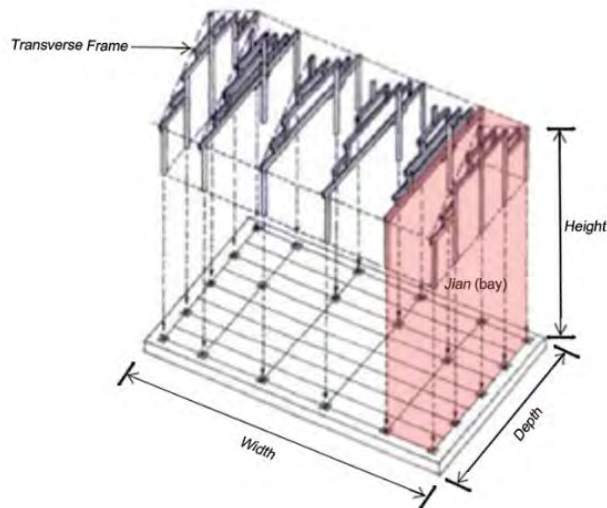


Figure 3. Composition of the *Tingtang* framework
(Drafted by Pengfei Ma).

frames. That explains why *Yingzao-fashi* only offered an image of transverse frames to demonstrate “the beams and columns between two bays”. This kind of expression fully matched the *Tingtang* framework and was likely to be the most rational way to guide construction. Because, at a technical level, construction practitioners only needed to refer to the types of transverse frames already depicted in the *Yingzao-fashi* illustrations if they understood the scale and function of the structure they intended to build.

Yet, how did builders understand the scale and function of a building within *Tingtang* style before construction? In imperial China, this was never a subject that builders needed to consider, for imperial laws provided rigorous regulations for the scale and style of various buildings based on the hierarchy of the empire. For instance, in the Tang and Song dynasties, there were nine grades of officials, and diverse regulations were issued to define the building form and scale of offices and dwellings for officials in different grades. *Tang Huiyao* (唐会要 the historical records of the national regulatory framework of the Tang dynasty) provided for the relevant clauses of *Yingshanling* (营缮令 the law of construction and repair) in Tang dynasty:

The width of mansion buildings for officials above fifth grade was not allowed to be over five bays, and that for officials under sixth grade was not allowed to be over three bays ”⁷.

The law of construction and repair prevailing in the subsequent Song dynasty followed these Tang dynasty provisions without any change.

Yingzao-fashi, as the imperial building standard of the Song dynasty also prescribes the scope of *Tingtang* technically. The standard uses *Caifen* (材分), a modular system for all dimensional measurements in structural carpentry, to control the proportion of the overall building and its major components. *Caifen* presented a set of basic units ranging from high grade to low reflecting the size and importance of corresponding buildings. Each is a combinational dimension of length and width for the rectangular cross-section of an eave bracket component *Huagong* (华拱). That dimension is the basic modular unit. All dimensions in the carpentry of the structure relate to the basic unit, thus controlling overall dimensions and proportion of the structure.

Eight grades for the basic units were applied to the buildings in different classes representing different occupants in the Song dynasty. Given the text of *Yingzao-fashi*, the basic units of the first and second grade were used for important palace or temple halls of royalty and divinity. Normally they had eleven, nine or seven bays, while the basic units from the third to seventh grade were for official mansions or ordinary official buildings with seven, five or three bays. The *Tingtang* framework was the structural type used only for buildings with basic units from the third to seventh grade, whereas structures with basic units of the first and second grade had to be built with the *Diange* framework.

Following these explicit regulations for building function and scale, builders could identify a *Tingtang* structure easily under the guidance of *Yingzao-fashi*. *Tingtang*, if less important than *Diange*, had wider applicability and flexibility to satisfy the varying needs of living, both for society and family. Throughout the Song dynasty and subsequently, *Tingtang* was broadly adopted as the major structural form of urban buildings, especially offices and official dwellings. Indeed, the name *Tingtang* expresses its two inherent building types, each assuming significant roles in Chinese pre-modern habitation: *Ting* and *Tang*.

Ting and Tang

Due to the dearth of knowledge of the roots of Chinese architecture, the Chinese architectural concepts *Ting* and *Tang* have generally both been rendered as “hall” or “mansion” in most English literature referring to them, thereby losing the unique and

specific original meanings. The introductory chapter of *Yingzao-fashi* discussed the meaning of *Tang* by quoting ancient documents, *Shuowe* (说文 explaining characters) and *Shiming* (释名 interpreting names), but these interpretations for *Tang* were too simple to illustrate the profound meaning of *Tang* within Chinese culture.⁸ *Yingzao-fashi* did not offer any interpretation for *Ting*, while some other contemporary literature did.⁹ The original semantic meaning of the Chinese word *Ting* was listening; it later became an architectural concept when referring to a one-storey building for administrative officials to handle governmental affairs

The earliest architectural mention of *Tang* dates back to the Zhou dynasty (1044-256 B.C.E.). The Chinese classic text about social behaviour and ceremonial ritual in Zhou dynasty, *Yili* (仪礼 etiquette and ceremony), presented two meanings of *Tang* at that

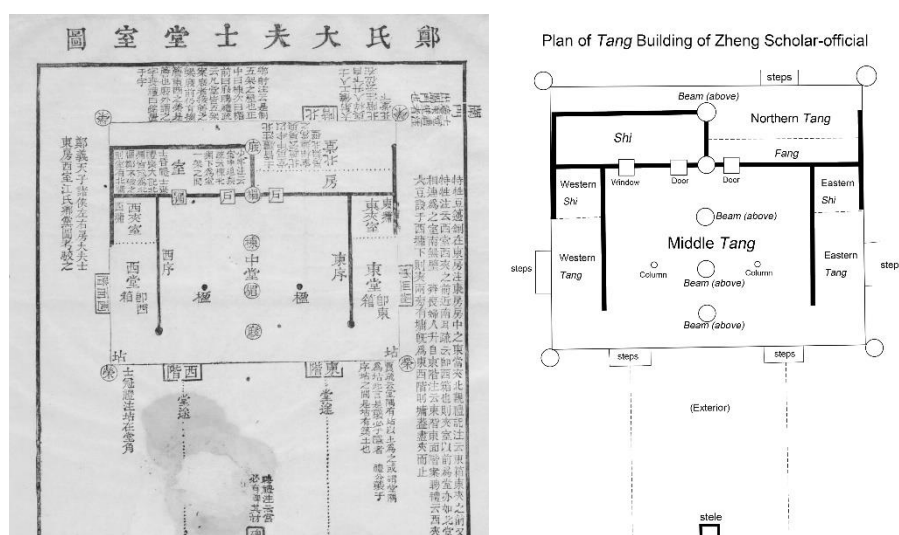


Figure 4. Internal layout of a Tang building of scholar-officials during Zhou dynasty from *Liyitu* (礼仪图, Etiquette) by Zhang Huiyan in Qing dynasty, English translation by Pengfei Ma (National Diet Library, Tokyo).

time. First, the main structure of a building complex either for official residences or public activities, like temples and schools, was called *Tang*. Specifically, the *Tang* building in the plan was normally divided into two sections: the front was an open space, and the rear consisted of enclosed spaces known as *Shi* (室 bedroom) and *Fang* (房 ordinary room) for living and storage respectively (Figure 4). Apart from being the name given to the whole building, Tang, secondly, was also the name of the open space front section, and there could be more than one *Tang* space in a *Tang* building. The open space of *Tang* in dwellings was for private conversation and important family rites like weddings and funerals, while for public institutions it functioned as a common meeting

area and for ceremonies. In the following Han dynasty, the configuration of the *Tang* building for official dwellings remained as that in the earlier Zhou dynasty, but some senior officials and nobilities started to build another independent *Tang* building as a place to handle their official business. This was called exterior *Tang* and possessed the same spatial configuration as the original interior *Tang* for family living. The two *Tang* buildings in one dwelling were separated by a door, *Zhongmeng* (中门 middle gate) to form two yards front and back.

Ting as an architectural type emerged much later than *Tang* and assumed a different role from *Tang* in Chinese habitation. According to the historical literature of the Weijin period (220-420C.E.) *Ting* was not only the office building for administrative officials to handle governmental affairs but also the main building of some officials' dwellings. For instance, the *Weishu* (魏书 historical record of the Wei dynasty) describes a *Ting* building well-known in Taiyuan county. It was built by Wang Chun 王椿, the local governor famous for his professional skills in construction, and his *Ting* building functioned as the main structure of his mansion. Residents were so impressed by the grandeur of the structure that they called Chun's mansion 'the King' mansion of *Taiyuan*.¹⁰

From the Tang dynasty (618-907 C.E.) forward, the residential and office buildings of incumbent officials tended to merge into cases known as *Yazhai* (衙宅 office dwelling). Though *Yazhai* was a combined building complex, its settings for working and living incorporated separate courtyards linked only by doors. Some records of the historical literature of the time, for example, a story from *Jiu Tangshu* (旧唐书 the early historical record of the Tang dynasty) is evidence of the separation:

The senior general Gao Xianzhi 高仙芝 as well as the governor of *Anxi* district, often nominated his assistant general Feng Changqing 封常清 to govern and defend their administrative region when he went out to battle. Another general, Zheng Dequan 郑德詮, the son of Xianzhi's foster-nurse, maintained brotherly relationships with Xianzhi. Therefore, Dequan regarded Changqing as his servant and usually despised him. Once, when Changqing returned to the government office, following the lead of other generals, Dequan rode a horse in front of them in order to show contempt for Changqing. When Changqing arrived at the *Ting* of the government office, he immediately ordered his men to bring Dequan, who was in the governor

Xianzhi's dwelling at that time, to see him clandestinely. The *Ting* building (where Changqing arrived) was connected to the dwelling courtyards. After Dequan went through several doors and reached the *Ting*, Changqing ordered his men to close these doors, isolating the *Ting* from the dwelling courtyards.¹¹

In addition, the clauses of the Tang dynasty *Yingshanling* (营缮令 the law of construction and repair), specific to the official dwellings, only stipulated the rules for the construction of *Tang* and lacked instructions for *Ting*. That means *Ting* was not adopted as the building of official dwellings, indicating the rigorous distinction between offices and dwellings in the Tang dynasty. Also, there is insufficient evidence to confirm that *Ting* had been a building for dwellings of common people at that time.

Ting came to be recorded as a building serving common family living from the following Song dynasty (960 - 1279 C.E.). *Ting*, at that time, was not only built within official *Yazhai* but also within common people's dwellings. *Simashi Shuyi* (司马氏书仪 ceremonial of *Sima*) and *Zhuzi Jiali* (朱子家礼 family etiquette of *Zhuzi*) are two classics of family etiquette and ceremony, compiled respectively by the well-known Confucian scholars of the Song dynasty, Sima Guang 司马光 and Zhu Xi 朱熹. Both books specify the ideal configuration of Chinese resident courtyards.¹² The main buildings are positioned along the middle axis of the courtyards. From external to internal, in order are the entrance gate, *Ting*, middle gate, middle *Tang* and the bedroom. The order is quite similar to that found in the Han dynasty mentioned above, but a *Ting* building displaced the exterior *Tang* building of Han. For office dwellings, some local chronicles of the Song dynasty presented more a detailed configuration of *Yazhai* through illustrations (Figure 5). There was only one main *Ting* located in the central front yard, connected to the rear *Tang* buildings by corridors, while there could be several *Tang* buildings at the back and side yards. Doors or corridors were used to link the *Ting* and the courtyard walls on both sides. Because of the requirements of etiquette, *Ting* was the main building, functioning as a meeting room for guests or officials and handling

government business. In contrast, *Tang* at the rear was mixed with gardens and living rooms to support private family conversation and daily leisure.

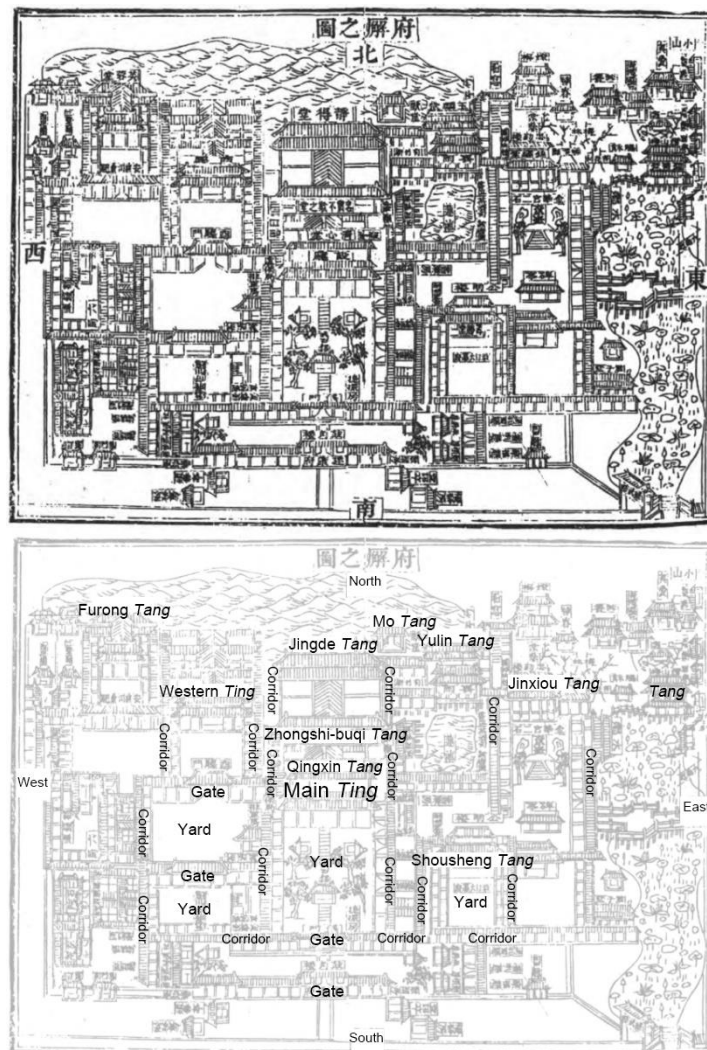


Figure 5. Plan of a Song Yazhai from *Jingding-Jiankangzhi* (景定建康志 local chronicle of Jiankang), by Zhou Yinghe in the Southern Song dynasty, English translation by Pengfei Ma (Guo Daiheng, *The Ancient Chinese Architectural History*, 3 vols, [Beijing: China Building Industry Press, 2003], 616).

Overall, *Ting* and *Tang*, albeit a close nexus in Chinese dwellings, were two building types for different functions until the Song dynasty. *Ting* was mainly the building for social communication and government business, while *Tang* accommodated family living and rituals. In naming the timber framework *Tingtang*, the compiler of *Yingzao-fashi* seemingly attempted to establish a corresponding relationship between building types and structural types, notwithstanding not presented as a strict regulation. As a state standard for official construction, the treatise failed to standardise vernacular dwellings, but the *Tingtang* framework was also widely applied in the building *Ting* and

Tang of common people with strict limitation for the use of eave brackets and the number of *Jian* (间 bay) of their buildings. In fact, *Ting* and *Tang* of both officials and common people gradually merged into one building to carry both society and clan living during the following Ming dynasty (1368-1644 C.E.) and Qing dynasty (1644-1912 C.E.). As the core buildings of Chinese dwellings and government offices, *Ting* and *Tang* were simply the architectural representatives of Chinese inhabitation. Hence, how did the structural type *Tingtang* bear such plentiful and complicated meanings that had been evolved for several thousand years?

Parallel Space and Chinese habitation

The unique spatial organisation of *Tingtang* fostered identifiably Chinese modes of life through the building of *Ting* and *Tang*. The timber structure was the cardinal element forming the space and volume of Chinese buildings, and to a large extent, determined their internal spatial configuration. The basic measuring unit of building scale, *Jian*, in *Tingtang* was fundamentally the space between two transverse frames. (Figure 3) The tectonic tactic underlying the *Tingtang* framework, the longitudinal connection of transverse frames, produced a series of homogeneous parallel spaces, or bays, defined by transverse frames. A typical Chinese *Ting* or *Tang* for common people was of three to five bays, while the significant buildings of royal palaces or temples could be of nine or eleven bays. Parallel spaces were the essence of the spatial features matching the specific functions of Chinese living.

However, it is evident that the simple parallel relationship was inadequate for accommodating the varied nature of Chinese living. Parallel spaces were of the same depth and height, and only their width could fluctuate. These properties limited the utility of simple parallel spaces, but Chinese builders enriched their extension to make them sufficiently flexible. The combination, rotation, and conversion of parallel spaces, according to the practical demands of construction, were to enable much complex and subtle spatial configuration in Chinese buildings. In addition to single buildings, even the classical Chinese courtyard, the basic pattern of Chinese residence, may be considered a logical extension of *Tingtang*, for the peripheral buildings enclosing the courtyard were all with the *Tingtang* framework.

To illustrate with a case, *Sanshan Villa* (三山别业) was the dwelling of Lu You 陆游 (1125–1209) the preeminent poet of the Southern Song dynasty. The main living area was roughly located in a building in the centre of a large landscaped garden. The main building, with a plan in the form of \perp , was a typical set of parallel spaces (Figure 6). There was a five-bay structure placed in the front, while the bay in the middle was the *Tang* space. Three parallel bays were perpendicular to the front five parallel bays, connecting to the rear of the *Tang* space. According to Lu You's own writing, the three-

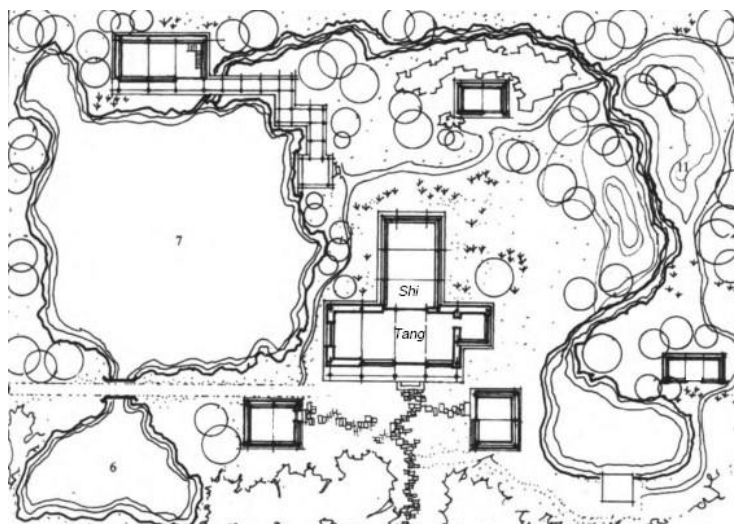


Figure 6. Plan of Sanshan Villa
(Guo Daiheng, *The Ancient Chinese Architectural History*,
3 vols, [Beijing: China Building Industry Press, 2003], 618).

bay structure linking to the *Tang* was the *Shi* (室 bedroom) for living and sleeping, while *Tang* was the place to meet for the purpose of a private conversation with guests.¹³ The door at the front facade of *Tang* was the main entrance door of the building, and another small door connected the *Tang* and *Shi* spaces. In winter, the small door would be the entrance door of the *Shi* and usually closed to keep the *Shi* warm, thus separating *Tang* and *Shi* into two independent spaces. In the hot summer, the small door would be removed to encourage ventilation from the main entrance door to penetrate throughout the entire *Tang* and *Shi*. In this case, the *Tang* would merge with *Shi* into an integrated space. A noteworthy room was the end space of the right-hand side of the five-bay space. Its front wall recessed some distance, making the room much smaller than the other rooms. The summer sunlight would be blocked by the side wall of the room to the left, so Lu You called the small room a fine place for a summer respite.¹⁴

The main building of the *Sanshan Villa* exemplifies the flexibility of the parallel spaces, but it was not a unique case. In fact, the plan forms of 丁, 上, and even 工 were pervasive in the Song dynasty. The painting *Qiangli-jiangshantu* (千里江山图 Thousand Miles of Rivers and Mountains), was a masterpiece work of Wang Ximeng 王孟希, one of the most renowned court painters of the Northern Song period. The various dwellings depicted in this painting reflected the versatility generated by the combination, rotation, and conversion of parallel spaces. Although there is no evidence to prove that the dwellings depicted were identical to those in reality, their basic layout and form probably approximate that of real dwellings.

A typical family building of the Ming dynasty, the main building in a Chinese courtyard, also embodied the classic of parallel spaces for Chinese living. Within the five-bay structure the centre room *Tang*, as the most important space, was the place for ancestor ritual and family conversation. The two rooms adjacent to *Tang* were for daily living and family recreation, while the outermost rooms were bedrooms, treated as the least important spaces. From the Ming dynasty forward, it is arguable that a rectangular courtyard enclosed by *Tingtang* structures started to become the dominant form of Chinese dwellings until modern China. A typical courtyard, the historical type of Chinese residence, was also a building complex of parallel spaces.

Conclusion

In *Tingtang* Chinese builders created a structural type, which was highly appropriate for meeting imperial construction standards and supporting diverse living demands. Throughout imperial history, *Ting* and *Tang* were the core buildings of Chinese dwellings and government offices and for organising daily family and social living. The parallel spaces produced by the *Tingtang* framework, which could be combined into several complex configurations, constituted the fundamental spatial form of Chinese dwellings, office buildings and courtyards. It is their flexibility that has endowed the timber structure with an incredible vitality which underpinned Chinese habitation for millennia.

Endnotes

¹ In enumerating structure types, some scholars claim that *Yingzao-fashi* discussed four types in its text, *Diange*, *Tingtang*, *Yuwu* (余屋 remaining room), and *Tingxie* (亭榭 pavilion), see Guo Qinghua, 'Yingzao Fashi: Twelfth-Century Chinese Building Manual', *Architectural History*, 41 vols (1998), 1-13. However, according to the recent study of Zhu Yongchun 朱永春, *Yuwu* was not a structure type; see Zhu Yongchun, 'Retrospection on *Diantang*, *Tingtang*

and Yuwu in *Yingzao-fashi* (关于《营造法式》中殿堂、厅堂与余屋几个问题的思辨)', *Architectural History* (建筑史), 2 (2016), 82-89. *Tingxie* was a simple type of structure for landscape, and there were few illustrations for it in *Yingzao-fashi*. In summary, the main structure types for common buildings were *Diange* and *Tingtang*.

² Distinct from modern plan drawings, *Dipan* more precisely performed as illustration to denote inner structural arrangements including the position of column brackets and beams.

³ Zhou Xueying 周学鹰, 'Study on building technology of the Terrace in the Han dynasty (汉代高台建筑技术研究)', *Archaeology and Cultural Relics* (考古与文物), 4 (2006), 71.

⁴ Zhang Shiqin 张十庆, 'Scrutinise the traditional structural types and their evolution from tectonic thinking (从建构思维看古代建筑结构类型与演化)', *Architect* (建筑师), 4 (2007), 170.

⁵ Zhang, 'Scrutinise the traditional structural types and their evolution from tectonic thinking', 168-171.

⁶ W. Perceval Yetts, "A Chinese Treatise on Architecture", *the Bulletin of the school of Oriental Studies*, 4 vols, No. 3 (London Institutions, 1927), 473-492, and Demieville Paul, "Che-yin Song Li Ming-tchong Ying tsao fa che (石印宋李明仲营造法式)", *Bulletin, Ecole Francaise d'Extreme Orient*, 25 vols, No. 1/2 (1925), 213-264.

⁷ Wang Bo 王溥 [Song], *Tanghuiyao* (唐会要), (Beijing: Zhonghua Book Company, 2017).

⁸ Li Jie 李诫 [Song], *Yingzao-fashi*, 1 vols, (Beijing: The Commercial Press, 1954).

⁹ Song Qi 宋祁 [Song], Zheng Jian 郑戡 [Song], Zhao Zhenduo 赵振铎 (eds.), *Ji Yun* (集韵), (Shanghai: Shanghai Lexicographical Publishing House, 2013).

¹⁰ Wei Shou 魏收 [Qi], *Wei Shu* 魏书, (Beijing: Zhonghua Book Company, 1997).

¹¹ Zhao Ying 赵莹 [Jin], *Jiu Tang Shu* 旧唐书, (Beijing: Zhonghua Book Company, 1975).

¹² Sima Guang 司马光 [Song], *Simashishuyi* (司马氏书仪), (Beijing: The Commercial Press, 1936), and Zhu Xi 朱熹 [Song], "jiali (家礼)", *Zhuzi-quanshu* (朱子全书), (Shanghai: Shanghai Guji Press and Hefei: Anhui Education Press, 2002).

¹³ Lu You 陆游 [Song], "Jushiji (居室记)", *Luyou-quanji-jiaozhu* (陆游全集校注), (Nanjing: Zhejiang Education Press, 2011).

¹⁴ Lu You 陆游 [Song], "Dongpian-xiaoshi-quri-zuiyuan-meitaoshuzhidi-xizuowuzi (东偏小室去日最远每逃暑之地戏作五字)", *Luyou-quanji-jiaozhu* (陆游全集校注), (Nanjing: Zhejiang Education Press, 2011).

Concrete Complexities: Reinforced Concrete in the Architecture of Auckland's Town Hall, Chief Post Office and Ferry Building

Milica Madanovic
University of Auckland

Abstract

Economic prosperity and the changed political circumstances resulted in increased building activity in the pre-First World War New Zealand. Auckland, the country's largest city, was not an exemption. Queen Street, the main civic and mercantile axis of New Zealand's capital of commerce, acquired three new landmark buildings, constructed simultaneously between the years 1909 and 1912. The three buildings – Auckland's Town Hall, Chief Post Office, and Ferry Building – still remain important historic monuments of Central Auckland. Focusing on the materiality of the three buildings, this paper contributes to the study of early history of reinforced concrete in New Zealand. The relations between the innovative structural material and historicist architectural language of the three Queen Street buildings are discussed in context of the early 20th century socio-political and cultural circumstances. The paper demonstrates that there was no tension between the use of cutting edge construction technology for the structure and the Edwardian Baroque for the architectural envelopes of the three buildings. In fact, both the materiality and the architectural language were considered to be indicative of the development the city and the country were undergoing.

Introduction

The early 20th century marked a golden period in New Zealand history. The country's economy was recovering from the 1880s and 1890s depression; the socio-cultural matrix was transforming as the old towns were growing; the transition of New Zealand from a colony into a dominion altered the political climate. Auckland, New Zealand's Queen City, was not untouched by the changes. "Progress", "development", and "prosperity" were the period's leitmotifs, colouring every aspect of the city life. A stronger economy, the development of public institutions, and an increased population influenced growth in the construction industry.

The erection of numerous buildings transformed central Auckland into a large construction site in the first two decades of the 20th century. The majority of the new structures were constructed of stone and brick, with limited use of reinforced concrete. Though at the first decades of the

20th century reinforced concrete was used only partially – mostly in the construction of foundations, floors and stairs – the innovative material was a popular topic, widely discussed in lay and professional circles. The early employment of reinforced concrete was well documented by the press and interpreted as a sign of progress and prosperity. However, in spite of the increased interest in new building technologies, the architectural language of the newly erected structures remained confined to the 19th century practices of historicism. Combinations of past architectural styles continued to dominate the urban scenery of Auckland.

Queen Street, Auckland's commercial thoroughway, acquired three landmark buildings between the years 1909 and 1912. The Town Hall, the Chief Post Office and the Ferry Building to this day remain historic landmarks of the city centre, and can be seen as examples of broader early 20th century construction practices. The large-scale construction projects in Auckland attracted extensive press coverage in the first decades of the 20th century. The Town Hall and the Ferry Building were celebrated as symbols of civic pride, and the Chief Post Office as a testimony to national progress.¹ Henry L. Wade, the president of the Auckland district branch of the New Zealand Institute of Architects, noted the significance of the three buildings and of reinforced concrete, in an interview in 1911:

It is pleasing to note that the Government and the municipal authorities are waking up to the fact that it is high time more importance and character were attached to design, and the materials used in the construction of our public buildings... Of such structures, three buildings now nearing completion in Auckland might be mentioned, the new Chief Post Office, the Town Hall, and the Harbour Board's new Ferry buildings, all of which are constructed of stone, brick, and reinforced concrete. The latter material will doubtless play an important part in our building programme of the future...²

Conservation and renovation projects, conducted since the 1980s, classified the three structures as unreinforced masonry buildings.³ In contrast, the early 20th century press advertised them as both earthquake- and fire-proof edifices, due to the structural application of ferro-concrete. This paper explores the extent to which reinforced concrete was used in each of the three edifices. How did period commentators align the historicist architectural language of the buildings and the introduction of the technologically advanced new material? The paper shows that in fact both the language and the materiality were associated with the confidence and progress of the Edwardian period.

Edwardian Landmarks of “Progressive Auckland”: Architectural Style as an Expression of Contemporary Circumstances

Distinctive features of Auckland’s central cityscape and valuable historic monuments, the Town Hall, the Chief Post Office, and the Ferry Building have been well documented in New Zealand architectural historiography.⁴ Prevalently focused on their stylistic qualities, the researchers placed the buildings amongst the country’s most successful achievements of Imperial Baroque architecture. Unlike these earlier texts, this paper is focused on the materiality of the three Queen Street structures. The relations between the new structural material and architectural language of the buildings are discussed in the context of broader historic conditions. Furthermore, based on the study of period sources, the paper proposes that the three buildings should be considered together. Documenting the general attitude that public buildings were a suitable expression of socio-economic and political conditions, the early 20th century press singled the three edifices out as the three most significant construction projects in Auckland.

The future direction of New Zealand towns and cities rapidly gained traction at the turn of the century. The development of Auckland was closely related to the concurrent building programme, described by the press as a “practical illustration of the steady progress” the city was making.⁵ “Building reports” on the new structures erected across the city were published regularly. The “handsome shapes” and the structural qualities of the new buildings were widely discussed. These articles traced the latest architectural stylistic trends and the use of innovative building technologies, perceiving them as an expression of up-to-date quality and progress.⁶ The new buildings were interpreted as symbols of the city’s bright future and were a matter of great public interest. They were considered to be a reflection, or better yet, proof of the betterment the city – and the country – were experiencing. The buildings’ patrons – the Auckland municipal authorities in the cases of the Town Hall and the Ferry Building; the New Zealand Government for the Chief Post Office – were determined to create durable architectural pieces, expressive of contemporary circumstances, and suitable for generations to come. To do so, two strategies were implemented.

First, the architectural language found to be the most suitable for the patron’s intentions was chosen. Period sources documented the importance placed on the fact that the three buildings were shaped in the latest fashion – the style often referred to as the “English”, “modern” or “free interpretation” of the Renaissance. Popular throughout the British Empire and based on the long line of culturally legitimised precedents, Edwardian Baroque was considered as the most appropriate style for important public buildings. Furthermore, prominent overseas architectural solutions were used as a source of formal inspiration.

The New Zealand Governor himself, the Right Honourable Lord Islington, noted at the opening ceremony of the Auckland's Town Hall in 1911 that "an adequate and appropriate building should be provided for those who are selected by their fellow citizens to control and administer that service."⁷ The Governor's opinion was that such a building should be central in situation, spacious in dimensions, and dignified in appearance. John and Edward Clark, the Melbourne architects who won the design competition for the new Auckland Town Hall, aspired to those architectural qualities.⁸ Though their solution was not unanimously welcomed by the Auckland public and a few loud voices rose against it,⁹ it was generally agreed that the building was a "true sign and symbol of Auckland's arrival at full municipal maturity."¹⁰ On the other hand, a connection to Britain was made obvious by the similarity to the Lambeth Town Hall, built in London in 1908. Both buildings were constructed on a triangular site, in the style of Edwardian Baroque. Facades of Auckland Town Hall were modelled unpretentiously, with a moderate application of architectural ornament. Slender Ionic pilasters and columns create the rhythm of the long horizontal facades. The building's corner is accentuated with an elliptical apex. Radiating institutional significance of the structure, the apex is surmounted by a tall clock tower – a traditional symbol of civic prosperity, capped with a cupola. Combining council administration and public entertainment, the building's interior was divided between offices at the front, and two large public halls at the rear.

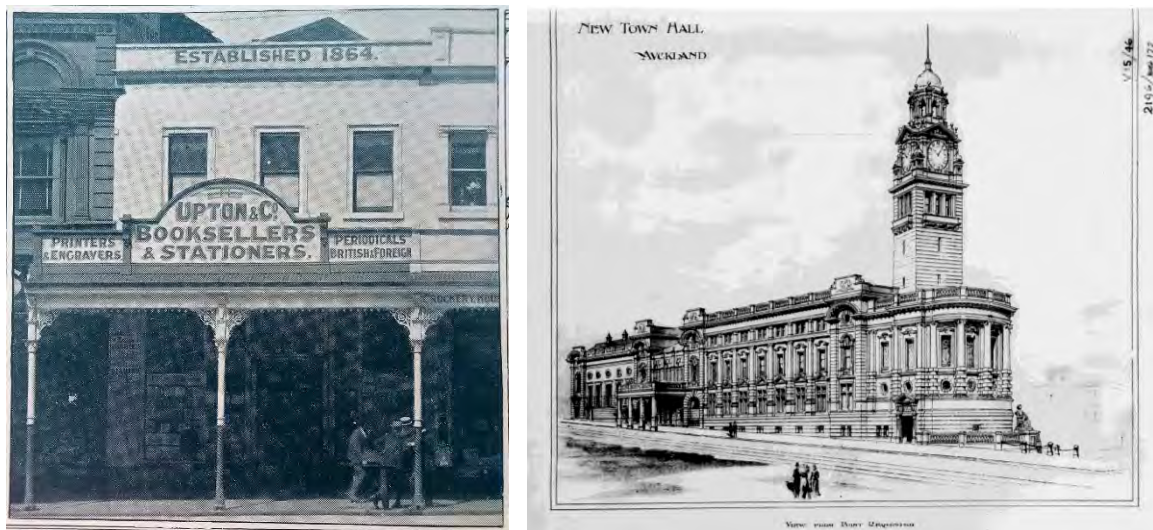


Figure 1. Left: The First Municipal Offices in Upton & Coy's Shop, Queen Street (Auckland Council Archives, ACC 398 Publications 1903-1908, Record No. 400048); Right: New Town Hall (Auckland Council Archives, AKC 033 City Engineers Work Plans Aperture Cards 1872-1993, Record. No. 2196-172).

Another landmark of civic pride and Auckland's self-confidence, the Ferry Building was the first major historic structure a visitor would notice approaching Auckland by sea.¹¹ One of the

most imposing port buildings in New Zealand, it was designed by the architect Alexander Wiseman, and built between 1909 and 1912.¹² Celebrating Auckland's status as the country's biggest and busiest port, the ornate Imperial Baroque structure was erected by the city's Harbour Board, as a part of the costly reorganisation of the docks. Highlighting that "at no point is the progress of Auckland more in evidence than along the waterfront," an article published in 1911, maintained that the Ferry Building was one of its "most striking improvements."¹³ The monumental design was a testimony of the city's aspirations to become one of the leading Southern Hemisphere ports. The warm colour palette remains an appealing design feature, uncharacteristic for other Edwardian buildings of the period constructed in Auckland.



Figure 2. Proposed Ferry Building for the Auckland Harbour Board (Auckland Council Archives, ACC 015, Record No. 3194-5).

Contributing to the hub of the city's transport and communication systems, Auckland Chief Post Office was built in close proximity to the Ferry Building, at the foot of Queen Street. Designed by the Government architect John Campbell, and Claude Paton, it was constructed 1909-1912.¹⁴ The imposing Edwardian Baroque edifice reflected the significance of the postal service as a Government network for public welfare. Described as "a milestone in the progress of the city,"¹⁵ the Chief Post Office was a sister building with the one constructed concurrently in Wellington. Both buildings were stylistically, as well as structurally, related to Sir Henry Tanner's General Post Office in London.¹⁶ The similarities with the London example were proudly acknowledged at the opening ceremony of the Auckland Post Office.¹⁷



Figure 3. General Post Office, 1912. (Auckland Star: Negatives. Ref: 1/1-002894-G. Alexander Turnbull Library, Wellington, New Zealand. [/records/23210653](#)).

Innovative Building Technologies in the Service of Progress: Reinforced Concrete in the Auckland Town Hall, the Chief Post Office, and the Ferry Building in Auckland

The second strategy used in “building for the future” – the construction of important public architectural monuments – was the employment of cutting-edge building technologies, and making certain the public was well informed about this effort. At this stage, in the years before the First World War, the use of reinforced concrete was not yet as developed as it would be in the years to come. It was partly applied in the construction of buildings, mostly for the foundations, floors and stairs. However, its employment was always publicly advertised, and directly associated with the notion of progressive and prosperous Auckland.

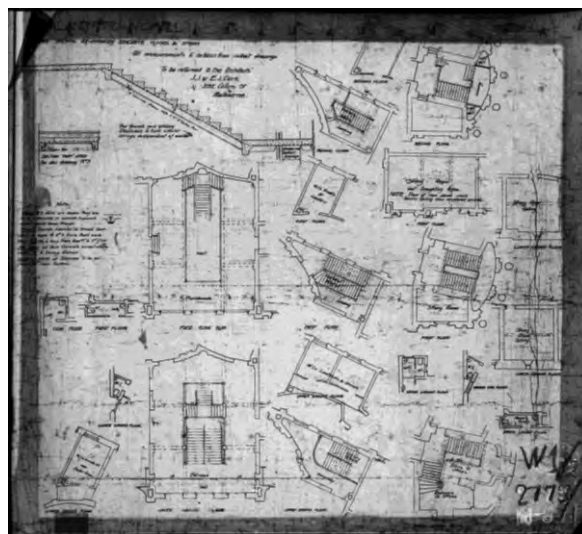


Figure 4. Auckland Town Hall: Drawing Showing Reinforced Concrete Floors and Stairs. Detail No. 9 (Auckland Council Archives, AKC 033 City Engineers Works Plans Aperture Cards 1782-1993, Record No. 2773-1).

The structure of the three Queen Street landmarks attracted a great deal of public attention in the early 20th century. However, though the period sources stressed the structural use of reinforced concrete, the Auckland City Town Hall, the Chief Post Office, and the Ferry Building were mostly constructed of unreinforced masonry. In fact, in the structure of the Town Hall building, reinforced concrete was used only in the construction of the Queen Street retaining wall, the floors and the stairs.¹⁸ In contrast, an article published after the winning design was selected highlighted that “a fine structure was proposed,” with fireproof elements of reinforced concrete.¹⁹ Both the lengthy study of the new Town Hall building, published in the May 1909 issue of *Progress*, as well as the booklet published two years later for the opening ceremony, praised the arrangement of the building’s reinforced concrete foundations. They described this as a special feature of the construction, and stressed that the method of piers and beams, reinforced with Kahn steel bars, had previously been used by the architects in several important buildings in Australia.²⁰ Similarly, a report on “buildings in progress” noted that the Ferry Building stood on a foundation of ferro-concrete piles and that all the floors were laid down in the same material, “rendering the building practically fireproof.”²¹ The Chief Post Office in Auckland was built upon 260 reinforced concrete piles. The material was also used for the floor of the ground floor and for the roof structure. A period source concluded that “the building will thereby be greatly strengthened, and rendered immune from the threat of fire from either the basement or the floor.”²²

Encapsulating the extent of public interest in the matter, a period source noted that, ever since the use of reinforced concrete was first proposed by engineers for the construction of Auckland wharves, “it is improbable that any other subject has been more generally a topic for discussion and controversy on the part for both press and public.”²³ Why was reinforced concrete such a popular topic in the early 20th century New Zealand?

In his major and so far unsurpassed study, Geoffrey Thornton demonstrates the long history of concrete construction in New Zealand.²⁴ Earlier positive experiences with unreinforced concrete set the stage for the introduction and acceptance of reinforcing. Cultural, socio-economic and political circumstances of the period also played an important role in the acceptance of the new material. In the atmosphere of the growing self-confidence and national pride, the impetus to look forward, to celebrate the future, permeated everyday experience. New Zealanders heeded the raucous call of the Machine Age. Latest inventions remained a popular topic in the first decades of the 20th century; new technologies were eagerly employed

and broadly advertised. Ferro-concrete was praised for its innovativeness, advertised as “the modern *iron-stone* – a material which promises a revolution in building schemes.”²⁵ An article from 1908, published in the *Auckland Star* newspapers, proclaimed that “wood, like the stone axe, has had its day, and as far as huge constructions are concerned, we are largely entering into the cement age.”²⁶

Furthermore, New Zealand prosperity and civic and national pride needed to be plastically expressed. And what better way to do so than to build? Grand public buildings were erected prior to the First World War, giving the historical circumstances empirically observable forms. However, all that building activity came at a price. In the good Protestant tradition of frugality, employing a cost-effective, earthquake- and fire-proof, durable material was the most obvious choice. Furthermore, the international context was relevant for the development of New Zealand national identity. Reinforced concrete was promoted through its association with state of the art construction overseas. Pride was taken in the fact that, remote as it was, New Zealand kept pace with the world.²⁷ On the other hand, connections with Imperialism and another important precondition of political legitimacy – the civilizational demand for longevity – were expressed through frequent comparisons with the building practice of Ancient Rome. For instance, the Wellington architect, James O’Dea, maintained that reinforced concrete will soon supersede all other building materials, “for not alone is it fireproof and earthquake-proof, but its age is as unlimited as that of the aqueducts and bridges built by Rome when she was mistress of the world.”²⁸

The media actively contributed to the wider popularisation of the new material. An article published in 1907 informed the public that ferro-concrete, reinforced, or armoured concrete, “which are one and the same thing under different appellations, has come to take its place amongst the leading methods and materials adopted in structural works in New Zealand.”²⁹ The information was sometimes articulated in terms that would be easily understood by any lay person. For example, the structure of reinforced concrete was explained as a “happy combination” that “may be compared to a marriage of two dissimilar but complementary natures, like our old friend Jack Sprat and his wife.”³⁰ Similarly, a report on the first annual dinner of the Ferro-concrete Company of Australasia was spiced with trivia: “the cartes du menu were whimsically designed to represent a skeleton ferro erection, enclosing a list of courses whose names, in conformity with the general concept, were... ‘Fillet du Schnapper au Sauce Ciment,’ and ‘Beton Arme Electricite Frites’.”³¹ Mainly employing the Hennebique system, the Ferro-Concrete Company of Australasia was the first to comprehensively undertake the construction of reinforced concrete structures in the Dominion.³² The article on the first annual dinner advertised the Ferro-concrete company of Australasia as a skilled

medium between the innovative building material and the consumer.³³ Its promotional materials stressed that reinforced concrete was a material understood by comparatively few people: “it was not... made by just putting a few pieces of steel or wire into concrete.”³⁴ The reinforcing required skill, knowledge, care, and conscientiousness – all of which were guaranteed by the company.

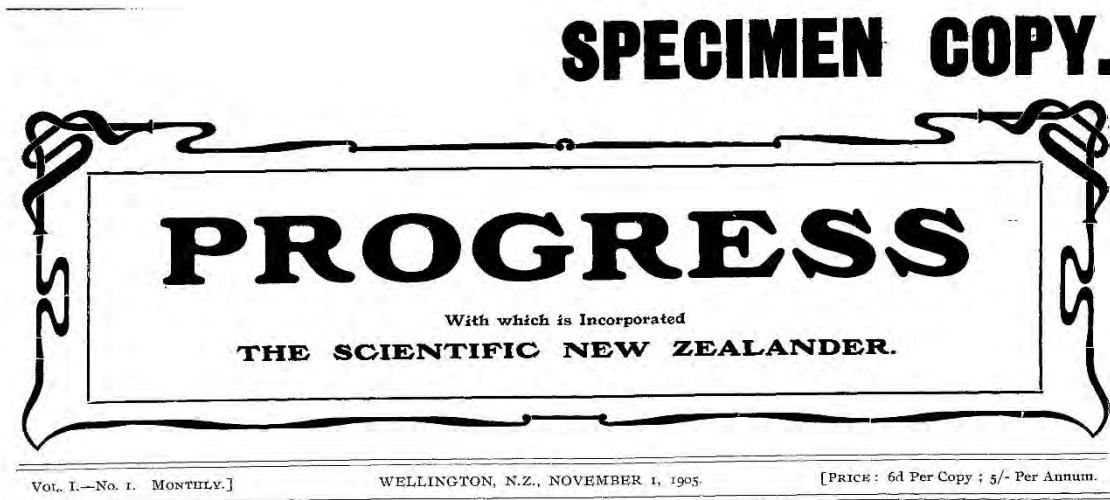


Figure 5. Progress with which is Incorporated the Scientific New Zealander (*Progress* 1, No.1 (November 1, 1905): 5).

The earthquake and fire-proof qualities of reinforced concrete also attracted a lot of interest. Clearly, earthquakes were, and still remain, a constant threat to New Zealand’s construction, while fire presents a danger for any urban environment. In fact, the earthquake and fire-proof potentials were in focus when *Progress* first mentioned reinforced concrete, in 1905 – the same year the publication itself was founded. *Progress* remained the country’s most important specialist magazine reporting on international and local technological advances and issues for years. Discussing “earthquakes and their relation to building construction in New Zealand,” Frederick de Jersey Clere passingly mentioned that, one of the possible solutions for the construction of earthquake resistant buildings would be “iron construction protected by concrete.”³⁵ New Zealanders had been attentively following the earthquake and fire-proof tests conducted in the US.³⁶ Comparing the system used in the construction of the Auckland wharves with the American one, Samuel Brown described the New York experiments, and concluded that reinforced concrete was “the most fire and earthquake proof mode of construction at present known to engineering science.”³⁷

As with any popular topic, reinforced concrete also attracted critics. However, it appears that the New Zealanders were eager to experiment – there were not many negative views of the innovative material. Caution with the application of reinforced concrete was advised in an

article published in the May 1906 issue of *Progress*.³⁸ Similarly, the *Auckland Star* published an article that, though praising the Auckland Harbour Board for “being up-to-date in its operations, and placing the port of Auckland in the van of the harbours of the world,” wondered if it might be wiser to have kept some of the existing wooden structures in the construction of the wharves – at least until wider experience with reinforced concrete had been acquired.³⁹ I could find only one entirely negative reading of reinforced concrete.⁴⁰ G. A. Lewis discussed “many and formidable” failures of reinforced concrete. He maintained that, though the subject of reinforced concrete was fascinating to theorise about, being in an experimental stage, it was mostly attractive to young engineers and architects. The experienced professionals, however, should not accept the material uncritically, he asserted, bearing in mind the disasters leading to the collapse of ferro-concrete buildings. The article instantly provoked two responses, both dismissing Lewis’ opinion as a misinterpretation.⁴¹

Conclusion

The early 20th century economic prosperity and the change of New Zealand’s political status resulted in increased construction activity in this period. The developing nation and its growing cities needed buildings suitable for housing their administrative and governing apparatus. The building activity in pre-First World War Auckland was interpreted as the verification of the city’s development. The Auckland Town Hall, the Chief Post Office, and the Ferry Building were the city’s most significant early 20th century public structures. Closely monitored by the press, the buildings were ultimately interpreted as symbols of national pride and the prosperity of Auckland.

Period sources clearly documented the importance the general public placed on the use of reinforced concrete in the first decades of the 20th century. Reinforced concrete was abundant in both technical and symbolical qualities. It was economical, structurally durable, earthquake-resistant, and fire-proof. Furthermore, it had a long tradition with imperial connotations, was used internationally, and was widely popularised. In sum, originating in the imperial times of the great Roman engineers, developed by the modern innovators for the sake of progress and bright future, reinforced concrete was suitable for the construction of both public buildings and the national identity.

Early 20th century Aucklanders did not think that the use of the innovative structural material demanded a particularly innovative architectural language. On the contrary – the Auckland Town Hall, the Chief Post Office, and the Ferry Building, as well as the majority of contemporaneous construction, combined the cutting-edge technology with the historicist architectural forms of Edwardian Baroque. Within their architecture the “progressive” merged

with the “traditional”. Both were perceived as signs of progress and advertised as the symbols of Auckland’s modernity, development and prosperity. The early 20th century press clearly documented that – as far as the function, the architectural style, and the materials used were concerned – the three buildings were genuine landmarks of “to-day”, and a valuable public legacy for the generations to come.

¹ For example, one amongst many, the article announcing the future Chief Post Office, Ferry, and Town Hall buildings as splendid symbols of the city’s prosperity: “Review of the Year,” *New Zealand Herald* 45, No. 13946 (December 31 1908): 7.

² “Land and Buildings,” *New Zealand Herald* 48, No. 14801 (October 3, 1911): 9.

³ For example, writing about the strengthening of Auckland Town Hall, Trevor Robertson said that the building was mostly constructed of unreinforced masonry: Trevor Robertson, “The Strengthening of the Town Hall,” in *Proceedings of the 12th World Conference on Earthquake Engineering* (2000), accessed January 4, 2018, <http://www.iitk.ac.in/nicee/wcee/article/1155.pdf>

⁴ Extensive information on the individual buildings is available at the Heritage New Zealand website. See also: John Stacpoole and Peter Beaven, *Architecture 1820-1970* (Wellington: A.H. & A. W. Reed, 1972): 44, 68; John Wilson, *AA Book of New Zealand Historic Places* (Auckland: Lansdowne Press, 1984): 38-41; David Johnson, *The Auckland Ferry Building* (Auckland: Auckland Maritime Museum, 1988); Peter Richardson, “An Architecture of Empire: The Government Buildings of John Campbell in New Zealand,” MA diss. University of Canterbury, 1988: 165-169; Terence Hodgson, *Looking at the Architecture of New Zealand* (Wellington: Grantham House, 1990): 36-37; Peter Shaw, *A History of New Zealand Architecture* (Auckland: Hodder Moa Beckett, 2003): 67-70; Lewis E. Martin, *Built for Us: The Work of Government and Colonial Architects 1860s to 1960s* (Dunedin: University of Otago Press, 2004): 96-97.

⁵ “The Prosperity of Auckland,” *New Zealand Herald* 43, No. 13250 (August 8, 1906): 4.

⁶ For example, praising the “wonderful activity in the building trade,” an article highlighted that “in the business area ferro-concrete buildings from five to eight storeys high are in course of construction...” “The Closing Year: Record of Progress,” *New Zealand Herald* 44, No. 13633 (December 30, 1907): 6.

⁷ “Auckland’s Town Hall,” *Auckland Star* 42, No. 297 (December 14, 1911): 7.

⁸ A lengthy report on the results of the competition: “Auckland’s Town Hall: Three Designs Selected. Fine Structure Proposed,” *New Zealand Herald* 44, No. 13435 (March 13, 1907): 8.

⁹ The design solution and the chosen location were heavily critiqued in a 1907 article: P. A. Vaile, “The Auckland Flat Iron,” *Auckland Star* 38, No. 121 (May 22, 1907): 8.

¹⁰ “Auckland’s Town Hall,” *Auckland Star* 42, No. 297 (December 14, 1911): 4.

¹¹ Extensive and, so far, unsurpassed study of the Ferry Building: Johnson, *The Auckland Ferry Building*.

¹² “The Ferry Building, Auckland,” *Progress* 5, No. 3 (January 1, 1910), 99.

¹³ “Improving the Waterfront: The New Ferry Office,” *New Zealand Herald* 48, No. 14622 (March 7, 1911): 7.

¹⁴ For more information see: Richardson, “An Architecture of Empire,” 165-169.

¹⁵ “New Post Office: The Opening Ceremony,” *New Zealand Herald* 49, No. 15156 (November 21, 1912): 8.

¹⁶ Peter Richardson, “An Architecture of Empire,” 166.

¹⁷ “New Post Office: The Opening Ceremony,” 8.

- ¹⁸ Trevor Robertson, "The Strengthening of the Town Hall," in *Proceedings of the 12th World Conference on Earthquake Engineering* (2000), accessed January 4, 2018, <http://www.iitk.ac.in/nicee/wcee/article/1155.pdf>
- ¹⁹ "Auckland's Town Hall," *New Zealand Herald* 44, No. 13435 (March 12, 1907): 8.
- ²⁰ "The Town Hall, Auckland," *Progress* 4, No. 7 (May 1, 1909): 246; *Programme of the Official Opening of the Town Hall*, 23. During the early 20th century, John and Edward Clark worked on a number of commissions, including the Melbourne City Baths (started 1902); the Ballarat offices of the National Mutual Life Assurance Association (competition, 1904); the Maitland Hospital, New South Wales (1903-05); the Women's Refuge (1907) and extensions to the Women's Hospital (1907-17) both in Carlton, Melbourne; and the new Melbourne Hospital, Lonsdale Street (begun in 1912 after a second prize awarded in 1905). However, at this stage I was not able to determine was reinforced concrete used for the construction of some of this buildings. More on life and work of John J. Clark: Andrew Dodd, *JJ Clark: Architect of the Australian Renaissance* (Sydney: UNSW Publishing, 2012).
- ²¹ "Buildings in Progress: Harbour Ferries Building," *Auckland Star* 42, No. 62 (March 14, 1911): 9.
- ²² "Building a Post Office," *New Zealand Herald* 46, No. 14109 (July 10, 1909): 6.
- ²³ "Reinforced Concrete: An Engineer's View," *Auckland Star* 34, No. 262 (November 2, 1908): 3.
- ²⁴ Geoffrey Thornton, *Cast in Concrete: Concrete Construction in New Zealand 1850-1930* (Auckland: Reed, 1996).
- ²⁵ "Revolutionary Building: An Enterprising Milling Company," *Evening Post* 72, No. 46 (August 23, 1906): 6.
- ²⁶ John Guiniven, "The Truth about Ferro-Concrete," *Auckland Star* 39, No. 237 (October 3, 1908): 7.
- ²⁷ E.g.: "Ferro-Concrete Buildings: London's Post Offices," *New Zealand Herald* 44, No. 13395 (January 25, 1907): 6; "The Architecture of Britain," *Progress* 5, No. 4 (February 1, 1910): 135-136.
- ²⁸ "Ferro-Concrete Buildings," *Evening Post* 81, No. 117 (May 19, 1911): 2.
- ²⁹ "Ferro-Concrete Construction in Auckland," *Progress* 3, No. 1 (November 1, 1907): 10.
- ³⁰ "Ferro-Concrete: A Building Revolution," *New Zealand Times* 30, No. 6406 (January 1, 1908):
- ³¹ "Ferro-Concrete Dinner: The Progress of Ferro Reinforcement," *Auckland Star* 38, No. 185 (August 5, 1907): 6.
- ³² "Ferro-Concrete Construction in Auckland": 10.
- ³³ Ferro-concrete company of Australasia was a proper *bureau d'études* as defined by Cyrille Simmonet. Simmonet argued that *bureaux d'études* developed the innovative business concepts – epitomized in the methods of Hennebique company – that were crucial for the success of reinforced concrete in the early 20th century. The unique nature of reinforced concrete – its novelty and the fact that it was not available in human's immediate surroundings, but was a principle which could not exist without the inventor – required a theoretical underpinning. Mediating between the manufacturer and the consumer, these *bureaux d'études*, the original holders of the patent rights, possessed the knowledge behind this theory. *Bureaux* prescribed the dosage, the configuration of the reinforcement, they calculated the section of the structures, and regulated the manufacturing of the raw material even before they were transformed. A particular colonizing force in itself, the *bureaux* controlled the supply chain, constantly aiming at the expansion of business, areas of influence and clientele: Cyrille Simmonet, "The origins of reinforced concrete," in: *Early Reinforced Concrete*, ed. Frank Newby (Aldershot: Ashgate c2001), 119-135.
- ³⁴ "Ferro-Concrete Dinner: The Progress of Ferro Reinforcement": 6.
- ³⁵ F. de J. Clere, "Notes on Earthquakes and Their Relation to Building Construction in New Zealand," *Progress* 1, No. 1 (November 1, 1905): 2 (Supplement).
- ³⁶ "Building in Earthquake Countries (I)," *Progress* 1, No. 7 (May, 1 1906): 201; "Building in Earthquake Countries (II)," *Progress* 1, No. 8 (June, 1 1906): 28.
- ³⁷ "Seismic and Fire Risks: Claims of Ferro-Concrete," *New Zealand Times* 27, No. 5948 (July 11, 1906): 7.
- ³⁸ "Shear and Adhesion in Reinforced Concrete," *Progress* 1, No. 7 (May 1, 1906): 170-171.
- ³⁹ "Ferro-Concrete: Mr. Napier's Observations. Report to the Harbour Board. Policy of Caution Counselling," *Auckland Star* 38, No. 31 (February 5, 1907): 3.
- ⁴⁰ "Failures of Ferro-Concrete," *Progress* 3, No. 9 (July 1, 1908): 311.
- ⁴¹ C. Fleming Macdonald, "Reinforced Concrete," *Progress* 3, No. 11 (September 1, 1908): 379-380; R. W. Lesley, "Ferro-Concrete as a Heat Resister," *Progress* 4, No 4 (February 1, 1908): 118.

Tools, which tools?: The changings of architects

Gill Matthewson
Monash University

Abstract

In the call for papers for this conference, the origin of the word 'technology' in the Greek word "tekhnē" is detailed. Translated as meaning "art" or "craft", we are reminded that conceiving and making are inextricably linked; a dependency that suggests that "tekhnē" lies at the core of architectural practice.

*The paper considers practice through a popular textbook (*The Architect in Practice*) that was first published in 1952 and is now in its 11th revised and updated edition. The book is not intended to focus on the skills of design, but on all the multiple other skills the authors deem necessary to be a 'successful' and 'efficient' architect. Should there be any doubt, the introduction exhorts the reader specifically to lay aside the tools of design/drawing in order to concentrate on the valuable lessons contained in the book. The tools that need to be set aside to allow for this concentration change across the editions, loosely but belatedly following technological changes in the tools of the profession over the more than six decades since the book was first published. From "tee-square, colours and brushes" to "CAD equipment and thick felt pens", the listing of these tools also tell a story of changing practices and conceptions of what an architect is and does. The paper discusses the implications these changes have for the connection between conceiving and making in architecture.*

Sixty-five years ago, in 1952, an architect (William Norman Bruce George) and a quantity surveyor (Arthur James Willis) published a textbook entitled *The Architect in Practice* offering guidance and advice to budding architects. Willis (the first named author, born 1895) had by this date already written a number of books about quantity surveying, at least two of which bear his name and are still in print.¹ George was twenty years Willis's junior, and wrote two other books: *British Heritage* in 1976 and *World Architecture* in 1981.² In 1958, George also established an architectural firm George, Trew & Dunn, specialising in hospitals in the UK.³ His most notable work was the design of the Royal Military Chapel in Birdcage Walk, London after it was predominantly destroyed by a V1 bomb during World War Two.⁴ Built on the existing ground plan, George (usually credited with the design) framed the surviving

Lombardo-Byzantine inspired gold-mosaicked apse (by George Edmund Street in 1879)⁵ with a structure of white Pentelic marble and Portland stone. The clearly modernist design was thought to be influenced by Alva Aalto, whose work George had admired whilst on a study tour that included Finland when a student.⁶

The Architect in Practice, like other Willis books, is still in print – albeit under new authorship, revised and updated – and now in its eleventh edition (2016). The current authors claim that the book has been a leading textbook since the first edition and, although written for the UK, has been used worldwide for educating architects.⁷ All Australasian schools of architecture, except one, have copies, ranging from two to seven editions. Notwithstanding the UK focus, the book also presents a detailed picture of an architect in practice in Australasia.

The book is not about the skills of design, but on all the multiple other skills the authors deem necessary to be a ‘successful’ and ‘efficient’ practicing architect. Should there be any doubt, the final sentence in the first paragraph of the introduction advises the reader to lay aside the tools of design/drawing in order to concentrate on the valuable lessons contained in the book. What needs setting aside to allow for this concentration changes across the editions more or less following technological changes in the tools of architecture since 1952 and trace a kind of history over that time. They also trace the meaning of those tools because tools are more than their utility, they represent different ways of thinking about architects and architecture. This paper discusses this list of tools, its different manifestations across the eleven editions, and the implications the changes have for the connection between conceiving and making in architecture.

1952

In the 1950s, when the first edition was published, architecture in the UK was dominated by small private practices, although with a sizeable portion of RIBA membership working for local governments.⁸ Andrew Saint describes a changing profession in the UK in the 1950s and 60s moving from the ideal of the architect as a gentleman plying the profession in a small practice, towards the architect as a managerial or entrepreneurial architect in larger practices. While Willis and George aimed their book at those planning to become private practitioners, one chapter covers the prospect of dealing with large commissions from public authorities common at the time.⁹ Saint cites the RIBA as promoting the idea of the efficient/managerial architect towards the end of the decade,¹⁰ but Willis and George already had the making of the efficient architect as their target in 1952.

The book begins with a rather elaborate series of pages. First, are the inspiration, the Dedication, and an epigraph – all on a single page.¹¹ These have a similar message concerning the very wide range of roles an architect must fulfil: artist, administrator, and even lawyer. The preface that follows is a quasi-Socratic dialogue reiterating the complexities of roles and describing the difficulty of conveying these in a book, but insisting that they will succeed. In the introduction, the authors advise that in order to concentrate on the valuable lessons contained in the book:

Let the reader therefore leave his drawing-table, forget his tee-square, his colours and his brushes, take off his smock and settle down to his desk (or arm-chair) to study an aspect of his work which he may find requires some self-discipline but is nevertheless essential to make him an efficient architect.¹²

The tools to be laid aside are all design/drawing tools and the book is clear that these skills are not sufficient to be an architect and especially not enough to be a successful one. It may be through drawing that architecture is conceived, represented and eventually made, but it is through the lessons of the book that drawings become built architecture and the designer an architect. Accordingly, the introduction begins with the lines:

Ability to design and skill in draughtmanship will not alone make an architect. The purpose of this book is to present to architectural students, and perhaps the less experienced practitioners, some indication of the practice and procedure with which they must be acquainted if they are to follow their profession with success.¹³

The tension between the architect's role as primarily concerned with the art and aesthetics of architecture and as deeply involved with technical and building matters is as old as the profession (and continues to rumble).¹⁴ This paper is interested in the tools listed and what they tell us about this shifting tension.

The tools

The tee-square is a classic symbol of an architect and in some form have been used in the designing of buildings since classical times. It, with the drawing-table, is a tool for the many kinds of drawings that architects and architecture students undertake, from perspectives to construction drawings to free-hand sketches. The items next in the list, 'colours and brushes,' refer to the traditional media of gouache, water-colour washes and inks that were used to enhance and clarify drawings, and to present a proposed project. All these items would have been familiar to architecture students one hundred years previously, albeit in their article

training in an office rather than schools. The last item on the list is a smock and is perhaps the most curious item on the list for contemporary architects and architecture students.

Smocks, in practical terms, protected clothes from staining by the by-products of the crafting involved in design and drawing: ink, graphite, charcoal, colour materials, and perhaps the bloodstains from slips with scalpels when scratching out incorrectly placed lines. In other words, it makes the crafting involved in the production of the drawings of architecture explicit. But the wearing of a smock was also, and perhaps more importantly, symbolic – a claim to artistic status and identity that was part and parcel of the Beaux-Arts tradition under which George had studied at the Liverpool School of Architecture in the 1930s. Under the directorship of Charles Reilly, the school developed a strong atelier system which emphasised the art of drawing and an aesthetic rather than technical approach to architectural education.¹⁵ Although Reilly retired the year that George began (1933), the Beaux Arts methodology and philosophy dominated in most schools of architecture in the UK until at least the Second World War.

A photograph of a studio in the Liverpool school in 1930 shows the students wearing a variety of over-garments or smocks.¹⁶ However, a contemporary of George's, Joseph Esherick, studying in the "firmly-committed Beaux-Arts" school of architecture at the University of Pennsylvania describes wearing a blue smock during his education, much more of a uniform than those on display in the Liverpool photograph. Similarly, at Cornell University in the 1920s, the smock was a uniform; moreover, each year class wore a different coloured one.¹⁷ Both schools did not permit first-year students to wear this uniform. Esherick details a ritual involving first-year students fighting for the right to wear the architect's smock by removing it from a second-year student – by force.¹⁸ Esherick considered these de-smocking fights to be "muddy, aimless, and harmless battles," more a ritual conducted between gentlemen than thugs. Indeed, such fights were not only allowed but encouraged at the university because they were thought to "develop manliness and courage."¹⁹ While architecture schools might continue to have rites of passage (such as all-nighters and crits),²⁰ this kind of pugilistic ritual has not survived.

Regardless of colour or pattern, rituals or pragmatics, the smock was symbolic of being an architecture student in the Beaux-Arts tradition. Fashion sociologist Joanne Entwistle maintains that clothing represents an important connection between individual identity and social belonging which is "signalled and reproduced through shared tastes and dress styles: one's whole embodied appearance signals membership."²¹ Smocks made this identification strong for architecture students. Certainly, for Willis and George at the time of their writing the

first book, the smock represented the architecture student as art-architect that they insisted needed the help of their book to become successful by being efficient.

The wearing of smocks in the professional workforce mid-century is less clear. In fact, Saint recalls an architect causing great amusement when he wore a smock at the drawing board in the London county council's architects' department in 1957 – just five years after Willis and George's publication.²² There are, of course, always clichés that arise around the clothing of a particular profession: bankers wear pin-stripe suits and doctors white coats. Mid-century architects were often associated with bow ties and the wearing of them was the cliché for architects of the time (allegedly, the bowtie prevented a drawing being smeared by a standard tie). New York architect Peter Eisenman still continues this aesthetic, and blogs on the internet argue that it is a clear signifier of an architect of a certain generation.²³ It is, of course, the contemporary cliché that architects wear black.²⁴

The architecture profession has its roots in the so-called 'gentlemanly' professions which evolved in the nineteenth century. Indeed, architecture schools in the early twentieth century considered their objective was the production of gentlemen.²⁵ The professions, and the gentlemen who worked in them, were employed in work that did not involve 'sweat' or dirt, they could and did wear white, hence the term white-collar work. According to Karen McNeill, most American architects at the turn of the century "wore suits that were typical of any other white-collar professional."²⁶ Entwistle discusses the nature of the suit and acknowledges its complex and nuanced meanings, but argues that the suit signals formal and conservative²⁷ – ideal for an aspiring profession. Smocks as protection for that clothing somewhat belies the cleanliness of that professional aspiration, or at least the public face of the profession.

But, in the 1950s, the smock in practice was not necessarily the romantic pre-war Beaux-Arts smock with its signature pleating. In a photograph of the Queensland firm of Hayes and Scott used for their Christmas card in 1959, the seven men of the firm are posed at their drawing boards, four of whom are wearing what might be better described as dust or lab coats.²⁸ Particularly if white, this kind of 'smock' can also be seen as a symbol of the serious *work* of drawing and so the serious work of architecture – work that involves specialist equipment and the knowledge to wield it. In 1965, Massimo Vignelli, co-founder of the Unimark International design company, tapped into this seriousness when he insisted that all their designers world-wide wear what he calls 'white smocks'.²⁹ For him, the 'white smock' (which is a white lab coat in the photograph of Vignelli that accompanies his declaration) denoted professional – he explicitly mentions the architect and the doctor – at a time when graphic design was less established as a profession than either architecture or medicine. It was also, in his view, a

“great equaliser, stressing objectivity over subjectivity,” a key element in the firm’s philosophy. However, in 1970, employees revolted – for them the white smock/coat symbolised corporate power, technocrats and a formality at odds with the kind of rule-breaking design thinking that characterised Unimark, and so blue jeans took over. The various student revolts in architecture schools in the late 1960s and early 1970s, including in Australasia and the UK,³⁰ would also have put paid to such formal wear. Certainly, no photographs of students during the 1960s and 1970s I have found show smocks – like at Unimark International, casualwear and jeans became universal.

And so perhaps the most curious part of the inclusion of the smock in Willis and George’s list was the number of years and editions it remained.

1970

It is not until the fourth edition published in 1970, that there is any revision to the text. Another author, or more precisely, collaborator is added to the credits: Christopher J Willis, son of the first author and also a quantity surveyor. The opening paragraph of the introduction modifies the list of design tools that must be laid aside in order to attend to the book: “colours and brushes” have been swapped for “set-square and scales.”³¹ For the authors, the architecture student of 1970 no longer dealt so much in the colour washes of nearly twenty years previously. In Neil Bingham’s survey of architectural drawings of the twentieth century, he identifies moves in the 1960s towards representations of architecture through photo-collage and applied colour in the form of shapes of adhesive sheets like Letraset.³² He argues that these moves reflected the revolutionary ideas of the times and critiques around modernism. That said, many of the images included by Bingham for the period still utilise colour-brush-work, with the addition of felt-tip pins, crayons and oil-pastels.

Willis and George’s nomination of set-squares and scales in the stead of colours and brushes appears to be more backward-looking. These are the tools of the kind of straight geometric drawings favoured by post-war reconstruction modernism rather than a critique of it. The smock also remains on the list, a seemingly odd and dated vestige of romantic version of an architect as a particular kind of artist. Despite the seeming irrelevance of the smock in whatever form, the fifth (1974) and sixth (1981) editions of the book kept the list unaltered (by 1981, Willis was 86 and George 66).

1992

It is not until the seventh edition in 1992 that Willis and George retire as authors and with this change comes a complete rewrite. Although the intervening editions had updated and added

where necessary, the format and much of the text of the book remained, in the main, that of the 1952 edition. The rewrite is under the first authorship of David Chappell (an architect, who has maintained this role in all following editions) and Christopher Willis (the former collaborator on the previous three editions). With this seventh edition, the material of the book is completely re-structured into new chapters, which are grouped into parts, and each chapter consists of numbered sections and sub-sections. This is a clear move away from the discursive prose of Willis and George to a more reference-text format, rendered easily accessible through the intense numbering of sections and sub-sections. Although they continue to urge the architecture student reader to lay aside design tools and settle into an armchair to study the lessons of the book, the book is now less of an armchair-read and more obviously a 'dip in, dip out' source of information.

In the re-writing, some of the anachronistic aspects of the book, which were well overdue for revision, have been addressed. It is not until this edition that the language of the book acknowledges that architecture students and architects might not just be men nearly two decades after women began to enter schools of architecture in large numbers in the 1970s. To do this, the text shifts to the plural of architects/readers to avoid the singular pronoun.³³ And the list of design tools is also updated:

Let the readers therefore leave their drawing board, forget their tee-squares, set squares and scales, move away from their CAD equipment and settle down to their desk or armchair to study an aspect of their work which they may find requires some self-discipline but is nevertheless essential to make them efficient architects.³⁴

The drawing-table is replaced by the drawing board. Finally, the smock has been dropped and in its stead are computers. In casting off the smock, its historical, symbolic and pragmatic associations have been discarded. Being an architecture student might still involve serious work and mess but, with more relaxed dress codes in general, there was less formal wear (like white shirts) that needed protecting. The symbolism of the smock denoting the architect-artist was perhaps also a romantic redundancy. Except, the wearing of black, a colour associated with contemporary rather than nineteenth century artists, more likely supplanted it.³⁵

The wearing of black is not restricted to the education environment and therefore constitutes a more intensely embodied indicator of architectural identity. Garry Stevens maintains that becoming an architect, unlike with other professions, requires not just *knowing* something (such as drawing or design or even the multiple roles the book details) but *being* something.³⁶

This, he argues, is due to a particularly high level of indeterminacy or uncertainty hovering around the identity of architects because of prevailing ideas of genius, individual innate talent and creativity. This makes the ‘knowing’ for architects far more uncertain than, for example, the ‘knowing’ of doctors and consequently places a higher emphasis on ‘being.’ An architect’s ‘being’ is classically and inextricably entwined with creativity, which is why the connection to artistic skills like design and drawing persists.³⁷

2000s

In the eighth edition of the book in 2000, the second author (Christopher Willis) has been replaced by a third member (and third generation) of the Willis family – Andrew, yet another quantity surveyor.³⁸ The tools of design are refined to include just the drawing board and CAD equipment, omitting the tee-squares, set-squares and scales. This reflects the fast uptake of computers into architecture over the 1990s. While CAD was taught in some schools of architecture beginning in the early 1980s, it became increasingly compulsory during the nineties.³⁹

For the ninth edition in 2005, the preface and introduction material is collapsed together to form a new preface; there is no longer an introduction to the book.⁴⁰ It is in the preface now that the reader is asked to lay aside the tools of design.

In the eleventh (and latest) edition in 2016, there is a new co-author (Michael Dunn has replaced Willis breaking the connection of the book with the Willis family). The major change is the dropping of the drawing board as the signifier of the many kinds of drawing architects produce. Readers are now asked to “move away from their CAD equipment, lay aside their thick felt pens...”⁴¹ For Chappell and Dunn, thick pens stand in for a loose kind of drawing that contrasts with the precision that computer-aided design tools can deliver. The specification of thick pens is slightly unusual; architect blogger Steve Ramos describes how most architects use pens rather than pencils, and lists five essential tools for an architect. Felt-tip pens came in at number two (after a thick skin!), but he precisely details the need for a variety of pens that can execute a wide variety of line thicknesses.⁴²

Drawings and tools and architects and image

It is drawings as representations of what might become architecture (be they symbolised by the drawing board, tee-square, colours, felt pens, or CAD equipment) that the authors over the years both privilege and try to tempt their reader away from with the promise of success. They, like others, assume drawings to be key to the education of an architect.⁴³ Esherick

concludes his reminiscences of his Beaux-Arts education with the declaration “and we did learn to draw.”⁴⁴

Bingham argues that the rapid ascent of CAD in the last decade of the century meant that the “architect simply had a new drawing tool.”⁴⁵ However, while computers and the ever-developing software that they run might be at one level be seen as simply a new tool, they have also disrupted (and continue to disrupt) some very old patterns in becoming an architect.⁴⁶ In 2000, Dana Cuff observed that the near universal acceptance of computers into architecture schools and offices had disturbed the customary understanding that fresh graduates would still need extensive training before they could actually contribute to the office.⁴⁷ Universities teach students the very latest CAD and graphics software – or students train themselves in order to produce compelling images for their portfolios. This expertise can make them very valuable to firms – sometimes more valuable than older, experienced architects.

In a statistical study of the Australian Census, I reported a high number of older men leaving the architectural workforce in Australia between the 2006 and 2011 Censuses.⁴⁸ More recently, the 2016 Census shows a dramatic loss of men who were in their fifties in 2011.⁴⁹ These are architects who know how to run a project, how a building is put together, the ins and outs of the construction industry and the legislation that controls it – in fact, precisely all the matters that the book details for the education of its readers. If this knowledge is no longer sufficient to keep those who have it in architecture and there is a greater need for very particular drawing/computer skills, then the premise of the book is seriously destabilised.

By laying aside the tools and symbols of all kinds of drawing and design, the authors of the book ask architecture students to step for a moment outside of the design world and enter the world of practice; a practice that is assumed to be the private practitioner.⁵⁰ These are traditional concepts of an architect and do not acknowledge that architecture as a profession has been and is continuing to undergo continuous change and severe disruption. Many architects work in large firms,⁵¹ and the digital revolution is having a major impact. Writing in the late 1990s, Garry Stevens warned that computers in architecture were both producing an underclass of CAD operators and threatening the occupational integrity of architecture.⁵² Computers both expand and contract the scope of architects; they permit the total construction and crafting of a building in digital form from every nook and cranny to cityscape revealing every gnarly detail and spatial potential. But the very sophistication of the tools that enable such digital crafting can also lead to the fracturing of what it means to be an architect because each

software tool requires a degree of specialist knowledge reaching well beyond that required by the tools of the mid-twentieth century.

If the conceiving and making of architecture is bound to its tools of representation through drawing, then architecture will continue to be disrupted by the fast-developing tools presented by the digital revolution. This has unknown and tough implications for the education of architects and any book directed towards practice. Just as the smock stayed for too long on the list of items the budding architect needs to temporarily put aside, the ideas of practice that the book detail will always be behind the cutting edge.

¹ Initially sole authored but currently: Sandra Lee, William Trench and Andrew Willis, *Willis's Elements of Quantity Surveying*, 12th ed. (Chichester: Wiley-Blackwell, 2014) first published in 1935; Allan Ashworth, Keith Hogg and Catherine Higgs, *Willis's Practice and Procedure for the Quantity Surveyor*, 13th ed. (Chichester: Wiley-Blackwell, 2013) first published in 1951.

² W.N.B. George, *British Heritage: In Colour* (Poole, Dorset: Blandford Press, 1976); and W.N.B. George, *World Architecture (colour)* (Poole, Dorset: Blandford Press, 1981).

³ 'William Norman Bruce George,' *Dictionary of Scottish Architects*, accessed January 15, 2018, http://www.scottisharchitects.org.uk/architect_full.php?id=403813

⁴ 'Bruce George, Architect – Obituary,' *The Daily Telegraph*, March 20, 2016

<http://www.telegraph.co.uk/obituaries/2016/03/20/bruce-george-architect---obituary/>

⁵ 'The Royal Military Chapel, The Guards' Chapel, Wellington Barracks, Birdcage Walk,' *Churches Together in Westminster*, accessed <http://ctiw.london/2012/guards-chapel/>

⁶ 'Bruce George, Special Obituary,' *Old Farnhamians' Association*, March 7, 2016, accessed January 15, 2018, http://www.farnhamians.org/ofa/Obit_BruceGeorge.htm

⁷ David Chappell and Michael Dunn, *The Architect in Practice*, 11th ed. (Chichester: Wiley-Blackwell, 2016), xiv.

⁸ Andrew Saint, *The Image of the Architect* (New Haven and London: Yale University Press, 1983), 142.

⁹ Arthur J Willis and W.N.B. George, *The Architect in Practice*, 1st ed. (London: Crosby Lockwood & Son Ltd, 1952), xi.

¹⁰ Saint, *The Image of an Architect*, 147.

¹¹ Willis and George, *The Architect in Practice*, 1st ed., v.

¹² Willis and George, *The Architect in Practice*, 1st ed., xi.

¹³ Willis and George, *The Architect in Practice*, 1st ed., xi.

¹⁴ Saint, *The Image of an Architect*, 61; Dana Cuff, 'Introduction: Architecture's Double-Bind,' in C. Greig Crysler, Stephen Cairns and Hilde Heynen (eds.) *The SAGE Handbook of Architectural Theory* (London: SAGE Publications, 2012).

¹⁵ Andrew Saint, *Architect and Engineer: A study in sibling rivalry* (London and New Haven: Yale University Press, 2007), 466.

¹⁶ Saint, *Architect and Engineer*, 466.

¹⁷ 'Vari-Colored Smocks Donned by Architects,' *The Cornell Daily Sun* XLIV, no. 69 (December 15, 1923), <http://cdsun.library.cornell.edu/cgi-bin/cornell?a=d&d=CDS19231215&dliv=userclipping&cliparea=1.1%2C704%2C567%2C653%2C757&factor=4&e=-----en-20--1--txt-txIN----->

¹⁸ Joseph Esherick, 'Architectural Education in the Thirties and Seventies: A Personal View,' in Spiro Kostof (ed.), *The Architect: Chapters in a History of the Profession*, revised ed. (Los Angeles: University of California Press, 2000), 248.

¹⁹ 1914 university text cited in George E. Thomas and David B. Brownlee, *Building America's First University: An Historical and Architectural Guide to the University of Pennsylvania* (Philadelphia: University of Pennsylvania Press, 2000), 19.

²⁰ Dana Cuff, *Architecture: The Story of Practice* (Cambridge, MA: MIT Press, 1991), 118.

²¹ J. Entwistle and A. Rocamora, 'The Field of Fashion Materialized: A Study of London Fashion Week,' *Sociology - The Journal of the British Sociological Association*, 40, 4 (2006), 743.

-
- ²² Andrew Saint, 'John Bancroft, Obituary,' *The Guardian*, September 20, 2011, <https://www.theguardian.com/artanddesign/2011/sep/20/john-bancroft-obituary>
- ²³ 'Architects and Bowties,' *Architects' Wives*, October 21 2010, accessed January 31, 2018, <http://architectswives.wordpress.com/2010/10/21/architects-and-bowties/>; 'Bow Ties,' *Architangent*, September 20, 2011, accessed January 31, 2018, <http://architangent.com/2011/09/30-bow-ties/> ()
- ²⁴ Cordula Rau, *Why Do Architects Wear Black?* (Wien: Springer, 2009).
- ²⁵ AIA education report 1906-7 cited in Elizabeth G. Grossman & Lisa B. Reitzes, 'Caught in the Crossfire: Women and Architectural Education, 1880-1910,' in Ellen Perry Berkley & Matilda McQuaid (eds), *Architecture, A Place for Women* (Washington & London: Smithsonian Institution Press, 1989), 29.
- ²⁶ Karen McNeill, 'Julia Morgan: Gender, Architecture, and Professional Style,' *Pacific Historical Review*, 76, 2 (2007), 245.
- ²⁷ Joanne Entwistle, 'Fashion and the Fleshy Body: Dress as Embodied Practice,' *Fashion Theory: The Journal of Dress, Body & Culture*, 4, 3 (2000), 328.
- ²⁸ 'Christmas Card,' The Hayes and Scott Collection, University of Queensland, UQFL278, Folder B, image 0001 <https://web.library.uq.edu.au/files/1496/filename.jpg>
- ²⁹ Lella Vignelli and Massimo Vignelli, *Lella Vignelli and Massimo Vignelli: Design is One* (Mulgrave, VIC: The Images Publishing Group, 2004), 28.
- ³⁰ Glen Hill and Lee Stickells, 'Pig Architecture,' *Architecture AU*, June 22, 2012, <https://architectureau.com/articles/pig-architecture/>. Also Bill Mackay, 'The Counter-Culture and its Containment: The Loose Years,' in Julia Gatley and Lucy Treep (eds.), *The Auckland School: 100 Years of Architecture and Planning* (Auckland: School of Architecture and Planning, University of Auckland, 2017), 91.
- ³¹ Willis and George, *The Architect in Practice*, 4th ed. (Crosby Lockwood Staples, 1970), xiii.
- ³² Neil Bingham, *100 Years of Architectural Drawing: 1900–2000* (London: Laurence King Publishing, 2013), 180.
- ³³ David Chappell and Christopher J. Willis, *The Architect in Practice*, 7th ed. (Oxford: Blackwell Scientific Publications, 1992), xix.
- ³⁴ Chappell and Willis, *The Architect in Practice*, 7th ed., xix.
- ³⁵ Rau, *Why Do Architects Wear Black?*
- ³⁶ Garry Stevens, 'Struggle in the Studio: A Bourdivin Look at Architectural Pedagogy,' *Journal of Architectural Education*, 49, 2 (1995), 112.
- ³⁷ Cuff, 'Introduction: Architecture's Double-Bind,' 385.
- ³⁸ Noted in the preface, David Chappell and Andrew Willis, *The Architect in Practice*, 8th ed. (Oxford: Blackwell Science Ltd, 2000), xii.
- ³⁹ Garry Stevens, 'Reflections of and Apostate CAD Teacher,' *Journal of Architectural Education*, 51, 1 (1997), 78.
- ⁴⁰ David Chappell and Andrew Willis, *The Architect in Practice*, 9th ed. (Oxford: Blackwell Publishing, 2005), xi.
- ⁴¹ David Chappell and Michael Dunn, *The Architect in Practice*, 11th ed. (Chichester: Wiley-Blackwell, 2016), xiii.
- ⁴² Steve Ramos, '5 Essential Tools for an Architect,' *Buildings are Cool*, (Accessed February 2, 2018) <http://www.buildingsarecool.com/new-blog/5-essential-tools-architect>
- ⁴³ Cuff, 'Introduction: Architecture's Double-Bind.'
- ⁴⁴ Joseph Esherick, 'Architectural Education in the Thirties and Seventies,' 276.
- ⁴⁵ Bingham, '100 Years of Architectural Drawing,' 239.
- ⁴⁶ Cuff, *Architecture: The Story of Practice*, Chapter 4.
- ⁴⁷ Dana Cuff, 'Epilogue: Still Practicing,' in Kostof, *The Architect*, 347.
- ⁴⁸ Gill Matthewson, 'The Gendered Attrition of Architects in Australia,' *Architecture Research Quarterly*, 21, 2 (2017), 176.
- ⁴⁹ Gill Matthewson, *Parlour Census Report 2001–2016: Women in Architecture in Australia* (Melbourne: Parlour Publishing, 2018), 13.
- ⁵⁰ Chappell and Dunn, *The Architect in Practice*, xiii.
- ⁵¹ Dana Cuff, 'Commentary: Architecture's Undisciplined Urban Desire,' *Architectural Theory Review* 19, 1 (2014): 92–97; Sumati Ahuja, Natalia Nikolova and Stewart Clegg, 'Paradoxical Identity: The changing nature of architectural work and its relation to architects' identity,' *Journal of Professions and Organization* 4, 1 (2017): 2–19.
- ⁵² Stevens, 'Reflections of and Apostate CAD Teacher,' 78, 79.

From Emergency Reception Centres to Housing Experiments: Migrant Accommodation and The Commonwealth Department of Public Works

Renee Miller-Yeaman
University of Melbourne

Abstract

The Commonwealth Department of Works in conjunction with Commonwealth Hostels Limited oversaw the design and construction of two migrant hostels, the Endeavour and the Enterprise during the late 1960s. These two hostels were distinct in a new generation of on-arrival migrant accommodation as they were erected on newly obtained sites and designed within the department rather than tendered out to private firms. This paper explores the Endeavour Hostel, which opened in Randwick, Sydney, in 1970 as an experimental site for housing technologies used historically for migrants and refugees in Australia. Accommodating up to 1000 people, the design's provision for temporary, collective living aimed to be aligned with motels rather than the ex-army facilities that housed migrants throughout Australia in the late 1940s. Testing domestic arrangements to maximise efficiency in accommodating migrant workers has a lineage in the Commonwealth Building Experimental Station that advanced innovation in construction technologies. In 1949 the program carried out investigations into alternative emergency accommodation with suggestions of constructing house shells that were divided into dormitories for migrant workers and then subsequently transformed into permanent houses. This paper reflects on domestic settings for construction experiments as a platform to examine how the design strategies employed in this hostel relate to the Commonwealth's shifting agendas with accommodating incoming populations during the 1960s and 1970s. The constant pulse of national tensions surrounding migration and ethnicity surfaces in this period due to policy changes from welfare services based on notions of assimilation to the emergence of multicultural policies. In addition, successive federal governments debated the number of refugees Australia should resettle that were displaced by the Vietnam War. By focusing on the development of the Endeavour Hostel, the paper reflects on how the design is informed by these political tensions in relationship to the push for maximum utility in government subsidised housing.

Introduction: The Endeavour

The Endeavour, referencing the colonial investigative ship, is commonly recognised as a street name replicated in cities and rural towns across Australia. However, it was also the chosen name for the development of a new Commonwealth Migrant Hostel located in Randwick, Sydney that was opened by the Minister for Labour and National Service in March 1970.¹ This absurd name selection deliberately flagged the British cultural heritage of colonial Australia to incoming migrant and refugee populations during the 1970s and 1980s, when the Endeavour was in operation. The application of this administrative formula of selecting colonial objects to name infrastructure also signals that migrant hostel accommodation had by this point in its evolution become a government institution. The Endeavour was an unlocked but self-sufficient complex that included housing, dining, entertainment and child-care facilities in separate buildings spread out over a portion of the former Commonwealth Rifle Range. Located in a heavy industrialised area in Sydney's southeast, the Endeavour was designed to accommodate 1000 new migrants in radial planned, brick-faced housing blocks that were connected by walkways to sports fields and landscaped gardens. This institutional complex provided transitory accommodation for migrant families arriving from European nations as well as Turkey and subsequently housed and provided English language programs for large numbers of refugees from Mainland South East Asia from 1976 onwards.²

This paper analyses the hostel development in the context of the broader nationwide program led by the Department of Immigration and the Department of Labour and National Service in conjunction with Commonwealth Hostels Limited. The Endeavour had a Melbourne counterpart that also recognised another colonial relic in its name – The Enterprise located in Springvale that opened later in October 1970.³ Again, this was located on the fringe of suburbia and near established industries in Western Melbourne. Original projects designed within the Commonwealth Department of Public Works, these hostels were unique within the government's vision for future generations of migrant accommodation; they were not redevelopments of existing hostel sites populated with adapted ex-military huts as in the past. Prominent local firms undertook extensions and redevelopments that occurred at other sites such as Villawood Migrant Hostel in Sydney. At Villawood, it was Bunning and Madden and like, the Public Works Department, the firms associated with these new redevelopments publicly celebrated their housing designs.⁴

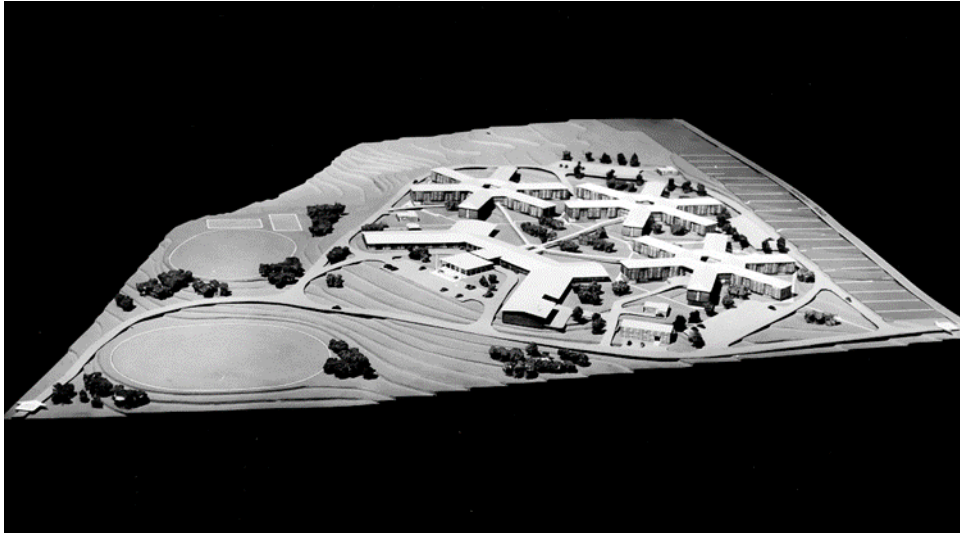


Figure 1. The Endeavour Hostel, Randwick, Sydney: Site model. Date Unknown: 1966-69,
Source: NAA: MP1760/1, M1966/46354

This paper examines the process behind the design brief for the Endeavour alongside asking how this new generation of hostel developments were internally described and promoted in departmental publications. In these publications, the Endeavour is upheld as representative of a “completely new concept for Australia’s new settlers,” in that it represented a new era in hostel accommodation that provided modern forms of domesticity.⁵ The incarnation of the domestic in social housing was a site for innovation in construction technologies and programmatic arrangements but also a site where design experimentations collude with social experimentation. Federal Government research into different methods and technologies to accommodate large transitory populations begins with the Department of Works and Housing’s Commonwealth Experimental Building Station that investigated prototypes for earlier migrant worker accommodation in the 1940s.⁶ Trajectories of hostel sites were defined by a constant renewal of provisional housing practices and experimentation with form and construction practices that drew on diverse spatial models from military barracks to the motel. Early incarnations employed mobile structures that acted as emergency reception centres that were used frequently to filter migrants per their ethnicity.⁷ However, in the later more permanent incarnations seen in the design of the Endeavour, the architectural model borrows from both planning seen in suburban neighbourhoods and the temporary lodging associated with the motel. This merging of spatial qualities associated with public institutions, motels and houses reflect the anxieties around the forms of hospitality offered to incoming populations and about how these modern forms of domesticity should be received.

The Endeavour is the focus of this enquiry as it was an approximate architectural template for the Enterprise and consequently the departmental records are more comprehensive surrounding its inception. Drawing on departmental committee reports and debates about the appropriate forms and standard of facilities, this paper examines the design strategies employed in the hostel and the subsequent management of facilities in relation to the federal government's shifting agendas with accommodating incoming populations during the 1970s.⁸ These new domestic experimentations through social housing occurred in an environment where debates about ethnicity and cultural affiliations were informing political agendas in relation to immigration policies and on-arrival accommodation. The inter-departmental discourse surrounding the development of the Endeavour's design brief was grounded in policy that aimed to substantially bolster migrant recruitment from a competitive market in Europe due to its increasing political stability and economic prosperity. This placed pressure on Australia to market itself as an advantageous destination and resulted in the Department of Immigration's acquisition of new sites and construction of modern hostels with improved and subsidised accommodation for migrants.⁹ However, the Endeavour's completion and ensuing occupation marked the decline in the government's recruitment drive for migrants and the beginning of settlement programs for refugees from non-European backgrounds. During the late 1960s and 1970s successive federal governments debated the number of refugees Australia should resettle arriving from non-European countries including nationals leaving Pinochet's dictatorship in Chile and displaced persons from the Vietnam War arriving from Mainland South East Asia.¹⁰ This paper is informed by these recurrent tensions surrounding migration and ethnicity in Australia and looks at the programmatic, functional and formal objectives pertinent to economically efficient social housing in light of this divisive political context.

Modern Domesticity: The Commonwealth Department of Works and Migrant Hostels

The Endeavour and the Enterprise both featured in the annual publication, *Works Review*, produced by the Commonwealth Department of Works that reported on the department's major projects both underway and complete. Set up after Federation, the department went through successive name changes. In 1945 it became the Department of Works and Housing, partly in need to address Australia's housing shortage, and then in 1952 took on the title, Department of Works, and by the late 1970s the projects it oversaw were gradually decreasing.¹¹ *Works Review* in this

format had a publication life from 1957 to 1973, reflecting the emphasis on nation building through infrastructure development during this time.¹² The periodical showcased through extensive photographic documentation the building achievements in industry, education and large-scale municipal buildings both in Australia and through its governmental mandate in Papua New Guinea prior to the processes of independence.¹³ The inclusion of hostels in this documentation of nation building suggests that the accommodation and resettlement of migrants had become another division of public housing in Australia - rather than only provisional barracks for a temporary workforce. The two new hostels are always referred to with the prefix 'modern' and stood alongside airports, post offices and schools in this building catalogue of a new Australia.

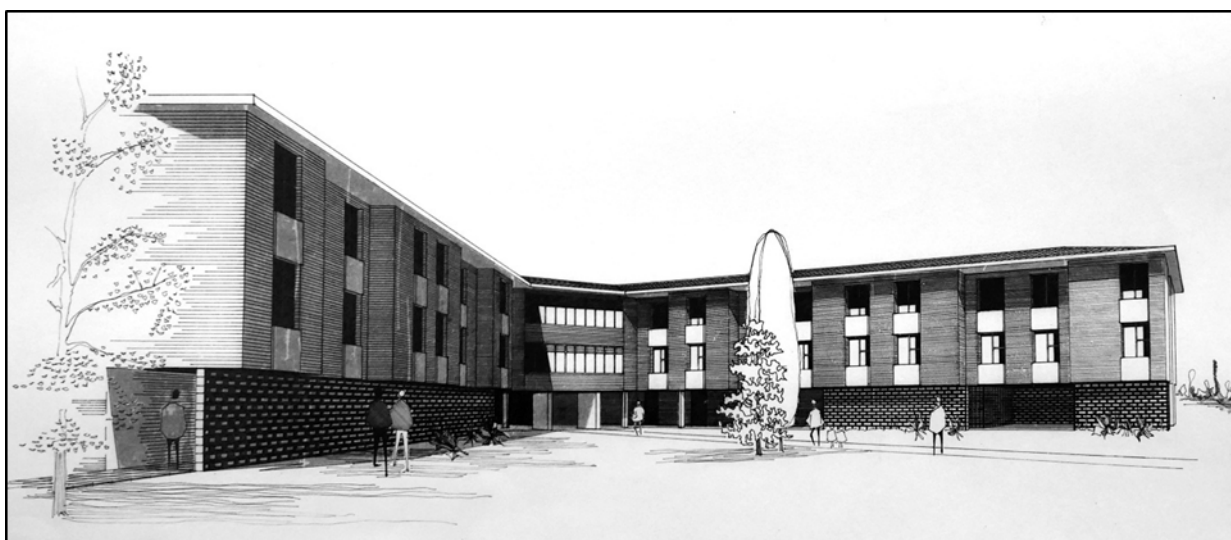


Figure 2. The Endeavour Hostel, Randwick, Sydney: Accommodation blocks, view between two wings. Date Unknown: 1966-69, Source: NAA: MP1760/1, M1966/46354.

During the 1960s and 1970s Sydney was producing itself as a modern, world-class city, one that was artistically and culturally informed and in part, through its architecture, a coveted destination.¹⁴ In *Works Review* there was an emphasis on the new international terminal in Sydney constructed over marine mud and billed to bring “world class air travel facilities” to the region.¹⁵ Sydney’s emergence as a world-class city coincides with changing policies to the welfare services offered to incoming refugees along with bipartisan political criticism for assimilation based resettlement policies. During this period, new methods of articulating national identity in regards to Australia’s developing diversity emerge as attitudes around Multiculturalism shift from ideas based on integration to assertions that individuals and groups have a right to maintain their cultural and/or religious distinctiveness, approaches and practices.

These policy changes arguably contributed to a slow shift in conceptions of nationhood from being anchored in British allegiances to one that situated Australia independently in the global exchange of economies and people. This position of Australia, via Sydney, as a progressive nation, striding towards a cosmopolitan future is important when considering the role played by hostel designs, such as the Endeavour, in advancing national ideals.¹⁶ In examining the narratives that bracketed and contextualised hostel design in government sponsored publications, it is possible to consider how their architecture was used to promote Australia as a destination built anew but also how past allegiances continued to resurface.

Experiments in housing incoming migrant and refugee populations after the Second World War can be traced back to the Department of Works and Housing's Commonwealth Building Experimental Station. The Station was set up between 1944 and 1945 and was initially under the jurisdiction of the Department of Post-War Reconstruction and then moved shortly after to the Department of Works and Housing and relocated to North Ryde in Sydney.¹⁷ Fundamental to its inception was the housing shortage that occurred during the Second World War and continued into the 1950s and in early cabinet propositions for a building station the impetus for housing construction research is outlined:

"The Commonwealth Housing Commission has indicated to this department that to build houses more economically than before the war, new methods of construction will have to be developed and existing methods rationalised. This will require research and experimentation with both existing and new construction methods. Much of the investigation cannot be undertaken without facilities for constructing experimental buildings which can be subjected to weather conditions and other practical tests. For this purpose, there is a need for an experimental building station."¹⁸

The earlier incarnation of the station aimed to develop technologies directly connected to housing such as prefabricated mechanical equipment for low cost housing and prefabricated concrete housing due to a shortage of the traditional materials of bricks and timber after the Second World War. The station was conceived and practiced with the cooperation of industry, professions and in collaborative partnership with the Council for Scientific and Industrial Research.¹⁹

Featured in Volume 4 of the *Technical Memorandums* by Department of Works and Housing is a selection of diagrams that show a variation on emergency accommodation for single-men migrants. The aims of this research conducted in early 1949 is outlined: "Attached are sketches showing how the basic shells of permanent houses could be used economically to serve as hostel for single-men immigrants, and subsequently completed as permanent houses of normal standard."²⁰ At this early stage of the post-war drive to populate, the recruitment emphasis was on young, single men to generate a workforce for infrastructure projects and to satisfy the emerging need for industrial labour. In the early hostels, referred to as migrant camps, genders were frequently segregated into men and women with men often separated from accompanying partners and children. The plan for this adaptive re-use of housing advocated six basic shells per community unit with four being occupied as dormitories and one consisting of part dormitories, part laundry, and another as the dining hall and ablutions block. This basic arrangement was shared by early built hostels that would be defined by divisions between dormitories and eating blocks that resembled in planning military barracks and were frequently assembled from left over army materials. In this scenario, the plan was for 38 people. A notable feature of this adaptive plan for hostels was the efficiency in materials, with most materials planned to be reused in the second housing incarnation with the only foreseeable waste being the plywood screens between cubicles. This dwelling strategy was not to replace the network of hotels emerging throughout Australia towards the end of the 1940s, as the project report states:

"It is not suggested that this type of development is suitable for the housing of all immigrants, but it is suggested that it is a practicable and economical way of providing for single men in areas where permanent housing will in due course be required, i.e. adjacent to large factories, mines etc."²¹

The project was advocated on the economic platform that "completing the house shells at a later date for permanent occupation should not be greater than if carried out originally."²² This housing experimentation generated a simple and innovative way to generate adaptive housing solutions for large incoming populations and could be viewed as a very early manifestation of the adaptive housing discourse that is prevalent today. Although the Building Station's main aims were to investigate new construction technologies along with developing substitute materials, the drive to maximise the efficiency of migrant accommodation can be linked to wider political motivations.

This research was initiated at a time when housing shortage concerns was occupying government at all levels and had arguably contributed in part to the fall of the Federal Labour government in 1949. In the first phases of post-war European migration, there was a political need to reassure voters that incoming migrants would not compete with Australian-born citizens for housing.²³ This experimentation with housing models that can adapt to be reused after the immediate influx of temporary workforces dissipates fits with this political agenda. In the later housing incarnations of hostel experiments such as the Endeavour, these concerns about reassuring the existing Australian-born population about housing competition dissipates in intensity. Instead new concerns emerge about projecting an image of a modern Australia to recruit dwindling migrant numbers from desired countries in Europe. The later projects were undertaken by the Public Works Department in conjunction with both the Department of Labour and National Service and the Department of Immigration. In the administration of these departments it was deemed necessary for the new dwellings to be convenient and comfortable to help project Australia as modern, open and flush with possibility. The negotiation between ideas about what constitutes home and unsettlement can be seen in the architecture, which exhibits design strategies that draw from both the house and the motel.



Figure 3. The Endeavour Hostel, Randwick, Sydney: New communal laundry facilities, 1971. Photograph Credit: Department of Immigration and Multicultural and Indigenous Affairs which at the time the photograph was commissioned was titled the Department of Immigration. Source: NAA: A12111, 1/197/22/20.

From the Motel to the House

Sarah Treadwell in her article “The Motel: An Image of Elsewhere,” offers a useful image of the motel: “Away from the architecture of the metropolis, situated in suburbs and wastelands where hotels will never be sited, constructing both the margins and the marginal, the motel is a transit form that mediates between a fixed address and vagrancy, between home and the car.”²⁴ The Endeavour, like most city based migrant hostels was situated in the suburban margins. Hostels occupied Commonwealth land that was either associated with industry or leftover from the war effort such as former munitions factories. In the architecture of the Endeavour there is an interplay between the motel, the hotel and the house that was consistently re-negotiated through subsequent changes in facility management. This programmatic interplay highlights the transitory form of accommodation and the hostel was packaged by the federal government as a short stay in a migrant’s journey to home ownership. Contemporary, collective images of the motel picked up from film history and historians evoke a domesticity that is marginal, frequently seedy and physical shells that are often rundown and decrepit. However, as Philip Goad suggests in his article “A Short Stay: The Motel and Australian Architecture,” the motel in the 1950s and early 60s was a new type of building that offered domestic privacy in relation to its counterpart the hotel and its often-shared corridors and bathrooms.²⁵ The motel’s connection to car travel, offered it the allure of modern forms of privacy as argued by Graeme Davison “the motel carried the privacy of travel established by the motor car into an essentially self-contained cellular form accommodation.”²⁶

One of the guiding aims behind the Endeavour’s design was to increase privacy for families. In the initial planning for the Endeavour it stipulates the design cater only for family units of four or more. This highlights the shift in the demographics the department wanted to recruit – shifting away from an emphasis on single male workers to families. In evidence to a Parliamentary Standing Committee on Public Works, the supporting documentation asserts: “The living accommodation is so planned as to provide the greatest flexibility in the use of the available space, and simultaneously to enable families to live in as normal a family setting as is practicable within a hostel system.”²⁷ This quote is pertinent as it encapsulates the two pivotal agendas, one to maximise space for increased capacity and two to provide standards of accommodation akin to independent apartments to foster an environment conducive to homemaking practices. The Endeavour consisted of four accommodation blocks and one large administration block which included the communal kitchen and dining room,

child minding facilities along with areas for staff. The four accommodation blocks were replicas with minor adjustments and were striking in scale and form for a hostel development due to their radial planning of six accommodation wings. In each core, connecting the six wings was the shared male and female bathrooms along with a shared telephone booth and laundry drying rooms. The arrangements of units in each extruding wing from the core was planned with flexibility by using inter-communicating doors to cater for shifts in the number and the ages of children in each family. In the initial planning stages each unit consisted of at least two bedrooms, some more - one master bedroom which could be occupied by the parents but also used as a family living room. It was equipped with a divan bed which could be converted into a compact settee for seating when the program of the room shifted to a living room and the secondary bedrooms were joined to the master. These family units also contained toilets and hand basins.

The car is largely absent from this design, unlike roadside motels which pivot on the transition from car to room. However, the entrance to each family's accommodation often comes directly off the internal covered walkways and at times roads, encapsulating that sense of privacy seen in the motel. Unlike the motel, the corridor of the hotel still lingers in its needs to be navigated to get to the shower. In this division and arrangement of rooms, there are traces of three domestic types, the motel, the hotel and the third is a more abstract attempt to render the home within these two transitory forms. One of the key aims of the new hostel designs, that was consistently reiterated in the departmental records and published reports, was that the architecture was to be less institutional in appearance. However, outside this repeated ambition and the furnishing of rooms with modern amenities and styles, the architecture in plan suggests a different reading. These clusters of radial wings make an imposing impression and from the aerial photography shots produced it evokes an institutional design for some type of incarceration or confinement such as a prison.

It is not in the scope of this short paper to trace the heritage of colonial prison architecture, particularly Parramatta Goal, that clearly informed this arrangement.²⁸ However, it is important to note though that the Enterprise in Melbourne which adopted a simile of this radial wing arrangement, was used temporarily as a detention centre in 1988 when three women and their children were transferred from the Maribyrnong Detention Centre. These new detainees shared facilities with other residents but were restricted from leaving the hostel grounds.²⁹ This quiet shift from accommodation to detention possibly suggests that the radial plan arrangement inherently lends itself to

spatial control. Considering this was the selected planning arrangement for purpose-built designs for the resettlement of migrants, it suggests departmental tensions that point to public anxieties around the type of accommodation and it inscribed agendas that should be offered to incoming people in need of accommodation. Apart from the planning similarities to the prison in the use of radial wings and cores, the internal layout of the rooms and their furnishings along with the disjuncture between sleeping quarters and communal everyday living such as eating or laundry suggest spatial configurations seen in the motel. The motel proliferated in Australia in the 1950s and 1960s and was viewed as a wholesome family destination, particularly on a long regional drive away from the city. It represented the benefits of an economically prosperous, modern Australia awash with American convenience that resulted in the ability to undertake independent, family travel.³⁰ The Endeavour's reference of the motel was to use the utilitarian domestic model to maximise space but the wider cultural suggestions were ideal for use in publications to entice migrants to Australia.



Figure 4. The Endeavour Hostel, Randwick, Sydney: Street view, 1984 Photograph Credit: Department of Immigration and Multicultural and Indigenous Affairs which at the time the photograph was commissioned was titled the Department of Immigration and Ethnic Affairs.

Source: NAA: A12111, 2/1984/22A/562.

Conclusion: Advertising Opportunity through Housing

Outside the publications that were produced in house by various departments for a professional audience such as *Works Review* and *Company Tidings*, there was considerable promotional material published to recruit migrants to Australia. Up until the 1970s, the Department of Immigration produced versions of a booklet titled,

Migrant Hostels in Australia, that was sent overseas to prospective countries in Europe. The booklet was divided into two categories: a British edition and a European edition and in 1969 was printed in 17 languages - the corresponding editions had minor differences but were structured the same. In the period between 1966 and 1970, revisions happened approximately bi-monthly marking minor changes to the text and predominantly updating the list of running hostels and tariff charges. There was significant debate between the different stakeholders involved with migrant hostels about how to represent hostel architecture and facilities, namely how to display an accurate image of the diverse standards across Australia while emphasising the modern and opportune facilities that the Endeavour was considered to represent. The Endeavour and its Melbourne replicate, the Enterprise were used to define current migrant hostel facilities and presented as the height of decades of housing experimentation for new arrivals:

“What are migrant hostels? They could be described as large boarding establishments, varying in capacity from 250 to 1500. Some are former armed service establishments which were vacated after the war and converted for migrant accommodation. Others were built in the early 1950s especially for the purpose of receiving migrants. Experienced gained over the years has resulted in great improvements in the planning and design of hostels. Two new hostels have been built, Endeavour at Randwick, Sydney and Enterprise at Springvale, Melbourne. These new hostels incorporate features designed to provide for all reasonable requirements of migrants.”³¹

The new dwellings with privacy for individual families along with updates of everyday technologies such as the inclusion of film projection equipment and telephones was pitched to prospective migrants and displaced people as a springboard for modern life in Australia. However, as this passage vaguely foreshadows, there were impressed notions about how the new facilities should be used and received by incoming people.³²

The Endeavour's completion contributed to a network of hostels across Sydney that during mid to late 1970s began to decrease in operative scale. Select hostels such as the Endeavour remained opened and were used to house large numbers of refugees displaced from the Vietnam War. The Endeavour's completion accentuates a significant juncture and convergence of immigration policies in relation to refugees with

on one hand materialising the necessity for better, more liveable accommodation for economically disenfranchised populations. However, at the same time within government departments existing hostel sites were beginning to be considered as locations for future purpose built Immigration Detention Centres. The radial planning seen in the Endeavour and its counterpart the Enterprise do suggest prison spatial formations and when considering Australia's subsequent immigration histories, these designs foreshadow the emergence of networks of immigration detention. However, simultaneously these housing complexes borrowed from commercial domestic templates such as the motel to both maximise the programmatic efficiency demanded in government subsidised housing but also to render the possibility of a home in an institution. This packaging of future opportunity through domestic tropes associated with a prosperous and modern Australia was emphasised in how the Endeavour was visually and textually represented in different divisions of government publications for varying demographics. By positioning the architecture at the forefront, this paper initiates a discussion on how the range of spatial strategies informing hostel design along with the tentativeness to declare an approach, indicates the anxieties around federal government hospitality towards migrants and refugees entering Australia.

¹ Australia. Dept. of Works, *Works Review / Commonwealth of Australia Department of Works* (Canberra : Australian Govt. Pub. Service, 1969-70): 18-19.

² Australia. Parliament, *Proposed Migrant Hostel at Randwick, Sydney N.S.W.: Evidence to the Parliamentary Standing Committee on Public Works by the Department of Labour and National Service* (Canberra: Australian Govt. Pub. Service): Exact date unknown, range: 1966-69 (NAA: MP1760/1, M1966/46354).

³ Commonwealth Hostels Limited, *Company Tidings: Staff Journal of Commonwealth Hostels Limited*, 9, 6, December (1970), 5; For information on the Enterprise see: *A worthwhile enterprise: the migrant hostel in Springvale* (Melbourne: Immigration Museum 2008.)

⁴ Bunning and Madden, *The work of Bunning & Madden*, (Sydney: Bunning and Madden, 1970), 68-69

⁵ Australia. Dept. of Works, *Works Review*, 18-19.

⁶ Australia. Commonwealth Experimental Building Station, *Office Record/Dept. of Works and Housing, Commonwealth Experimental Housing Station*, (Sydney: The Station, no. 76-100, 1949): Office record no. 95/File no. GE/827.

⁷ Sara Wills, "Between the hostel and the detention centre: possible trajectories of migrant pain and shame in Australia," in William Logan and Keir Reeves (eds.), *Places of Pain and Shame: Dealing with Difficult Heritage*, eds. (New York: Routledge, 2009), 263-280.

⁸ See: Don McMaster, *Asylum seekers: Australia's response to refugees* (Melbourne: Melbourne University Press, 2001); James Jupp, *From White Australia to Woomera: the story of Australian immigration* (New York: Cambridge University Press 2002).

⁹ Australia. Parliament, *Proposed Migrant Hostel at Randwick*, Sydney N.S.W, 4-8.

¹⁰ See: Klaus Neumann, *Across the Seas: Australia's Response to Refugees: A History* (Melbourne: Schwartz Publishing Pty. Ltd, 2015): 189-245.

¹¹ Julie Willis "Commonwealth Department of Works," in Philip Goad, Julie Willis, (eds.), *The Encyclopedia of Australian Architecture* (Melbourne, Vic.: Cambridge University Press, 2012):164-165.

¹² Australia. Dept. of Works, *Works Review / Commonwealth of Australia Department of Works* (Canberra: Australian Govt. Pub. Service) 1957-1973.

¹³ Australia. Dept. of Works, *Works review*,18-19.

-
- ¹⁴ Michael Symonds, "Outside the spaces of modernity: Western Sydney and the logic of the European city," in Helen Grace, et al., *Home/world: space, community and marginality in Sydney's west* (Annandale, N.S.W.: Pluto Press, 1997), 67.
- ¹⁵ Australia. Dept. of Works, *Works Review*, 69-70, 3.
- ¹⁶ See Ghassan Hage, *Against paranoid nationalism: searching for hope in a shrinking society*, (Annandale, Vic.: Pluto Press, 2003); Suvendrini Perera, *Australia and the insular imagination: beaches, borders, boats*, (New York: Palgrave Macmillan, 2009). Also see James Juppe (ed.), *The Australia people: An Encyclopedia of the Nation, Its People and their Origin*, (North Ryde, N.S.W. : Angus & Robertson, 1988).
- ¹⁷ Terence Williamson, "Building and Construction Research" in Philip Goad, Julie Willis, (eds.), *The Encyclopedia of Australian Architecture* (Melbourne, Vic.: Cambridge University Press, 2012):164-165.
- ¹⁸ Australia. Parliament. Cabinet Agendum No. 565(b), November 1943. Appendix 1, Experimental Building Station in Geoff Bock, *The end was to build well: a half-century of Australian government building research* (North Ryde, N.S.W.: CSIRO Australia, Division of Building, Construction and Engineering, 1995): 6-7.
- ¹⁹ Geoff Bock, *The end was to build well*, 11.
- ²⁰ Building Station, *Office Record*, No. 95.
- ²¹ Building Station, *Office Record*, No. 95.
- ²² Building Station, *Office Record*, No. 95.
- ²³ Ann-Mari Jordens, *On Accommodating Migrants*, Administration, Compliance and Governability Program, Working Paper No. 19, (Canberra: Australian National University, Research School of Social Sciences, 1994)
- ²⁴ Sarah Treadwell, "The Motel: An Image Elsewhere," *Space and Culture*, 8, 2 (May 2005) 214.
- ²⁵ Philip Goad, "A Short Stay: The Motel and Australian Architecture," in Amor Connors ed., *Motel: Exhibition Catalogue*, (Melbourne: Melbourne School of Design, The University of Melbourne, 2015): 9-18.
- ²⁶ Graeme Davison, Sheryl Yelland, *Car wars: how the car won our hearts and conquered our cities*, (Crows Nest, NSW: Allen & Unwin, 2004), 99, as quoted in Paul Hogben and Judith O'Callaghan, *Leisure Space: The transformation of Sydney, 1945-1970*, (New South Publishing, Sydney, 2014):74.
- ²⁷ *Endeavour Migrant Hostel, Randwick, NSW, Part 2*, (NAA: MP1760/1, M1966/46354).
- ²⁸ James Semple Kerr, "Designing a colonial goal," in Lenore Coltheart (ed.), *Significant sites : history and public works in New South Wales*, (Sydney : Hale & Iremonger, 1989), 40-51.
- ²⁹ *A worthwhile enterprise: the migrant hostel in Springvale*, (Melbourne: Immigration Museum, 2008), 18.
- ³⁰ Goad, *A Short Stay: The Motel and Australian Architecture*, 9-18.
- ³¹ "Revision copy for April British edition," in *Dept. of Immigration pamphlets* (NAA: B146, 1966/1000).
- ³² See discussion of migrants with Turkish heritage in *Dept. of Immigration pamphlets*, (NAA: B146, 1966/1000).

The Problem of Air New Zealand House in 1960s Auckland

Luciana Mota
Federal University of Bahia

Elizabeth Aitken Rose
University of Auckland

Julia Gatley
University of Auckland

Abstract

In the 1960s, Auckland's Downtown site at the prominent No. 1 Queen Street gateway faced comprehensive redevelopment, with a series of proposals combining the clearance of numerous old buildings and their replacement with a convention centre, department stores, high-rise office buildings and a public space that ultimately became known as Queen Elizabeth II Square. The Square was proposed in the first scheme developed by Professor Robert Terence Kennedy of the University of Auckland. A later scheme, by Connor & Associates, introduced a 22 storey office building on its north side.

This paper explores the controversy surrounding this office building: Air New Zealand House. Groups of young architects and planners, particularly members of the Auckland Architectural Association (AAA), objected to the building, because of the negative effects they believed it would have, including increased wind speeds at street level at its base and excessive shading on the Square to its south.

Utilising archival documents and newspaper reports, this paper examines the campaign against this urban renewal proposal and the technologies that the opponents used to build their case, and to demonstrate and present their concerns, particularly wind tunnel testing. The main research question becomes, how effective were the technologies of the day in predicting the negative impact that Air New Zealand House would have on its immediate surrounds?

In the end, the Auckland City Council gave permission for the construction of Air New Zealand House. As built, it confirmed all the predictions about increased wind speeds and shading; QEII Square's value as a public space

was compromised from the outset. The paper shows that economics and politics were privileged over amenity value. And the decision was short-sighted, as evidenced by another major redevelopment of the site, underway at the present time.

Introduction

In the 1960s, the use of wind tunnel testing for building research was relatively new. Early testing had used aeronautical wind tunnel technology to investigate aspects of wind-building interaction, but discrepancies in the results had not proven credible. In the early 1960s, however, researchers began to overcome inconsistencies and develop the technology to make it more reliable.¹

These advances coincided with the comprehensive redevelopment of cities post-war and the proliferation of high-rise office buildings utilising steel and concrete-framed construction. Wind tunnel testing was further developed to investigate the relationship between buildings and wind. The First International Conference on Wind Effects on Building and Structure was held at Farnborough, in the United Kingdom, in 1963. This event heightened awareness of the technology and its possibilities. The central prerogatives were: 1) to measure the force of the wind on façades, which now often comprised light-weight cladding systems such as glass curtain walling; and 2) to understand the extent and effects of increased wind speeds at street level, around the bases of high-rise buildings.² In this way, there is a direct relationship between the modernist architecture of the period and the improvement of the wind tunnel testing technology to analyse the design of new buildings and their locations in urban contexts.

This paper explores what is thought to be the first New Zealand example of wind tunnel testing for a proposed building: No. 1 Queen Street, gateway to Auckland's main commercial thoroughfare and abutting the waterfront, which in this era, was designated mainly for port activities. The now iconic 'red fence' sealed off public access to piers and the sea. Known in the design phase as Office Block No. 1, it was renamed Air New Zealand House (1968-72) and is now HSBC House. The paper is part of more extensive research on the 1960s Downtown Scheme, with future work drawing on interviews with architects, planners and legal counsel, to elucidate the processes involved in the decisions towards an arguably compromised outcome for Auckland's public realm.

By the 1960s, the lower or northern end of Queen Street had become rat-infested and dilapidated as the city's economic locus moved from the port, uphill to the south. Much of it was reclaimed land and primarily owned by the Auckland Harbour Board (AHB). The Board began to make plans for the renewal of a substantial tract of land bounded by Quay Street and Customs Street. This paper does not aim to present a history of the Downtown area, already covered by Robert Hanson, John Sutherland and Dennis Smith.³ Instead, it focuses on the design and realisation of Office Block No.1/Air New Zealand House, its effects on its immediate neighbour, Queen Elizabeth II Square (QEII Square) (see Fig. 1 and Fig. 2) and the campaign mounted against it.

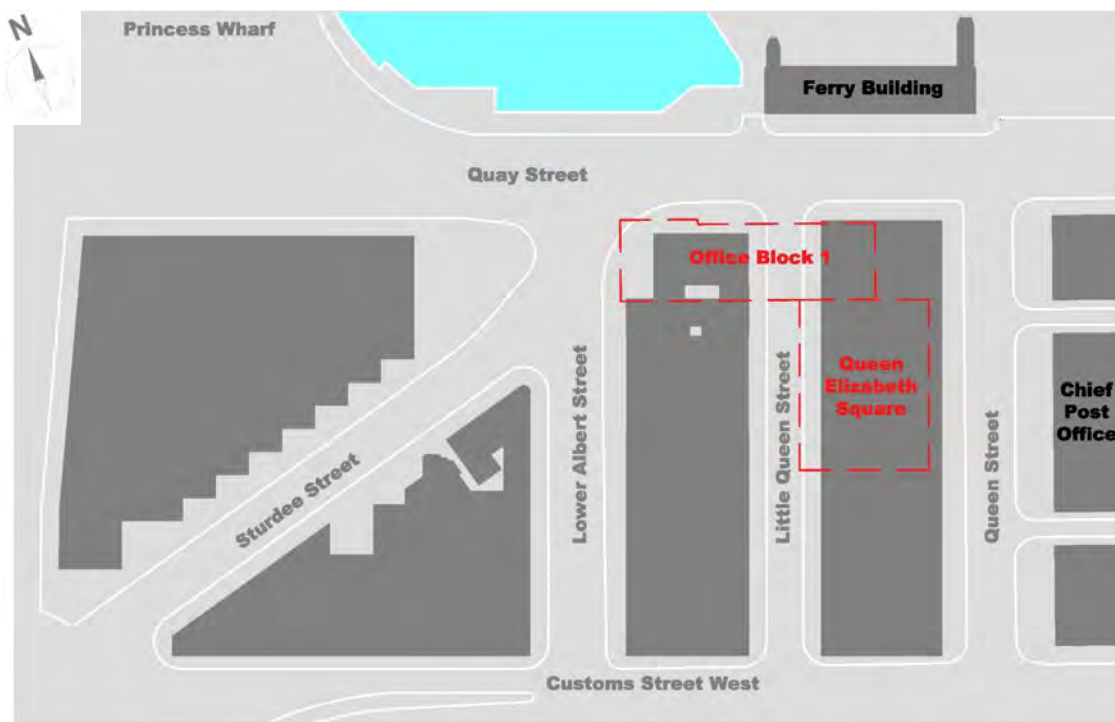


Figure 1. Downtown Auckland in 1968, with the locations of Office Block 1 and QEII Square identified in dotted lines. Image by Luciana Mota. Adapted from Hanson, "Urban Renewal and the Downtown Area," 1968.

A group of young architects and legal counsel, many of whom went on to have significant careers, led the resistance. Ivan Juriss, Marshall Cook and David Mitchell eventually won the New Zealand Institute of Architects' (NZIA) highest honour, the Gold Medal, with Julian Miles and Paul Cavanagh becoming Queens Counsel. The campaign employed the current building technologies, including solar charts and wind tunnel testing, to investigate shadowing and wind speeds around the base of the proposal.⁴ Despite the evidence presented, the Auckland City Council and Town and Country Planning Appeal Board (now the Environment Court) dismissed the objections in 1968. The 21-storey office building, with ground floor retail space and basement car parking, was completed in

1972 (developed by the AMP Society, designed by Peddle, Thorp & Walker, and built by Mainline-Dillingham-Fletcher Ltd), with Queen Elizabeth Square II opening in 1980.⁵ The campaign's predictions were vindicated, with politics and economics privileged over amenity values. The paper begins with a brief contextual overview of the Downtown Scheme before examining, in greater depth, the Office Block No. 1 proposal and the main strands of the debate and evidence presented leading up to its approval.



Figure 2. Downtown Auckland in 2017, before recent demolitions.
Image by Luciana Mota. Adapted from Auckland Council's GIS.

The Downtown Scheme

Professor Robert Kennedy, an English architect-planner, appointed in 1957 to establish the University of Auckland's Department of Town Planning, was commissioned by the AHB to prepare the first plans to redevelop the Downtown area. His outline plan, released in January 1964, covered a 13-hectare site – five owned by the AHB.⁶ Among other ideas, he envisaged closing the northern block of lower Queen Street, along with Little Queen Street and Sturdee Street to the west, to accommodate 20 new multi-storeyed commercial and residential buildings. Central to this was the creation of a substantial pedestrian plaza abutting the sumptuous Edwardian Baroque Chief Post Office (built 1909-12, with a street frontage of 55 metres). To be known as Queen Square, it would “provide ample room for the civic amenities and embellishments of sculpture, fountains, trees and plants.”⁷ Kennedy also proposed a 22-storey office block on the northwest side of the Square (see Fig. 3).



Figure 3. Part of Kennedy's Downtown proposal. Image by Luciana Mota. Adapted from Smith, "A Short History of the Sixties Downtown," 2013.

For Stage 1 of the redevelopment, the AHB then commissioned George J. Connor & Associates to prepare a study for a smaller 2.83-hectare site bounded by Queen, Customs, and Quay Streets, with an emphasis on commercial feasibility. The Connor proposal abandoned residential development in favour of shops, offices and car parking. The podium also went, and Lower Queen Street was retained, with a much-diminished square to the west. The 22-storey tower (now referred to as Office Block No. 1) moved from the north-west to the northern boundary of the square (see Fig. 4).

Armed with both possible master plans, the AHB invited developers to tender for Stage 1, while emphasising that a firm decision had not yet been made. Although both schemes were included in the tender documentation, the Board's preference, in its statement of outcomes, was aligned with the Connor plan.⁸

The tender closed in January 1966. Three months later, the AHB announced the winner – the Australian and New Zealand consortium of Mainline-Dillingham-Fletcher (MDF). The bid included a series of conditions. Among these, the consortium required that a life insurance company (in fact, the AMP Society) would own the principal office block sites.⁹ The enactment of the Auckland Harbour Board Loan and Empowering Act 1967 enabled the Board to create a freehold title for No. 1 Queen Street, meeting MDF's terms.¹⁰



Figure 4. Connor & Associates' Downtown proposal. Image by Luciana Mota. Source: Sutherland, "Downtown Auckland," 1976.

Approval for Office Block 1

The process to secure Auckland City Council approval for proceeding with MDF's scheme started in June 1966, when the consortium submitted a report and a set of drawings of the Downtown Scheme to the Council for analysis. The Director of Works and City Engineer, A. J. Dickson, noted that three buildings – Office Blocks 1 and 2 and a Motel – all infringed the height limit of 110 feet (33.53 metres) and "the bulk control of 65 degrees from the centre line of the adjacent street."¹¹ Thus, the buildings did not comply with the height limits and angular plane provisions specified in the Council's District Scheme (subsequently District Plan). Dickson also expressed concern about the shading that Office Block 1 would cast over the square. He noted that the public space would be entirely in shadow from approximately 11:00 a.m. to 1:30 p.m. at the time of equinoxes in September and March each year, and from around 10:00 a.m. to 2:00 p.m. at the time of the winter solstice in June.¹² Recommending approval of the proposal in principle, he advised, among other things, that "further consideration should be given to the relationship between Office Block No. 1 and the proposed Square."¹³ Following Dickson's advice, the Town Clerk approved the project in principle in August 1966.¹⁴

MDF's solicitors sought formal confirmation of the approval in April 1968.¹⁵ At this time, Dickson explained to the Town Clerk that Council had not yet given consent for the construction of Office Blocks 1 and 2 and that it would need to consider both under Ordinance 901, because of their height and bulk.¹⁶ Upon learning this, the consortium

sought a dispensation for Office Block 1 to exceed the height and bulk regulations and a further exemption to build colonnades instead of verandahs on the street frontage.¹⁷ B. Duder, from the Town Planning Division, suggested the reorientation of the Block from east-west to north-south alignment to the Deputy Mayor A. O. Glasse as a viable option.¹⁸ It was to no avail, and in June 1968 the Council's Town Planning Committee granted the dispensations.¹⁹ By this time, MDF had secured Air New Zealand as the future occupant of Office Block 1.

The Office Block 1 Campaign

As soon as the dispensations became publicly known, the Auckland Architectural Association (AAA), a lobby group formed in 1965, complained that the Auckland City Council had not publicly notified the proposal.²⁰ The New Zealand Institute of Architects (NZIA) soon raised its concern too. All parties recognised that formal objections would delay the project and that even the threat of such a delay could influence the financial backers to withdraw from the project.

Despite this possibility, the AAA, NZIA, University of Auckland's School of Architecture and Department of Town Planning staff, and other young Auckland architects started a campaign against the construction of Office Block 1. In July 1968, the AHB attended meetings with the AAA and University staff to try to "correct misconception" about the scheme. Meanwhile, the project architects increased the proposed height of the colonnade to 10 feet (3.05 metres), but refused to move the tower to a different part of the site.²¹

Besides the AAA and the NZIA, which were represented by the same solicitor (Nicholson, Gribbin & Co), two more groups soon raised objections. One comprised architects Nigel Cook, Marshall Cook and David Mitchell, and the other, architects Ivan Juriss and Keith E. Hay, architectural student Allan Quinn and solicitor Frank Haigh. Their objections were against the height and bulk of Office Blocks 1 and 2, and the lack of verandahs on Office Block 1 and the Parking Building. The Auckland City Council would only consider the objection against the height and bulk of Office Blocks 1 and 2 – not the lack of a verandah on Office Block 1 or the Parking Building.²²

From the outset, the NZIA had been tentative in expressing its objection. Following discussions with the AHB, it withdrew, leaving the other groups to proceed without it.²³

The Hearings and the Experiment

Council heard the objections at a special meeting in August 1968. Julian Miles, representing the team of Cook, Cook and Mitchell, clarified that their only complaint was the positioning of the Office Block 1. They based this on the “technical nature relating to sun and shade diagrams and the effect of winds upon buildings of this height.”²⁴ They claimed that Queen Square would be “virtually shaded in its entirety from approximately 11:00 a.m. to 2:00 p.m.,” exactly “the time when the users of this square are going to want to use it.”²⁵ Miles presented evidence of wind tests carried out in England on a model of a building of a design similar to Office Block 1. Research showed that “when winds hitting a building at approximately this height hit the building, are drawn down to the square itself in a type of vortex action and, by the time it reaches the ground level it is going at something like twice its original speed.”²⁶

At the August meeting, the Juriss group presented an alternative design, relocating Office Block 1 from the site’s northern boundary to a more central location, on the west side of the Square (see Fig. 5). They aimed to find a solution that would save the public square from the shade of the building. They also worked to increase opposition to the proposed design by publishing their arguments and an alternative plan in the *AA Bulletin*.²⁷

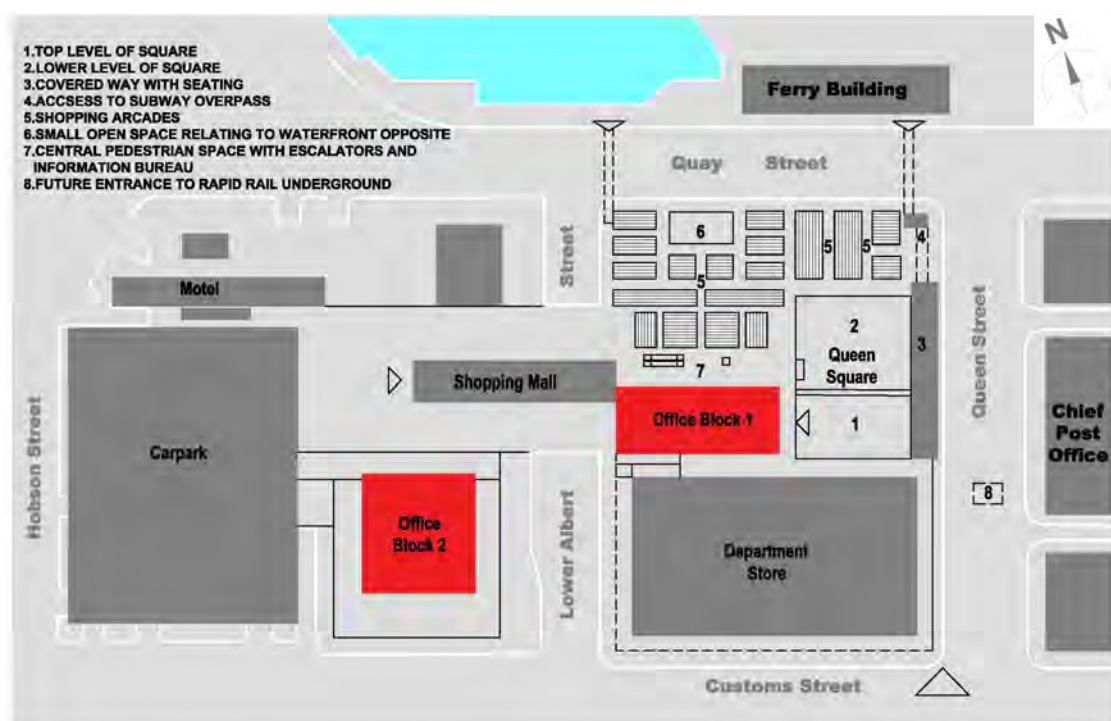


Figure 5. Alternative scheme proposed by the Juriss group.
Image by Luciana Mota. Adapted from *AA Bulletin*, no. 22, n.p.

Other objectors included Mr Curtis, from the AAA, and Professor Kennedy. Curtis noted that the location of Office Block 1 had been raised in the discussions held in 1966, yet the AHB's architects had not modified their design. Kennedy, invited by the AHB to comment on the MDF proposal, was particularly conscious that his plan had been superseded.²⁸

David Beattie QC (later Sir David Beattie and Governor General) represented the AHB. Referring to an article by D. E. Sexton – an engineer at the United Kingdom's Building Research Station (BRS) – he argued that “no series of tests on typical cases can provide sufficient information to predict what conditions will occur around all arrangements of building and many ad hoc tests of new developments have been made.”²⁹ He concluded somewhat bizarrely, given Auckland's windy subtropical climate, “that vortex formations by a large building is not necessarily an unwelcome problem. In hot, humid regions, wind speeds are often low, and by correct choices of building shapes a vortex can be generated which will provide welcome breezes.”³⁰ There is no record of the Sexton publication to which Beattie was referring, although the comment may have been taken out of context from a report mentioning Sexton, believed to have been given to the Council by David Mitchell. Beattie may also have been alluding to Sexton's early work in the field, where Sexton noted that it was not “possible in wind tunnel equipment to reproduce correctly all the features present at full scale, for example, the turbulence or gustiness of the wind.”³¹

Although Beattie's attestation demonstrates the extent to which the technology was still thought to be in its infancy in the 1960s, studies on the wind effects of tall buildings were being carried out around the world. The BRS, in particular, responding to concerns about pedestrian discomfort and damage to doors and windows in shopping precincts and around multi-storey buildings, was demonstrating that it was possible to create an acceptable test correcting the irregularities of earlier technologies.³² In a 1964 publication (reprinted in 1965), Sexton described a BRS wind tunnel costing around £2,500, “constructed in part of an existing building, 75ft x 40ft on plan”, and similar to one constructed at the Texas Engineering Station.³³ In an article published in 1968, however, Sexton outlines a simplified model: one “suitable for teaching purposes and ad hoc testing in relation to airflow around buildings”, costing around a £1,000, not requiring special contractors and fitting into a space not exceeding 20ft long by 15ft wide by 10ft high (6.0m by 4.5m by 3.0m).³⁴ (see Fig. 6)

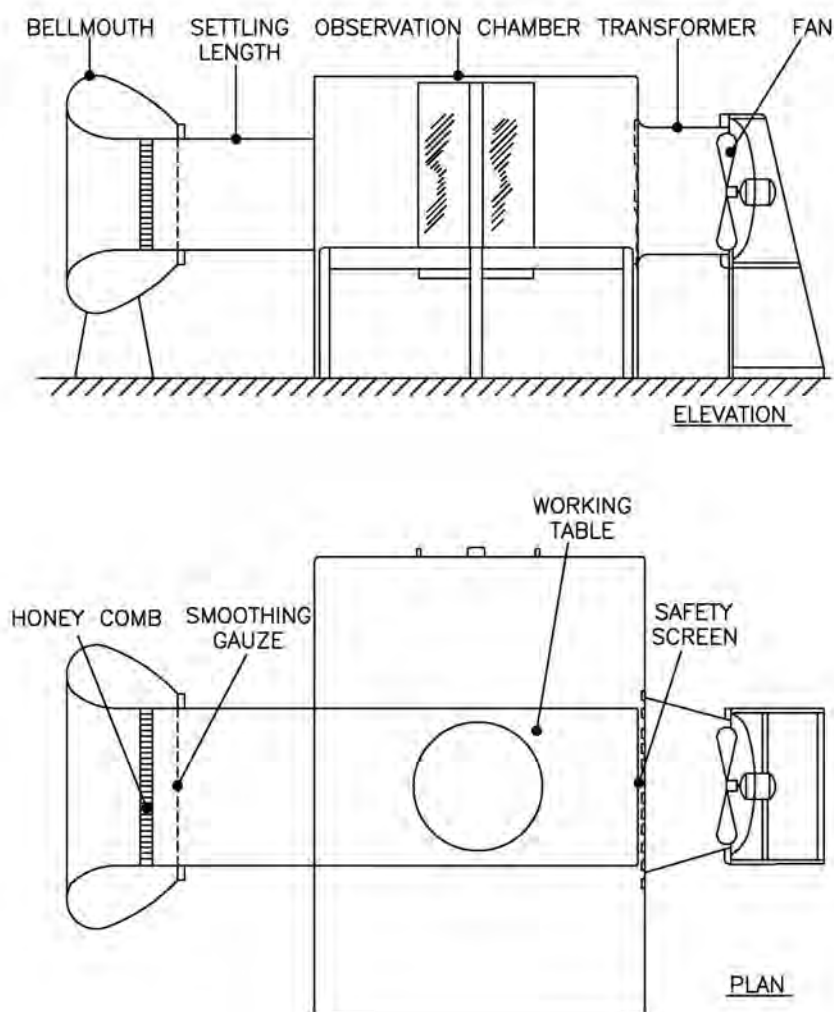


Figure 6. Simple wind tunnel design by Sexton. Image by authors.
Source: Sexton, "A Simple Wind-Tunnel for Studying Air-Flow Round Buildings," 1968.

At the hearing, Beattie also asserted that his clients could not re-position Office Block 1 because Air New Zealand (now the tenant) wished for "maximum visibility," and that the Juriss alternative was "an unfavourable location from the point of view of public access." He suggested that Queen Square "should rather be called a 'place'," and as a square, people should consider Office Block 1's first-floor terrace: a "7,000 sq. ft. [650.3 square metres] Garden deck into the sun, with a view, for the use of Aucklanders."³⁵

The Auckland City Council found in favour of the developers. While recognising the shade and wind effects that the tall building would have on the Square, councillors concluded the impact did not justify "a reduction in the permitted height of the building that could jeopardise the construction of this building, and might perhaps result in the abandonment of the whole Downtown Scheme." Furthermore, they claimed that they did

not have the jurisdiction to require the applicants to relocate the building elsewhere on the site.³⁶

Cook, Cook and Mitchell continued their campaign against Office Block 1, drawing up a petition asking the Auckland City Council to deny the project planning permission, collecting signatures on the streets of Auckland.³⁷ They also made what is thought to have been New Zealand's first wind tunnel for testing the wind effects of a proposed building. The Tunnel, constructed in the former Browns Mill building (Durham Lane, Auckland), was based on Sexton's drawings, which Nigel Cook took from one of the British journal articles then recently published.³⁸

The article describes the design and performance of a simple, low-speed wind tunnel that Sexton had constructed inside an old building. Cook, Cook and Mitchell's wind tunnel included a scale model of the Downtown Scheme with fans and smoke to demonstrate the effects of wind. Their efforts generated media attention, with Television New Zealand screening the experiment on its *Town and Around* programme,³⁹ the nightly magazine-format current affairs show that followed the evening news in the mid-to-late 1960s.

The Juriss and Cook, Cook and Mitchell groups decided to appeal the Council's decision. They sought to get the dispensations allowing the building to breach the Council's height limit and angular plane provisions revoked – although the re-siting of the building remained their preferred option. The case was heard by the Town and Country Planning Appeal Board in October 1968. The Board, convinced by the AHB and MDF claim that “the proposed office building was appropriately sited and well designed and was unlikely to cause any but minimal difficulties as regards shade or wind,” upheld the Council's decision to grant the dispensations.⁴⁰

The Aftermath

When Air New Zealand House opened, it was immediately apparent that all the predictions regarding wind effects and shading were realised, exactly as per the objectors' research and analyses. In particular, the wind tunnel tests performed by Cook, Cook and Mitchell were verified *in loco*, after construction.

The corner of Air New Zealand House at the intersection of Queen and Quay Streets was soon recognised as problematic. Indeed, in a 1974 newspaper article highlighting the “swirls around the tall buildings of the downtown redevelopment scheme”, senior Auckland City Council planner, J. R. Betts, described it as a “particularly bad spot”.⁴¹ That

year, the Council commissioned staff at the University of Auckland's School of Engineering to conduct a wind tunnel test for the building, in an effort to work out how to relieve the effects of the wind on pedestrians.⁴² Now accepting the wind effects, MDF (by this time Fletcher-Mainline Downtown Ltd) expressed interest in the results, to inform the design of the canopy "as a continuation of the office block colonnade to the Queen and Customs Streets corner".⁴³ One of those involved in the testing, D.H. Freeston, a senior lecturer in Engineering, concluded that the results showed that "the presence of the canopy resulted in no significant improvement under north-east wind conditions," and only "slight improvement directly under the canopy with south-west winds."⁴⁴ The Downtown saga appears to have prompted the University to take an interest in wind tunnel testing, with a tunnel built at the School of Engineering City Campus in the late 1960s and research becoming well established in the following decade.⁴⁵

The criticisms continued. In 1976, architect and future academic John Sutherland published an appraisal of the completed parts of the Downtown Scheme. Although QEII Square was unfinished, he could already describe the effects as predicted in 1968:

The square is no place for the less than hardy when shaded and no place at all when moderate breezes blow. A TV2 programme last year was able to find someone actually blown off their feet, Wellington style.⁴⁶

A 1977 book, *Walking Around Town*, identified the Square as one of four New Zealand examples of public spaces that suffered from wind and shading issues. The author, J. Mackay, noted that the winds were stronger higher up the exterior walls of the building and the "downflow twists into a horseshoe vortex, which wraps around the building, causing high velocities at street level near the front face and corners of the building."⁴⁷ Of the Square, he wrote:

Within the Square the air is gusty, and a clockwise rising vortex sucks up litter and deposits it on the three-storey roof of the shopping complex. Meanwhile, at the front face of the building, the aggravated wind conditions make the crossing of Quay Street to the ferry terminal very unpleasant.⁴⁸

In rethinking the future of the Downtown site in 2014, the Auckland Council (which subsumed the Auckland City Council in 2010) commissioned an evaluation of the public spaces in the area. This evaluation re-confirmed all earlier assessments, concluding that the Square was an uncomfortable space: in the shade "at the crucial lunchtime and evening times most of the year," with "localized wind turbulence caused by wind shear of adjacent buildings."⁴⁹ When the Council sold much of the city block in 2015, there was

little expectation that the public space would survive redevelopment. Thus it came to pass in 2016, despite a vigorous legal challenge from the Auckland Architectural Association over the Council's right to sell the land and sacrifice public space in a city already short of urban squares in its heartland.

Conclusion

This paper has examined the controversy that surrounded the realisation of Auckland's Air New Zealand House in the 1960s, including the use of the new and emerging technology of wind tunnel testing for buildings in urban environments, as part of a campaign to prevent the building from being built as per the original design. The paper shows how the young New Zealand architects researched international developments in the technology available at that time and applied their research to the specifics of the design for Air New Zealand House and its context.

The design of Air New Zealand House coincided with the dissemination of the new research on wind tunnel testing, at conferences and in books and journals. The publications were available in New Zealand, enabling Nigel Cook, Marshall Cook and David Mitchell to build their wind-tunnel, utilising a scale model of the scheme. They produced an accurate forecast of the increased wind speeds and shading that the new building would have on its surrounds, to the detriment of pedestrians.

Their conclusions had little impact at the time. The Auckland City Council gave permission for Air New Zealand House to be built, including dispensations so that it could exceed the Council's prescribed height and bulk regulations, because of concern that if it did not meet the developers' demands, then they might withdraw from the project.

The completion of the building confirmed all the concerns regarding increased wind speeds at the base of Air New Zealand House and its shading of QEII Square at times when members of the public were most likely to use it. Post-occupancy comments affirmed that the wind tunnel investigations made by Cook, Cook and Mitchell in 1968 had been correct in their results and conclusions.

At the time of writing, the whole of the Downtown site is again under comprehensive redevelopment. Given the dissatisfaction about the wind and shading effects, it is perhaps surprising that it took 50 years to address the issues. Even so, Air New Zealand House (HSBC House) stays, while most of the public space to its south goes, to be replaced by more tall buildings.

Notes

- ¹ T. V. Lawson, *Wind Effects on Building: Volume 1, Design Applications* (London: Applied Science Publishers Ltd, 1980), 268-269.
- ² Angus J MacDonald, *Wind Loading on Buildings* (London: Applied Science Publishers Ltd, 1975), 19; D. E. Sexton, "Design and Performance of Wind Tunnel for Building Research", *Building Science*, 1 (1965): 141-151.
- ³ Robert A. C. Hanson, "Urban Renewal and the Downtown Area," BArch unpublished sub-thesis, University of Auckland, 1968; John Sutherland, "Downtown Auckland," *NZIA Journal* 43, no.5, (October 1976): 8-27; and Dennis Smith, "A Short History of the Sixties Downtown," *Architecture New Zealand*, no. 2 (2013): 25-37.
- ⁴ From 1967, sun-path diagrams for the latitude of Auckland (36.8°S) were available in Lyndon Bastings, *Sunshine and Shade: A Handbook for New Zealand* (New Zealand: Building Research Bureau of New Zealand Inc., 1967).
- ⁵ "Queen Elizabeth Square," *Te Ara*. Accessed May 28, 2018, <https://teara.govt.nz/en/photograph/22956/queen-elizabeth-square>.
- ⁶ R.T. Kennedy, *Auckland Central Area Properties: Report and Redevelopment Plan*, January 1964, Kennedy Papers, Box 21, Architecture Archive, University of Auckland; and Smith, "A Short History of the Sixties Downtown," 26.
- ⁷ "City Gateway Worthy of Best Country Can Offer In Fine Buildings," *New Zealand Herald*, February 26, 1964.
- ⁸ Auckland Harbour Board, "Invitation to a Tender for Central Area Properties Development Scheme, Stage 1," Prospectus, Part 1, 1965.
- ⁹ Smith, "A Short History of the Sixties Downtown," 33.
- ¹⁰ Auckland Harbour Board Loan and Empowering 1967, no. 7, 1462-1463.
- ¹¹ Letter, A. J. Dickson, Director of Works and City Engineer, Auckland City Council, to the Town Clerk, 27.07.1966, 5, ACC 275, Auckland Council Archives.
- ¹² Letter, Dickson to Town Clerk, 6.
- ¹³ Letter, Dickson to Town Clerk, 8.
- ¹⁴ Memorandum for the Director of Works and City Engineer, August 25, 1966, ACC 219, Auckland Council Archives.
- ¹⁵ Letter, Finlay, Shieff, Angland & Maclaren, to the Town Clerk, April 18, 1968, ACC 275, Auckland Council Archives.
- ¹⁶ Letter, A. J. Dickson to the Town Clerk, May 22, 1968, ACC 275, Auckland Council Archives.
- ¹⁷ Letter, Finlay, Shieff, Angland & Maclaren, to the Town Clerk, June 4, 1968, ACC 275, Auckland Council Archives.
- ¹⁸ Memorandum of Discussion, June 5, 1968, ACC 275, Auckland Council Archives.
- ¹⁹ "Downtown' Dispensation," *Auckland Star*, June 19, 1968.
- ²⁰ "Dispensation on Downtown Plans Criticized," *Auckland Star*, June 22, 1968.
- ²¹ "Builders Oppose Scheme Delay," *New Zealand Herald*, July 30, 1968; "Objection Can Delay Scheme," *Auckland Star*, July 23, 1968.
- ²² Letter, A. J. Dickson to the Town Clerk, August 5, 1968, ACC 275, Auckland Council Archives.
- ²³ Letters of objections, July 26, 1968, 4, Auckland Council Archives.
- ²⁴ Minutes of Meeting of Council, Downtown Scheme, August 13, 1968, 12, ACC 275, Auckland Council Archives.
- ²⁵ Minutes of Meeting of Council, 12.
- ²⁶ Minutes of Meeting of Council, 13.
- ²⁷ "Downtown," *AA Bulletin*, 22 (1968): n.p.
- ²⁸ Minutes of Meeting of Council, Downtown Scheme, August 13, 1968, 21-25, ACC 275, Auckland Council Archives.
- ²⁹ Minutes of Meeting of Council. 27.
- ³⁰ Minutes of Meeting of Council, 27.
- ³¹ A. F. E. Wise, D. E. Sexton and M. S. T. Lillywhite, "Urban Planning Research: Studies of Air Flow Round Buildings," *Architects' Journal*, Vol. 141 (19 May 1965): 1185-1189, 1186.
- ³² Wise, Sexton and Lillywhite, "Urban Planning Research," 1185.
- ³³ Sexton, "Design and Performance of a Wind Tunnel for Building Research", 141.
- ³⁴ D. E. Sexton, "A Simple Wind Tunnel for Studying Air-Flow Round Buildings," *Architect and Building News* (June 26 1968): 983-985.
- ³⁵ Minutes of Meeting of Council. Downtown Scheme, August 13, 1968, 27-29, ACC 275, Auckland Council Archives.

³⁶ Letter, G.O. Sims (the Town Clerk) to the Objectors, August 15, 1968, ACC 275, Auckland Council Archives.

³⁷ "Objectors Revisit QEII Wind-Tunnel," *New Zealand Herald*, October 5, 1996.

³⁸ Pers. comm. Nigel Cook to authors, May 30, 2018.

³⁹ "Objectors Revisit QEII Wind-Tunnel."

⁴⁰ The Town and Country Planning Appeal Board, Decision, November 21, 1968, ACC 275, Auckland Council Archives.

⁴¹ "Calm Down! The Boffins are Doing Something about it," *Auckland Star*, December 12, 1974.

⁴² "Calm Down! The Boffins are Doing Something about it."

⁴³ Letter, Fletcher-Mainline Downtown Limited to the City Planner, J. R. Betts, Auckland City Council, October 29, 1974, ACC 275, Auckland Council Archives. In 1971, as condition in allowing the construction of the Office Block 2, Council required the redesign of the covered pedestrian way shown on the original plans, and that it "shall be completed no later than the date of completion of the main building". Letter, J. R. Betts, Principal Planner – Projects, to the City Secretary, November 22, 1974, ACC 275, Auckland Council Archives.

⁴⁴ Letter, J. R. Betts, Principal Planner – Projects, to the City Secretary, December 2, 1974, ACC 275, Auckland Council Archives.

⁴⁵ Pers. comm. Professor Richard Flay to the authors, April 20, 2018.

⁴⁶ John Sutherland, "Downtown Auckland," *NZIA Journal* 43, no.5 (October 1976), 24.

⁴⁷ John D. Mackay, *Walking Around Town: Planning for Pedestrians in New Zealand* (Wellington: Town and Country Planning Division, Ministry of Works and Development, 1977), 22.

⁴⁸ Mackay, *Walking Around Town*, 46.

⁴⁹ RESET Urban Design, *Downtown Public Open Space Evaluation: Final Report*, September 4, 2014. Report commissioned by the Auckland Council.

Concrete: A Western Australian tradition

Andrew Murray

University of Melbourne

Abstract

In 1961, The Hale School Memorial Hall was completed in Perth, Western Australia. While Jennifer Taylor credits the building with the introduction of béton brut into Australia she also described the building as a “strangely isolated example”, not joined by a similar work until the completion of the Social Sciences Building at Flinders University, Adelaide in 1969. Yet in the period between these two buildings Australia saw a wide range of béton brut experiments carried out which laid the ground work for the materials widespread acceptance in the 1970s. This paper contends that rather than being an isolated example the Hale School Memorial Hall spurred on a wave of béton brut buildings in Western Australia throughout the 1960s, constituting what could be considered a regional tradition. Ian Molyneux has previously identified the key role that concrete played in Western Australia during this period, suggesting that it is the use of concrete, particularly off-form concrete, which constitutes the most visible and significant contribution that Western Australia made to contemporary Australian architecture. However, to date this contribution has received little scholarly attention. This paper then sets out to chart a nascent history of béton brut buildings in the 1960s in Western Australia. It examines a decade of material and formal experimentation looking particularly at the key role that recent graduates, publications, and the construction industry played in the formation of this tradition.

Introduction

Jennifer Taylor wrote in *Australian Architecture since 1960* on the introduction of *béton brut* concrete into Australia.

The first of the 'beton brut' concrete buildings was the Hale School Memorial Hall in Perth by Marshall Clifton in association with Anthony Brand...At the time of its completion in 1961 it was greeted with mixed cries of outrage and applause. The crudeness and uneven forms of some of the concrete work point to its experimental nature and the immaturity of the concrete industry at the time... [it was] a strangely isolated example and it was not until the completion in 1969 of the Social Sciences Building at Flinders University that it was joined by a work with similar, formalist pretensions.¹

With this statement, Taylor glossed over an entire decade of concrete experiments in Australia and this narrative sequence remains largely unchallenged. This paper seeks to redress this view, demonstrating that the 1960s in fact saw the widespread development of *béton brut* buildings across the country; a series of buildings that would mount a significant challenge to the orthodox modern movement. Particularly, this paper looks at the Western Australian contribution demonstrating that rather than being a "strangely isolated example", the Hale School Memorial Hall instead acted as a catalyst for a series of experimental *béton brut* buildings carried out in the early 1960s by a small group of closely connected young architects. Architectural historian Ian Molyneux has suggested that it was the use of concrete, particularly off-form concrete, that is the most visible and significant contribution that Western Australia has made to contemporary Australian architecture² and this paper sets out to chart the extent of this contribution. This paper aims to not only record this series of buildings, but importantly to ask why they happened, when they happened.

The 1960s was a formative decade in the rebuilding of Australia driven by the relaxing of wartime rationing coupled with a series of economic growths. The arrival of new technologies, changing consumer tastes and unrivalled economic prosperity led to a period characterised by a variety of architectural expressions and ideological debates. One of the most visible of these new expressions was an increasing use of exposed concrete across a range of institutional and civic buildings. Widely used in major projects by architects like James Birrell, Daryl Jackson and John Andrews, concrete became closely linked to ideas of postwar progress and what has come to be known as Brutalism, which, as Philip Goad describes, was an idiom that was "a key partner in the rediscovery of the Australian landscape... and the Australian city."³ However, as illustrated by the coverage in Taylor's

book, the increasing use of concrete during this period has received little scholarly attention. Miles Lewis' book *200 Years of Concrete in Australia* remains the most comprehensive text on the material generally, however the postwar contribution is almost entirely overlooked. A handful of examples are illustrated, but the use of *béton brut* is mentioned only twice - in reference to the undercroft at the UWA Winthrop hall, completed in 1927 as the first, and the completion of Stanhill apartments by Frederick Romberg in 1950.⁴

J.M. Freeland's *Architecture in Australia* makes mention of the material, positioning the increased use of off-form concrete, along with other "warmer" and "textured" materials as central to the development of an architectural approach more "thoroughly and distinctly Australian."⁵ Freeland illustrates this approach with the Hale School Memorial Hall, alongside Goldstein Hall, designed by the New South Wales Government Architect Branch (1964) but does not elaborate much beyond the images. Jennifer Taylor's *Australian Architecture since 1960* – despite its side-stepping of the 1960s – provides the broadest survey of postwar concrete buildings in Australia to date. She devotes a chapter to those buildings which exploit the rich possibilities and sculptural qualities of the material, described as "Rational and Robust."⁶ These are predominantly projects from the 1970s, and she describes the use of concrete in the 1960s as "commonly used... but its prosaic treatment in general commercial and industrial buildings... was quite distinct from the heroic plastic use that had characterised Japanese, European and American architecture of the previous decade."⁷

The 1970s certainly saw the widespread use of expressed concrete around Australia, however, there was a range of "heroic" concrete buildings completed throughout the 1960s that have not been accounted for – buildings which laid the foundation for the materials success in the later decades and played an important part in the early rebuilding of postwar Australia. Early examples were often found in educational settings, praised for its hard wearing, low maintenance qualities.⁸ Christ College, Hobart (1960), the Highways Department Offices, Adelaide (1964), Union College at The University of Queensland (1964-65), Goldstein Hall, The University of Sydney (1964), and the considerable output of the NSW Government Architects Branch from 1964 onwards represent key moments in the early use of off-form concrete.

The heroic use of concrete in the 1960s has been the subject of much recent scholarship internationally, particularly surrounding its role in the formation of Brutalism. The recognition and excavation of buildings from this period is exemplified in the recent campaign *SOS Brutalism*, an initiative of the Deutsches Architekturmuseum to complete a

global survey of significant brutalist buildings in order to raise awareness of their increasingly threatened status.⁹ EPFL in Switzerland have released a series of books which look at the central role that concrete played in the work of Louis Kahn, Le Corbusier, Nervi and German architecture.¹⁰ In Australia, Philip Goad has produced the most comprehensive update to Taylor's "Rational and Robust" grouping, in his recent *Fabrications* article "Bringing it all Home: Robin Boyd and Australia's Embrace of Brutalism, 1955-71".¹¹ Here, Goad highlights a range of key buildings overlooked in Taylor's survey, including Seidler's 1967 Killara House, Bogle & Banfield's Total Car Park (1965), and the work of Dirk Bolt in Hobart. Other seminal concrete buildings from the 1960s have been featured in a range of recent texts, including *Hot Modernism* which includes the work of James Birrell at the University of Queensland and Glenn Harper's "The Brutalist Project Sydney" which comprehensively maps brutalist projects throughout New South Wales.¹² This paper aims to build on these recent revisions, further illustrating the particularly strong and cohesive body of work produced in this period.

It is important at this point to define the parameters of terms and be clear in the paper's intention. This paper specifically seeks to address the use of *béton brut*, concrete which is left untreated after the formwork is removed, or "a concrete whose surface bore the traces of the grain of the wooden moulds, the imprint of the building process."¹³ It looks specifically at those buildings in Western Australia that use this process as the generator of design, or as Miles Lewis describes, in "architecturally conspicuous locations."¹⁴ This is important to distinguish as *béton brut*, or off-form board marked concrete, had been used extensively since the early 20th century for engineering and other structures. This paper uses Western Australia as a case study with the intention of charting a geographically specific group of concrete buildings and the situation in which they were produced, by way of highlighting the diversity present in postwar architectural practice in Australia.

The Hale School Memorial Hall

The first of the major *béton brut* building completed in Western Australia was the 1961 Hale School Memorial Hall, designed by Marshall Clifton and Anthony Brand, architects in Association, with R.J. Ferguson as the design architect. The Hall was to be the centre piece of the new Hale School campus, an elite private boys school located in the garden suburb of Wembley Downs. Brand and Clifton were tasked with designing the new school, but given the demands of designing an entire campus they were unable to complete the Hall in time. Instead, in 1960 Brand sought help to finish the Hall from fellow Perth Technical College (PTC) graduate, R.J. Ferguson, the two having just commenced a private practice together, Brand and Ferguson.



Figure 1: Hale School Memorial Hall, Wembley Downs, 1961.

Source: *Cross-Section* Archive, Melbourne University.

Ferguson, then 28, had recently returned from a formative three-year trip abroad, working for a year and a half with Chamberlin Powell and Bon (CPB) on the Barbican redevelopment, and later driving across Europe and Asia visiting many of Le Corbusier's buildings along with a range of vernacular architecture. Working on the Barbican project, which was then designed with a highly polished smooth concrete finish, does not appear to have had any significant formal influence on Ferguson's practice. Instead he suggests that the major lesson he took from his time at CPB was confidence – losing any fear of big jobs.¹⁵ Rather it was an interest in architectural traditions and the finely textured board marked concrete surfaces he saw in the buildings of Le Corbusier, and a series of houses in Switzerland during this trip which would most directly influence the first years of his practice.

Upon his return, Ferguson was keen to put into practice the exciting new concrete processes he had seen on his travels, and the dramatic, monumental presence implied by a memorial project provided the ideal application. Ferguson had never built with concrete before, and in 1960 he used another project which the practice Brand and Ferguson had just been awarded, the Fremantle South Terrace Primary School, as a kind of testing ground for the Hall. A modest two-storey state primary school, the soffit of the first-floor balcony provided the opportunity for Ferguson to experiment with the material. Despite the diminutive scale, the project clearly illustrates Ferguson's enthusiasm for *béton brut* and was constructed within months of returning from his study trip. Ferguson specifically chose

jarrah boards for the formwork which were sawn in different thicknesses and arranged to emphasise the surface texture, which was later scaled up for use in the Memorial Hall.

The beginnings of a tradition

The Hale School Memorial Hall was a dramatic building, and had an immediate impact on the local profession, particularly after it was awarded the RIBA Bronze Medal for 1959-1961 and the *Architecture and Arts* Australian building of the year in 1962, the journal calling it “one of Australia’s most significant buildings.”¹⁶ *Cross-Section* described it as “courageous” suggesting “this architecture, may serve as a touchstone of taste and temperament for many years to come.”¹⁷ The infamous local architectural commentator Caliban, pseudonym of architect Peter Parkinson, noted shortly after its completion, “Hale School Hall is a sophisticated exercise in surface texture and abstract balance, and as such is a building with which to be extremely pleased.”¹⁸ While the profession generally admired it, it was a shock to the school and the general public. An opinion piece in *The Architect WA*, describes this tension, “The Hale School Hall used a form of construction which was not only totally untried in WA, but also uncommon elsewhere...and it was only the medal which saved the building from being rendered and the architects from being sued.”¹⁹

Despite the divisive reception from the public, the young architectural profession took up the material with gusto and the Hale School Memorial Hall can be seen as the starting point for a series of experimental works carried out in the state over the next several years. From 1960-1965 a small but confident brace of buildings were completed in almost total *béton brut*, mostly carried out by a small group of well-connected and adventurous young architects. These buildings quickly caught the attention of the *Cross-Section* editors and in 1965 they noted, “Western Australia has set the pace for the rest of Australia in off-form concrete buildings.”²⁰ The first to follow from the Memorial Hall was the 1962 Celtic Club designed by Silver and Goldberg, notable for its large scale brise soleil stretched across the front facade. Hawkins and Sands built a series of buildings on Cottesloe Beach including an enormous boardwalk, kiosk, and change rooms, followed in 1963 by the Mosman Park School for Deaf Children which was a bold white concrete building set just back from the beach. A block of flats designed by Brand, Ferguson and Solarski in 1963 also on Cottesloe Beach mixed *béton brut* with concrete blocks. These were followed by the completion of the first stage of Western Australian Institute of Technology (WAIT) in 1964, designed by the Public Works Department (PWD) headed by Vin Davies, and stage 1 of St Mary’s Anglican Girls School designed by Margaret Feilman.

Many of these were directly influenced by Ferguson’s Memorial Hall. Robert Hanlin, design architect for the deaf school and St Mary’s school had worked closely with Ferguson and

Anthony Brand on construction methods and mix colours, and Vin Davis has readily acknowledged his admiration for the “Corbian” nature of the Hall.²¹ The success of these early experiments led to a series of striking works in the late 1960s and into the 1970s. These include the Kings Park office buildings (Krantz and Sheldon, 1966), The UWA Law School and Sports Centre (R.J. Ferguson, 1967, 1970), Marine Research Laboratory (CCN, 1968), the second stage WAIT Campus (PWD 1965-68), CBH Office (Geoffrey Summerhayes, 1969) and Forbes and Fitzhardinge’s ANZ Bank (1966-67), Freemasons Hall (1967), and series of three City Beach Change Rooms (1970).



Figure 2: Western Australian Institute of Technology, Bentley. 1964.

Source: *Constructional Review*, February 1966.

The Influences

The network of architects and engineers involved in these buildings was deeply interconnected, individuals often assisting on other projects and providing help with construction details and finishes. The architectural community in Western Australia in the early 1960s was a tight knit group and this proved to be a fertile ground to share and disseminate architectural ideas. The recent arrival of significant émigré architects alongside a contingent of well-travelled students contributed to a healthy architectural discourse, bolstered by the local institute journal *The Architect WA*. But what led to the flourishing of this particular material? This is a task far beyond this brief paper, but a range of motivating factors can be identified, including: an emerging concrete industry, the support of local journals, and the experimental, practical qualities of the material.

By this time Ferguson was offered the Hale School Memorial Hall commission in 1960, there was a well-established local concrete industry, and large-scale testing of the material

was already occurring. The use of precast panels or frames and experiments with domes, folded plate and hyperbolic paraboloid structures were common, and precast concrete panels were being used to construct houses regularly through the WA State Housing Commission in the early 1950s.²² The use of reinforced concrete frames were common place in high rise developments and most large infrastructure projects were completed in concrete including dams, bridges and silos. Two notable concrete architectural experiments carried out during this period were the 1958 Display Pavilion at the Claremont Showgrounds, and the Tawarri Dome. Designed by the Architectural division of the PWD, with engineering carried out by Lew Harding, the Display Pavilion was a concrete hyperbolic paraboloid, inspired by the recent work of Candela.²³ The Tawarri Dome was designed by Tony Brand (before he joined with Ferguson) while at Forbes and Fitzhardinge in 1957, with the structure designed by William (Bill) Barton. While not a paraboloid, the building was a three-pointed concrete shell dome, with glazing slotted in between the large arched openings.

Experiments like these ensured local practices and engineers were familiar with the process and the potential limits of the material. The engineer for the Hale School Memorial Hall, Peter Bruechle, recalls this familiarity noting it was the board marked finish not the structure that was difficult:

The structure didn't bother me. I could design the structure in reinforced concrete, that wasn't the real problem, it was the finish... Fergy [R.J. Ferguson] made test panels, and he used sawn boards, and deliberately got them sawn so they had a pattern on them. It was all a bit experimental.²⁴

The use of concrete in Western Australia was supported and advocated by the building industry at an early stage, and the abundance of good local sand and aggregate made it a cost-effective and attractive option.²⁵ The Leederville Technical College began a course in concrete practice instigated in 1955 by the RAIA, Master Builders' Federation, Department of Education and the Swan Portland Cement company to improve "the lamentably low standard of concrete construction in W.A." which architects and builders eagerly attended.²⁶ The course was so popular that a second was implemented to cope with demand. The "low standards" were clearly improved and a second national office of the Cement and Concrete Association of Australia (CCAA) opened in Perth in 1962.²⁷ The CCAA later organised the first off-form concrete conference in Australia, held in Perth in October 1964 titled "The Off-Form Concrete Surface Finishes Symposium."²⁸ Local hardware retailers got involved as well, and in 1964 Bunnings began advertising timbers specifically designed for use in off-form concrete formwork announcing "Timber gives

concrete new look”.²⁹ Local journal *The Architect WA* often published articles on the science of concrete and reported on symposiums held in Sydney, technical information on waterproofing, the use of timber formwork for surface finish, as well as republishing a lengthy article by Nervi from the 6th Congress of the International Union of Architects (UIA) on reinforced concrete in September 1961.³⁰ Weekly construction newsletter *Building and Construction* ran a special on concrete and its application across four issues in June 1962,³¹ and national journal *Constructional Review* often published WA work and technical information.

Aside from its cost-effectiveness, another major factor which may have contributed to the widespread uptake of the material was its weather resistant properties. West Australian architects were acutely aware of the need to protect against the difficult climate³² characterised by direct sun, driving rain, and specifically salt erosion from the coast, and the ability for concrete to resist these conditions was quickly seized upon. Desmond Sands, then President of the RAIA WA, espoused the benefits in a conference paper noting that the use of concrete is often necessitated in locations near the ocean which are affected by severe salt deterioration and the amount of costly maintenance which could be avoided by the use of concrete.³³ He echoed this sentiment when discussing one of his own projects several years later, the Cottesloe Boardwalk, noting that “The major design consideration was the need to withstand wear from coastal weather and public alike.”³⁴ Anthony Brand also highlighted the importance of this when designing a series of sculptural concrete beach kiosks in 1970, using a series of curved forms to keep the concrete in compression so that it wouldn’t crack, resisting the corrosive beach conditions.³⁵ Indeed many of the key off-form concrete buildings in the early years were located either on, or next to the beach, giving further credence to the idea that its early appearance in Perth was closely tied to its ability to resist salt erosion.

Almost all the examples described used a similar formwork technique and surface patterning despite the wide range of formwork process and finishes available at the time. The use of rough sawn, 15cm by 5cm (6 in. x 2 in.) timber formwork resulting in a deeply textured surface which was shared across a number of these projects. The use of timber formwork had many advantages for architects in Western Australia – it could be re-used and was relatively cost-effective compared to other treatments.³⁶ But the use of *béton brut* by this group of architects was largely ideologically motivated and was sought out for its aesthetic and textural capacity rather than any pragmatic qualities it possessed. Ferguson for example was interested the human scaled quality achieved by the finely board marked surface, something he saw lacking in the smooth finish that resulted from the use of large plywood sheets he observed in Le Corbusier’s work at Chandigarh.³⁷ Similarly Rob Hanlin’s

choice of material in the Mosman Park School for Deaf Children was aesthetically motivated, suggesting that the brilliant white of the concrete with rough board markings would enhance the sensorial experience for the students.³⁸

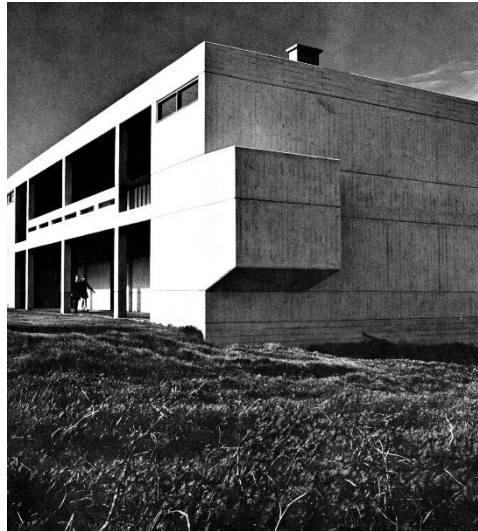


Figure 3: Mosman Park School for Deaf Children, Mosman Park. 1963.

Source: Sowden, *Towards an Australian Architecture*.

A practical tradition

An interest in the functional attributes of concrete and the ‘can-do’ attitude espoused by young engineers like Peter Bruechle draws upon a long-standing practical building tradition in WA. Ian Molyneux has described this tradition stating, “A belief in the principles of rational analysis of requirements and technological options has since remained the dominant ideological basis of architectural study in Western Australia.”³⁹ A practical building culture was deeply ingrained in the state, historically driven by a lack of materials, money, and skill.⁴⁰ The architectural course at PTC established by W.H. Robertson in 1946 continued this tradition, which Duncan Richards described as “far too practical in nature, trade based training rather than education.”⁴¹ Adrian Forty suggests that more so than other materials, concrete facilitates the ability to experiment, allowing the architect to be their “own alchemist”,⁴² and for young Western Australian architects and engineers, concrete clearly enabled exciting new formal opportunities. It possessed a satisfyingly functional, tectonic quality that aligned with local traditions, while allowing for self-expression. It was hard wearing and weather resistant, and the deeply textured, craggy surface produced a wonderfully pleasing aesthetic quality in the unrelenting sunshine.

Significantly, it provided a way to continue the practical building tradition outside of the strong masonry tradition that had persisted in WA since the 19th century, in part due to the high quality of brick production in the city facilitated in part by the large numbers of clay pits.⁴³ This was a legacy developed through great historic civic works designed by government architects George Temple Poole and Hillson Beasley in the late 19th and very early 20th century, and which continued on into the 1950s. Major public buildings like the Agnes Walsh Nurses Home (1955) and the Sir Charles Gairdner Hospital (1958) were designed by the PWD in brick, as well as many significant government schools like Governor Stirling Senior High School (1956). Unlike brick, concrete did not hold any particular cultural significance to the state; it was a modern, introduced material. The enthusiastic embrace during the 1960s of concrete by young architects demonstrates the easy fit it achieved in Western Australia, and the opportunity it provided for the construction of a new tradition.

Conclusion

The late 1950s in Western Australia saw the arrival of émigré architects, a wealth of students returning from overseas travel, and a building rush triggered by a recent mineral boom which set the scene for an active start to the following decade. Building on a series of experimental concrete buildings from the 1950s along with increasing industry support, the 1960s bore witness to a range of *béton brut* buildings produced by a young, tight-knit group of architects and engineers excited by the possibilities of this new process, openly learning and sharing their experiences with each other.

Arguably triggered by the completion of the Hale School Memorial Hall, the widespread use of off-form concrete in Western Australia throughout the 1960s constituted what could be considered a new regional tradition. The plasticity of forms and the robust, economical nature of the material proved to be the ideal vehicle for a new generation of Western Australian architects. The use of heavily textured *béton brut* was a deliberate and considered decision and it symbolised a dynamic changing of the guard in the profession. For this group of architects, *béton brut* provided a medium to critique the orthodox modern movement while continuing a legacy of practical and robust solutions so deeply ingrained in local architectural practice. This paper has identified a brief but intense period of development in concrete expression which occurred in Western Australia, but one that was echoed around the country. These buildings provide an alternative perspective on the shift that occurred between the largely conservative public architecture of the immediate postwar period and the confident pluralism evident in the 1970s, of which the use of *béton brut* played a significant role.

Endnotes

- ¹ Jennifer Taylor, *Australian Architecture Since 1960*, (Sydney: Law Book Co., 1986), 79-80.
- ² Ian Molyneux, "Building in Western Australia 1940-1979," in *Western Towns and Buildings*, eds. Margaret Pitt Morison and John White (Nedlands: UWA Press, 1979), 153.
- ³ Philip Goad, "Bringing it all Home: Robin Boyd and Australia's Embrace of Brutalism, 1955-71," *Fabrications* 25, 2 (2015), 208.
- ⁴ Miles Lewis, *200 Years of Concrete in Australia* (North Sydney: Concrete Institute of Australia, 1988), 103.
- ⁵ J.M. Freeland, *Architecture in Australia: A History* (Melbourne: Cheshire, 1968), 305.
- ⁶ Taylor, *Australian Architecture Since 1960*, 78.
- ⁷ Taylor, *Australian Architecture Since 1960*, 79.
- ⁸ "Technical College," *Constructional Review* 41, 3 (1968), 15.
- ⁹ Oliver Elser, Philip Kurz and Peter Cachola Schmal, *SOS Brutalism: A Global Survey* (Zurich: Park Books, 2017). See also: SOS Brutalism, <http://www.sosbrutalism.org>.
- ¹⁰ For example: Roberto Gargiani and Anna Rosellini, *Le Corbusier and Ineffable Space, 1940-1965: Surface Materials and Psychophysiology of Vision* (Lausanne: EPFL Press, 2011); Roberto Gargiana, Louis I. Kahn: Exposed Concrete and Hollow Stones, 1949-1959 (Lausanne: EPFL Press, 2014).
- ¹¹ Goad, "Bringing it all Home."
- ¹² J. Macarthur et al., eds. *Hot Modernism: Queensland Architecture, 1945-1975* (London: Artifice Books, 2015); Glenn Harper, "The Brutalist Project Sydney," see <https://www.architects.nsw.gov.au/public-resources/byera-hadley-travelling-scholarships1/33-past-reports/452-the-brutalist-project-sydney>
- ¹³ Rejean Legault, "The Idea of Brutalism in Canadian Architecture," in Rhodri Windsor Liscombe (ed.) *Architecture and the Canadian Fabric*, (Vancouver: UBC Press, 2011), 319.
- ¹⁴ Lewis, *200 Years of Concrete in Australia*, 103.
- ¹⁵ R.J. Ferguson, interviewed by author, December 2015.
- ¹⁶ "1962 Architecture and Arts Awards," *The Australian Journal of Architecture and Arts* 10, 12 (1962), 20.
- ¹⁷ *Cross-Section* 123 (January 1963).
- ¹⁸ Caliban, "Caliban," *The Architect WA* 6 (June 1963), 49.
- ¹⁹ "Opinion," *The Architect WA* 8 (December 1965), 39.
- ²⁰ *Cross-Section* 147 (January 1965).
- ²¹ Joseph Buch, "You May Seek Him in the Building: Interview with Vin Davies," *The Architect WA*, 34, 4 (1995), 29.
- ²² "University Has Its Own Housing Scheme" *The West Australian*, February 3, 1951, 5.
- ²³ *Constructional Review*, January (1959), 15-18.
- ²⁴ Peter Bruechle, interviewed by author, October 2016.
- ²⁵ Anthony Brand, interviewed by author, December 2017.
- ²⁶ "Syllabus of Lecture," *The Architect WA* 3 (March 1955), 12.
- ²⁷ "New Offices for Western Australian Division of Cement & Construction Association," *Constructional Review* 36, 6, (June 1962), 19.
- ²⁸ Speakers included C.F. Morrish, engineer, and R.W. Roberts on the cost of finishes, along with site visits including to the Deaf and Dumb school in Mosman Park. See *Constructional Review* 37, 12 (December 1964), 28.
- ²⁹ "Bunnings Advertisement," *The Architect WA*, 7, 3 (December 1964), n.p.
- ³⁰ P.I. Nervi, "The influence of reinforced concrete – technical and scientific progress on the architecture of today and tomorrow," *The Architect WA* 4 (September 1961), 46-54.
- ³¹ *Building and Construction*, June (1962). (No issue numbers)
- ³² "Talking Architecture," in Geoffrey London, Duncan Richards (eds.) *Modern Houses: Architect-Designed Houses in Western Australia from 1950-1960*, (Nedlands: School of Architecture and Fine Arts, The University of Western Australia, 1997), 31.
- ³³ "Our Cover Picture," *Constructional Review* 37, 12 (December 1964), 28.
- ³⁴ Harry Sowden, *Towards an Australian Architecture* (London: Lund Humphries, 1970), 137.
- ³⁵ Brand, interviewed by author, December 2017.
- ³⁶ R.W. Roberts, "Cost Comment on Off-Form Concrete Finishes," *Constructional Review* 37, 12 (1964), 24-28.

³⁷ Ferguson on Le Corbusier's concrete work: "Much of his work is brutal by intent stripped off ply sheets. The Swiss Pavilion at the Cite Universitaire, Paris has intimidating form but being stripped off timber boards produced a texture compatible with human scale." R.J. Ferguson, Personal communication with Andrew Murray, September, 2017.

³⁸ Robert Hanlin, Personal communication with author, November 2017.

³⁹ Molyneux, "Building in Western Australia 1940-1979," 140.

⁴⁰ Simon Anderson and Geoffrey London, "The Western Edge," *Architecture Australia* 79, 4 (1990), 48.

⁴¹ Duncan Richards, "With a Little Help From My Friends: Francis Senior Bolland at PTC." Unpublished essay, 2009.

⁴² Adrian Forty, *Concrete and Culture: A Material History* (London: Reaktion Books, 2012), 40.

Forty suggests the flexible and forgiving nature of the material, combined with the ability to experiment with additives and aggregates enables this 'alchemy.'

⁴³ Molyneux, "Building in Western Australia 1940-1979," 79.

Knowledge Transfer in the Nineteenth Century: The Short History of *béton aggloméré* in Queensland

Elizabeth Musgrave
University of Queensland

Abstract

This paper will revisit Brisbane during the second half of the nineteenth century; a time when technological innovation was perceived as essential to the economic prosperity of the newly proclaimed colony of Queensland, and individuals sought opportunities to make good through its operation. It will investigate early concrete technology in Queensland and specifically the contribution made by Charles Lambert Depree (c.1845-1893), an engineer and surveyor educated at King's College, Cambridge, whose interest in concrete was triggered during his time in France working on a patented process for coppering iron armour-plated ships. Depree, who arrived in Brisbane in 1869, is credited with introducing concrete into the colony of Queensland. His legacy, a concrete house 'Goldicott,' constructed using pise technology, is an exemplar of a moment in time when concrete was poised between its craft origins and its potential as a modern industrial material.

Queensland does not feature greatly in generalist accounts of technological innovation in relation to architecture in Australia. Henry Cowan's (1998) portrayal of technology in Australia mentions Queensland only in relation to its timber 'style' of construction. In Miles Lewis' 200 Years of Concrete in Australia, concrete innovation within the Queensland Railways and Mines and Works Departments is noted in relation to the achievements of H.C. Stanley and A.B. Brady. Yet Donald Watson and Judith Mackay in their seminal work, Queensland Architects of the 20th Century report that Charles Lambert Depree was a significant figure in the innovative use of concrete in Queensland and Australia. This paper investigates the circumstances surrounding his contribution.

In *Concrete and Culture: A Material History* (2012), Adrian Forty writes of the abstruseness of concrete – a material formed simply by mixing cement, water, sand and aggregate:

In so far as concrete came out of the speculative research of industrial chemists, it was a 'modern' material; likewise, in so far as it developed through the impetus of entrepreneurs to market cement, it was 'modern;' but in so far as it was a product of messy hit-or-miss experiments of tradesmen and contractors on the building site, it was wholly non-modern.¹

It is this characteristic of concrete, of being poised between modernity and primitiveness, that enables the historian to see 'into 'a fugacious world of beliefs and counter beliefs, hopes and fears, longings and loathings'² and to identify the social and cultural, political and economic circumstances of its making. The story behind 'Goldicott,' a concrete villa built by Charles Lambert Depree (1845-1893) in 1885 in the village of Toowong, now a suburb of Brisbane, provides insight into the political and economic circumstances of the newly formed colony of Queensland. Queensland's first leaders perceived that infrastructure, in particular the railway was essential to survival of the financially precarious colony and that technological innovation was the means to address the colony's extensive and difficult terrain.³ Innovation in Queensland is tied to the arrival of engineer emigres, armed with the most current knowledge and expertise, and keen to 'make their way' in the colonies. Among this group was Charles Lambert Depree, engineer, surveyor and architect of Goldicott, who Donald Watson and Judith Mackay in *Queensland Architects of the 20th Century* (1994) identify as a significant figure in the innovative use of concrete in Queensland and Australia.⁴ Other generalist accounts of technology in Australia fail to mention Depree in relation to innovation in either architecture or engineering. This paper describes the circumstances surrounding Depree's contribution in order to establish its significance.

***Béton aggloméré* in France and England**

Peter Collins' *Concrete: the Vision of a New Architecture: a study of August Perret and his precursors* (1959), which focuses on French innovation to contextualise a study of Auguste Perret, architect and contractor, has, until recently been considered as received wisdom on the origins of concrete. It is only since the end of the 20th century that historians including Pedro Guedes, Cyrille Simonnet and Adrian Forty have examined other centres of experimentation - in England, the United States and Germany – to acknowledge the

development of concrete as haphazard, opportunistic and 'dispersed' across classes and professional groups:

chemists and engineers who developed cements, industrialists whose prime interest was in the commercial exploitation of cement production and ordinary builders who by trial and error on the building site, developed the practical application of the material and subsequently the technique of reinforcing it with steel.⁵

France's tradition of systematic enquiry was critical to the development of concrete⁶ and Collins' account provides a window onto France in 1868, when the young English-trained engineer, Charles Lambert Depree was working on a patented process for copper plating iron armour for ships.⁷

Collins traces a line of inquiry from *pise* construction techniques⁸ through Jean-Baptiste Rondelet (1743 – 1829) who used mortar to bind pise material; Joseph-Louis Lambot (1814-1887) who experimented in artisanal fero-cement horticulture products; Francois Coignet (1814-1888) who patented ways to industrialise concrete production; Joseph Monier (1823-1906) and François Hennebique (1842-1921), who separately patented reinforced concrete systems. He observes that innovation in France in the nineteenth century, was constrained not by a lack of invention but of opportunities for 'exploitation and experiment.'⁹ This is confirmed by Forty who, citing Simonnet (2005), notes that although knowledge was in the hands of industrialists chemists and engineers, 'the actual work of constructing in concrete remained in the hands of small contracting firms using traditional skills.'¹⁰

Françoise Coignet, inventor, chemical manufacturer and wealthy industrialist, possessed both the finance and the materials and equipment necessary for experimentation. Coignet also understood the value of the patent system for creating an industrial monopoly. The construction of a new factory in St Denis in 1851 using a *pisé de terre* system provided Coignet with the opportunity to experiment with different aggregates, proportions and consistencies of mixture. A second experiment, a promotional house at 72 rue Charles-Michels, Saint-Denis followed in 1953.¹¹

Coignet adopted the term *béton aggloméré* to describe his process.¹² *Béton* has its roots in the Old French word *betum* meaning 'a mass of rubbish on the ground' and *aggloméré*, compacted. He took out two patents in France titled *Béton Economique* and *Emploi de*

Béton in March 1855,¹³ and one in England in November 1855.¹⁴ In the United States, his process became known as *Béton Coignet* and was used in concrete blocks and in-situ constructions.¹⁵ In 1855, he built the stationmaster's house at Suresnes, which became the subject of a lecture given at the French Institute of Civil Engineers in 1859. He published a text *Bétons Agglomérés appliqués à l'Art de Construire*,¹⁶ and in 1861 established himself as a building contractor under the name *Société Centrale des Bétons Agglomérés*.¹⁷

Coignet's 1859 lecture to the French Institute of Civil Engineers was reported in a review published in *The Builder* on 2nd July 1859,¹⁸ and Collins believes that it is through this report in *The Builder* that a Mr B. Herschel Babbage in South Australia gained the knowledge that enabled him to erect Australia's first concrete house.¹⁹ Babbage, in turn, reported on his house in *The Builder* in 1860,²⁰ promoting concrete's use in remote locations, its economy, buildability, especially in the absence of skilled labour, comfort, fire resistance and defensibility;²¹ the same characteristics of concrete that Depree would later also promote.

Coignet had his commercial eye on the potential of concrete's industrial scale usage, and his monopoly in Paris extended to the construction of the retaining wall to the Passy Cemetery, the Boulevard de l'Empereru and the 'Aqueduct de la Vanne' (1867-74) and other key elements of Haussmann's Paris. Another influential character, English building contractor Joseph Tall, was conscious of concrete's reliance on craft practices. Realising that most of the expense of building in concrete lay in the timber formwork, he devised and in 1864 patented a demountable and reusable shuttering system.²² When local contractors, who risked being locked out of production, pointed out that the patented system was nothing more than what was required by conventional *pisé* construction, Tall claimed that he was 'only seeking an "improvement."' ²³ Tall's Patented Shuttering was used under licence on projects in France including for the construction of a large number of workmen's dwellings in Paris – a project commissioned by the Emperor Napoleon III which was awarded the gold medal at the 1867 Paris Exhibition where it was exhibited alongside Monier's reinforced horticultural pipes and a concrete pavilion by Coignet.²⁴

Although there was widespread experimentation with iron rods and straps, Joseph Monier and Francois Hennebique had not yet patented their most significant innovations in reinforced concrete when Depree left Europe in 1869 for the colony of Queensland.²⁵ Depree may not have visited the 1867 Exhibition, but he would have been aware of work by Coignet's firm,²⁶ and would have been fully apprised of concrete's capacity as a mass-material, its mould-ability, and the mechanisms for its industrial scale use. There are sufficient correlations between events in Coignet's career and those in Depree's to suggest

that in migrating to the colony of Queensland he hoped to 'make good' as a contractor in concrete, in a manner similar to Coignet.

Le béton in the colony of Queensland

On arriving in Queensland in 1869, armed with testimonials and letters of introduction,²⁷ Charles Lambert Depree sat the Government examination and qualified as a Crown Lands Surveyor. Soon after, he opened an office as a Civil Engineer and Surveyor.²⁸ However, there was little public work available in the financially precarious colony of Queensland. Like Coignet, Depree began a demonstration project – a concrete out-building adjacent to his family home, Mecklenburgh Villa, Fortitude Valley. Adopting terminology used by Joseph Tall, he lodged a patent in Queensland titled 'Certain improvements in the mode of building in concrete' in November 1871. Letters of Registration dated 11 February 1872 refer to 'specifications therewith annexed.' These 'specifications,' which share similarities with English patented systems,²⁹ were not included with the archived patent documents. An undated drawing depicting this 'improvement' was discovered archived with railway drawings³⁰ and titled as 'Sketch of Mr Dupree's (sic) patent framework for building concrete houses' (Figure 1). That this drawing was discovered with railway drawings, suggests that Depree did or was intending to construct concrete railway structures or buildings in the manner of Coignet at Suresnes, for by 1872 he was working with the Queensland Railways.

The drawing depicts a very straightforward reusable timber shuttering system, described by Depree as follows:

The apparatus employed in building is remarkably simple in construction and in use and consists chiefly of uprights and frames of timber. The uprights are bolted together in pairs at a distance apart equal to the thickness of the wall to be built and these are then placed at intervals of a few feet all around the site of the walls. Moveable frames are then placed in position connecting them, and the concrete, carefully mixed, is filled in between them. The frames are allowed to remain for one or two days, and are then moved upwards and the process repeated.³¹

Between 1872 and 1875 Depree worked on the extension of the Main Line railway from Ipswich to its Brisbane terminus at Roma Street Station and between 1875 and 1877, after the discovery of tin near Quart Pot Creek, he was Resident Engineer for the working survey of the Warwick-Stanthorpe Railway.⁴¹ Queensland State Archives have in a listing titled 'Albums of Employees of the Chief Engineer's Branch' a folio of *Photographic Views Illustrative of Recent Railway Construction in Queensland* (1882), which features almost exclusively infrastructure completed on the Warwick to Stanthorpe line during the period Depree's was engineer responsible for the working surveys. These include concrete arched culverts with 1.8m and 3m spans, one of which was still in service at the time of publication of Miles Lewis' history on concrete in Australia,⁴² and a concrete dam used to supply water to the locomotives. Also constructed on the line were two tunnels with concrete lined walls and brick arched ceilings. These projects quickly demonstrated the capacity of concrete to circumvent problems of regular flooding.

Between 1878 and 1880, Depree was District Engineer in charge of Railways in Maryborough, a major port and point of entry for immigrants to Queensland. Watson and Mackay report that his appearance in towns throughout the Wide Bay region was welcomed as a precursor to the coming of the railway.⁴³ In 1886, Depree was appointed Assistant Engineer-in-Charge of the Southern and Central Division of the Railway Survey Branch, supervising drawing office staff and answering only to Chief Engineer H.C. Stanley.⁴⁴ At this time, the Main Line was extended from Roma Street Station to the newly constructed Central and Brunswick Street Stations. This involved the construction of two tunnels, the first from Roma Street to Central opened in 1889 and the second and also the longest, to Brunswick Street opened in 1890.

In 1885, Depree constructed 'Goldicott'⁴⁵ in Toowong on land he had fortuitously acquired freehold title to ten years earlier in 1874, shortly before the opening of Toowong railway station on the Brisbane to Ipswich railway line in 1875⁴⁶ (Figure 3). 'Goldicott' sits at the end of a spur of land in the foothills of Mt Coot-tha and in 1885, commanded a 360 degree view to the hills, river and distant town. It remains the most prominent of prestige addresses in Toowong and is a demonstration of Depree's ambition.

Toowong in the 1860s and 1870s was a 'fashionable, new' suburb and home to some of Brisbane's most distinguished citizens including premiers, members of the judiciary and legislative assembly, architects William Henry Ellerker, F.D.G Stanley and Richard Gailey and Depree's own supervisor, Henry Charles Stanley.⁴⁷ Villa suburbs like Toowong, which

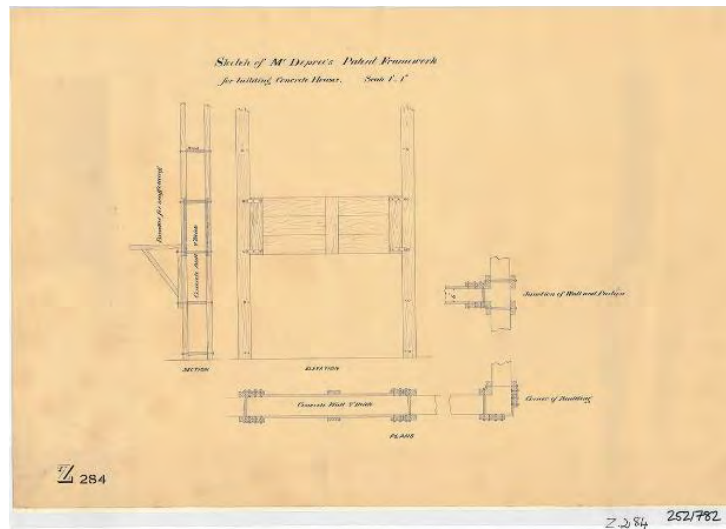


Figure 1. Drawings – Railway. ‘Sketch of Mr Dupree’s (sic) patent framework for building concrete houses.’ (Source: Queensland State Archives. Item ID: 2521782. Series ID: 17687.

Depree’s concrete out-building attracted much attention and led to his being engaged as a contractor on a number of government contracts including the male and female refractory wards at Woogaroo Asylum (Goodna).³² An extant architectural plan of the Refractory Cells contains the following note: ‘Note 2 buildings to be built to this plan one for males ... one for females’ (Figure 2). Plans indicate a mass wall construction although the dimensions of the two wall thicknesses (14 inch external walls and 9 inch internal walls) are consistent with either concrete or brickwork. Wall surfaces are scoured to resemble stone, a means of rendering concrete typical in England at this time.³³ *Grace’s Guide to British Industrial History* claims the contract for refractory cells was ‘most satisfactorily carried out,’ suggesting this drawing is related to Depree’s project.³⁴

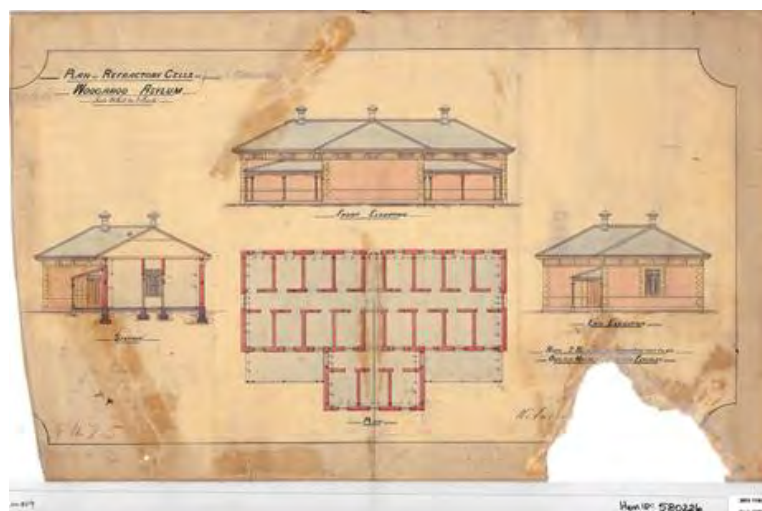


Figure 2. Architectural Drawing. ‘Plan of refractory cells at Woogaroo Asylum’ (Source: Queensland State Archives. Item ID: 580226.)

Grace's Guide also claims that Depree was engaged to work on the first and smaller of two underground reservoirs, the Service Reservoirs, built in 1871 on Wickham Terrace then known as Windmill Hill. The Service Reservoir's Heritage Citation records the following information:

Tenders were called in 1870 for the construction of a reservoir in either concrete or brick. Henry Holmes' tender was accepted specifying the use of concrete, but after preliminary excavations and the identification of cracks in concrete samples, Holmes requested to change the walls to brick and subsequently offered to withdraw his contract. The Board of Waterworks made the decision to complete the contract under its own Clerk of Works; immediately letting a contract for bricklaying and purchasing 69,000 locally produced bricks.³⁵

However, there is little else to confirm Depree's involvement with this project. Ultimately, concrete work on the Service Reservoir was limited to the cement rendering of a small portion of the interior walls.

A lack of funding for public works may have been the trigger for Depree taking a position with the Queensland Government in July 1871. Depree was appointed Assistant Engineer on the Southern and Western Railway working under the direction of Chief Engineer Henry Charles Stanley.³⁶ He was well prepared for this new role, having been articled to work on the Kidwelly Branch of the Carmarthen and Cardigan Railway, a rail line passing through difficult terrain in South Wales.³⁷

The significance of railways to the Queensland's economy cannot be underestimated. Historian A.E. Cole notes that two-thirds of the colony's produce travelled down the Main Dividing Range from Toowoomba to Ipswich at this time on mud roads: 'a risky and expensive journey' that could take two weeks to complete.³⁸ 'It was no uncommon circumstance for 100 drays to be detained waiting for the possibility of travelling.'³⁹ After years of recession, false starts, arguments over gauge sizes, bad press, appropriation bills, and unpaid contractors and labourers, the line to Toowoomba opened to traffic on 12 April 1866. It was devastated the following year though flooding; flooding immediately registered as a seasonal risk shaping the future expansion of railways in Queensland.⁴⁰

developed in Australian colonies close to major towns, were modelled on a similar concept in England: 'conscious, but miniature, imitations of the landed estates of the old aristocracy.' They were inhabited by the affluent middle class, businessmen, professionals and civic leaders who 'needed to be within reach of the cities but preferred not to live in them.'⁴⁸ Early Brisbane town was plagued with poor sanitation, unreliable water supply, and outbreaks of typhus fever, whereas Toowong had been compared favourably with the dales of Devon. Extensive gardens featured ornamental trees, citrus and roses, tennis lawns, terraces with dry-stone walling.⁴⁹

Depree promoted Goldicot in an article in the *Brisbane Courier* "Concrete Buildings:"

The house is of considerable size, about 50ft x 50ft, with 10 ft verandahs and the walls both internal and external (15ft in height) are built entirely of concrete, as are also the piers for wall plates ext. The outer walls are 9in in thickness and the inner ones 6in. The stone is composed of broken stone, sand and Portland cement. The stone, a kind of greenstone strongly impregnated with quartz, is obtained on the ground.⁵⁰



Figure 3. Mount St. Mary's, previously "Goldicott." (Source: Heritage Register, Heritage Branch Staff.)

The article continues, describing 'the apparatus' depicted in Depree's 1871 patent drawing and also describes the practical advantages of concrete over brickwork using many of the same points that Babbage noted 20 years earlier:

.... it is somewhat cheaper than brick, and superior to it in imperviousness to heat and damp and also to sound. The work can be carried out but with little

skilled labour, a carpenter only being required to supervise the erection and shifting-up of the apparatus.... It is especially desirable where white ants are so destructive....⁵¹

The concrete exterior walls on the veranda of 'Goldicott' are rendered and lineated in imitation of stonework. Other external faces are plain rendered. Full length bay windows with timber framed sash walk through windows opened onto the veranda. The entrance hall was lit by a gas lamp, using gas reticulated along nearby Sherwood Road. In 1992 the house was refurbished revealing a full-length hand painted mural on the walls of the entrance hall.⁵² Frescos were common in the houses of rich Lyonnainse traders, whose country estates were frequently constructed in *pise* and decorated using frescoes to 'conceal(s) from the spectator's eye the nature of the building material.'⁵³ Depree's mural replaces classical scenes common to villas in France with scenes of wading birds and grasses, found along creeks in the Milton Reach of the Brisbane River.⁵⁴

As a prototype, Goldicott was not a huge success. Brick and stone were the traditional symbols of wealth and prestige, not concrete,⁵⁵ as Forty citing a 1876 article in *The Builder* observes: 'There is an undoubted prejudice against the look and even the feel of Portland Cement.'⁵⁶ Whilst aspiring to be progressive in other ways, Brisbane's growing professional and elite class sought to imitate the homesteads of landed gentry, and despite timber being described as the traditional mode of construction in Queensland,⁵⁷ villa estate houses were frequently built in brick and stone. Brick estate houses adjacent to Goldicott in Toowong included William Ellerker's 'Dovercourt Cottage' (c.1864),⁵⁸ Walter Horatio Wilson's 'Sherwood Grove' (c1866),⁵⁹ and F.D.G Stanley's 'Sidney House' (1882) for Thomas Finney.⁶⁰

Depree's house is caught between the origins of concrete in craft practices and its modern potential. Depree did not explore the material character of concrete, which in Goldicott is hidden with renders, paints and wallpapers. He did not experiment with reinforcing by inserting pieces of mesh or iron, a practice common amongst builders and contracting firms in Europe that led to a surge in patented systems at that time.⁶¹ Nor did his *pise* construction method progress concrete's potential for modern industrialised production. Instead, Depree appears concerned with finding a market for his system within the small and conservative setting of Brisbane.

The earliest railway bridges in Queensland were low-level bridges constructed of timber or steel trusses. Reinforced concrete was realised first in road bridges in Queensland and

architect and engineer Alfred Barton Brady (1856-1932) who arrived in Queensland in 1884, is most associated with its development. Brady's Gairloch Bridge (1890) over the Herbert River near Ingham has concrete piers whilst the Lady Lamington Bridge over the Mary River Maryborough (1896) has reinforced concrete abutments, piers and superstructure and is considered 'one of the world's first major concrete girder bridges.'⁶² Depree's concrete house was not replicated, until building contractor Walter Taylor used reinforced concrete in a series of high profile projects in the early 20th century including his own house in Graceville (c1912), the Methodist Church, Graceville (1917-1951) and the Indooroopilly Toll Bridge, now known as the Walter Taylor Bridge (1932-1936).⁶³

The Depree family resided at 'Goldicott' for only five years before 'anxiety and pressure of work' caused Charles' health to deteriorate.⁶⁴ In 1890, he was granted 12 months leave and the family travelled to England where Charles consulted with physicians who recommended rest in a cooler climate. He did not recover and died at Southport on 30 August 1893.⁶⁵ 'Goldicott' was let for many years before the Sisters of Mercy, who took up residence and renamed the property 'Mount St Mary's' in 1903, purchased the entire estate at auction in 1902.⁶⁶ The statement of significance for its entry on the State Heritage Register reads:

It is significant as an early and very rare Queensland experiment in concrete housing, and is important in demonstrating a high degree of technical achievement. The concrete construction was innovative and remarkable for its time.⁶⁷

Charles Lambert Depree's experience with concrete in Queensland reruns themes associated with concrete's haphazard development in France and England. His story is pieced together from: a patent which has become detached from its specification drawing and archived under an incorrect name; a drawing of that patented process found amongst Railways Drawings but also listed under an incorrect name; a drawing of buildings, since demolished at Woogaroo Asylum that matches descriptions of the patented process for concrete; and an article in the *Brisbane Courier* which appears to tie these events together and which accords with details and facts in *Minutes of the Institute of Civil Engineers* and *Grace's Guide to Industrial History*. These indicate coincidences and correspondences in actions and terminology that link Depree to notable pioneers in the development of concrete in France.

It is true that success in the colonies was greatly influenced by the time of emigration and the opportunities presented on arrival; Depree's arrival coincided with one of Queensland's frequent recessions and there were limits to the knowledge he brought with him. The colony of Queensland, whose development was hampered by great distances and poor lines of communication, was driven from 1866 by an urgency to establish the rail infrastructure necessary for economic security. Certainly, small innovations in the overall success of the first rail lines to inland centres were lost in the hectic activity by which these achievements were realised. One can only speculate what successes might have attached to Depree, had he arrived 10 years later, armed with a working knowledge of reinforced concrete systems.

Finally, events portray a colony where socially and culturally conservative values stifled modern innovation and development in daily life. Forty writes: "Reactions to concrete are reactions to modernity, and on that account should not be understood as direct affects of concrete, but have to be associated with the whole field of events and processes that constitute modern existence."⁶⁸ In 1880s Brisbane, concrete was overlooked in relation to everyday life, confirming a blindness to the onset of modernism.

Endnotes

¹ Adrian Forty, *Concrete and Culture: a Material History* (London: Reaktion Books, 2012), 16.

² Forty, *Concrete and Culture*, 11.

³ Mr. Abraham Fitzgibbon, engineer, advisor to the Premier and chief proponent of the 3ft 6in gauge: 'Let the country but make the railways and the railroads will make the country' cited in A. E. Cole, "Early History of the Queensland Railways," *Historical Society of Queensland* (27 April 1944): 284-311.

⁴ Donald Watson and Judith McKay, *Queensland Architects of the 19th Century* (Brisbane: Queensland Museum, 1994), 54.

⁵ Forty, *Concrete and Culture*, 16.

⁶ Andrew Saint, Review of "Le béton: histoire d'un matériau by Cyrille Simonnet" in *Construction History* 21 (2005-6): 111.

⁷ *Grace's Guide to British Industrial History*.
https://www.gracesguide.co.uk/index.php?title=CharlesLambert_Depree&oldid=810865.
 Accessed 04.09.2017.

⁸ Peter Collins, *Concrete: the Vision of a New Architecture: A study of Auguste Perret and his precursors* (London: Faber and Faber 1959), 20. Also Forty, *Concrete and Culture*, 28.

⁹ Collins, *Concrete*, 27.

¹⁰ Forty, *Concrete and Culture*, 16 and 17 paraphrasing Cyrille Simonnet, *Le Béton*, 2005.

¹¹ Collins, *Concrete*, 27. Plans were drawn up by architect, Théodore Lachèze.

¹² Collins, *Concrete*, 27

¹³ Collins, *Concrete*, 28. Addendum lodged on 11 December 1855. This second patent recognised the capacity of concrete to assume any shape and detail and enabled Coignet effective control of building in monolithic concrete in France.

¹⁴ Collins, *Concrete*, 29. Addendum lodged in 24 June 1856. Addendum covered new developments in relation to iron as a tensioning element in concrete. Not yet recognising the role of iron as a reinforcing element. Engineers remained suspicious that iron embedded in concrete would rust.

¹⁵ Leonard F. Beckwith, *Report on Béton-Coignet, its Fabrication and Uses* (Washington: Government Printing Office, 1868). Q.A. Gillmore, "Béton-Coignet: Extract from a report on Béton-

Coignet" in *Beton-Coignet : Description of the Material and its Uses in France and America* (Brooklyn N.Y.: N.Y. & L.I. Coignet Stone Co., 1874).

¹⁶ Collins, *Concrete*, 31.

¹⁷ François Coignet cited in Collins, *Concrete*, 31.

¹⁸ Collins, *Concrete*, 39.

¹⁹ Collins, *Concrete*, 39. Miles Lewis, *Two hundred years of concrete in Australia* (North Sydney: Concrete Institute of Australia, 1988). Babbage arrived in Adelaide in 1851 and was appointed Chief Engineer for the Adelaide City to Port Railway in 1853.

²⁰ Collins, *Concrete*, 39. From this report, Collins is able to conclude that Babbage's house utilised timber formwork and Coignet's recipe for *béton aggloméré*.

²¹ B.H. Babbage, Letter, *The Builder* (6 October 1860) cited in Cowen, *From Wattle & Daub to Concrete & Steel*, 82.

²² Thomas Potter, *Concrete: Its use in building and the construction of concrete walls, floors etc.* (London: E. F. Spon, 1877), 20.

²³ Collins, *Concrete*, 40.

²⁴ Potter, *Concrete: Its use in building*, 85. Collins, *Concrete*, 40. Tall also built a demonstration project, gave lectures at the Architecture Association and published a pamphlet in 1868 which he alleged sold 38000 copies.

²⁵ Monier's investigations at the time of Depree's stay in Paris were limited to pipes and containers for horticultural use. Hennebique's patent for his building system was not submitted until 1892.

²⁶ Collins, *Concrete*, 31, 33-34.

²⁷ *Grace's Guide*

²⁸ *Grace's Guide*

²⁹ Particularly "Tall's Apparatus" and "Osborn's Apparatus" illustrated in Potter, *Concrete: Its use in building*, 86-89.

³⁰ 'Plans of Queensland Railway Station Buildings, Residences, Bridges and Station Equipment.' The inventor's name is incorrectly recorded in listings as Dupree.

³¹ 'Concrete Buildings,' *Brisbane Courier* (8 July 1885): 5.

³² *Grace's Guide*. Obit in *Minutes of Proceedings of Institute of Civil Engineers* (1842): 390. Downloaded 03/07/2017.

³³ Collins, *Concrete*, 20. Collins notes the use of concrete in England primarily involved the construction of concrete blockwork laid to imitate stone.

³⁴ *Grace's Guide*. 'Service Reservoirs' were added to Queensland heritage Register 21 October 1992. QHR 600174 Citation notes they are a 'creative and technical achievement of the Colonial era.'

³⁵ <https://environment.ehp.qld.gov.au/heritage-register/detail/?id=600174>

³⁶ Stanley had trained at Edinburgh University and was articled to Messrs. B and E Blyth, Consulting engineers to the Caledonian Railways and other railways in Scotland.

³⁷ *Grace's Guide*

³⁸ A.E. Cole, 'Early History of the Queensland Railways,' 287.

³⁹ Cole, 'Early History of the Queensland Railways,' 284.

⁴⁰ Cole, 'Early History of the Queensland Railways,' 306.

⁴¹ *Grace's Guide*; Obit.

⁴² Lewis, *Two Hundred Years*, 31. Also Watson and Mackay, *Queensland Architects*, 54.

⁴³ Watson and Mackay, *Queensland Architects*, 54.

⁴⁴ Watson and McKay, *Queensland Architects of the 19th Century*, 54.

⁴⁵ Depree's wife was Ella Louise Butterworth. Their children were Charles Fynney, Catherine Edith, Sidney Smallbrook, Jessie Louisa, Ella Maude. A daughter, Catherine Augusta, did not survive. https://www.onegreatfamily.com/fh/Charles_Depree?606852580 Accessed 04/09/2017

⁴⁶ Brisbane to Ipswich Rail opened to traffic on 14 June 1875. Cole, 'Early History of the Queensland Railways,' 308.

⁴⁷ Other residents included Premiers Sir Arthur Hunter Palmer and Sir Thomas Mcllwraith, and Clerk of the Queensland Legislative Assembly, Charles Holmes a Court. Helen Gregory ed. *Arcadian Simplicity: J.B. Fewings Memoirs of Toowong* (Brisbane: Library Board of Queensland, 1990). 'Hon. C. G. Holmes a' Court dead.' *The Queenslander* Sat 26 Jan. 1924: 15.

<https://trove.nla.gov.au/newspaper/article/25533693>

⁴⁸ Helen Gregory, *Arcadian Simplicity*, 29.

⁴⁹ 'Brisbane's Beautiful Suburbs: Toowong,' *Architecture and Building Journal of Queensland* (7 April 1924): 23-26.

⁵⁰ 'Concrete Buildings,' *Brisbane Courier*, 8 July 1885, 5.

-
- ⁵¹ 'Concrete Buildings,' *Brisbane Courier*, 8 July 1885, 5.
- ⁵² <https://environment.ehp.qld.gov.au/heritage-register/detail/?id=600181> Accessed 12/02/2018.
- ⁵³ Rondelet, *Traité de l'Art de Bâtir*, 1802. Cited by Collins, *Concrete*, 20.
- ⁵⁴ John Oxley (1823) cited in *Arcadian Simplicity*, 22. Oxley describes 'low open forest; good grass and iron-bark trees.'
- ⁵⁵ <https://environment.ehp.qld.gov.au/heritage-register/detail/?id=600181> Accessed 12/02/2018.
- ⁵⁶ Forty, *Concrete and Culture*, 10.
- ⁵⁷ Cowen, *From Wattle & Daub to Concrete & Steel*, 33.
- ⁵⁸ Watson and McKay, *Queensland Architects of the 19th Century*, 62.
- ⁵⁹ Watson and McKay, *Queensland Architects of the 19th Century*, 169. F.E. Lord, 'Brisbane's Historic Homes,' *The Queenslander*. Date unknown. Included in 'Toowong: Study of a Ridgescape by its residents.' Submission from residents of Toowong to the Australian Heritage Commission, 1995.
- ⁶⁰ Watson and McKay, *Queensland Architects of the 19th Century*, 172.
- ⁶¹ Forty, *Concrete and Culture*, 17 cites Collins, *Concrete*, 50; Simmonet, *Le Béton*, 57.
- ⁶² Lewis, *Two Hundred Years*, 10 and 184. Lady Lamington Bridge utilised a system designed by Hungarian Robert Wunsch in 1884.
- ⁶³ <https://environment.ehp.qld.gov.au/heritage-register/detail/?id=600181> Accessed 12/02/2018.
- ⁶⁴ 'Obituary,' Minutes of the Proceedings of the Institute of Civil Engineers, 391. Accessed 03/09/2017.
- ⁶⁵ 'Obituary,' Minutes of the Proceedings of the Institute of Civil Engineers, 391. Accessed 03/09/2017.
- ⁶⁶ Mount St Mary's Convent entered on Queensland Heritage Register 26/11/1998. QHR601601 <https://environment.ehp.qld.gov.au/heritage-register/detail/?id=601601> Accessed 12/02/2018.
- ⁶⁷ <https://environment.ehp.qld.gov.au/heritage-register/results/?q=mount+st+mary%27s> Accessed 12/02/2018.
- ⁶⁸ Forty, *Concrete and Culture*, 14.

On why we should consider that the interior perspective render is art, after all: a review of literature concerning the development of perspective representations of interior spaces from the Italian Renaissance to the digital age

Louie T. Navarro
Hong Kong Polytechnic University

Gerhard Bruyns
Hong Kong Polytechnic University

Abstract

In order to establish how the interior perspective render can secure for interior design the status of a legitimate art form, this review of literature will be looking into the history of representing three-dimensional interior spaces from the varied perspectives, or better yet, the evolutionary perspective of the practice of interior spatial representation itself: from painters to architects to decorators and eventually, interior designers beginning from the time interior space was first depicted, all the way to the current iteration of the interior perspective render created with the use of computer technology.

Now if this ‘elevation’ may seem antithetical given the frame of reclamation most especially when one considers that this is suggestive of a return to autonomy—that divorce of form and function—that has been repeatedly levied against art in order to diminish its significance, this article will forward the necessity of such a positioning as we are catapulted into the digital age.

Ambitiously, by forwarding this render as the consummate ‘end’ that encompasses the historical, theoretical, and practical facets of the practice of interior design, this review will argue how claims to its value as a work of art can be indicative of the profession’s role in reimagining spaces in a future poised for a literal iteration of the notion of a space transcending spatiality. At the most basic, this review will look into how such an elevation can secure the continuity of a practice that with its very physical, tangible quality is challenged by the inescapable reality of virtuality.

Shared practices or Representations as once shared by practices

Focused on the transmission¹ of the design idea, graphical representations of the interior have their histories embedded within practices that have in turn been codified during the Italian Renaissance². These drawing-types' influence on the practice of architecture—and of course, interior design³—cannot be denied: six centuries later, not much has changed in the way they are employed today.

We can arrive at so many definitions of what these drawings themselves in turn represent, but two definitions should suffice for this endeavour. The first is from Lotz' "The Rendering of the Interior in Architectural Drawings of the Renaissance"⁴ wherein the author forwarded a definition in the 'narrowest' sense in that these drawings "serve in the planning, the execution, or the illustration of the building project" (4). The second is from Brothers' "What Drawings Did in Renaissance Italy"⁵: "Drawings functioned as a form of communication with patrons, builders, and members of the workshop" (108). These definitions are not dissimilar in that they describe these drawings as as a means to an end that in turn make use of specific techniques depending on the audience they wish to engage: (1) other architects (in *the planning* together with the *members of the workshop*); (2) the clients (in *the illustration of the building project* for the benefit of the *patron*); and (3) the contractors (in *the execution* by the *builders*).

For this review, we will concern ourselves with the last two types beginning with the drawings that are meant primarily to communicate with contractors: orthographic representations. Institutionalised by way of Raphael's letters to Pope Leo X of 1519⁶ that contained a proposal for a set of drawings consisting of the 'triumvirate' of plan, elevation (exterior), and the section (interior), this set paved the way for preciseness during the course of building in the absence of the architect. Individually, these drawings are pieces to a "puzzle"⁷ that is the object they depict.

Other drawings such as axonometric, multiview, and specific to the interior, the laid-out interior/developed surface interior⁸ are all attempts at combining this triumvirate of orthographically-projected drawings. What is important to note here is the preciseness in which these conventions are carried-out in order to retain all pertinent information. This is most true in the case of axonometric drawing that unlike the others, the principal plane or axis of an object is not parallel to the projection plane. With this technique, in an attempt to depict a three-dimensional object on a two-dimensional on a two-dimensional, flat surface the scale for both near and distant features remain the same. An easier way to define what axonometric projection is is to say what it is not: perspective projection.

This is the second mode of graphical representation that concerns us here and is considered as one of the landmark achievements of the Renaissance as “the great opener of western eyes”^{9 10}.

Considering how many architects of the Renaissance were also artists (painters, sculptors, etc.) or were artists first before becoming architects¹¹, the histories of representations in architecture and painting are inevitably intertwined. Inevitable in a sense that drawing materials and implements, and more importantly, drawing techniques were shared amongst these so-called Renaissance men¹².

Alas, such an ideal blurring of practices never lasted. Perhaps it didn’t help that painters were considered to belong to a higher order than architects at the time.

As Lotz succinctly noted: the reason why Alberti would choose to write about perspective drawing in his treatise *On Painting* instead of the *Ten Books on Architecture* (*On the Art of Building in Ten Books*) is that “the architect merely gives substance to the inventions of the painter. Consequently, architecture is an art of lower rank, painting one of higher” (14).

Architectural truth or Representations in the age of the specialisation of practices

This divide between architects and painters had nothing to do with the ways and means of representation per se but in its perception instead as it relates to *truth*.

The problem lies in perspective drawings’ inability to convey useful information in its distorted, “untruthful”¹³ depiction of space because of foreshortening and overlaps—although ‘truthfulness’ is relative here. Because on the other hand, perspective drawing was championed precisely because it showed the viewer a ‘correct’ drawing of a three-dimensional world on a two-dimensional plane—on how it ‘truthfully’ represented what we see¹⁴.

But this perceptual ‘truthfulness’ is of no use to a trade that necessitates precise measurements to facilitate actual construction in the absence of the architect¹⁵. As Evans would contrast orthographic drawings with perspective drawings in “Architectural Projection”¹⁶: “The advantage of orthographic projection is that it preserves more of the shape and size of what is drawn than perspective does. It is easier to make things from than to see things with” (21). A treatise on how orthographic projection became the preferred medium of the architectural profession, Evans would conclude that: “As painting after the Renaissance was overwhelmingly perspectival, so architecture after the Renaissance was overwhelmingly orthographic” (25).

Although perspective drawings were never completely shunned in practice¹⁷, it became, to use Lotz' term, an architectural 'expedient' specifically used for the appreciation of clients who cannot make sense of orthographic drawings. Flowing from this is the idea that perspective drawings were easier to sell.

But this did not change the fact that the perceptual 'truthfulness' that the Renaissance painters and scholars after them so championed was reduced to an 'expedient' in the practice of architecture: "a means of attaining an end, especially one that is convenient but possibly improper or immoral"¹⁸ in its 'untruthfulness'.

By relegating perspective drawing to the domain of painting, it effectively positioned architecture—by way of its primary means of communication, i.e., orthographic drawings—on a higher moral plane of truth.

All this is even of more interest given that orthographic projection was initially considered as a mere preparatory step in the drawing of perspective—"relegated to the status of a technical manner: technical drawing"¹⁹—before it transformed into "the inviolate medium of architectural thinking"²⁰.

In the same essay by Lotz—it was a treatise entitled the "Rendering of the *Interior* [emphasis mine] in Architectural Drawings" after all—he would identify the first perspective drawing of an interior that faithfully subscribed to Alberti's prescriptions in *On Painting*: with a central vanishing point that primarily served as a setting for human figures.

By none other than a painter, Pisanello, it is a *dipintura*—Alberti's term for interior perspectives—of a space with barrel vaulting that is more of a shell in its frame construction.

The way it was drawn is still considered a rudimentary technique of representing three-dimensional space on a two-dimensional surface for any interior design student today.

Ideal representations or Representations that have become interior design-specific

Dated 1776, the painting entitled Room in the Prinz-Max-Palais in Dresden has been described by Mario Praz in *An Illustrated History of Interior Decoration: from Pompeii to Art Nouveau*²¹ as an "example of an interior painted for its own sake without people: it is one of the first, if not the first, of a genre which was to have an enormous success in the course of the 19th century" (154).

In similar fashion but of limited scope, Charlotte Gere's *Nineteenth Century Interiors: An Album of Watercolors*²² also focused on this genre of portraiture the subject of which is the interior space: "The depiction of rooms for their own sake, rather than as background to a narrative, anecdotal, or portrait painting, germinated, reached its fullest flowering, and died within the space of one century" (14). Loosely, they can be referred to as interior-portraits owing to the fact that they were made after the construction of the interior.

Although at the onset, these interior-portraits can be argued to have no relation to what concerns us here (i.e., graphical representations), it must be highlighted that the provenance of such ideal representations—"for their own sake"—was identified by Gere to be a corollary of the first use of the term 'interior decoration' in print with the release of the instalment of illustrations by Charles Percier and Pierre Fontaine in 1801 as part of the publication *Receuil de Decorations Interieures*: "That this interest in interior decoration had a direct bearing on the taste for interior views is evidenced by the fact that so many of them show rooms that must just have been decorated and newly arranged" (13).

Gere would also note of other significant publication that contributed to this new profession's popularity: Thomas Hope's *Household Furniture and Interior Decoration* published 1807 and George Smith's *A Collection of Designs for Household Furniture and Interior Decoration* published 1808 and "Within less than a decade the concept of an independent art of 'interior decoration' was established" (13).

By the mid-19th century, the publication in 1868 of Charles Eastlake's *Hints on Household Taste in Furniture, Upholstery, and Other Details*²³ represented an important marker in the history of the specialised practice of interior decoration. Eastlake would position himself against the tide of practitioners working on domestic interiors such as architects²⁴ and most especially, upholsterers and curtain-makers, and pronounced that "Indeed, it was the practical evidence that a healthy and genuine taste was altogether wanting" (74).

There is one more work that today is considered part of the triumvirate of publications alongside that of Praz's and Gere's that focused on the historical development of the interior by way of its representation: Peter Thornton's *Authentic Décor: The Domestic Interior, 1620-1920*²⁵.

Beyond the criticism levied against these publications²⁶, what is of interest for us here is the year Thornton's survey stopped: 1920. Involving architects and painters once again,

this decade will witness a reunion of practices separated four centuries prior. This time, these practices will rally against perspective drawing.

In the wake of this, the domestic interior will be witness to the demise of the interior decorator.

There are two things worth emphasising at this juncture. The first point is the recognition of the lasting influence of the medium of watercolor and of course, perspective drawing in the professional practice of interior design. Indirectly, these publications by Praz, Thornton, and Gere reinforced the preeminence of a representational technique that have become particular to the practice of interior decoration all the way through the early part of the 20th century: the interior perspective drawing rendered in watercolor. This can be read as the hijacking of a medium that the profession can call its own. Effectively outliving the practice as it has been known as interior decoration, this brings us to the second point: the plight of the professional interior decorator can be similarly argued to have *germinated, reached its fullest flowering, and died within the space of one century.*

Scientific recourse or Representations as a site of the reinforcement of architecture's dominance

Firmly believing the need to do away with perspective drawing that is restrictive and of course, anthropocentric, El Lissitzky's "A. and Pangeometry"²⁷ published in 1925 championed axonometric drawing as an alternative. This would be preceded two years prior by the De Stijl exhibition at the L'Effort Moderne gallery in Paris, France: a year that had Yve-Alain Bois in "Metamorphosis of Axonometry" proclaiming as the year of the "modern revival of axonometry" (42).

Modernist painters as spearheaded by the Impressionist and Cubist^{28 29} and eventually, architects³⁰, were contesting the fixity, finiteness of the conventions of perspective as reduced to that single vantage point—as a singular truth³¹—that had ultimately limited our visual faculty³².

Additionally, Robert Bruegmann in "The Pencil and the Electronic Sketchboard: Architectural Representation and the Computer"³³, a work that will trace the transition of the architectural drawing from 'pencil to computer,' noted how Modernist architects were further driven by "their enthusiasm for removing all traces of the subjective and personal" (142).

No longer an issue of the 'truthful' orthographic drawings versus the 'untruthful' perspective drawings of the Renaissance, the issue by the turn of the 20th century ran in

a more or less parallel fashion: objectivity versus subjectivity, the structural versus the ornamental, the scientific versus the aesthetic.

Bruegmann forwarded this to be a battle of graphical representations involving class: the masses (scientific) versus the elites (aesthetic) by highlighting the architectural convention of representations at the turn of the century: “watercolor washes and other ‘pictorial’ effects that revealed the hand of the architect were banished in favor of precise, hard-line drawings in ink on flat white paper with, occasionally, flat color, usually in primary hues” (142).

As early as the mid-twentieth century, this shift was reflected in the popularity of employing the more ‘scientific’ means of representation (orthographic drawings) versus interior perspective renders in watercolor that privileged the material elements of the interior (specifically colors, textures, and patterns) in one of the renowned schools for interior design.

A study that looked into the history of a school that was known for its ‘good taste’, Joanna Merwood-Salisbury in “Interior Design as Environmental Design: The Parsons Program in the 1960s”³⁴ would expound how, driven by social awareness and engagement, the shift from ‘aesthetic to scientific’ in the school’s curriculum—as an example, the replacement of the course “Drawing and Painting” with “Graphic Communications”—was part of the interdisciplinary approach that had complete disregard for the distinction across spatial disciplines (architecture, landscape architecture, urban design, etc.) across post-war America.

This change was “based on modernist ideas about the improvement of physical well-being for all and the betterment of social relations, an approach in which the concept of taste appeared to have no place” (119).

Given the history of the said school’s curriculum founded on the practice of interior decoration—it was the title of the program after all when it was established in 1904³⁵—that focused on the ‘updating’ of historic, French period interiors³⁶, this meant that like the upholsterer’s and curtain maker’s in England who were accused of lacking taste a century prior, the interior decorator was likewise, to put it mildly, demoted, but this time for privileging taste.

Although there is this one curious comment made by Lissitzky that appeared as a footnote to his 1925 text. After proclaiming Mondrian’s ‘solution’ to representation with a

return to flatness, the author observed that: “When the De Stijl Artists [artists] transpose the Mondrian principle to the three planes of space, they become interior decorators”.

On the one hand, this can be read much like another demotion, on the other, it can be considered as an endorsement of ‘decorators’ as artists.

Finally, beauty or *The value of the interior perspective render in the future practice of interior design*

Mark Wigley in *The Architecture of Deconstruction: Derrida’s Haunt*³⁷ reclaimed architecture from the violence that philosophy has exacted against it by bringing to fore the architectonic configuration of philosophy. For the author, architecture is that structure that gave philosophy its ground in the same way that Heidegger’s temple unconcealed the ground on which it stood. Here the case for the dominance of architecture is established: that it can never be a mere ornament to philosophy, a mere cosmetic addition—this status is reserved for interior design.

In the process of exposing the fissures within the architecture that is philosophy, Wigley had (inadvertently?) enacted the very same violence he compellingly charged philosophy of employing in its subordination of architecture.

We have so far traced the systemic violence enacted between practices grounded in their more or less shared representational processes: painters versus architects; architects versus painters; interior decorators (who derived their practice of representation from painters) versus architects, upholsterers, and curtain-makers (who lacked taste); Modernists architects and painters versus perspective drawing (indirectly, all practitioners who utilise this may they be architects, painter, etc. themselves); interior designers versus interior decorators (who privileged taste); painters versus/for decorators (Lissitzky); and architects versus interior designers (structure versus ornament) or alternatively, architects for interior designers within the frame of this endeavour (ornament/interior design as art).

Given the context of reclaiming the practice, we can very well do what Wigley has done, i.e., disprove such a positioning, but instead, we are taking the route of acquiescence and look at how such a conferral can actually be beneficial to interior design. This is why this review was grounded in the presupposition that if interior design is art, then its processes—from the conception of the design idea all the way to its articulation that culminates in the interior perspective render—must then hold the key to its own reclamation.

Such an endeavour must be considered ever more relevant in this day and age where the practice sees itself vacillating between autonomy that necessitates the isolation of its

stakeholders or subsumption under the rubric of the blurring of exterior and interior environments that necessitates a certain flexibility of its stakeholders. It can certainly be argued that nothing is wrong with one or the other, but so long as history repeats itself, a practice uncertain of its stand, unsure of what it can bring to the table dominated by discourses of other practices, interior spatial practices will forever be subjected to a certain... disparagement: neither structurally important nor aesthetically vaunted.

As Kent Kleinman in "Taste, After All"³⁸ would comment on why indeed, there is still that question of taste in the practice of interior design today:

The field's episodic and earnest attempts to selectively distance itself from its own history—to posit a state of affairs 'after taste'³⁹—are in response to charges of subjectivism, elitism, and classicism that cling to the history of eighteenth-century enlightenment itself; who, after all, but wealthy white English gentlemen or German philosophers had the time and comfort to contemplate with utter disinterest objects of the beauty in the world? (39)

It is a given that the outcomes (i.e., interior-designed spaces) can never be considered as works of art in this sense of being 'looked at' for the sole reason of its occupancy, but delving into the processes of interior-designing itself (specifically: representation) can afford us a certain ground from which to reconsider how such an act of 'looking at' is possible.

Once we consider how representations of interior-designed spaces as the terminal representation in the practice continue to present itself as an aspirational ideal—an act borne *and* sustained in liminality, in-between planning expressed as orthography and actual construction—we arrive at a definition of a work of art.

Although referring to the dangers of the positioning of architecture closer to the visual arts, Robin Evans' commentary in "Translations from Drawing to Building"⁴⁰ is nonetheless applicable in the case of interior design: "...we would be relinquishing claim to architecture that now flourishes within the political, economic and social order... that in giving up grandiose pretensions to represent and define the social world in both its imaginative and active aspects architecture may, by contradiction and concentration, constitute anew?" (157)

Epilogue: Post-truth spaces

As Michael Baxandall noted in *Painting and Experience in Fifteenth Century Italy: A Primer in the Social History of Pictorial Style*⁴¹: “Much of what we call ‘taste’ lies in this, the conformity between discriminations demanded by a painting and skills of discrimination possessed by the beholder” (34).

Baxandall's seminal publication would argue that the production of a work of art is contingent on the society where it was produced and our understanding of the same should be informed by the specificity of such a milieu⁴². This is embodied in the notion of the ‘period eye.’ Simply, it is a mode of looking defined by what an individual ‘brings-in’—innate, learned, and experienced—in the interpretation of that which what one looks at. But in as much as it demands of the ‘beholder’ certain discriminatory skills, it also demands of the artists the same set of skills in order to produce a work of art.

Although Baxandall's argument for a specific Quattrocento cognitive style vis-à-vis a Quattrocento pictorial style is still very relevant, the question today is: with the preponderance of internet use and corollary exposure to information (regardless of say, veracity), how is ‘discrimination’ evolved? Also of computer technology: has it then pushed our discriminatory eye? Has it also, in turn, pushed the processes behind works of art? And specific to this endeavour, what of the practice of interior design?

The idea of immaculate interior spaces speaks of the fashion in interior design then (the interior-portraits of the 19th century) but is still very much alive today: most especially with the prevalence of digital representations that for a time “represented in many ways the fulfilment of the modernist dreams of the 1920s of a rational, economical architecture”⁴³. In light of the fact that in the 200 years or so that have passed since the ‘beginnings’ of the profession as personified by the interior decorator, could it be that this ‘fashion’—as close as it is, by definition, tied to the currency of the new—may, instead of ‘running out of fashion,’ actually portend the future of interior design?

Further, unlike a study of a buried civilisation, drawing inferences from artefacts, we are looking at a contemporaneous phenomenon. Happening as we speak or better yet, *Instagrammable*.

As these drawings are continually projected in the virtual space of the internet, shared in various social networking platforms where the reception of ideas (by clients, potential or otherwise) makes the ‘real’ secondary, can we consider such sophisticated representations as not only crucial for the said reception of the design idea but may ultimately be changing the very idea of space itself?

Going beyond their use-value as tools necessary in the selling of interior spaces, the value of the interior perspective render must be considered important now more than ever.

Endnotes

¹ Here, we take from Evans' essay "Translations from Drawing to Building" where in his introduction he likened the drawing to a vehicle.

Robin Evans, "Translations from Drawing to Building," in *Translations From Drawing to Building and Other Essays* (London: Architectural Association Publications, 1997), 153-193.

² Eve Blau and Edward Kaufman, Introduction, in Eve Blau, Edward Kaufman, Robin Evans, and Centre Canadien d'architecture (eds.), *Architecture and its Image: Four Centuries of Architectural Representation: Works from the Collection of the Canadian Centre for Architecture* (Montreal: Cambridge, MA: Centre Canadien d'Architecture/Canadian Centre for Architecture; Distributed by the MIT Press, 1989), 13-15; Brothers; Robin Evans, *The Projective Cast: Architecture and its Three Geometries* (Cambridge, MA.; London: MIT Press, 1995); Lotz.

³ Although as argued by Amy Campos and Deborah Schneiderman in their introduction for the compiler *Interiors Beyond Architecture* (2018), the field of interior design can be considered to go beyond being a just a "subset" (xv) of architecture, this Review of literature will not concern itself with reclaiming the practice of interior design by going this route. In fact, this endeavour will go in the opposite direction of such an argument as will be forwarded in the subsection 'Finally, beauty or The value of the interior perspective render in the future practice of interior design.'

⁴ Wolfgang Lotz, "The Rendering of the Interior in Architectural Drawings of the Renaissance," in *Studies in Italian Renaissance Architecture* (Cambridge, MA: MIT Press, 1977), 1-65.

⁵ Cammy Brothers, "What Drawings Did In Renaissance Italy," *The Companions to the History of Architecture*, 1:4 (2017), 104-135.

⁶ Yve-Alain Bois, "Metamorphosis of Axonometry," *Daidalos*, 1 (1981), 41-58; Evans, *The Projective*; Lotz.

⁷ Blau and Edward, 13.

⁸ See the definitive scholarships on the representation of interior spaces of Laura Jacobus in "On 'Whether a Man Could See before Him and behind Him Both at Once': The Role of Drawing in the Design of Interior Space in England c. 1600-1800" and Robin Evans in "The Developed Surface: An Enquiry into the Brief Life of an Eighteenth-Century Drawing Technique".

⁹ Robin Evans, "Architectural Projection," in *Architecture and its Image*, 18-35; 24.

¹⁰ See Philipp H. Lepenies' *Art, Politics, and Development: How Linear Perspective Shaped Policies in the Western World* (2014) on how this means of representation had far-ranging influence that went beyond the domain of the art world—to name but just one of the many scholarly works that dealt with the preeminence of perspective drawing.

¹¹ Brothers; Lotz.

¹² Brothers.

¹³ Lotz, 4.

¹⁴ Elkins, *The Poetics of Perspective*; Laura Jacobus, "On 'Whether a Man Could See,'" *Architectural History*, 31 (1988), 148-165.

¹⁵ Brothers; Lotz.

¹⁶ Evans, "Architectural".

¹⁷ Bois; Brothers; Lotz.

¹⁸ *Oxford Dictionaries*, s.v. "expedient," accessed May 24, 2018.

¹⁹ Evans, "Architectural," 24.

- 20 Evans, "Architectural," 33.
- 21 Mario Praz, *An Illustrated History of Interior Decoration: from Pompeii to Art Nouveau* (Milan: Longanesi & C., 1981).
- 22 Charlotte Gere, *Nineteenth Century Interiors: An Album of Watercolors* (London: Thames and Hudson Ltd., 1992).
- 23 Charles Eastlake, *Hints on Household Taste: The Classic Handbook of Victorian Interior Decoration* (New York: Dover Publications, 1986).
- 24 For Thornton, this divide amongst practitioners working on the domestic interior, specifically between the architects and upholsterers, began in the late 17th century and "raged right through the nineteenth century" (1984, 10).
- 25 Peter Thornton, *Authentic Décor: The Domestic Interior, 1620-1920* (New York: Viking, 1984).
- 26 Editors Mark Taylor and Julieanna Preston in their introduction to *Intimus: Interior Design Theory Reader* (2006) would cast doubts on these publications as they "perpetuate the style-manual documentation of furnishings and accessories... [that] contributed to the suppression and relegation of the decorative to a lesser understood architectural activity" (11).
- 27 El Lissitzky, "A. and Pangeometry" (1925), <https://thedetachedgaze.com/2014/03/15/105/>.
- 28 Indeed as Elkins would note: "Contemporary art has largely abandoned it, or more precisely, the founding of modernism was bound up with a rejection of perspective, a rejection that has itself been abandoned in postmodern developments" (1994, 3).
- 29 Lissitzky.
- 30 Bois.
- 31 Panofsky cf. Lissitzky's visual pyramid.
- 32 Bois; Lissitzky.
- 33 Robert Bruegmann, "The Pencil and the Electronic Sketchboard: Architectural Representation and the Computer," in *Architecture and its Image*, 138-155.
- 34 Joanna Merwood-Salisbury, "Interior Design as Environmental Design: The Parsons Program in the 1960s," in Kent Kleinman, Joanna Merwood-Salisbury, and Lois Weinthal (eds.), *After Taste: Expanded Practice in Interior Design* (1st ed.) (New York: Princeton Architectural Press, 2012), 110-129.
- 35 "History," The New School, Parsons, accessed January 11, 2018 <http://www.newschool.edu/parsons/history/>
- 36 Merwood-Salisbury.
- 37 Mark Wigley, *The Architecture of Deconstruction: Derrida's Haunt* (Cambridge, London: MIT Press, 1993).
- 38 Kent Kleinman, "Taste, After All," in *After Taste*, 28-41.
- 39 Referring to the book *After Taste: Expanded Practice in Interior Design* which the author co-edited and where this essay appeared. In turn, this references Elsie de Wolfe's autobiography entitled *After Taste* published in 1935.
- 40 Evans, "Translations".
- 41 Michael Baxandall, *Painting and Experience in Fifteenth Century Italy: A Primer in the Social History of Pictorial Style* (Oxford: Clarendon Press, 1972).

⁴² Further, Baxandall's description of the transactions between artists and 'clients' of the Renaissance mirror the transactions interior designers today deal with on a daily basis, in particular, "the customer's participation in it [in this case, designing]" (1972, 3).

⁴³ Bruegmann, 147.

Edward Bell and the Technology of Sydney's Third Water Supply Scheme

Jennifer Preston
University of Queensland

Abstract

Sydney was declared a city in 1842 and The Sydney City Council was formed. The Council became responsible for the construction of much of the city's infrastructure and one of the biggest problems that they faced was that of water supply. The condition of the old tank stream was putrid and it had been abandoned in 1826. Lachlan swamps and Busby's bore could not supply sufficient water for the growing city. A third water supply scheme was needed.

In 1856 the City Commissioners appointed an Englishman, Edward Bell, as the City Engineer and he was charged with the task of making a flawed concept work. Sydney's third water supply scheme involved the creation of dams, pipes and pumping engines but it also necessitated the construction of buildings; a pumping station and two reservoirs. These buildings were the first of their types in Australia and they saw the importation of English technologies and their adaption to the local sites and circumstances.

Drawing on the archives of the City of Sydney and Sydney Water, newspapers from the period, reports of the various water enquiries and elements of the remaining structures, this paper investigates the work of Edward Bell and some of the innovations and technologies that he implemented in the design and construction of Sydney's third water supply.

Introduction

The Third water Supply Scheme for Sydney was surrounded by controversy and mired in politics and was seemingly constantly discussed in the media of the day. What was often not appreciated at the time and even less so now, was the extent of the technological achievement that created a city wide water supply scheme that was no longer completely at the mercy of weather and climate. Whilst the expanding city meant that the scheme was finally superseded by the more extensive Nepean Scheme, the third water supply scheme, also known as the Botany Swamps Scheme introduced technology from Britain

that had never been used before in Australia, indeed several elements of it were still relatively new in Britain. The scheme also engaged local engineers, manufacturers and contractors who contributed to the project through the manufacture of the pipeline, the construction of the buildings, the installation of the machinery and equipment and through the production of ancillary items, particularly for repairs and maintenance. In several instances Australian materials, particularly timber and stone, were used adjusting the British design and technology to suit.

This paper will focus on the period from 1856 to the close of 1870 when, despite the enquiries, previous designs and false starts the final scheme was designed and realised by Edward Bell, Sydney's city engineer. Edward Bell is a fascinating and arguably much undervalued figure in the history of Victorian Sydney. His training was broad, his skill significant, his knowledge extensive and his perseverance is evidenced by the fifteen years that he worked for the City Of Sydney. Despite being a "eminent engineer" and a "professional gentleman"¹, he also seems a somewhat irascible character and a study of this man is long overdue but this paper will resist the temptation to examine the life of Edward Bell in detail and rather focus only on his role in the Third Water Supply Scheme for Sydney and the technology it introduced into Australia.

Sydney's First and Second Water Supply

When Captain Arthur Phillip made the decision to settle the first fleet in the cove known as *War-ran* by the indigenous population and later named Sydney Cove, the most significant driving factor was the "finest spring of water."² This became known as the tank stream and was the first water supply for the settlement. Despite numerous efforts to keep the tank stream clean, the combination of drought, rising population and misuse of the water meant that the Tank Stream supply soon became insufficient in both quality and quantity.

In 1826 John Busby, a mineral surveyor for the Government, was asked by the Governor Sir Thomas Brisbane to find an alternative source of fresh water. Busby recommended drawing a supply from the Lachlan swamps in the area of what is now Centennial Park by a pipe that was to lead to a reservoir at Hyde Park, then known as the Racecourse. The pipe was undertaken but the reservoir was not, instead the pipe was supported on trestles once it reached Hyde Park so that water carts could be easily filled before they distributed the water throughout the city.

With an ever increasing population and droughts regularly affecting the supply, dams were constructed at several points to conserve water. A severe drought in 1849 brought the topic of a reliable water supply to the fore again and a steam pump, the first in New South Wales was installed in 1854 at the lower end of the Lachlan swamp to boost supply but it was never going to be a long term solution.³

Sydney's Third water Supply Scheme

Sydney had been plagued by droughts on a frequent but unpredictable basis since the first days of the colony. In 1849 a severe drought with less than a quarter of the annual average rainfall, brought the problem of a reliable and consistent supply of water for Sydney to prominence once again. Sydney had become a city in 1842 and by 1849 the population had reached forty thousand. Two investigations were conducted into possible water supply options; firstly, in 1849 by the then City Surveyor Francis Clark and between 1850 and 1852 by a Special Committee of the Council. Perhaps in frustration at the lack of action to resolve the water supply problem, in January 1852 the Governor, Sir Charles Fitzroy, appointed a board with five members to look at how the Botany Swamps could be used to provide the water supply for Sydney. The recommendations of this board established the main features of what became the Botany Swamps Water Supply Scheme.⁴ These included the establishment of a pumping station on the Botany swamps with water pumped to mid and high level reservoirs that would then feed water by gravity to the population of the city.

The Sydney City Council was sacked by the New South Wales government in 1853 and replaced by three commissioners. William Rider who had been the City Engineer under the former council was asked to prepare a design for the Botany Swamp water supply scheme based on the recommendations of the board. The scheme was centred on two existing ponds on land owned by Simeon Lord, Mill pond and what became known as Engine pond.⁵

Rider prepared designs for the scheme to pump from the dams on Lords land which had been acquired by the council, to a mid-level reservoir in Crown Street Surry Hills with a high level reservoir planned for an as yet unidentified site in the vicinity of Victoria barracks at Paddington. Rider's plans were elaborate, expensive and had serious design flaws. The manufacturers of the engines that were to pump the water Thomas Perry and Son of Bilston, Staffordshire in England, found the design and documentation so poor that it was "impracticable to execute the designs"⁶. However they had a contract to supply and in order to avoid being in breach of that contract consulted "one of the highest

authorities upon hydraulic engineering in England”⁷. It seems likely that this was Thomas Hawksley, an English civil engineer who had a significant role in many of the major water supply schemes in Britain.

Hawk(e)sley wrote in a letter to the manufacturers;

“the design is exceedingly defective and obscure, and the drawing and specification so imperfect and contradictory on many important particulars, and so physically impossible on others, as, in the entire absence of other information, to render it necessary for you to depart in some important particulars from the express direction of the engineer in order to produce a working machine, and in other respects to supply the deficiency of instruction by the best inferences that can be drawn from the general contract and intention of the documents rendered for your guidance.”⁸

Part of the problem was “the distance of the parties” and “the impossibility of obtaining specific information in due time” but Hawksley also noted “the obvious inability of the engineer...to design in detail a work of the character of the one upon which you are engaged.”⁹

There were also site specific issues. Rider had located the engine house on a foundation of deep sand.¹⁰ This would have made it almost impossible and certainly extremely expensive to construct the necessary footings for a pumping station sufficient to support the heavy machinery required. There was also concern over the manner in which Rider had been appointed and in December 1855 it was recommended that Rider and his assistant be dismissed for fraud and corruption. Rider and the City Commissioners had disagreed over the designs for both the water supply scheme and the city’s sewerage system. Rider was dismissed with no workable design for the Botany Swamps Scheme in place.

Edward Bell arrived in Sydney from England on the ship *Joshua* with his wife Mary and eleven children on 25 January 1856.¹¹ On The 21st of January a notice had appeared in the *Sydney Morning Herald* calling for applications for the position of City Engineer with a closing date of 4th February. On the 1st of February the closing date was extended to the 11th and on the 13th a notice in the newspapers announced that Edward Bell had been appointed to the position by the City Commissioners.¹² Bell had been born and educated in England serving “his articles working on the drainage of fens and on municipal water

supplies in Britain and Holland” and his career had “a particular focus on drainage, water provision and sewerage works” in several countries.¹³

At the same time as the manufacturers were seeking advice from Hawksley, Edward Bell had reviewed Riders documents, come to the conclusion that they were “absurd and impractical” and had with the agreement of the City Commissioners sent word to England to stop the manufacture of the engines as instructed by Rider.¹⁴

Working on the basic principles established by the Governors board of 1852, where water was pumped from the Botany swamps to mid-level and high level reservoirs, Bell developed a new design. It was a traditionally English design and much of the machinery and components for the various constructions were imported from Britain.

Bell established an agent and inspecting engineer in England and advised them of the requirements of the pumping system, that each “engine and pump was to deliver 1.5 million gallons per day against a head of 210 feet.”¹⁵

The heart of the scheme was the Botany Pumping Station which included an engine house, boiler house, chimney, workshop, pipeline and reservoirs as well as a new wharf constructed nearby to facilitate the delivery of the coal which fired the boilers.



Figure 1. Botany Pumping Station
SRC2907, City of Sydney Archives

The Botany Pumping Station

Bell's design located the pumping station on the northern side of Cook's River, at its junction with Botany Bay on the site of Simeon Lord's former flour Mill where the bedrock was accessible for the foundations required to support the heavy beam engines.¹⁶

Whilst it has been claimed, "all of the machinery and equipment for the implementation of the Botany Scheme was imported from England and Scotland", this is not strictly accurate¹⁷. The tendering and ordering of materials had begun in 1854, with P. N. Russell & co. of Sydney, winning the tender for the thirty inch cast iron rising main that was to deliver the water from the pumping station to the mid and high level reservoirs.¹⁸ The pipe had walls two inches thick and the joints in the pipe sections were "turned and bored interference fits".¹⁹ The pipe ran in an almost direct line from the pumping station to a new mid-level reservoir at Crown Street in Surry Hills. The pumping station's foundation stone was laid in December 1857 and the station was operational within two years.²⁰

The principle buildings erected at Botany were the boiler house and engine house and a 142 foot high chimney. The engine house was built of stone from George's River and measured fifty feet by forty feet. It was two storeys high with ironbark beams but despite the use of native stone and timber it "was representative of English practise of the day."²¹



Figure 2. Steam Engine Cylinder with Fairbairn drop Valves, 1856. Museum of Applied Arts and Sciences.

The machinery in the buildings and their expected performance were summarised in the *Illustrated Sydney News* in 1872;

In this building there are three steam engines of 100 horse-power each, six boilers 36 feet in length by 74 feet in diameter, and three large lifting or

forcing pumps, by which the water for the supply of Sydney is impelled through the 30-inch cast iron main pipes which extend from the Botany engine-house to the reservoirs in Sydney, a distance in a straight line of about four and a half miles. Each pump is capable of sending into Sydney one hundred and forty-four gallons of water every rise and fall of the engine-beam, or two and a half millions of gallons every twenty-four hours; so the three engines combined are able to send in seven and a half millions of gallons daily, or about forty gallons per head for a population of 188,000.²²

The public showed significant interest in the technical specifications of the pumping station machinery and the newspapers supplied the information. Further details were provided in the Sydney Morning Herald;

To give some further idea of the size of the engine we may state that the beams are 24 feet in length, which is also the diameter of the fly wheel; the ring of the lathe, without the arms, weighs 19 tons 16 cwt; its entire weight is 36 tons...The width of the cylinder is 42 inches."²³

The three massive single cylinder vertical steam engines by Thomas Perry and Son were shipped to Australia and installed at the pumping station in 1858. The engines were unique in the colony and were representative of the last generation of beam engines, typically large rotative engines that powered water and sewerage pumping stations. The steam engine cylinder of one of these engines is held in the collection of the Museum of Applied Arts and Sciences in Sydney.²⁴ [Figure 2].

The engine has Fairbairn drop valves and the visible part of the valve gear includes the means to select the point in the engine cycle at which the steam supply is stopped. This feature improved the energy efficiency by making use of the continued expansion of the steam after it had been cut off.²⁵ To prevent the condensing of cool air on the outside of the cylinder it was first covered with a course woollen fabric called drugget and then encased in polished cedar slats.²⁶

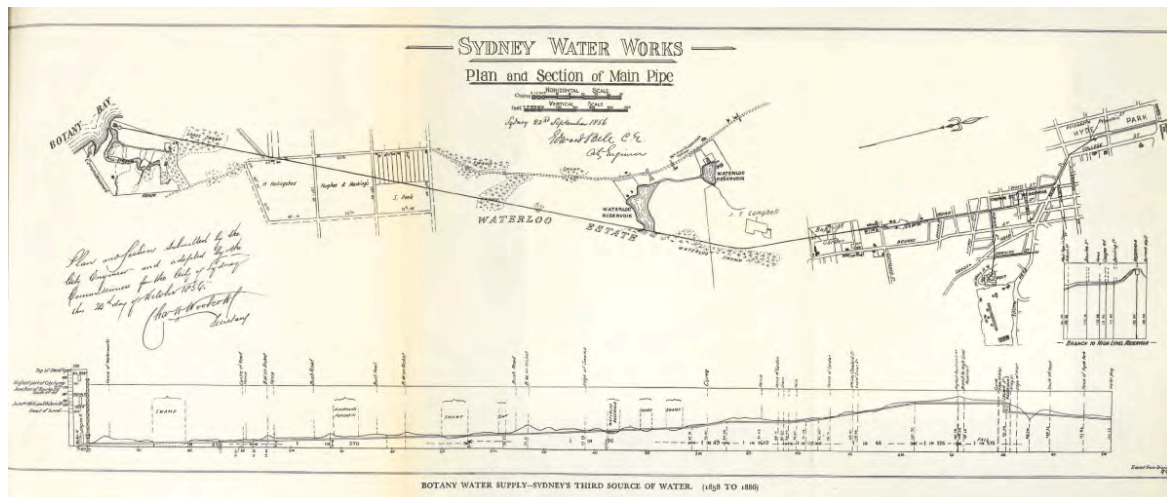


Figure 3. Sydney Water Works Plan and Section of Main Pipe. Edward Bell.
From F. J. J. Henry *The water Supply and Sewerage of Sydney*, opposite page 48

The traditional English method for balancing the pressure of each pump up until the 1850s was the use of a standpipe – in this case 220 foot high. It appeared in Bell's early designs and can be seen on his drawing of the scheme dated 23rd September 1856, [figure 3] but he subsequently replaced the standpipe in the design by pressure vessels for balancing the head for each pump.²⁷ This was one of Bell's technological improvements over previous schemes. Pressure vessels had only recently been used in England and Bell, clearly aware of the latest English technology and in communication with engineers there, modified his design to utilise pressure vessels.

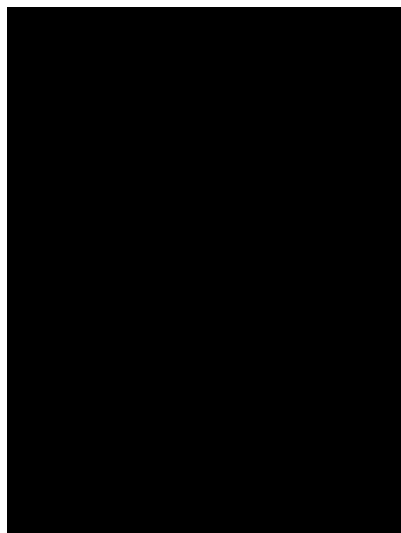


Figure 4. Section through the Engine House showing pressure vessels
Botany Wetlands Heritage Study.

The boiler house was also of stone, a single storey high and measured seventy six feet by fifty feet. It contained six coal fired boilers, each seven feet in diameter and thirty six feet long with each containing two fireplaces.

The pumping station was operational by the end of 1859 and replacement parts were manufactured in Australia from the earliest years of its operation. James Moores, George Allwood and Nicholas Gifford supplied three pumps in 1866, Chapman Brothers supplied a cylinder cover that same year and P N Russell manufactured two cast iron pump barrels.²⁸ The Dry Dock Engineering Company in Balmain provided two pistons for steam cylinders of the pumping engines at Botany Water Works in 1871.

The application of science and industry at the Botany Pumping Station was a hugely significant undertaking in technological and economic terms for mid-nineteenth century Sydney but the pumping station was only part of the scheme that also involved reservoirs and dams.



Figure 5. Engines at the Botany Pumping Station.
SRC2906, City of Sydney Archives.

Crown Street and Paddington Reservoirs

The pumping station was connected to the mid-level reservoir at Crown Street in Surry Hills by the thirty inch main by P. N. Russell & co. The Crown Street reservoir still exists and is still in full operational use although the three and a half million gallons of water it contains today comes from the Nepean rather than from Botany. The reservoir is located 139 feet (42.367m) above sea level and the original design by Bell was also a typically English design in most respects.²⁹ Construction commenced in 1857 and the structure

was built partly in excavated rock which was sealed with bitumen and partly on fill with the floor in brick. It was divided into two equal parts and constructed with brick walls that were faced with approximately 300,000 impervious glazed bricks imported from England.³⁰

The roof structure comprised cast iron fish-belly girders supported on 170 ironbark columns, each twelve inches square. The column capitals were also imported from England, manufactured by Rabne Feez and Co. The arches cast iron cross stays followed the shape of the brick jack-arches.³¹

The jack-arch was developed in England towards the end of the eighteenth century, primarily as a means of fireproofing mill construction. In an article about the origin and use of the jack-arch in New South Wales, the conservation architects Sean Johnson and Ian Stapleton claim that “its first use in Australia was at the Old Treasury Building, Melbourne” which was constructed between 1858 and 1862. The Crown street reservoir was complete with its roof sealed with tar and covered in puddle clay in 1858. It was then covered in soil and sown with grass.³² The reservoir was in service by 1859. It is therefore almost certain that the Crown Street reservoir was the first use of the jack-arch in Australia.

Another ‘first’ for the Crown Street Reservoir was the load testing of its beams. The cast-iron beams were individually load tested to 50% greater than the expected load prior to construction, a new practise in Australia at the time. The practise was first used in England only six years earlier for the construction of the Crystal palace in London in 1851. Not all the construction technology was English. English practise of the time would have supported the beams on cast-iron columns. In the Crown Street Reservoir and the later Paddington reservoir, Australian hardwood ironbark columns were used.³³ Some of these are still in existence at both reservoirs.



Figure 6. Crown Street Reservoir
Sydney Water, 2009.

To further increase the storage of water and to supply the parts of the city and suburbs at higher elevation, a second reservoir was constructed at Paddington with the initial section beginning in 1864 and completed in 1866. A further section was designed to expand the capacity of the reservoir and was built between 1875 and 1878. The combination of technologies used in the Crown Street and Paddington Reservoirs proved to be unique as later reservoirs at Woollahra, Waverley and Petersham used brick columns to support their brick jack-arched rooves.

Initially the Crown Street Reservoir fed water via gravity to properties at lower levels of the city and suburbs but in 1879 a pumping station was completed at Crown Street to pump water up to the Paddington Reservoir. This was the first water pumping system to use Australian made equipment, the pumps being manufactured by *Mort's Dock and Engineering* at Balmain with water valves produced by P. N. Russell and Co.³⁴

The Botany Dams

Although the water supply had not failed during the early years of the Botany pumping stations operation, the inadequacy of water storage at the lower end of the scheme that relied principally on Engine Pond made it necessary to turn off the water supply at night. In 1866 a reliable water supply was a regularly discussed topic again in the newspapers and between 1866 and 1867 Bell prepared plans and specifications for six additional ponds between Mill Pond and Gardeners Road, along the line of Mill Creek and work began in 1867.

The dam walls were constructed of a framework of timber beams that were bolted together with iron bolts and closely fitted vertical planks were fixed to both sides of the frame. Two of these frames were then sloped outwards in opposite directions and the space between filled with fine silt mud or bog and sand.³⁵ The dams were built between high natural sand banks that bordered the stream. The dams were covered in couch grass, and were raised 14 feet above the swamp level. A weir of eight feet above swamp level was inserted to accommodate flood overflow. A sluice was centred along the watercourse in each dam.³⁶ Bell also erected a puddle wall to protect the Engine Pond dam better from salt ingress.³⁷

The 'bog' was applied to the surface of the dam with the intention that it would seep into the body of the work through capillary action of the water. Once there it would consolidate within, filling voids and providing an additional cement to stabilise the earthen structure³⁸ In October 1867 during *the Commission appointed to inquire into the supply of water to Sydney and suburbs* Bell was asked about the dam's design because severe damage had occurred during construction due to storms. Despite doubts by some of the commissioners, Bell insisted that the design was sound and was adamant that they would perform adequately.

In February 1868, with the inquiry continuing, heavy rains severely damaged some of the completed dams. Bell was recalled to testify again and asked if the fact that three of the dams had been partially destroyed by the floods had shaken his confidence in the principles of their construction. Bell replied that "the principle of their construction is correct. The partial destruction of the three lower dams is attributed to the stupidity or negligence, if nothing worse, of the man who was charged with them who had not opened any of the weirs or sluices to relieve the water pressure, contrary to his instructions".³⁹

Further dams were planned but never constructed although after Bell left Sydney in 1872, several further additions were made to the scheme including in 1879 a pumping plant at Crown Street reservoir to lift water up to Paddington Reservoir and in 1881 a supplemental plant was installed to raise the water up to Woollahra Reservoir, which had been completed in 1880.⁴⁰

In 1884-5 a severe drought dried up the ponds at Botany with only Engine Pond holding water. Hudson's temporary scheme was initiated to bring water from the Upper Nepean into the Botany Supply Scheme and this was achieved in 1886 but this was effectively the end of the Botany scheme although it continued as a backup supply until 1893.⁴¹

Throughout the life of the pumping station it was added to, repaired and modified until its closure in 1996 when the machinery and equipment was sold, the chimney reused to vent the sewer and later truncated to accommodate the flight paths of aeroplanes to the Kingsford Smith Airport. The workshop, the wharf, the boiler house and some parts of the Engine House were demolished but part of the Engine House and Chimney remain.⁴²

The third water supply scheme for Sydney contained some of the latest technological advances in Britain at the time for water supply schemes even though it was half a world away. Innovations such as the Fairbairn drop valves and pressure vessels meant that the Botany Pumping Station was what we would today call “World Class”. The innovative use of the jack-arch in the Crown Street reservoir was arguably its first use in Australia. The individually load testing of beams was progressive practise that was to become commonplace after its debut on the construction of the Crown Street Reservoir. The construction of the reservoirs at Crown Street and Paddington used local hardwood for the column supports, an innovation that proved sound, many of these posts still functioning today. The third water supply scheme for Sydney was the largest technological project of its time in the country and the fledgling local manufacturing companies such as P. N. Russell & co. and Morts Engineering works at Balmain played their part contributing to both its creation and its maintenance. For Edward Bell, the irascible but persistent and highly skilled engineer, this was undoubtedly his most technologically complex achievement in Australia. He dealt with the issues of the previous flawed concept, delays in construction, political interference, repeated governmental inquiries, criticism in the press, failed contractors, poor maintenance and possibly incompetent workman and yet despite it all brought to fruition a constant and reliable water supply for Sydney.

¹ Senex, “Our Water Supply”, *The Water Supply of the City of Sydney*, n.d., 5; “Our Water Supply”, *The Sydney Morning Herald*, 30 January, 1866, 3.

² Arthur Phillip, *The Voyage of Governor Phillip to Botany Bay*, London: John Stockdale, 1789, Chapter IV.

³ Noel Thorpe, “Water Supply and sewerage”, *Sydney: From Settlement to City*, Don Fraser ed. Engineers Australia Pty Ltd, 1989, 20.

⁴ F. J. J. Henry, *The Water Supply and Sewerage of Sydney*, Sydney: Metropolitan Water Sewerage and Drainage Board, 1939, 48-49.

⁵ F. J. J. Henry, *The Water Supply and Sewerage of Sydney*, Sydney: Metropolitan Water Sewerage and Drainage Board, 1939, 49.

⁶ Edward Bell, “Botany Water Works, *Sydney Morning Herald*, 21 December 1857, 3.

⁷ Edward Bell, “Botany Water Works, *Sydney Morning Herald*, 21 December 1857, 3.

⁸ Edward Bell, “Botany Water Works, *Sydney Morning Herald*, 21 December 1857, 3.

⁹ Edward Bell, “Botany Water Works, *Sydney Morning Herald*, 21 December 1857, 3.

¹⁰ Wendy Thorp, Brian McDonald, Craig Burton, Tony Brassil, *Botany Wetlands Heritage Study*, May 1991, 31.

¹¹ “Shipping Intelligence”, *The Empire*, 26 January 1856, 4.

-
- ¹² "City Engineer", *The Empire*, 13 February 1856, 1.
- ¹³ Jennifer Preston and Naomi Stead, "Edward Bell and the Interdisciplinarity of Engineering and Architecture in Victorian Sydney", *Fabrications*, 2013, Volume 23, No.2, 187.
- ¹⁴ Edward Bell, "Botany Water-works", *Sydney Morning Herald*, 21 December 1857, 3.
- ¹⁵ Noel Thorpe "Water Supply and Sewerage", *Sydney from Settlement to City*, Don Fraser, ed., Sydney: Engineers Australia Pty Ltd 1989, 21; Noel Thorpe, "The History of the Botany Water Supply", *Sydney Water Board Journal*, October 1953, Volume 3, No. 3, 76.
- ¹⁶ NSW Legislative Council 1869, "Report of the commission appointed to enquire into the supply of water to Sydney and Suburbs", *NSW Legislative Council Journal* Volume 17, part 2; Noel Thorpe "Water Supply and Sewerage", *Sydney from Settlement to City*, Don Fraser, ed., Sydney: Engineers Australia Pty Ltd 1989, 21; Sydney Water, *Botany Wetlands Conservation Management Plan*, September 2003, 19.
- ¹⁷ Graham Brookes & Associates, Heritage Impact Assessment – Proposed Subdivision, Crown Street Reservoir, Surry Hills, 2001, 18.
- ¹⁸ Sydney City Archives, 65/0395 4 October 1866.
- ¹⁹ Noel Thorpe "Water Supply and Sewerage", *Sydney from Settlement to City*, Don Fraser, ed., Sydney: Engineers Australia Pty Ltd 1989, 21.
- ²⁰ Sydney Water, *Botany Wetlands: Conservation Management Plan*, 2003, 20.
- ²¹ "The Botany Water Works", *The Sydney Morning Herald*, 10 March 1859, 5; Graham Brookes & Associates, Heritage Impact Assessment – Proposed Subdivision, Crown Street Reservoir, Surry Hills, 2001, 19.
- ²² "The Sydney Waterworks Botany", *Illustrated Sydney News*, 28 October, 1872, 7.
- ²³ "The Botany Water Works", *The Sydney Morning Herald*, 10 March 1859 pg 5
- ²⁴ www.powerhousemuseum.com/mob/collection/database?irn=212334
- ²⁵ www.powerhousemuseum.com/mob/collection/database?irn=212334
- ²⁶ "The Botany Water Works", *The Sydney Morning Herald*, 10 March 1859 pg 5
- ²⁷ Noel Thorpe "Water Supply and Sewerage", *Sydney from Settlement to City*, Don Fraser, ed., Sydney: Engineers Australia Pty Ltd 1989, 21.
- ²⁸ Sydney City Archives, 65/0387, 65/0393, 65/0395.
- ²⁹ T. J. Roseby, Sydney's Water Supply and Sewerage, 1788-1918, Commemoration Volume, Sydney: Metropolitan Board of Water Supply and Sewerage, 1918, 23
- ³⁰ Noel Thorpe "Water Supply and Sewerage", *Sydney from Settlement to City*, Don Fraser, ed., Sydney: Engineers Australia Pty Ltd 1989, 21.
- ³¹ Noel Thorpe "Water Supply and Sewerage", *Sydney from Settlement to City*, Don Fraser, ed., Sydney: Engineers Australia Pty Ltd 1989, 21; Sydney Water, *Heritage Register*, "Crown Street Reservoir (Covered) (WS 0034) and Site".
- ³² Sydney Water, *Heritage Register*, "Crown Street Reservoir (Covered) (WS 0034) and Site".
- ³³ Sydney Water, *Crown Street Reservoir and Site Conservation Management Plan*, May 2004.
- ³⁴ Sydney Water, *Heritage Register*, "Crown Street Reservoir (Covered) (WS 0034) and Site".
- ³⁵ "Botany Water Works", *The Sydney Morning Herald*, 24 June 1867, 3; W. V. Aird, *The water Supply, Sewerage and Drainage of Sydney*, Sydney: Metropolitan Water Sewerage and Drainage Board, 1961, 11; F. J. J. Henry, *The Water Supply and Sewerage of Sydney*, Sydney: Metropolitan Water Sewerage and Drainage Board, 1939, 49.
- ³⁶ NSW Legislative Council 1869, "Report of the commission appointed to enquire into the supply of water to Sydney and Suburbs".
- ³⁷ NSW Legislative Council 1869, "Report of the commission appointed to enquire into the supply of water to Sydney and Suburbs"; Sydney Water, *Botany Wetlands: Conservation Management Plan*, 2003, 23.
- ³⁸ NSW Legislative Council 1869, "Report of the commission appointed to enquire into the supply of water to Sydney and Suburbs", questions 237-242 and 257-260: Sydney Water, *Botany Wetlands: Conservation Management Plan*, 2003, 23.
- ³⁹ NSW Legislative Council 1869, "Report of the commission appointed to enquire into the supply of water to Sydney and Suburbs, question 1842, *Botany Wetlands: Conservation Management Plan*, 2003, 25.
- ⁴⁰ F. J. J. Henry, *The Water Supply and Sewerage of Sydney*, Sydney: Metropolitan Water Sewerage and Drainage Board, 1939, 49.
- ⁴¹ F. J. J. Henry, *The Water Supply and Sewerage of Sydney*, Sydney: Metropolitan Water Sewerage and Drainage Board, 1939, 63-64; Aird, 1961, 13

⁴² Wendy Thorp, Brian McDonald, Craig Burton, Tony Brassil, *Botany Wetlands Heritage Study*, May 1991, 11.

The Stone Sarjeant Architecture, Materiality and Colonisation in Pukenamu Queens Park Whanganui

Matt Joseph Taylor Ritani

Abstract

This paper posits that the introduction of architecture and technology to Pukenamu/Queens park Whanganui, Aotearoa was intentionally used to support the colonial project. Looking at introduced technology in Pukenamu's history, from the initial harvest and utilization of riparian forest and raupo to a stoic white Oamaru stone urban materiality we see a centering of european building methodologies and a deliberate erasure of tikanga māori architectural knowledge. Today a milieu of institutional structures exercise a nuanced colonial authority over the Pukenamu urban realm and those who inhabit it. The paper compares Pukenamu Queens Park's architectures through a Kaupapa Māori and colonial theoretical framework. The paper observes Pukenamu's architectures chronologically and analyzes how the strategic intentions of colonialism were achieved through architectural materiality. Reflecting on these strategies, the paper asks for further investigations into architectural materiality as a colonial tool to identify possible strategies of resistance.

Introduction

“I will retreat no further.”¹-Haimoana Hiroti at the battle of Moutoa island, 14 May 1864

Pukenamu Queens Park is the urban centre of the city of Whanganui. It hosts a collection of institutional buildings and monuments from the International style War Memorial Hall to the neoclassical Sarjeant Gallery Te Whare o Rehua. This paper argues the architectural fabric constructed over history within this site supports the colonising of Whanganui. Colonialism in Aotearoa has significantly influenced the urban realm “New Zealand’s urban centres have been dominated by European values and this is represented in the built form.”² The site echoes a development paradigm from other urban locales, such as Pukeahu Mt Cook in Te Whanganui-a-tara Wellington. A summary of this development pattern includes the following succession of typologies; a Pa occupation; a military stockade; a rational gridded town plan and an institutional building such as an Art Gallery or Museum. Pukenamu/Queens Park, prior to its beautification, hosts a rogue squatter community, named “The Rookery”³ The Sarjeant Gallery is currently the centre of this urban condition. The Sarjeant “has 'pride of place'” *and* “exalted position”⁴ within the park. Pukenamu Queens Park and the architecture it contains, and has contained in the past, are a ripe strata to interrogate the architectural colonisation of urban space.

“In our post-colonial societies (cities on stolen land, cities to which those from the former colonies have migrated), the politics of space and bodies cannot be untangled from the racial and gendered hierarchies, exclusions, and violence.”⁵

The military infrastructure of the Rutland Stockade with its elevated position and Musket peephole windows⁶ enabling military activity against the local Iwi, can be understood as an architectural colonisation. The paper posits that materiality is critical colonising tool. From the re-representation of European institutional buildings superimposed onto the settler frontier, through to the gaze of a military citadel across the landscape these architectures are influential “transmitters in the cultural system.”⁸ Architecture and its materiality have power in establishing a Colony. The paper argues the architecture of each stage of the Pukenamu Queens Park’s development is subservient to the colonial agenda.

The paper presages Pukenuamu's buildings with a overview of Kaupapa Māori and Colonial theory as they pertain to the efficacy of architectural space over people. Starting with a discussion of Linda Tuhiwai Smith's comparisons of Māori versus Colonial conceptions of space the paper moves to Edward Gibbon Wakefield's theories of colonisation. The paper will then explore how these theories manifest in the site's architectures across time - making a case for the architectural colonisation of the Pukenuamu/Queens Park. This paper does not intended to be a comprehensive historical survey of the park's development but instead focuses on certain architectures for the sake of specifichness and brevity. The narrative covers Pukenuamu Pa and Paikatore, the early settler occupation, the Rutland Stockade, the town of Petre and the Moutoa Memorial, the Native Land Court, the Rookery and the beautification of Queens Park and finally the Sarjeant Gallery. The paper then discusses how colonial power is manifested in a contemporary context. The paper concludes with a summary of these operative strategies and asks for further investigation into how to engage with colonial architectural power.

Te Ao Māori and colonial conceptions of space

In analysing the architectures of Pukenuamu/Queens Par the paper starts with the epistemological position that the Te Ao Māori is a valid framework of knowledge that does not "reject or exclude Pakeha culture."⁹ To begin in a kaupapa Māori theoretical space we start with a conception of the world as the space created between Papatūānuku and Rangi with the trickster Maui pulling Te Ika a Māui (Maui's fish)¹⁰ out of the sea to create the North Island. Whanganui was formed as a result of the battle of the Maunga (Mountains). Mt Taranaki having failed to best Tongariro ran to the sea¹¹ carving the Whanganui river and filling it with his tears after losing the hand of the lovely Pihanga. Pukenuamu sits close to the rivermouth of the Whanganui river in the crook of the last turn Taranaki made before he journeyed north. Within Te Ao Māori there is a deep understanding that Tangata Whenua trace a whakapapa back to Papatuanuku. There is a famous Whanganui Whakatauki¹²(proverb) that demonstrates "that the self is an environment and conversely that the environment is a self."¹³ Māori and the Whenua are deeply interconnected.

E rere kau mai te awa nui nei
Mai i te kāhui maunga ki Tangaroa
Ko au te awa

Ko te awa ko au.

The river flows

From the mountains to the sea

I am the river

The river is me.¹⁴

Within western architectural practice a Euclidean spatial sensibility is pervasive. “For centuries space sensory perception and imagination have been linked to the concept of three-dimensional geometry of Euclidean space, this thus being the dominant thinking process.”¹⁵ This western Euclidean space is but one way in an array of cultural perspectives through which to understand architectural space. Linda Tuhiwai Smith describes a colonial conception of space as an

“...involved processes of marking, defining and controlling space. There is a very specific spatial vocabulary of colonialism which can be assembled around three concepts: (1) the line, (2) the centre, and (3) the outside.”¹⁶



Sarjeant Art Gallery, circa 1919. Photographer unidentified. Sarjeant Art Gallery, Wanganui. Ref: PAColl-5800-13. Alexander Turnbull Library, Wellington, New Zealand. [/records/22805407](#)

Within Pukenuu Queens Park manifestations of the line, the centre and the outside organize the site spatially and socially. The park is highly axial with the processional Veterans Steps bifurcating the site. The stairs conclude at the Sarjeant Gallery at the apex of the park. This processional path is one of Smith's dividing lines. Pukenuu hill is consistently occupied by an architecture that manifests the dominant social power in the city at the time. Some of these architectures appropriate stylistic authenticity from other architectures. The Sarjeant Gallery is a neoclassical building which co-opts the "authority, authenticity and longevity of the classical greek architecture."¹⁷ Another system of dividing lines employed in the colonising of Whanganui and Aotearoa was surveying. Surveying is a means of abstracting the land and creating new definitions of place and space. This was key in the transformation and domestication of the natural environment.¹⁸ This documentation and making abstract the land was informed by the notion of *Terra Nullius* an assumption the land was 'empty' and not being utilized to its fullest economic potential.

When we compare a Kaupapa Māori framework to the colonial theory we see a divergence in values. These contrasting perspectives iterate across the architectures of the site. These new european architectures and technology were not necessarily opposed by Māori. "European innovations were fitted into a vigorous and adaptive culture; those which suited it flourished, and those that did not were ignored or neglected."¹⁹ Initially Putiki Iwi encouraged occupation in Whanganui out of "out of enlightened self-interest"²⁰ for the mutual benefit of both Pakeha and Māori and to increase access to european goods. It is easy to understand why Pukenuu Queens Park is a site of conflict as it is a place where a Kaupapa Māori notion of the integrated land and self meets an enlightenment model stipulating an empty landscape full of resources to be leveraged by an institutional technology and architecture.

Edward Gibbon Wakefield and the colonial spatial agenda

To understand the colonial mindset a productive starting point is to investigate those who had agency within the colonial process. Edward Gibbon Wakefield and his son Edward Jerningham Wakefield are strong agents within the colonisation of Whanganui and their activities are useful to analyze as they demonstrate some key tenets of colonialism. "The driving force in Edward Gibbon Wakefield's life was his appetite for power and influence."²¹ Wakefield Gibbon had left England after being jailed for deceiving teenage girls from wealthy families into marriage in

order to fund his political ambitions not once, but twice.²² The second time Wakefield was incarcerated he read widely on the "classical economists, the utilitarians, and on social questions."²³ Wakefield also spent time in Australia and Canada observing and learning from emerging colonies. He further developed these ideas in a series of articles and a treatise called "A view of the art of colonisation"²⁴ which documented Wakefield's views on how the built environment in a colonized settlement should operate. Wakefield's remains visible in our urban environment nationally through the naming of streets and spaces. Wakefield colonisation theory is surmised in the following dream-like quote of the landscape yet to be colonised.

"He finds that colonizing consists of making all sorts of things not yet in existence. He beholds either nothing but a wilderness, or the first settlers engaged in making roads and bridges, houses and gardens, farms, mills, a dock, a lighthouse, a courthouse, a prison, a school-house, and a church. If he goes to a colony already established, still the further construction of civilized society is the sight that meets his eyes in every direction."

25

The Decolonizing Art and Architecture Residency (DAAR) defines a colonizing architecture as a part of "the existing dominant structure - financial, military and legal - conceived for the benefit of a single group"²⁶ The establishment of buildings in a landscape supported the growth of a developing community of settlers. This in turn facilitated the introduction of technology, materials and new architectures that could increase economic benefit from the land.

"For over 200 years writers . . . have persistently painted this picture of the poor benighted savage reeling under Western impact . . . in these studies there lurks the assumption of European cultural and technological superiority. The islanders are thus explicitly or implicitly inferior."²⁷

Architecture within western canon is often utilized as a means of legitimising institutions with "buildings themselves expressing authority in the way they are used or made. In other words, authority, such as it was, lay in human endeavour."²⁸ Within Pukenua Queens Park there are a number of institutional buildings. There are two libraries, the Alexandra Research Library and the Wanganui Public Library, the Whanganui Regional Museum, the War Memorial Hall and the Queens Park school demolished in 1977. Museums and libraries as archivers and

authenticators of history have a difficult relationship with indigenous peoples. There is “a history of schooling as a tool of colonization, as a mechanism of assimilation, as a process of indoctrination in colonial Christian belief systems as an instrument of domestication of Indigenous Peoples globally.”²⁹ The site also accommodates the Native Land Court an institution responsible for a vast and systematic alienation of Mana Whenua from their land.

Māori occupation of Pukenuamu pre-1840

Pukenuamu hill was occupied, prior to the first settlement, by two pa; Pukenuamu - a fighting pa that prior to the first arrival of the Wakefields, narrowly avoided attack from a Ngapuhi Taua War Party consisting of Te Roroa warriors lead by Tu Whare.³⁰ The other Pa was Paikatore, a trading location and also the point of arrival for Edward Jerningham Wakefield. Paikatore was also the site where the Te Tiriti o Waitangi was signed with members of the Whanganui Iwi. Pukenuamu viewed over the rivermouth, a gateway to the upper river. Putiki Iwi were vulnerable from Waka Taua War Canoe attacks from Ngati Toa Rangatira in the south, Taranaki tribes in the north and the various upper river Iwi. In 1929 Putiki Iwi suffered a massive attack from Te Rauparaha as vengeance for the prior killing of a Ngati Raukawa chief. Over 400 people were killed. Given Putiki's precarity Iwi leaders perceived colonisation as a means of providing protection for their people and to also assist in accessing european resources and technology.

Early settlers 1840 - 1846



Smith, William Mein, 1799-1869. [Smith, William Mein] 1799-1869 :The town of Petre on the Wanganui River in September 1841. Day & Haghe. [London, Smith, Elder 1845]. Ref: PUBL-0011-05. Alexander Turnbull Library, Wellington, New Zealand. /records/22872042

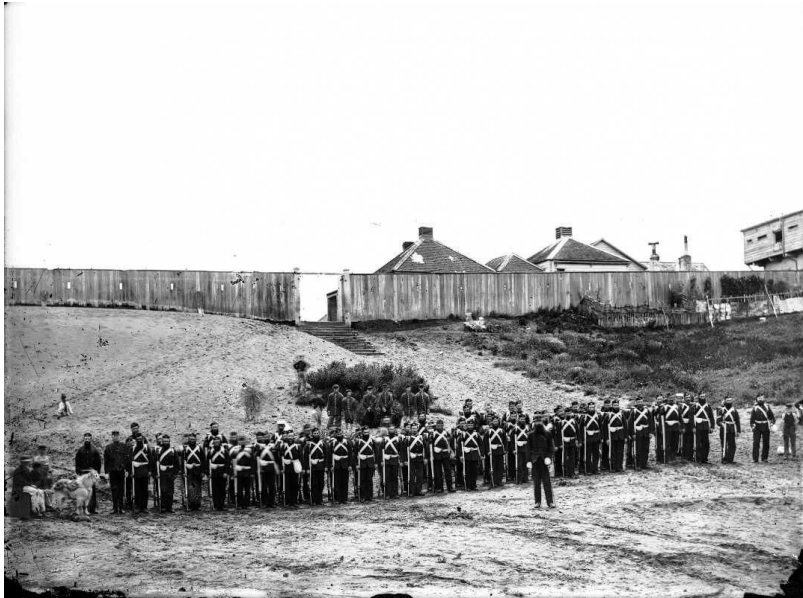
The initial impetus for the first settlement in Whanganui was an oversubscription of sections in the Wellington region. This demand for land prompted Edward Jerningham Wakefield to travel north to negotiate the sale.³¹ On May 19th 1840 the schooner *Surprise* entered the Whanganui rivermouth with Jerningham Wakefield and a Māori interpreter named Kuru. Nine days later 700 Māori had massed at Pakaitore. This group included chiefs who wished to sign contracts to sell their lands, as they understood such a transaction to mean within Māori notions of custodianship. Twenty-three chiefs signed the document, but as “Māori titles to land depended upon occupancy, conquest, and use”³² rather than an abstract notion of legal ownership, they did not completely understand the sale. The exchange of the blankets and muskets amongst other amenity items resulted in a riot as those present tried to secure their share of the payment. Two days later Wakefield returned to Pakaitore and was presented with a gift of 30 pigs and 10 tonnes of potatoes, in accordance with a customary tradition of reciprocity called *homai te homai* or a *gift for a gift*. This was an indication that the Iwi leaders had not fully understood the transaction that they had just concluded with Wakefield. Wakefield traded a few blankets at the time to ensure it would be perceived as a transaction. The first formal group of thirteen settlers arrived from Wellington on the Schooner *Elizabeth* on February 27th 1841

landing at Pakaitore. This purchase of the land was never completely accepted by the local Māori.

“Long before the payment arrived for the land, being handed over at last in 1848, the surveyors had moved in and the settlers had preferred their claims; as a result the initial anxiety of the local Māori population to obtain some of the newcomers for their areas changed to discontent.”³³

The first settlers lived in fear of imminent attack for the next six years.³⁴ They lived in small Raupo huts and had limited resources at their disposal. The upper river chief of Ngati-Haua-te-Rangi, Hemi Topine Te Mamaku had promised that the Pakeha settlers of the Whanganui settlement would be under his protection provided that there were no soldiers stationed in the settlement. Te Mamaku asserted “that their argument was with the government and its soldiers and not with the local settlers.”³⁵ Settler accommodation was initially made from Raupo procured from and constructed by local Māori. Indeed one of the most notable events of Whanganui’s early colonial conflict, the Gilfillan Massacre, was initiated over a disagreement of the price for one of these Raupo buildings.³⁶ This incident also occurred “The same month the [Rutland] stockade was completed.”³⁷ These settler houses with a Raupo cladding were not simply accommodation but colonial institutions, such as the “Police Office and Police Magistrate’s”³⁸ office. The establishment of these colonial institutions aligns with Wakefield’s vision of a landscape occupied with colonial social infrastructure.

The Rutland stockade 1846 - 1870



Soldiers from the 18th Royal Irish Regiment at Rutland Stockade, Wanganui. Ref: 1/1-000095-G. Alexander Turnbull Library, Wellington, New Zealand. /records/23101538

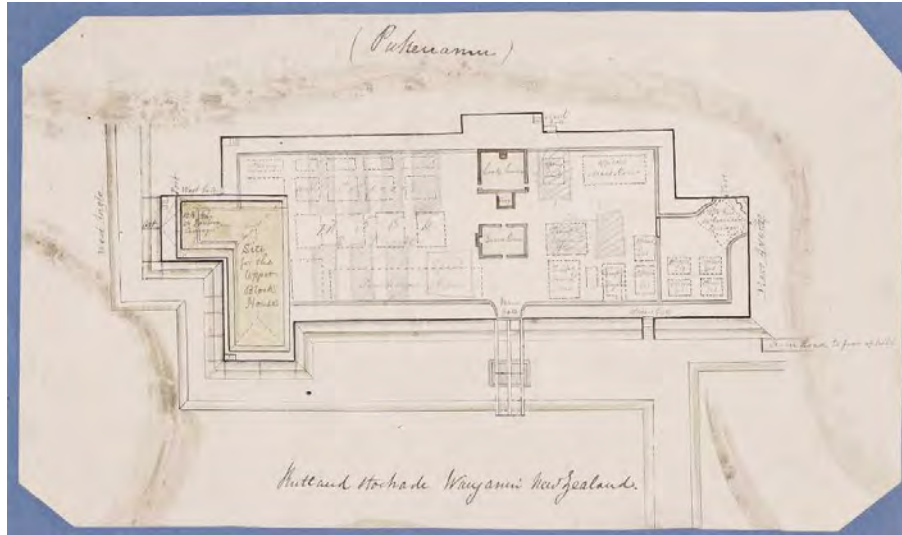
The Rutland Stockade was the largest of all the stockades constructed in the New Zealand Wars. As a colonizing architecture the stockade was a deliberate institutional infrastructure supporting the military occupation of Whanganui. On December 13th 1846, on the instruction of Governor George Grey, the 58th Rutlandshire Regiment arrived on the Frigate *H.M.S. Calliope* at the Whanganui settlement. The Regiment commenced the construction of the Rutland Stockade. Hoani Wiremu Hipango a local chief assisted in providing timber for the stockade. The first action of the Regiment was the “felling of riparian forest – an act of provocation to the river itself.”³⁹ The stockade was also constructed in part from corrugated iron⁴⁰ - a European material introduction. The Stockade was completed on the 1st April 1847. By 1846 the Regiment occupied the hill and continued to do so until 1870. From 1872 the site was used as a civil prison⁴¹ and although partially demolished the site was occupied by a squatter community, discussed in the next section on *The Rookery*. In 1882 the stockade was demolished in an “attempt to move on from a difficult and complex colonial past”⁴² and the area reclaimed for public use. Although it was demolished the Rutland Stockade maintains a presence in Whanganui through a commemorative boulder, the name of a local pub - The Rutland Arms, the timber in the Russlevale homestead,⁴³ the prison in Maria Place, now the Whanganui Resource Recovery Centre,⁴⁴ a Totara House in Bell Street, the furniture in the Masonic Lodge on Bell Street, fencing posts around the city, the brick edging to the path to the cenotaph at the top of

Pukenamu Hill,⁴⁵ and a number of brick chimneys.⁴⁶ These locations all either reference or are comprised of material from the stockade. The stockade was a panoptic fulcrum in the landscape and dominated over that which it gazed over. The Rutland Stockade also overlapped the current location of the Sarjeant Gallery.⁴⁷



Hamley, Joseph Osbertus, 1820-1911. Hamley, Joseph Osbertus, 1820-1911 :Wanganui, showing blockhouses from the sandhills. [16 January 1865]. Ref: E-047-q-039. Alexander Turnbull Library, Wellington, New Zealand. /records/22323722

In March 1928 it was suggested that there was enough timber from the remaining Rutland stockade gaol on the site to recreate and re-represent the Stockade as a wooden model to be displayed in the Whanganui Regional Museum.⁴⁸ It is clear that even after the demolition of the building there is a clear desire by members of the Whanganui community for the continued presence of this colonising structure to be archived permanently within the architectures of the park. At the time the demolition of the Stockade in the was met with “the disgust of patriotic colonists.”⁴⁹ The hostility in response to the demolition of the stockade is telling of the values of the complainants. This desire for the continued presence of a colonial military structure could be interpreted as “a manifestation of colonial or class guilt and an attempt at preparing oneself for some act of future revenge.”⁵⁰



Artist unknown : (Pukeramu) Rutland Stockade, Wanganui, New Zealand [1847]. Ref: E-952-f-117.

Alexander Turnbull Library, Wellington, New Zealand. /records/31986034

"It remains to be seen whether any changes to the interpretation [of the stockade]... will emerge, to honour and remember all of those involved, not just the imperial and colonial troops."⁵¹

The Rutland Stockade is manifested in the urban realm as a colonising force "Maori prompted its construction, helped build it, were held prisoner within it, and some remain interred on its site."⁵² The township became more established under the protection of the Rutland Stockade. In 1843 Anglican missionary Richard Taylor recorded 3,240 Maori living in the Whanganui River valley and 205 Settlers.⁵³

Petre and memorialisation 1840 - 1880



Detail 66/21713 - Plan of the Town of Petre in the District of Wanganui [Whanganui] - Sections, blocks, boundary - scales 10 inches:1 inch, 30 links:1 inch - R. D. Park, P. S. New Zealand Company. Date: 1850. Archives reference: AAFV 997 Box 132 WT7. Material from Archives New Zealand Te Rua Mahara o te Kāwanatanga. archway.archives.govt.nz/ViewFullItem.do?code=22824368

The town planning and the erection of memorials to the site was also used as a colonising tool. The town plan was designed in 1850. It showed an imagined colonial future with the institutions alluded to in Wakefields theories, a marketplace, a church, a hospital, a bank exchange and a reading room. The land is shown compartmentalized into sections of a viable size, divided by Smith's surveying lines for the emerging settler market. This creation of a new town is understood within colonial thought as a "year zero"⁵⁴ where the new Pākehā urban history commences. However we can see from the prior sections that "cities have always been indigenous places."⁵⁵ In a number of cities in Aotearoa these plans were often designed in Europe with little to no knowledge of the physical realities of the site. We can see this in the urban plans of places like Christchurch and Martinborough where a Union Jack is imprinted onto the centre of the city. Whanganui was originally named Petre by the New Zealand Company "as a compliment to Lord Petre, one of its directors."⁵⁶ Naming is a semiotic battle upon "over who should have the right to conceptually frame the area."⁵⁷ Within this site the settlers also began situate discrete signifying objects to support the colonising narrative. Pukenui Queens park is saturated with memorials. The site also possesses Aotearoa's first war memorial - the Moutua Memorial. This weeping woman sculpted in white marble is representative of an inaccurate settler interpretation of history.



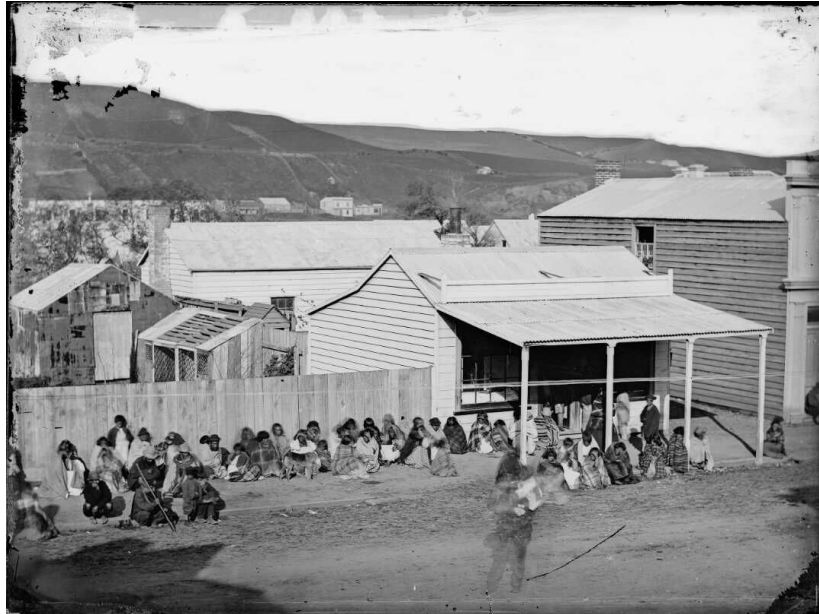
Street view of Rutland's stockade, memorial statue, the court house and the Albion Hotel, Wanganui district. Ref: 1/1-000051-G. Alexander Turnbull Library, Wellington, New Zealand. /records/22666128

“The memorial reflected the gratitude of Pākehā, especially in Whanganui town, that the battle had saved them from attack. Other memorials to the New Zealand wars were erected in the first two decades of the 20th century. There was a desire to recognise earlier military service on behalf of the British Empire, as a salutary example for a generation that was expected to fight in the First World War.”⁵⁸

The battle of Moutoa Island on the 14 May 1864 was between Whanganui Iwi and an invading Pai Marie Taua/War Party from the north. The Hauhau's, fueled by a hybridized Māori and Christian theology sought to attack the Whanganui settlement. The Whanganui Iwi fought to ensure their Hauhau opponents did not enter their lands without permission and thus uphold their Mana as Kaitiaki of their lands. This battle was about upholding the Mana of Whanganui Iwi. This memorial dedication is inscripted "In defense of law and order against fanaticism and Barbarism." This falsely frames the actions of Whanganui Iwi around settlers having a moral right to occupation and therefore being worthy of protection from their Māori neighbours - defenders of 'law and order'. The Memorial co-opts a battle that was not motivated by a desire to defend the new settler community. The Memorial was unveiled on 26 December 1865 and

has been in place for over 150 years. The town plan and the permanent stone sculptures legitimize the colonial narrative.

Native Land Court 1922 - 2018



Group of people sitting outside a shop in the Wanganui area, possibly waiting for a land court hearing.

Taken by William James Harding, ca 1860s.

The Whanganui city centre contains New Zealand's only purpose built Native land court still in physical existence. The Native Land Court nationally and systemically alienated the majority of lands from Māori across Aotearoa. In Whanganui this purpose built court building is actively protected by the dominant heritage powers. The Native Land Court legal modus operandi was to move Māori lands from collective ownership, in line with Māori values, to a limited number of individual titles through the means of a legal technology. This made it easier to convey in private title at a later date. A buyer would then only have to negotiate with a limited shortlist of owners. The Land Court process held appeal for Māori because it gave them an opportunity to assert Mana over a certain area of land through recognition from this court. This would give them a stronger holding over the land than other members of their Iwi. Ligation around the land would require Māori to visit - often from great distances - the court in Whanganui to attend a hearing that might be delayed or not even occur. Visiting delegates would have to cover their own legal defence costs and living expenses during this period. "Before the mid-eighties there was no

attempt to hold Court sittings in Māori villages”⁵⁹ often Māori would have to stay for weeks only to eventually lose possession of their lands as a result of settling inflated debts incurred by local shopkeepers and hoteliers, whilst awaiting a hearing. The requirement of Māori to visit the court rather than the court travelling to Māori, or indeed an intermediary location alludes to Linda Tuhiwai Smith’s colonial centre. Visiting Māori were also vulnerable to disease, poor local living conditions and alcohol, often with tragic outcomes;

“I was perfectly astonished at hearing that a subject of conversation at each hapu I visited was the number of natives dying in consequence of attendance at the Native Land Court at Wanganui.”⁶⁰

Recently a local technical college attempted to demolish the Native Land Court building for new educational facilities. The building is “a symbol of oppression that needed to be demolished so that the site could be reclaimed for Māori.”⁶¹ This proposal was met with resistance⁶² and was eventually heard at the Environment Court. The case was ruled in the favour of retention of the Native Land Court on the basis of its heritage value. “Non-western cultures tend to be marginalised in current conceptions of architectural heritage.”⁶³ The court remains, much like the other architectures of Pukenui Queens Park a robust and permanent reminder of the colonial impact in the built environment of Whanganui.

The Rookery 1870 - 1880

The Rookery was a squatter community in Pukenui Queens Park that emerged after the disestablishment of the Rutland stockade. The people that lived in the Rookery were “settlers without means.”⁶⁴ Some occupied the existing Married Mens Quarters and others built Raupo shacks. Raupo housing was used for hundreds of years in the area and was occupied by settlers on arrival to Whanganui. The Raupo Ordinance Act 1842, Aotearoa’s first building legislation, was passed to discourage the construction of raupo houses through taxation of existing Raupo buildings.

“Raupo buildings did not become a permanent feature of colonial New Zealand’s built environment and were, from the outset, a benchmark against which the material

prosperity, development, and growth of the colony could be measured as they faded from the scene.”⁶⁵

Legislative technology was used to erase a Tikanga construction methodology from the site. The Rookery was by all accounts “a place of ill repute”⁶⁶ and did not fit within the mould of the idealised settler demographic. It was named after a similar slum-like area in London. In 1872 the newly established borough council decided to demolish the Rookery and “burned [the Rookery Buildings] down to clear them out.”⁶⁷ After this exodus some squatters returned, growing to a sum of thirty dwellings until the council intervened and decided in 1880 to “level and beautify the area.”⁶⁸ Architecture wasn’t constructed in the Rookery to colonise, rather it was erased as it was not representative of the dominant social group controlling the urban centre of Whanganui.

The Sarjeant Te Whare o Rehua



View of the Sarjeant Gallery from the Pukenuu Queens park Forecourt - Author's own image.

The Sarjeant Gallery Te Whare o Rehua currently occupies the central high point of Pukenuu Queens park. This building colonises the park and is the central structure that consolidates all the power of the architectures before it. In 1917 following a bequest from Henry Sarjeant, a local farmer, a competition was held for the design of the Art Gallery. The winning design was by a young architect Donald Hosie working under Anscombe Associates. It is one of New Zealand's finest examples of neoclassical architecture and is recognised as a Category One historic place.

When understood through Linda Tuhiwai Smith's notions of colonial space it has a strong centre in its cruciform plan. It also has strong axial lines that extend out into the park beyond. Its prominence on the hill was zealously protected by one of its form directors;

"Cohen's confidence extended to his vigorous protection of the sarjeant gallery's strong architectural and sculptural form emerging from a green hill, to the extent that (according to oral tradition), he would, in the dead of night, root out trees that had been planted anywhere near the sight lines to and from this cultural icon of the city."⁶⁹

The Sarjeant is also an institutional building indicative of a society that has progressed through significant development in the eyes of Gibbon Wakefield's colonial process. An Art Gallery is an infrastructure of high culture. The Sarjeant is clad in Oamaru stone. There are numerous examples of neoclassical Oamaru stone buildings in Aotearoa. Erik Olssen discussing Oamaru's main street observed "the oamaru leaders celebrated, in glossy white limestone, the triumph of the pioneers and the certainty of progress through capitalism."⁷⁰ This white materiality indicated the dominance, longevity and power of the colonising culture. This building continues to exert the colonial forces of its predecessors.

Conclusion 1917 - 2018

This paper has sought to explore the colonising methods of architecture and materiality in Pukenui Queens Park. The paper establishes Colonial and Kaupapa theory from which to analyze Pukenui's architecture. From the initial arrival and establishment of European institutional infrastructure in a Raupo skin, to the construction of the Rutland Stockade of native timber gazing over the Landscape - Pukenui Queens Park's architecture has colonial power. The Petre gridded town plan and the proliferation of permanent stone war memorials sought to legitimize dominant colonising narrative. The Native Land Court systemically alienated Iwi from their land and the building continues to be protected to this day. The Rookery and its eventual demolition demonstrates the erasure of architectures that did not align with Whanganui's core colonising values. The Sarjeant Gallery is the current penultimate structure of this ongoing process. It contains the accrued power of these architectures and exudes itself across the urban realm. The architectures of the site, across time, have colonised the Pukenui hill.

“Modern Maori architecture is much more concerned with biculturalism, being able to express Maori cultural values alongside those of Pakeha in a socially acceptable manner. It is as though the conflict between cultures is something of the past, and that architecture has no place reflecting this because it is about the present and future.”⁷¹

We live in a time when architectural practice largely does not meaningfully express Te Ao Māori and as such Kaupapa Māori in architecture is largely ornamental. There is a need for further research understanding the urban power of colonising structures to better understand how this influence might be mitigated.

Endnotes

1. Jock, Phillips, and Gavin McLean. 2006. “Wanganui: War Memorial Capital of the World.” In *Heartlands: New Zealand Historians Write about Places Where History Happened*. Auckland, N.Z.: Penguin Books. Pg 78.
2. “Urban Whitescapes in W[h]anganui.” *Sub.Sist* (blog), June 8, 2014. <https://kaihoahoawhare.wordpress.com/2014/06/08/urban-whitescapes-in-whanganui/>.
3. “Local and General.” *Wanganui Chronicle*, November 16, 1881.
4. Curnow, Wystan, Christina Barton, Robert Leonard, Thomasin Sleight, 2014. “Report The Given as an Art-Political Statement Text by Wystan Curnow on Nine Works by Billy Apple, 1979 - 1980.” In *The Critic’s Part: Wystan Curnow Art Writings 1971-2013*
5. “The Right To The City: Against And Beyond.” Pantograph Punch. 6th November 2017. Accessed November 20, 2017. <http://pantograph-punch.com/post/right-to-the-city-against-beyond>.
6. New Zealand Architectural History Symposium, Paul Diamond, Victoria University of Wellington, and Centre for Building Performance Research. “The Rutland Stockade : An Enduring Presence.” In *A Massive Colonial Experiment: New Zealand Architecture in the 1840s : A One Day Symposium*, 2014. Pg 47.
7. Virilio, Paul. *Bunker Archeology*. New York: Princeton Architectural Press, 2012. pg 5
8. Fisher, Roger, Mary E. Lange, and M. Emmanuel N. Nkambule. “Cultural Hybridity and Vigor in the Decolonised Architectural Curriculum.” *Paranoá: Cadernos de Arquitetura e Urbanismo* 0, no. 18 (August 21, 2017). <https://doi.org/10.18830/issn.1679-0944.n18.2017.01>.
9. Pihama, Leonie, Fiona Cram, and Sheila Walker. “Creating Methodological Space: A Literature Review of Kaupapa Maori Research.” *Canadian Journal of Native Education; Edmonton* 26, no. 1 (2002): 30–43. Pg 33
10. Gossage, Peter. *The Fish of Maui*. London: Puffin Books : Penguin, 2011.
11. New Zealand Ministry of Education, Te Wharekura 58 (1999), http://www.tki.org.nz/r/maori/wharekura/whare58_st8_e.php (last accessed 27 July 2005). <https://teara.govt.nz/en/whenua-how-the-land-was-shaped/page-4>
12. “Whanganui Tribes.” Accessed February 28, 2018. <https://teara.govt.nz/en/whanganui-tribes/print>.

13. Rākete, Emilie. "In Human - Parasites, Posthumanism, Papatūānuku." Accessed June 9, 2018. http://www.academia.edu/17321004/In_Human_-_Parasites_Posthumanism_Papat%C5%AB%C4%81nuku.
14. Taonga, New Zealand Ministry for Culture and Heritage Te Manatu. n.d. "1. – Whanganui Tribes – Te Ara Encyclopedia of New Zealand." Web page. Accessed June 13, 2018. [/en/whanganui-tribes/page-1](http://www.teara.govt.nz/en/whanganui-tribes/page-1).
15. Tepavčević, Bojan, and Vesna Stojaković. "Representation of Non-Metric Concepts of Space in Architectural Design Theories." *Nexus Network Journal* 16, no. 2 (August 1, 2014): 285–97. <https://doi.org/10.1007/s00004-014-0194-8>.
16. Smith, Linda Tuhiwai. 2012. *Decolonizing Methodologies: Research and Indigenous Peoples*. London: Zed.
17. Jones, Peter Blundell. "Architecture and Political Legitimation." *The Architectural Review* v.200, no. 1193 (July 1, 1996): p66(6).
18. Byrnes, Giselle M. "'Texted Pasts'—the Sources of Colonial Land Surveying." *Kōtare : New Zealand Notes & Queries* 1, no. 1 (June 6, 1998). <https://ojs.victoria.ac.nz/kotare/article/view/583>.
19. Ballara, A "The Pursuit Of Mana: A Re-Evaluation Of The Process Of Land Alienation By Maoris, 1840-1890," *Journal of the Polynesian Society*. Accessed January 25, 2018. http://www.jps.auckland.ac.nz/document/Volume_91_1982/Volume_91%2C_No._4/The_pursuit_of_mana%3A_a_re-evaluation_of_the_process_of_land_alienation_by_Maoris%2C_1840-1890%2C_by_A._Ballara%2C_p_519-542?action=null.
20. Young, David, and George Henare. *Woven by Water: Histories of the Whanganui River*. Auckland, N.Z.: Royal New Zealand Foundation of the Blind, 2009. Pg 34
21. Taonga, New Zealand Ministry for Culture and Heritage Te Manatu. "Wakefield, Edward Gibbon." Web page. Accessed February 28, 2018. [/en/biographies/1w4/wakefield-edward-gibbon](http://www.teara.govt.nz/en/biographies/1w4/wakefield-edward-gibbon).
22. <https://nzhistory.govt.nz/people/edward-wakefield>
23. Taonga, New Zealand Ministry for Culture and Heritage Te Manatu. "Wakefield, Edward Gibbon." Web page. Accessed February 28, 2018. [/en/biographies/1w4/wakefield-edward-gibbon](http://www.teara.govt.nz/en/biographies/1w4/wakefield-edward-gibbon).
24. Wakefield, Edward Gibbon. *A View of the Art of Colonization, in Letters between a Statesman and a Colonist / by Edward Gibbon Wakefield, with an Introduction by James Collier*. Oxford: Clarendon Press, 1914.
25. Wakefield, Edward Gibbon. *A View of the Art of Colonization, in Letters between a Statesman and a Colonist / by Edward Gibbon Wakefield, with an Introduction by James Collier*. Oxford: Clarendon Press, 1914.
26. Demos, T. J. "Decolonizing Architecture/ Art Residency: Common Assembly." *Artforum International*; New York, April 2012.
27. Howe, K. R., 1977. "The Fate of the 'Savage' in Pacific Historiography", *New Zealand Journal of History*, 11: 137-54.
28. Melvin, Jeremy. n.d. "Seeds of Discontent: Can Architecture Be Revolutionary?" *Architectural Review*. Accessed June 27, 2018. <https://www.architectural-review.com/essays/seeds-of-discontent-can-architecture-be-revolutionary/10023876.article>.
29. Leonie, Pihama. 2018. "Colonisation, Neoliberalism, Māori Education and the Illusion of Treaty Partnership." Keynote Address. <http://www.nzare.org.nz/portals/306/images/Files/nzare-keynote-2018-Final-Pihama.pdf>.
30. "Death of Tu-Whare | NZETC." Accessed June 12, 2018. <http://nzetc.victoria.ac.nz/tm/scholarly/tei-SmiHist-t1-body1-d12-d7.html>.
31. Prickett, Nigel. *Landscapes of Conflict: A Field Guide to the New Zealand Wars*. Auckland, N.Z.: Random House New Zealand, 2002. pg 54
32. Shafto, H. *Fragments of Wanganui History*. Wanganui, N.Z.: Wanganui Chronicle, 1939. Pg 5.
33. Ballara, A "The Pursuit Of Mana: A Re-Evaluation Of The Process Of Land Alienation By Maoris, 1840-1890, P 519-542." *Journal of the Polynesian Society*: Accessed January 25, 2018. http://www.jps.auckland.ac.nz/document/Volume_91_1982/Volume_91%2C_No._4/The_pursuit_of_mana%3A_a_re-evaluation_of_the_process_of_land_alienation_by_Maoris%2C_1840-1890%2C_by_A._Ballara%2C_p_519-542?action=null.

34. Jock, Phillips, and Gavin McLean. "Wanganui: War Memorial Capital of the World." In *Heartlands: New Zealand Historians Write about Places Where History Happened*. Auckland, N.Z.: Penguin Books, 2006. Pg 78.
35. Voelkerling, Rex H, and Kevin L Stewart. 1986. *From Sand to Papa: A History of the Wanganui County*. Wanganui, N.Z.: Wanganui County Council.
36. Ritani, Matt Joseph Taylor, Victoria University of Wellington, School of Architecture, and Victoria University of Wellington. "Kafka's Anubim: Death, Anxiety and Architecture : A Thesis Submitted to the Victoria University of Wellington in Partial Fulfilment of the Requirements for the Degree of Master of Architecture Professional," 2015. Pg 129
37. New Zealand Architectural History Symposium, Paul Diamond, Victoria University of Wellington, and Centre for Building Performance Research. "The Rutland Stockade : An Enduring Presence." In *A Massive Colonial Experiment: New Zealand Architecture in the 1840s : A One Day Symposium*, 2014. Pg 4
38. "Whanganui in 1841 | NZHistory, New Zealand History Online." Accessed June 13, 2018. <https://nzhistory.govt.nz/media/photo/wanganui-1841>.
39. Young, David, and George Henare. 2009. *Woven by Water: Histories of the Whanganui River*. Auckland, N.Z.: Royal New Zealand Foundation of the Blind. Pg 34
40. "Whanganui District Library - Rutland Stockade." Accessed February 21, 2018. <http://www.whanganuilibrary.com/site/pages/heritage/queens-park-tour/rutland-stockade.php>.
41. New Zealand Architectural History Symposium, Paul Diamond, Victoria University of Wellington, and Centre for Building Performance Research. 2014. "The Rutland Stockade : An Enduring Presence." In *A Massive Colonial Experiment: New Zealand Architecture in the 1840s : A One Day Symposium*. Pg 49.
42. New Zealand Architectural History Symposium et al., *A Massive Colonial Experiment*. - An enduring presence the rutland stockade - paul diamond
43. "Timber from Stockade." *New Zealand Herald*, February 2, 1942.
44. Stowell, Laurel. "Both Sides of History Should Be Told." *NZ Herald*, January 27, 2015, sec. Wanganui Chronicle. http://www.nzherald.co.nz/wanganui-chronicle/news/article.cfm?c_id=1503426&objectid=11392852.
45. "Whanganui District Library - Rutland Stockade." Accessed February 21, 2018. <http://www.whanganuilibrary.com/site/pages/heritage/queens-park-tour/rutland-stockade.php>.
46. "Old Stockade." *Auckland Star*, March 15, 1928.
47. Stowell, Laurel Stowell, Laurel. 2017. "Unearthing Our History." *NZ Herald*, July 15, 2017, sec. Wanganui Chronicle. http://www.nzherald.co.nz/wanganui-chronicle/news/article.cfm?c_id=1503426&objectid=11889974.
48. *Auckland Star*. 1928. "Old Stockade.," March 15, 1928.
49. Cowan, James. 1922. *The New Zealand Wars: A History of the Maori Campaigns and the Pioneering Period*. Wellington [N.Z.: Govt. printer.
50. "Ammon Ngakuru - Blue Oyster Art Project Space." n.d. Accessed June 5, 2018. <http://www.blueoyster.org.nz/exhibitions/ammon-ngakuru/>.
51. New Zealand Architectural History Symposium, Paul Diamond, Victoria University of Wellington, and Centre for Building Performance Research. 2014. "The Rutland Stockade : An Enduring Presence." In *A Massive Colonial Experiment: New Zealand Architecture in the 1840s : A One Day Symposium*. pg 52
52. New Zealand Architectural History Symposium, Paul Diamond, Victoria University of Wellington, and Centre for Building Performance Research. 2014. "The Rutland Stockade : An Enduring Presence." In *A Massive Colonial Experiment: New Zealand Architecture in the 1840s : A One Day Symposium*.
53. "Whanganui, New Zealand, Photographed in the Late 1800's." Official Tourist Site For Whanganui, NZ, January 22, 2016. <http://www.visitwhanganui.nz/history-of-whanganui/>.
54. Griffiths, Michael R. 2017. *Biopolitics and Memory in Postcolonial Literature and Culture*. Florence: Taylor and Francis. <http://public.eblib.com/choice/publicfullrecord.aspx?p=4862217>.
55. Kiddle, Rebecca. 2018. *OUR VOICES: Indigeneity and Architecture*. 2018. S.I.: ORO EDITIONS.
56. McIntock, Alexander Hare, B. A. Susan Bailey, and New Zealand Ministry for Culture and Heritage Te Manatu Taonga. "WANGANUI." Web page. An encyclopaedia of New Zealand, edited by A. H. McIntock, 1966. Accessed February 27, 2018. /en/1966/wanganui.

57. Naming, Whanganui-, and Claiming Pt 2 « sub.sist 2.25.10 / 8pm. "Whanganui – Naming Is Claiming Pt 1." *Sub.Sist* (blog), March 14, 2009. <https://kaihoahoawhare.wordpress.com/2009/03/14/naming-is-claiming/>.
58. <https://teara.govt.nz/en/photograph/37837/moutoa-gardens-memorial>
59. Bruce, PD Vol. 52 (1885), 515. See also petition of Winiata Wharo to Chief Judge, Native Land Court, cit., Grey, PD Vol. 68 (1890), 456; N.Z. Herald, 1 Aug., 1885; Bagnall, special article, *ibid.*, 18 Dec., 1886
60. Sorrenson, M. P. K. "Land Purchase Methods And Their Effect On Maori Population, 1865-1901, 183-199." *Journal of the Polynesian Society*: 1956. http://www.jps.auckland.ac.nz/document/Volume_65_1956/Volume_65%2C_No._3/Land_purchase_methods_and_their_effect_on_Maori_population%2C_1865-1901%2C_by_M._P._K._Sorrenson%2C_p183-199?action=null.
61. Harding, Duncan, New Zealand, Environment Court, Victoria University of Wellington, Victoria University of Wellington, and School of Architecture. 2014. "Critical Architectural Heritage: Constructing Heritage with(out) the Wanganui Native Land Court Building: A Thesis Submitted to the Victoria University of Wellington in Fulfilment of the Requirements for the Degree of Master of Architecture."
62. Emerson, Anne-Marie. 2012. "Battle for Old Land Court." *NZ Herald*, June 18, 2012, sec. Wanganui Chronicle. https://www.nzherald.co.nz/wanganui-chronicle/news/article.cfm?c_id=1503426&objectid=11066272.
63. Harding, Duncan, New Zealand, Environment Court, Victoria University of Wellington, Victoria University of Wellington, and School of Architecture. 2014. "Critical Architectural Heritage: Constructing Heritage with(out) the Wanganui Native Land Court Building: A Thesis Submitted to the Victoria University of Wellington in Fulfilment of the Requirements for the Degree of Master of Architecture."
64. Historical Record: journal of the Whanganui Historical Society Inc. 1995. "The End of the Rutland Blockhouse at Wanganui," no. 26(2):40-42 (November).
65. HARMAN, KRISTYN. 2014. "'Some Dozen Raupo Whares, and a Few Tents': Remembering Raupo Houses in Colonial New Zealand," *Journal of New Zealand Studies* 19.
66. Belich, James. *I Shall Not Die: Titokowaru's War, 1868-1869*. Bridget Williams Books, 2010.
67. Stowell, Laurel Stowell, Laurel. "Unearthing Our History." *NZ Herald*, July 15, 2017, sec. Wanganui Chronicle. http://www.nzherald.co.nz/wanganui-chronicle/news/article.cfm?c_id=1503426&objectid=11889974.
68. Historical Record: journal of the Whanganui Historical Society Inc. 1995. "The End of the Rutland Blockhouse at Wanganui," no. 26(2):40-42 (November).
69. Chris, Cochran. 2012. "Sarjeant Gallery 1919 Queen's Park, Wanganui Heritage Assessment." Heritage Assessment. Wanganui: Wanganui District Council. http://www.sarjeant.org.nz/wp-content/uploads/2016/08/Heritage_Assessment_FINAL.pdf.
70. <https://teara.govt.nz/en/building-stone/page-3>
71. Glory 4.13.14 / 9am. 2009. "Deidre Brown – 'Maori Architecture.'" *Sub.Sist* (blog). May 25, 2009. <https://kaihoahoawhare.wordpress.com/2009/05/25/deidre-brown-maori-architecture/>.

American Modernist Tectonics vs Australian Gold Coast Topos

Marja Sarvimäki
Bond University

Abstract

In the 1940-50s, when the long stretch of beaches and swamps in the subtropical south-eastern Queensland started to be developed, it became the quintessential Australian holiday destination. In the area now known as the city of Gold Coast, modernist motels and resorts were built along the shoreline, while the marshlands were dug and dried into residential canal developments, largely following Florida as a model. The architectural language and technological features of the houses, on the other hand, were much influenced by the LA Case Study Houses among other American precedents. All this was at least partially due to rather similar climates of Florida and southern California in the US and the Australian Gold Coast, but also a sign of the increasing impact of American culture on the post-colonial and post-WWII Australia.

The identity of the Gold Coast, however, is rapidly changing as a result of both national and international migration and mass tourism which requires, or justifies, higher density. At a disquieting rate, modernist buildings are demolished with short, if any, notice. Although some individuals are raising their concerns and sadness about the loss of the area's identity, others see the change itself as the identity of the Gold Coast. Furthermore, many of the latter regard the Gold Coast as 'a city without history', meaning that there is nothing worth preserving, which reflects the lack of understanding the value of its mid-century modernist architecture. Due to the speedy disappearance of the said Australian cultural heritage, this paper focuses on recording and clarifying the tectonics within the Gold Coast topos and its specific synthesis of international modernism and local characteristics.

Canal estates à la Florida

The Gold Coast in south-eastern Queensland is one of the newest and most dynamic cities in Australia with permanent population of estimated 560,000 and growing faster than any other Australian city,¹ added yearly with millions of domestic and international

tourists. It has developed from humble origins of 'beach shacks' and B&Bs approximately seventy kilometres southeast from Brisbane, thus originally called South Coast, around present-day Surfers Paradise and Broadbeach. Gradually it was to cover 70 kilometres of coastline from South Stradbroke Island in the north to the southern Rainbow Bay and Coolangatta, where the Gold Coast International Airport is now located, into a linear city with the advantages and disadvantages of that urban typology. The Pacific Highway (current Gold Coast Hwy) basically split the expanse into the coastal area with beaches, motels, resort hotels and ocean-front estates along this north-south running throughway, while the canal developments were, and are, typical residential suburbs further to inland; only seven decades ago there was hardly anything else than swamps there. The city actually continues beyond this zone to the predominantly agricultural hinterland, even though most people associate only the coastline with the name Gold Coast, which it officially acquired in 1959 as a city.

When this long stretch of beaches and swamps in a subtropical setting started to be developed in the late-1940s throughout the 1950s, it became the quintessential Australian vacation and retirement spot. Modernist houses, motels and resort hotels were built along the shoreline, while the marshlands were dug and dried into canal developments, largely following Florida as a model.² This was reflected by same placenames than in Florida, such as Rio Vista, Miami Keys, Miami, Main Beach, Palm Beach, and the kind, not alone the name Gold Coast itself. When walking in the older suburbs, one can almost imagine being, for example, in Rio Vista in Fort Lauderdale, FL, with houses on the canal shores facing their private pontoon jetties for boats.

The architectural language and the inherent technology of the Gold Coast houses, on the other hand, was much influenced by the LA Case Study Houses among other American precedents, which was at least partially a result of rather similar climatic conditions in southern California, Florida, and the Australian Gold Coast. Another contributing factor was the increasing American influence in post-colonial Australia, added with the global 'building boom' after the World War II and the housing shortage of the 'baby boomers' across the world. At the same time, national and international tourism 'boomed' as well, with leisure travelling especially to seaside resorts, which was possible because of the rising living standards. Just as one comparable example, this was seen in the development of Waikiki in Honolulu, Hawaii, simultaneously with the Gold Coast.

Besides becoming *the* holiday resort of Australia, the Gold Coast also became a popular retirement destination for the Australians, including more permanent housing, again,

similarly to Hawaii and Florida. After the previous influences from continental Europe and especially the United Kingdom, the Australians were looking at the United States, expressed in the 150 – *An Unfinished Experiment in Living: Australian Houses in 1950-65* as follows:

Australian architects, the business world and popular culture had an ongoing interest in, and influence from, American culture. This dated back well into the nineteenth century, and affected building technology and design themes in Australian architecture. An entire generation of suburban housing, the 1920s Californian Bungalow, went under an American name³.

While there were plausibly other sources of inspiration as well, most notably Scandinavian and Japanese architecture, this paper highlights the impact of American technologies and design precedents in general, and those in California, Florida and Hawaii in particular, on the post-WWII architecture in the Australian Gold Coast. This is because the identity of the Gold Coast is rapidly changing as a result of both national and international migration and mass tourism which requires, or justifies, higher density. As a result, almost unnoticed, sometimes overnight, modernist buildings have been demolished, even if some individuals are raising their concerns and sadness in social media about the loss of the area's identity.⁴ Then again, others see the change itself as the identity of the Gold Coast. Furthermore, many of the latter regard the Gold Coast as 'a city without history', meaning that there is nothing worth preserving, which reflects certain lack of appreciating the value of its mid-century modernist architecture – the little that is left of it.

Hence, this paper focuses on the tectonics within the topos of the Gold Coast and its specific synthesis of international modernism and local characteristics both in house and resort design. The term *topos* in this context refers not only to 'place' and its analogous connotations, but especially to the Aristotelian 'rhetorical argument' as a means of persuasion;⁵ in the case of Gold Coast, persuasion is here considered in the light of the general acceptance of modernist architecture. Concerning *tectonics*, we follow Frampton's view of "the constantly evolving interplay of the three converging vectors, the *topos*, the *typos*, and the *tectonic*" in which "the role of the *tekton* leads eventually to the emergence of the master builder or *architecton*."⁶ Also, it is worth noting that among the 150 Australian houses discussed in the above-mentioned book, only fifteen are in the State of Queensland and as few as three in the Gold Coast, indicating that there still is a call for recording and understanding this specific mid-century building tradition in Australia. The primary methodological framework in this paper is that of embedded case

studies, which addresses the complex dynamics of the context, explains causal links, and uses multiple sources of evidence. The goal is to generate a theoretical framework for analyses regarding these techniques as part of the historiographies of Australian decolonization and social change from the late-1940s till the mid-1960s.



Figure 1. View of the Gold Coast looking south from the Brakes Crescent in Miami with Burleigh Heads on the background in about 1933 (Lesley Jenkins, *Now and Then: A Gold Coast Journey from the past to the present*, Gold Coast, QLD, Australia: Gold Coast City Council, 2010, 64).



Figure 2. The same view in February 2018 (photo by the author).

New technologies and materials

In the same way than the United States, among other parts of the ‘Western world’, post-war Australia faced the requisite to provide housing for the growing middle class. In the US, the well-known case in point – literally – was the Case Study House Project in southern California that was launched in 1945 by the editor-in-chief of the *Arts &*

Architecture magazine, John Entenza. The design proposals in this architectural competition demonstrated not only new, prefabricated industrial materials and their use in residential architecture, but also a novel lifestyle suitable for this architecture. Particularly persuasive was the Stahl House (Case Study House #22, 1959-60) by Pierre Koenig in the Hollywood Hills, not the least due to Julius Schulman's photographs, including the renowned one of two ladies in their cocktail dresses in the daringly cantilevered living room against the breathtaking night view of Los Angeles, which is one of the *Time* magazine's '100 Photos: The Most Influential Images of All Time'.⁷ In terms of building technology, the photo also features the reinforced concrete slab resting on reinforced concrete beams, which made the cantilevering possible together with the pool slab as balancing weight (not visible in this particular photo), large glass walls in slender steel mounts, exposed steel post-and-lintel frame structure, and corrugated steel ceilings (*stahl* is German for 'steel' and also the surname of the client, Buck Stahl).

Likewise, Australian popular magazines effectively promoted similar idealised lifestyle and modernist architecture in America and Australia, enforced by professional journals like *Architecture* (in 1955 renamed *Architecture in Australia*, now known as *Architecture Australia*), *Architecture Today*, and *Architecture and Arts*. The latter was a title adopted from Entenza's magazine and was a widespread publication during its lifetime in 1952-68.⁸ No wonder, these widely published trendsetting residences changed the very concept of residing in Australia:

In the 1950s, thousands of everyday Australians tried open plans, structural modules, new ventilation and heating systems, slab floors and heating coils, then bituminous, aluminium and steel flat roofing, metal sheet walling, wrought iron, steel roof trussing, concrete, cement block, cork tile, plastics and other industrial compounds in the materials of their houses, in combinations and places that would have caused horror before the war.⁹

One can continue the list with American style freezers, "refrigerators, washing machines, stoves, vitamisers (blenders), vacuum cleaners, toasters, electric kettles, and the stainless-steel double-bowl sink", all of which completed the 'American look' of a house's 'control centre' with built-in cabinetry – a kitchen regarded as the "mechanised centre of the house [...] like the engine of a car".¹⁰ And speaking of the car, a lightweight carport often replaced the garage, which was caused by fire regulations and post-war building codes that restricted the maximum floor areas, until the latter were lifted in 1952, although

the carport was there to stay. Inside the house, then, television started to change both the residents' lifestyle and the houses' layout with the 'family room'.¹¹

Not exclusively a south-eastern Queensland phenomenon, but on the whole significant in its subtropical climate, was the interrelationship between the house and the garden. In terms of technological advances, this was usually achieved by the slab-on-ground method, which allowed circulation on grade without steps between the indoors and the outdoors – the now commonly (over)used indoor-outdoor concept – and worked particularly well in the flat topography of the Gold Coast. In much of coastal Australia, similar to Florida, southern California and Hawaii in the US, this led into the appearance of an 'outdoor living room' for entertainment all year round, preferably facing a swimming pool. Even the Hawaiian word *lanai* found its advent in Australian vocabulary,¹² depicting the transitional space between inside and outside, similarly to the veranda of traditional Japanese houses. The increasing post-war interest in Japanese culture and architecture, which had influenced early modernism in general (e.g., modularity and standardisation, continuous space, attention to detail and tectonics), also was apparent in landscaping, which was reminiscent of the artistic gardens of Japan, although there also was a tendency for more naturalistic approach in bush settings with native plants in the turn of the 1960s, especially among the so-called Sydney School. The Gold Coast garden as well, more often than not, made the best of its beach setting, or *topos* if you wish.

In the post-war Queensland, there were some attempts to apply the traditional 'Queenslander' typology, with elevated floors and verandas under deep eaves, but generally speaking the Gold Coast houses were strikingly different regarding their architects' interpretations of international mid-century modernism. As stated by Alice Hampson: "An aspiring and rapidly developing aquatic playground, the Gold Coast of the 1950s had also become a fertile playground for architectural experiments."¹³

Take the Pfitzenmaier Beach House in Broadbeach by Edwin (Eddie) Hayes of Brisbane architectural firm Hayes & Scott to start with. It was constructed in 1953 for Brisbane businesswoman Ethne Pfitzenmaier (née Edwards), who together with her husband, Francis Pfitzenmaier, had built a prosperous hotel business in the 1930s, lost everything in the Great Depression, and successfully rebuilt their business again in Brisbane. After her husband's death, Ethne bought an old Broadbeach house in 1950 as a holiday home for herself and her two children, but soon decided to hire Hayes who had earlier renovated the family's house in Brisbane's Herston. "The result was a 'breakthrough' building for a new domestic modernism",¹⁴ according to Hampson, and was

acknowledged by the Queensland Award for Meritorious Architecture in the year of its completion. Yet, regarding the architectural partnership of Hayes & Scott that commenced in 1946, Hampson points out that:

Although their work was locally the most influential of the period, it received surprisingly little coverage in the serious national press. The pitchy publication coming out of the University of Melbourne, *Cross-Section*, hardly rated them a mention, and seldom did their work appear in publications such as *Architecture and Arts* or *Architecture*. Only non-professional women's journals gave their work the recognition which it deserved.¹⁵

Despite the lack of national recognition in professional publications, perhaps the popular magazines, actually, were more influential in persuading the acceptance of new architectural features seen in the Pfitzenmaier Beach House, such as a butterfly roof (one of the earliest in Australia), spatial division organised around the inverted pitch, a rather sparse garden utilising the dune landscape, and a large outdoor room with a massive barbecue and gorgeous views of the Pacific Ocean. The cantilevered portion of the living area was resting on the ground floor with garages and storages, which was the only part Hayes kept of the original house, protruding above the sand dunes. Some see it as a reinterpretation of the covered verandas of traditional Queenslanders,¹⁶ but it also was outstandingly similar to the building technology of the Stahl House, for instance. Nevertheless, carefully considered breezeways, which contained the open deck and the sea-facing entry that functioned as an air scoop, as well as louvres and shading visors were responses to the house's specific setting, although the general layout is reminiscent of the bi-nuclear plan of many American and other modernist houses. As one sign of the departure from the British tradition, the bathrooms had no bathtubs, only showers.¹⁷

The influence of the LA Case Study House projects was particularly obvious in the Graham House, also by Hayes & Scott of 1953 in Surfers (local for Surfers Paradise in short). At a first glance, the colour scheme would have reminded us of both the Entenza House (Case Study House #9, 1945-49) by Charles Eames and Eero Saarinen, and the Eames House (Case Study House #8, also designed in 1945 and completed in 1949) by Ray and Charles Eames, with Saarinen in the competition phase, next to each other in the Los Angeles suburb of Pacific Palisades. In the same way, the bright primary colours were used in the Graham House where they contrasted against the stark white brick walls and black steel trims. Bright colours were, of course, the theme in many mid-century modernist houses in Australia, such as the Rose Seidler House by Harry Seidler in 1950,

but here we discuss the Gold Coast only, even though this paper's argument of American influence could be extended to the internal influences within the Australian architectural discourse.

Compared to the above Case Study Houses in Los Angeles, Graham House was more in the vein of the Entenza House, as the brick walls in the ends of the rectangular plan *appear* similar to the loadbearing walls of the Entenza House with concealed steel frame and cross bracing, as opposing to the visible frame of the Eames House – the square mural in the west wall and the panel of the glass wall in the entry of the Graham House, divided diagonally into red, blue, yellow and black triangles, was possibly a reference to the diagonal bracing. Corresponding to the general trend of modernist technology, the interior had minimum structure in the open floor plan, which was rather easy to achieve in a small building with short spans, since the house was designed for a wealthy clothing manufacturer, Harvey Graham, as “a stylish entertainment and seduction pad for a sports-loving and martini-mixing bachelor”, as London, Goad and Hamann wittily put it. Hence, all needed was a bedroom, a bathroom (again with only a shower), and a living room with an open galley kitchen. Owing to the slab-on-ground technology, the house seemed to continue to the outdoors, making the patio a part of the interior. Inside, all floors were black, either the surface of dyed black concrete slab or black linoleum tiles in the kitchen, the bathroom, and the passage,¹⁸ in order to heighten the spatial continuity.

Lastly, the Pie House in Surfers, completed in 1965 and designed by Geoffrey Pie for his mother, exemplifies the next stage of the mid-century modernist Gold Coast houses. In essence, it was a courtyard house and as such more introvert than the two houses described above. Yet again, it was an interpretation of the bi-nuclear plan. Beyond the carport and car court in front, one was lead to the passageway along a flight of a few stairs and defined by a massive masonry wall on the right hand side, ending in a framed view of the Pacific Ocean. On the left were the bedrooms and a bathroom (no bathtub here either), while the south part of the house behind the wall was reserved for more public activities, including the main entry, though a screen wall veiled the open-to-the-sky atrium and living areas behind it from the car court. Furthermore, the house was covered by a flat roof of a concrete slab, with openings allowing both light and air to enter. The roof functioned as a ventilated umbrella and the cross-breezes were controlled by the sliding glass wall panels, whereas sun penetrating through adjustable openings provided passive heating in winter; there was also a fireplace in the living room.¹⁹ Because night temperatures can be as low as 10-15 Centigrade in the Gold Coast winter, contrary to the common perception of eternal heat, the design was an elucidating case of the acclimation

of modernist architecture into the local conditions, consistently to regionalist modernism in many other parts of the world in the 1950-60s.

These three mid-century modernist houses have now been demolished, as just one sign of the pressures to densify and 'verticalize' the Gold Coast, which has been a mortal blow for many small-scale buildings. In a somewhat embarrassing comparison to the US, for example, only three of the 25 completed LA Case Study Houses have been demolished and eleven are in the National Register.²⁰ Given that they are sold in seven-number dollar figures these days, the Gold Coast did not only lose an important part of its architectural heritage, but also a financial opportunity. (Of course, large-scale development is more profitable, but at what cost culturally?) It should also be noted that these Gold Coast houses, like many similar in California and elsewhere, comprised of fine samples of interiors, although space does not allow discussion here on the Australian mid-century modernist tradition of furniture design.

From low-rise to high-rise tectonics

In 1959, *Architecture in Australia* had its January-March issue dedicated to the Gold Coast. However, almost all the articles focused on its general urban development, offering predominantly critical views of it. It was followed by the 'Gold Coast Study' conducted in 1973-74, in which the theoretical framework was that of the *Learning from Las Vegas* by Robert Venturi, Denise Scott Brown and Steven Izenour. Contrary to Kevin Lynch's analytical method of 'five elements' applicable to more conventional cities, this certainly was an appropriate approach to analyse a linear city like the Gold Coast, which in many ways is reminiscent of Las Vegas, not only due to its urban layout but also regarding infrastructure designed for entertainment and leisure. A similar paradigm shift was also apparent in the 'Gold Coast Urban Heritage & Character Study', published by the City Council in 1997, and other later studies.

Because the first AA on the Gold Coast has been excessively cited and analysed, most recently in AA 2018 January-March issue (see below), more space is given here for actual building design. Referring to the technological phase of "Asbestos-Cement Era" the editors state that "the cult of the 'modernistic' was now firmly established", by listing such features as "skillion roofs and butterfly roofs, leaning walls and leaning posts, varnished cypress pine, log-mould feature walls, 'sunburst' balustrading, lacquered waterworn stones and uninhibited colours." The wide-spread use of asbestos, naturally, is one reason why these buildings had to later be remodelled; yet, it does not explain why many had to be demolished, even though the asbestos could just have been removed.

With regard to the next phase of “Consolidation”, the editors call attention to the increasing real estate speculation, leading to increasing land values and, consecutively, increasing height of buildings. They also criticise the architecture “appearing around the new hotels competing with each other in designs of almost valid vulgarity and ‘glamorous’ names emblazoned in neon signs.”²¹

In retrospect, the above was surely the beginning of the still-continuing profit-oriented development, whereas features like neon signs now can also be regarded as the very identity of the Gold Coast (the “valid vulgarity”?). One example is the iconic neon sign of the Pink Poodle Motel from 1967 that was preserved in 2005 on the otherwise redeveloped site; for this, the developers received the Helen Josephson Perpetual Trophy for Innovation in Urban Design. Correspondingly, Victoria Jones in her ‘Invisible Landscapes’ looks deeper than the surface with a poststructuralist paradigm and points out that “the common interpretation of the Gold Coast” presents it as “superficial or shallow”, but if the “often invisible and misunderstood economic, political and social landscapes can be interpreted, the visible landscape is given new validity.”²²

Regarding the motel typology and new building technologies applied to its buildings, those were usually small family operations and often designed by the owners who were inspired by American models. One example is the Surfers Paradise Motel, later renamed El Dorado, which was the first motel in Surfers when it was built in 1954.²³ Among the architect-designed motels was the Carapark Motel completed in 1959 by the aforementioned Hayes & Scott in Mermaid Beach (now demolished) that was one of the projects in the 1959 AA. Both architects were students of Karl Langer, a Viennese émigré who became a prominent architectural educator at the University of Queensland; the 1959 AA also included his article describing the technical challenges of the Florida-type canal developments. Langer’s modernist lessons were quite visible in the Carapark Motel, which comprised of a floating butterfly roof above the car entrance, a real estate agency across the motel office, both under skillion roofs, a caravan park, and holiday units in two-storey flat-roof wings with exposed structure, lining the circular swimming pool – all this was marked by a colossal sign of scaffolding on the roof.²⁴ Characteristically for the time and similarly to the US, everything revolved around the car access, for “[t]he 1950s were the years of the ‘drive-in’ – the drive-in cinema, the drive-in bank, the motel – and the drive-in house.”²⁵

Analogous features were expressed in the larger-scale modernist resort projects in the 1959 AA, such as the Lennons Broadbeach Hotel designed in 1955-57 by Langer himself

and the Chevron Hotel in 1957-58 by David Bell at Surfers. The latter site has since been totally redeveloped, which in addition to the newest skyscraper hotel buildings, includes the tower and podium with pastel coloured arcades by Hawaii-based architectural firm WATG in the eclectic 'Tropical Mediterranean' style (now named the Chevron Renaissance Hotel), which became a wide-spread trend in the 1990s Gold Coast and was prominent in American postmodernist architecture of the time as well. Originally the Chevron Hotel integrated a gas station with a butterfly roof and two-storey wings for accommodation, retail, and entertainment surrounded by meticulously landscaped pool area. In terms of technology, its reinforced concrete structure and its functions, including a 24-lane bowling alley below a convention centre, set the trend for Gold Coast resorts.

The Lennons (demolished in 1987), in turn, was the then-tallest building in the Gold Coast with its five-storey hotel wing defined by horizontal flights of balconies, added with bars, restaurants, a dance hall with bandstand, a convention hall, a swimming pool and other recreational facilities.²⁶ According to Macarthur et al., "[i]ts modern design and detailing brought a touch of American glamour to holidaying in the Queensland."²⁷



Figure 3. Kinkabool and Surfers Paradise around 1960 (Lesley Jenkins, *Now and Then: A Gold Coast Journey from the past to the present*, Gold Coast: Gold Coast City Council, 2010, 50). **Figure 4.** Kinkabool in February 2018 (photo by the author).

The growing verticality was apparent in the ten-storey Kinkabool apartment building in Surfers, constructed in 1959-60 and designed by John M. Morton of Lund Hutton Newell Black & Paulsen – at least this building was added in the *Queensland Heritage Register* in 2009, which allows us to analyse it in reality. It was an apartment building with resort-style facilities and therefore regarded more like a “luxurious and exotic holiday accommodation”²⁸ rather than an actual permanent dwelling, as one sign of the social change in the decades following the WWII, which established a precedent for the Gold

Coast residential typology. Referring to the ensuing urban development of the Australian Gold Coast, in comparison to Miami Beach in Florida, Honolulu in Hawaii, and Acapulco in Mexico, Andrew Leach, in his inaugural professorial lecture at the Griffith University in October 2014, stated that this kind of “infrastructure based on pleasure and relaxation” paradoxically offered “an urbanised experience of escaping the city” and goes on asserting that:

These cities together describe a threat to architecture with a capital ‘A’ by means of their patent subordination of architectural ideas to the logic of pleasure (and of development and real estate speculation as peculiar manifestations of the same).²⁹

Almost sixty years after the aforementioned *Architecture in Australia* January-March 1959 issue on the Gold Coast, the renamed *Architecture Australia* did it again with its January/February 2018 issue. Many of these latest articles address the maturing city, besides looking back at its beginnings in the 1940-50s and the technological changes of the time. Regarding the future, the editorial director, Cameron Bruhn, refers to Bill Heslop’s mantra “You Can’t Stop Progress” in the 1959 AA, echoed in the 2018 AA by Philip Follent’s argument that “The Gold Coast’s DNA is one of change”, while Philip Goad states that “the current growth and continuing vibrancy of a culture sustained almost solely by leisure will presage a new cultural and urban condition for the 21st century.”³⁰ Indeed, Matthew Eagle discusses the transformation as well, though from the perspective of a ‘local boy’, a rising young award-winning Gold Coast architect, and an Assistant Professor at the Abedian School of Architecture of Bond University. Eagle emphasises that the current:

change [is] driven not by new large-scale developments – many of which are struggling commercially [...] – but by small and authentic cultural, retail and hospitality interventions that repurpose the existing built fabric, build community interactions and reflect the region’s unique climate and place [...] as the Gold Coast transitions from a city of tourists to a city of residents.³¹

One can witness this in many areas that are sprouting vibrant enterprises and often occupy old industrial and other utilitarian buildings. And many of the motels with their neon signs along the Gold Coast Highway still exist – even if not necessarily significant as architecture with a capital ‘A’, but important for the sense of place. This is encouragingly similar to the early dynamic years of the Gold Coast culture and

experimental architectural technology, which offers an optimistic view of the newly-found appreciation and adaptive reuse of its mid-century heritage, especially in terms of *topos* understood as a rhetoric means of persuasion.

Endnotes

¹ <http://www.population.net.au/gold-coast-population/>. There are some other, higher estimations available as well, but this figure suffices for the purposes of this paper.

² E.g., Katherine Rickard, 'Run to Paradise: The Chevron Hotel, Gold Coast, from Foundation to Renaissance,' in Alexandra Brown and Andrew Leach (eds.), *Open: Proceedings of the 30th Annual Conference of the Society of Architectural Historians, Australia and New Zealand* (Gold Coast, Qld: SAHANZ, 2013), 57-66.

³ Geoffrey London, Philip Goad, and Conrad Hamann, *150 – An Unfinished Experiment in Living: Australian Houses 1950-65*, (Crawley, WA, Australia: The University of Western Australia, 2017, 9).

⁴ See, e.g., 'Have you seen the Gold Coast' at <https://www.facebook.com/Have-you-seen-the-old-Gold-Coast-280745045301771/> or @the_old_coast at https://www.yooying.com/the_old_coast.

⁵ E.g., *Stanford Encyclopedia of Philosophy*, <https://plato.stanford.edu/entries/aristotle-rhetoric/supplement2.html>

⁶ Kenneth Frampton, *Studies in Tectonic Culture: The Poetics of Construction in Nineteenth and Twentieth Century Architecture* (Cambridge, IL, USA: MIT Press, 1996, 2-4.)

⁷ <http://100photos.time.com/photos/julius-schulman-case-study-house-22#photograph>

⁸ London, Goad, and Hamann, *150*, 34. In the mid-1950s, the full title of the magazine was *Architecture and Arts and the Modern Home*.

⁹ London, Goad, and Hamann, *150*, 10.

¹⁰ London, Goad, and Hamann, *150*, 19.

¹¹ London, Goad, and Hamann, *150*, 21-22.

¹² London, Goad, and Hamann, *150*, 25.

¹³ Alice Hampson, 'Eddie Hayes: Two houses built for women', in Andrew Wilson (ed.), *Hayes & Scott: Post-war houses* (Brisbane: University of Queensland Press, 2005, 54-73).

¹⁴ Hampson, 'Eddie Hayes', 64.

¹⁵ Hampson, 'Eddie Hayes', 59.

¹⁶ E.g., Hampson, 'Eddie Hayes', 65.

¹⁷ London, Goad, and Hamann, *150*, 152-153.

¹⁸ London, Goad, and Hamann, *150*, 154-155.

¹⁹ London, Goad, and Hamann, *150*, 394-395.

²⁰ <http://docomomo-us.org/news/ten-case-study-houses-now-listed-in-the-national-register-of-historic-places>

²¹ *Architecture Australia*, January-March, 1959, 72-73.

²² Victoria (Tory) Jones, 'Invisible Landscapes: interpreting the unconventional landscape of Surfers Paradise' (M. Built Environment thesis, QUT, 2001, 34).

²³ Lesley Jenkins, *Now and Then: A Gold Coast Journey from the past to the present* (Gold Coast, QLD: Gold Coast City Council, 2010, 53-55).

²⁴ John Macarthur, Deborah van der Plaats, Janina Gosseye, and Andrew Wilson (eds.), *Hot Modernism: Queensland Architecture 1945-1975* (London: Artifice, 2015, 205).

²⁵ London, Goad, and Hamann, *150*, 16.

²⁶ Rickard, 'Run to Paradise', 58-65.

²⁷ Macarthur et al., *Hot Modernism*, 202.

²⁸ Rickard, 'Run to Paradise', 59.

²⁹ Andrew Leach, *The Gold Coast Moment: Inaugural Professorial Lecture* (Gold Coast: Griffith University, 2014, 25-26).

³⁰ Cameron Bruhn, 'The Gold Coast: A Place to Play, Work and Live'; Philip Follent, 'The Search for an Authentic Architecture and City Form'; and Philip Goad, 'Rear Window: Perceptions of the Gold Coast, Then and Now', *Architecture Australia*, Jan/Feb 2018, 10, 22, 45.

³¹ Matthew Eagle, 'An Architecture of Flimsiness', *Architecture Australia*, Jan/Feb 2018, 55.

Rangahaua: Architecture and Cultural Interface

Mark Southcombe
Victoria University of Wellington

Abstract

In the late 1980s and early 1990s Wanganui Regional Community Polytechnic was a fledgling institution with fledgling programme's including Te Rangakura, the first New Zealand accredited Māori Language Teacher education programme. Te Rangakura was an initiative by Māori for Māori to meet a problem with loss of Māori language at Primary School age level and the associated urgent need for teachers of Māori language. The language programme had a satellite format to access fluent local native language and cultural expertise through elders and potential language teachers, many of whom were Marae based. The centralised staging point for the Te Rangakura programme was Rangahaua; a new Maori Education Facility designed with Architects Southcombe McClean and Co. in Whanganui in late 1990. Rangahaua had a period of growth and flowering under Kaumātua Henry Bennett and Morvin Simon, before falling from grace as part of a Labour Government rationalisation of the Tertiary education sector that resulted in the closure of the host community based polytechnic. Rangahaua was the precursor for the well-known Māori education facility Pukenga at Unitec, and is also an important exemplar of a Marae based approach to Māori Architecture within a tertiary institution. The paper documents the contexts, process, design, construction and architectural outcomes of the project through archival research and interviews with key people involved in the project. It follows a chronological sequence recording the project's history and characteristics, and establishing Rangahaua's historic, architectural and cultural significance. The design approach of the architects as aligned other, Rangahaua Marae based foundation, design and operation, and the projects temporal nature, are reflected on.

Introduction

This paper is the result of an interactive discourse between the lead author and original architect of Rangahaua Mark Southcombe and contributors representing Whanganui Iwi and the former Wanganui Regional Community Polytechnic (WRCP). As we began our first

hui (meeting) June Rogan noted that “history depends on who is writing what at the time”.¹ The beginning point for the Rangahaua architectural project was a similar recognition of interests and the architect's lack of cultural knowledge and authority. There was an acknowledgement of the need for an active collaboration between the Architects, Whanganui Iwi, and Wanganui Regional Community Polytechnic (WRCP) to facilitate educational, architectural, and cultural intentions. So Rangahaua and this paper were created through an interactive collaborative process. We are conscious that what is written in black and white is a version of history, ever fragmentary and incomplete. This is our contribution to the collective.

Context

WRCP was established in 1984 as a result of a community driven initiative. It was the only tertiary institution in Whanganui, and the only one in New Zealand established from a community process. It was genuinely community focused, growing fast, and half constructed in 1990 when the government changed. At that point many courses were being taught in dilapidated houses scheduled for future redevelopment. WRCP was the first tertiary institution in NZ to appoint a Māori and Pacific liaison officer to bring a Māori perspective to its management and operation. The new Māori Studies department was established soon after with Morvin Simon's expertise and community support. Kaumātua (Elder) Henry Bennett was soon invited to take on the WRCP Māori and Pacific liaison and Head of Department role forming a strong team with Morvin Simon who maintained academic and teaching responsibilities.

Henry Bennett was a great behind-the-scenes communicator with the full confidence and support of a wide range of people including leaders of the three Whanganui Iwi (tribes). He was also “known as Mr Kōhanga as he played a major part in renovating and building many local Kōhanga Reo language nests”² With support of the WRCP CEO John W. Scott, and the polytechnic council Henry was instrumental in introducing Akoranga childcare centre, and Mangawhero Kōhanga Reo preschool education facilities to the campus. At that time Whanganui Iwi leaders were acutely aware that Te Reo (Māori language) speaking children were losing confidence and Māori language fluency within two months of beginning primary school, and that this was a major and urgent problem. By 1991 there were 623 Kōhanga Reo full immersion Māori language preschools in New Zealand including six in Whanganui, but there were only nine Kura Kaupapa Māori language immersion primary schools in the whole of the country³. So children fluent in Te Reo entered predominantly English language primary schools mostly poorly resourced to teach or even accommodate Māori language fluency.

WRCP Māori education initially occurred in S-House Learning Centre, an old bungalow on the periphery of the main campus in Liverpool Street. A diverse range of primarily short course and transitional programmes were taught. The department and building were named Rangahaua by Kaumātua from the supporting Iwi and staff involved in the programmes. “The word ‘Rangahaua’ is the imperative of ‘Rangahau’ meaning to seek, analyse, develop and expand upon”⁴ This was also described as “the concept of going out to do your own research to enhance your own development and personal circumstance for yourself, your whānau, (family) and your iwi”⁵. The holistic approach to Māori Education involved education in both culture and language, through all ages, and integrated with a whānau and home marae (The marae is the central architectural composition in contemporary Māori life)⁶. There were many courses taught beginning with ‘the language and related studies’ course and including 16-week full time Te Reo language courses Akoranga and Te Kōpae. There were a range of other programmes and regular activities such as Te Ataarangi language programme, Manaaki Tangata Marae catering and hospitality, Mahi Whakairo carving, Te Mahinga workforce re-entry, and Te Ranga Tū Kaha Health and fitness. S-House was also a neutral and welcoming base for a host of regular cultural activities by groups such as St. Vincent’s Māori Club, Ngā Puna Waihangā NZ Māori Artists and Writers’ local branch, the National Māori Choir and a Pacific Island group. It also served as a temporary Kura (school) for the first Kura Kaupapa Māori (total immersion school) in Whanganui. It was a thriving cultural hub, with the domestic kitchen feeding huge numbers of people at times.

The Te Rangakura Bilingual Bicultural Māori teacher training programme emerged from this context to facilitate retention of Māori language and cultural fluency, and the provision of bicultural teachers for state primary schools and emerging Kura Kaupapa Māori. The state provision of teacher education for Māori through Colleges of Education were the only accredited means for educating Māori teachers and were regarded as not adequately addressing the language and cultural proficiency, or the extent of Māori teachers needed⁷. Fluent native speakers of Te Reo could potentially help, but their generation was aging, without teacher training, and dispersed through the region and country. To access local Māori cultural knowledge, and to reduce barriers to Māori teacher training a satellite language programme was introduced in August 1990.

The Te Rangakura bilingual teacher training programme was initiated through the efforts of Henry Bennett over a period of a week. He drew together full support and resources from Māori academics, the three Whanganui Iwi and the Whanganui River Māori Trust

Board, and WRCP management and Council. The new programme began the very next week with 16 students⁸. “Students were selected into the programme by hapū/iwi and were supported by whānau”⁹ and this required a formal testimonial as a condition of entry to the programme. The programme was established through WRCP Rangahaua Māori Studies Department as a Māori driven initiative ahead of any educational approvals. “Te Rangakura wove together philosophies of the old with the new; and philosophies of the Marae and Kura (school)”¹⁰. The programme was designed collaboratively by Sonny Mikaere, Willie Robinson, Nihi Houia and Tony Scott with the supporters and contributors to the emergent Rangahaua programmes. Formal programme accreditation eventually came in 1992 as a NZQA approved Diploma in Teaching,¹¹ formalised by kaumātua Hohua Tutengaehe and programme moderator Whare Temoana in a significant event at Rangahaua.¹²

Cultural Negotiation

Rangahaua the place was also designed and built quickly and ahead of necessary governmental approvals for funding and construction. The first meetings between the architects Southcombe McClean and Co. (SMC) with Rangahaua whānau and polytech management had few stipulations. WRCP management noted that Rangahaua should be a contextual part of the low scale community of buildings’ successfully settled on campus derived from and relating to the colonial villas within the campus. It would adopt the established formal vocabulary of gables and verandas, and the established material palette of natural cedar, BS3033 Spanish white wall colour, aluminium windows, red-lead corrugated roof, and bullnose verandas. This colonial context was architecturally and culturally challenging. The briefed accommodation was four classrooms and associated support spaces, with a minimal budget being the key deliverable. It was a genuinely important project for WRCP and so should be located in the heart of the campus to transparently reflect the department significance within WRCP. Rangahaua staff and students were less prescriptive but what they needed was more demanding. What happened in a typical week was extraordinarily diverse and different to what most Pākehā (European) New Zealanders would understand as happening in a typical educational institution. It was a living community operating at all hours of the night and day, and over every day of a week. Rangahaua was to be a place of openness and hospitality to be modelled on a typical marae in terms of structure and protocol. There was also a key intention to not compete with the mana (prestige) of existing marae of the three contributing Whanganui Iwi. Henry Bennett noted

“although the building will have an outside structure similar to a Wharepuni, it will not have meeting house carvings or tukutuku. We don’t want any

competition between us and our Marae...we may have a little bit of decoration in the office area, but the only decoration we'll have on the Maihi will be at the finger tips"¹³.

The design occurred through an interactive process as a mediation between two sets of client meetings. WRCP management team was represented by CEO John W. Scott also a New Zealand artist, and by Michael Payne architect and WRCP chairman. Consultation with the Māori Studies Department occurred with Morvin Simon, Henry Bennett and the full Rangahaua team, students and wider whānau with iwi representatives including Julie Ranginui and George and Piki Waretini, and the administration 'engine room' of Marilyn Vreede and Janet Townsend. It was as important to model Marae, tikanga (protocol) as it was to provide educational and support spaces. It was to be neutral space, space of hospitality, space for people to stay, and space to expand and contract to accommodate everyone and everything that may be required. Rangahaua was also to be distinctly and recognisably Māori in terms of its architectural expression, and this would occur directly through reference to the 'traditional' Marae, seen by the client group as the primary, authoritative, and authentic source of Māori architectural culture. A Marae is typically a group of buildings around an open space of encounter and exchange, the Marae Ātea, focused on the principal building, a Wharenuī or meeting house as illustrated in Dr Mike Austin's "A description of the Māori Marae"¹⁴.

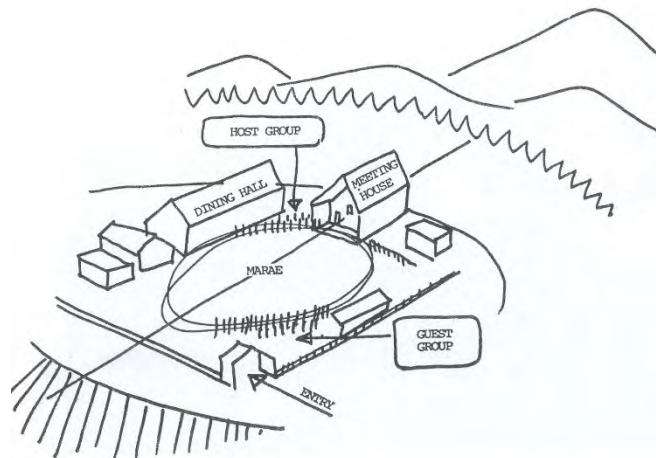


Figure 1. Reprint from Figure 2, Austin M R, *A Description of the Māori Marae*, Study Paper No30 University of Auckland School of Architecture, 233.

A new day

As the Rangahaua project design began architect and author of this paper Mark Southcombe had a theoretical understanding of Marae tikanga from studies at Auckland

University under Dr. Mike Austin. This understanding was augmented for the project by reference to Austin's "A description of the Māori Marae"¹⁵, experience on Marae, discussion of local practices, and immersion in the day to day operation of Rangahaua. The building design needed to embody and integrate Māori knowledge in the manner of the Māori initiated Te Rangakura programme, weaving the old and new. Rangahaua operated across the overlap between cultures, both an integral and integrated part of the WRCP system and yet also on the edge of the system and separate from it.

"They could use the facilities for pretty much anything they liked as long as it did not bring the polytechnic into disrepute. Things just happened at Rangahaua, lots of them self-funded for example with kai or unpaid tutors outside the polytechnic system as the people found necessary to do what they saw was needed"¹⁶.

There was also no funding available for the new building. The new National Government Minister of Education Lockwood Smith visited WRCP to consider the institution capital funding needs.

"Uncle Henry and others went out into the street and brought people in to indicate large numbers of students. Although Rangahaua was always full of people most of the time, he wanted it to look so full that the minister had no option but to grant a pūtea (grant) to build a new whare (house) to accommodate the staff and the students on the many courses"¹⁷.

The half-completed polytechnic was not awarded capital works funding for Rangahaua or any of its future capital projects such as a Library. WRCP responded to need and constructed the Rangahaua project anyway. This occurred through the support of local Wanganui Savings Bank, allowing the management of cash-flow so they could invest \$500,000 of working capital to self-fund Rangahaua.

Design

Minor conflict between management and the department occurred as soon as the design process began. WRCP management's preferred location for Rangahaua at the centre of the campus would tend to isolate the facility from its associated activities and smother the existing multifaceted Māori community engagement. S-House facilities on the periphery of the campus were accommodating a diversity of use without disrupting the mainstream institution. An alternative siting over an existing laneway was proposed so the existing S-

House building could remain. The siting mediated differences and would also help unify the wider polytechnic site that was at the time split in three parts by a road and laneway. The siting also supported potential future expansion.

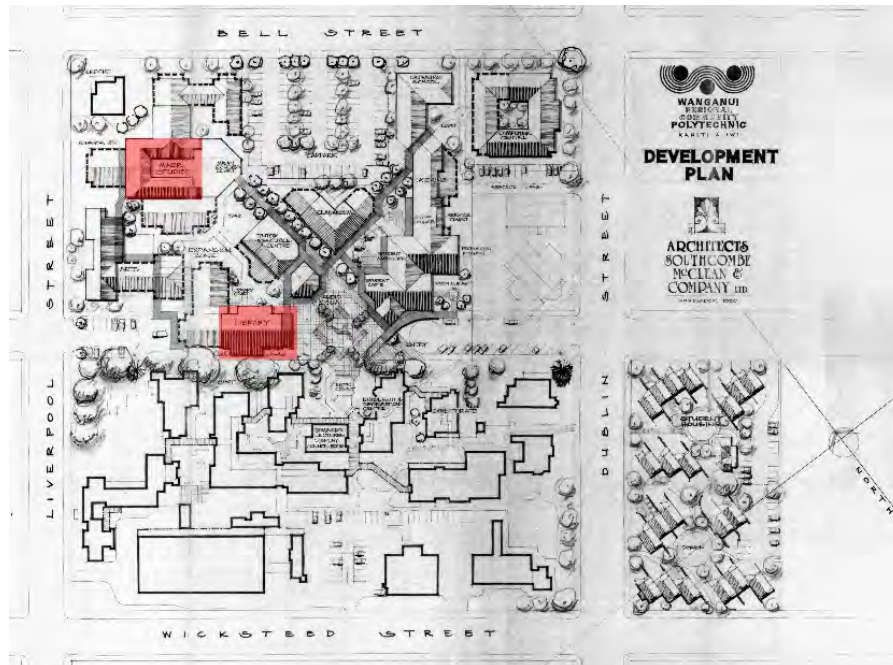


Figure 2. Architects Southcombe McClean and Company, *Wanganui Regional Community Polytechnic Development Plan*, November 1990.

The Rangahaua architectural concept abstracted and integrated a traditional Marae structure as a single building, with carefully negotiated cultural innovation. This arose from the insistence and clarity of the Rangahaua user brief that the building must have a traditional gable and Meeting House form. This was difficult and resisted by a young architect, and tested through design sketches and discussions that teased out the formal implications. In the final design there are some significant shifts. The generously proportioned Marae Ātea (open space) is adjacent to a Huinga, a second smaller central open space courtyard in the focal position conventionally reserved for a Meeting House. This exterior gathering space is bounded on three sides by seating and Māhau verandahs. It was conceptualised as a second informal Ātea, an open discussion space to readily accommodate the many people coming, going and overlapping, inviting them to sit and pause. This virtual Whare open house space was seen as an ideal manifestation of a house that would not compete with the mana of existing houses. The virtual house was formalised with a porch, Amo and Maihi forming an entrance portal facing the main Marae Ātea space. Around the edges of this smaller Huinga courtyard are Tari (offices), a Kauta (kitchen) and Wharekai, (dining room) two classrooms that combine as a Wharenui (meeting house),

Whata (storage), and Wharepaku (ablutions). Rangahaua was designed with the simplest geometry, domestic structure and materials. It's courtyard building form was also simple, exceptionally cost effective, and facilitated potential future outward expansion shown on the development plan figure 2.

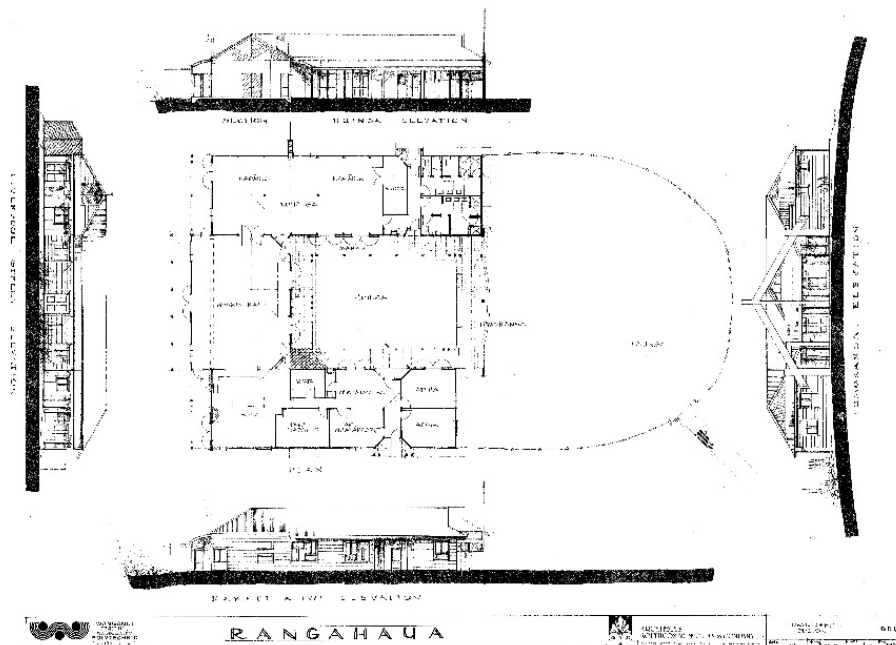


Figure 3. Architects Southcombe McClean and Company,
Rangahaua Concept Design Table Plan, Jan 1991.

The planning reworked conventional Marae planning patterns in some ways considered contentious and significant by the communities it served. As an educational facility the reception area was important from an administration and orientation point of view, but this is not given priority. In early design generations a major stainless-steel artwork portal helped to shift the entrance focus towards reception. This was resisted by the client user group and deleted from the design, because the real focus on arrival after formal or informal entry, is hospitality. From the exterior Huinga 'open house' courtyard the most important part of the project is the kitchen with its big table within, and the Dining Room where larger groups are accommodated. Guests arrive, are appropriately welcomed and are given hospitality before business occurs. From a Pākehā perspective the kitchen with its four ways to enter it is the real reception area. You can slip into it from whatever direction you approach. This is where people will share food and drink together, and relationships would be rekindled or begin to develop. This is the real beating heart of the hub. Multiple overlapping potential uses were accommodated within the 430m² building by designing for double duty uses. The Dining Room was conceived as the volume of two big classrooms.

It is a robust space that could also accommodate weaving and performance teaching, and importantly, it could also cater for big events by opening up from both sides and flowing outside. “It was immediately too small catering for about a quarter of the people attending the opening event”¹⁸.

Another two of the four briefed classrooms were combined to create an abstracted Whare Rūnanga used as a meeting house, for language teaching, and accommodation. A big door half way through the space folds and stacks outside the room volume and can divide the house into two separate classrooms so it could be used by two groups at one time. Low windows at floor level expose the ground view to language students seated on the floor in the manner the language was taught there. Wharepaku ablutions and Whata store rooms are also included under the one single roof in a location near the Paepae (orators bench). This was much discussed and approved after mediation by Kaumātua, who favoured internal access to toilets at night time, and the inclusion of a side door so guests who had travelled a distance might have discrete access to refresh themselves before being formally welcomed onto the Marae. An administrative wing of reception and offices completed the major parts of the ensemble and was notable for the sharing of space and the lack of hierarchy intended within that part of the building.

The design plan document (Figure 3) is only annotated in the Māori Language. It is designed as a table plan, to be worked on as opposed to an artwork to be exhibited. Its exclusive use of Māori language occurred through collaboration with the Rangahaua teaching staff who saw it as a communication and teaching resource for the wider Whanganui community.

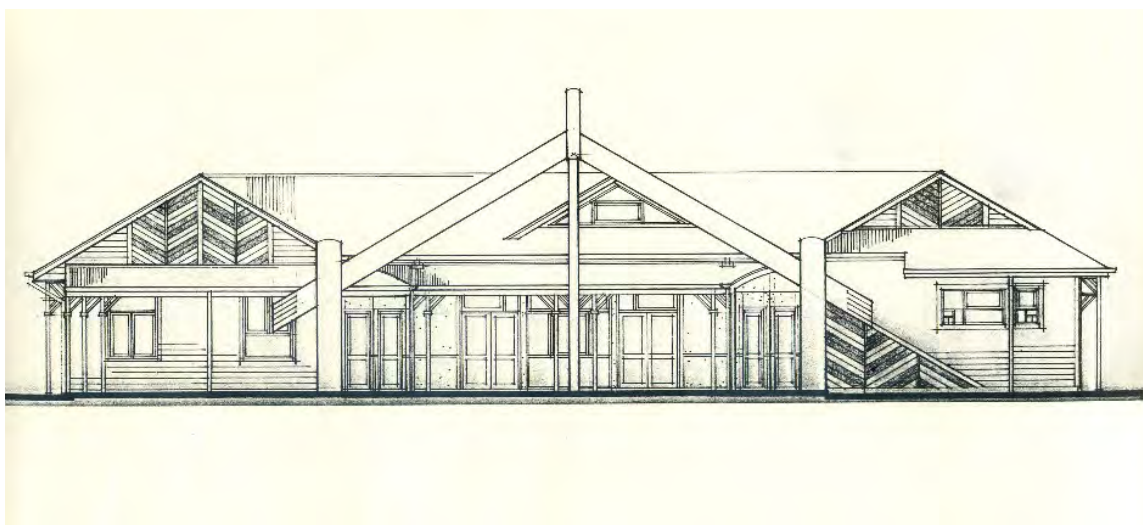


Figure 4. Architects Southcombe McClean and Company,
Developed Design Elevation, Jan 1991.

Māori concepts and values underpinned the design and its development at every turn. The building expression was adorned in an abstracted manner using stained cedar with patterns introduced within fenestration, structure the interior joinery, and interior glazing. The external patterns and composition are specifically abstract and generic; not of any particular Marae origin. This apparent lack of direct connection to cultural history was challenging for the architects. The patterns used were eventually abstracted from reference to a pair of important artworks by Bob Jahnke that had been purchased by the polytechnic for the department. One of these Taonga (treasures) remains in the Rangahaua reception area, the other was gifted to the former chairman of the polytechnic Michael Payne. Māori Glass artist Greg Hall was engaged to create small glass artworks within key internal doors.

Construction and opening

Māori concepts and values also underpinned the construction contract. A ceremonial ritual placing a Mauri stone (spiritual guardian) from the Whanganui River under the building foundations occurred towards the end of excavation, and traditional protocols excluding female visitors applied to the site during construction. This was immediately contentious. The protocol it was agreed was old local knowledge updated, and it would not apply to contractors or employees where there was no reasonable alternative for them. A female WRCP council member considered the protocol sexist and to have no place in a contemporary educational institution. She deliberately broke the protocol by entering the site causing immeasurable hurt to the Rangahaua whānau. It resulted in the Mauri stone being dug up and returned to the river. The Maihi and Amo that framed the central courtyard space and were so much a part of the building expression would now no longer be erected. From a place of cultural aspiration, Rangahaua, for a time, became just another building project for a polytechnic department. Cultural learning occurred, reconciliations were made, and the building construction continued and was eventually completed. Rangahaua was blessed in a dawn ceremony and occupied to significant acclaim. Guests came from throughout the wider Whanganui region and New Zealand including some from Unitec where the idea for a potential similar facility was taking shape. The huge numbers of guests were greatly in excess of the buildings ability to accommodate them, yet Rangahaua coped well. Both sides of its dining room were opened up and people were seated within the wider environment. The S House kitchen, hāngi (earth oven) and the new Rangahaua kitchen combined to provide generous hospitality.



Figure 5. Rangahaua as built without Amo and Maihi 1992, and Rangahaua with Amo and Maihi 1996, Photograph John W Scott.

The flush

There were a great many daily and major events at Rangahaua from student welcomes to graduations and other major events, all accommodated by the openness, flexibility, and hardworking overlapping character of the design. The cultural teaching programmes accommodated at Rangahaua grew rapidly including Te Rangakura. The programme was taught on a satellite basis with students earning and working with the Māori language in specially selected satellite schools for the majority of time and completing short teaching and language theory residential block courses at Rangahaua, reversing the Teachers' College primarily theory-based education pattern. During the short courses students were accommodated at Rangahaua in the Whare Rūnanga at times up to 100 people¹⁹. After the programme received accreditation in 1992 iwi from around New Zealand sought to train teachers on their home marae as satellite programmes to Rangahaua and with agreements between iwi, the course grew exponentially,

“within eight years to a student population of six hundred across 25 outposts throughout New Zealand. By 1998 it had become the largest Māori Teacher Training provider in the 150-year modern day history of Aotearoa”²⁰.

According to Morvin Simon's memory of Rangahaua at the time :

“With its own Te Kōhanga Reo run by national identities Piki and Te Oti Waretini we had a living marae, particularly as Te Rangakura satellites commenced sending their students to Rangahaua for training. It was an awesome buzz at the flush, cultural teams practising, choirs training, mahi hakinakina limbering up, tae chi students stretching, haka booming across the yard, Kura Kaupapa singing...Nga Puna Waihangā weaving, painting and carving, uncle Dave Teki running staff meetings, Judd Bailey mastering his craft in bone and stone, flat

guitars gasping for air, Janet learning her latest opera piece, Rangakura students being distracted by the pōwiri, Marilyn with a floor full of Te Ataarangi students, my wife Kura with her catering team preparing the daily cafe menu, 'karanga' girls expanding their lungs, Tipi and Mohi honing the art of oratory, Brendon Puketapu talking 'modems', Kohanga, Primary and Secondary buses coming and going...Incredible but true, it was absolutely 'tūmeke'!"²¹.



Figure 6 Rangahua at blessing of Amo and Maihi 1996.
Photograph John W. Scott collection.

Two major events in the life of Rangahaua are particularly memorable. The first of these was the first formal graduation of students from the Te Rangakura programme in 1996. "The Mauri (life force) built up over time and had a physical feel, instilled by the people passing through"²². In preparation for the event the Maihi and Amo of the Whare were installed as originally designed, and the former head of WRCP John W Scott was invited to come and open the newly installed tomokanga (entrance). The graduation event that followed occurred over a number of days giving appropriate recognition of each student's rohe (area) and journey. The second major event was the death and mourning of Kaumātua Henry Bennett in 1998 where the family had the honour of being invited to have Henry lay in state at Rangahaua for one night before being taken to Kai Iwi Marae. This was an opportunity for a great many to pay their respects and for Rangahaua and Henry to say goodbye.

The Sunset

Rangahaua intention was "to take the college to the people"²³. Its operation "utilised and applied Māori concepts in its structures and its applications"²⁴ partially within and alongside the polytechnic system and partially overlapping with it and outside it. Tino Rangitiratanga

(autonomous, self-determination) and the right to make decisions over issues affecting the people was also an important part of the underpinning philosophy. Whanganui Iwi also had a very visible presence on the national stage at the negotiation around Pakaitore (Moutua Gardens) in 1995. From this time there was increasing challenges to several of the WRCP programmes including those at Rangahaua from the established New Zealand educational and political communities who clearly saw their diversity, growth and strength as a challenge. Henry Bennett and the wider polytechnic management understood that there was a need to recognise and meet rigorous academic and educational standards balanced with traditional Māori knowledge delivered in a culturally significant manner. There were also quality management issues emerging with the growth and spread of the Te Rangakura programme that stretched those responsible for monitoring and maintaining the off-site course components. As more distant Iwi became involved and time passed, there was also less commitment to meeting WRCP requirements and the core activities occurring at Rangahaua. Eventually even graduations occurred remotely and much of the critical mass was dispersed. In response to ten years of underfunding and the associated financial deficits the half-completed polytechnic was disestablished in 2001. It was significantly rationalised and dismantled as an adjunct to UCOL Palmerston North against the clear preferences of the Whanganui community including those at Rangahaua. Whanganui Iwi leaders together approached Te Wānanga O Raukawa, a Māori tertiary education institution in Otaki who agreed to take on the Te Rangakura programme as long as appropriate. The programme continues to deliver Māori teacher training and has been successfully developed to incorporate Raukawa wānanga knowledge and ongoing national accreditation requirements to the point it now has degree status. WRCP main campus was abandoned and a new smaller campus built by UCOL in the manner of a palimpsest over the former Quay School of the Arts, Fine Arts campus in Taupo Quay. Few Māori studies courses occur there despite one of the buildings being named after Henry Bennett. The former WRCP campus now has a variety of predominantly iwi tenants such as the major Te Oranganui Iwi Health Authority, Awa FM the local iwi radio station, Te Wānanga o Aotearoa Weaving and Logging courses, and Pakohe Papers the makers of 100% New Zealand harakeke (flax) paper. Rangahaua still exists as a building and a concept operating as an important community complex for the Tupoho Whānau Trust, representing one of the three Whanganui Iwi. Recently the Maihi and Amo were removed from the building for maintenance.

Another day

As a result of the Rangahaua project architects SMC were asked in 1992 to design a Māori Studies facility for Unitec in Auckland with Māori architect Rewi Thompson invited by us as

an equal partner. Rewi Thompson was design and client liaison lead. Through all project stages there was collaboration and exchange. Authorship of the project is mixed, although the SMC role in the project has been rarely acknowledged except by Rewi Thompson. Pukenga was constructed by Unitec carpentry students led by the project management of SMC architect John McClean. Pukenga was briefed to be 'not a Marae like Rangahaua', rather it was conceived as a Māori education workplace, exemplifying Māori knowledge as a teaching tool, through its architecture. It was created through a more traditional architectural process than occurred for Rangahaua. There was plenty of consultation and communication between architects and client, but the cultural expertise tipped the power balance towards the architects allowing different opportunities and synergies than occurred in the Rangahaua project. The architecture that resulted is an important taonga (treasure) of Māori and New Zealand architecture with well documented significance²⁵. When it's critically considered today it may also be seen that the multiple narrative-based design cloaks a conventional education faculty layout that operated primarily and effectively as a Māori tertiary education workplace. Pukenga's design also had a gently rising open outdoor entrance space conceived as Ātea to accommodate cultural protocol, and despite intentions, for a time, the facility operated as a marae. "Pukenga, which opened in 1993, served as marae, wharekai, classroom space and administrative centre²⁶". In 2009 Pukenga was joined by the outstanding 'Ngākau Māhaki', a Whare Whakairo (Carved Meeting House) with an axial large paved Marae Ātea, and in 2012, it was joined by a wharekai 'Manaaki' dining facility substantially built over the Pukenga entrance space Ātea.

Reflection

Rangahaua was created by an architectural and management process that empowered Māori, the architect operating as 'aligned other'²⁷ and WRCP management operating in a genuine partnership mode. This modus operandi gave space for the deep diversity of activity and protocol necessary for a holistic Māori environment to occur, and for this to be seen as a core part of the educational service delivery. It also gave space for the architecture to be actively informed by the client group in a participatory model, and with the client group specialist cultural expertise dominating. The architect's role here is ambiguous, mediating and giving form and space to group intentions through discursive development. It results in a blended authorship with the client group, and Māori architecture through Māori community without access to a Māori architect.

"Rangahaua was by Māori not for Māori and that is different. Te Rangakura was not just about a brown teaching training programme. It was fundamentally different. Rangahaua is about the people. It just is. There is no question when

you are here, everybody knows it. It's Māori space. People have a tremendous pride in being a part of it"²⁸.

So, could Rangahaua be Māori space? And if so what's different about it? What are its characteristics? There is the doubling of the Ātea space, the generous open Ātea opening onto the abstracted virtual open space courtyard house. There is little narrative structure or representation attached to this Huinga space, but it exists as common space and is material to Rangahaua as place. This informal open space is permeably connected to the rest of the facility. Rangahaua as built, has seventeen exterior doors and multiple ways you can move around and through it should one path not be available due to different uses. This permeable, open, non-hierarchical design is easy to slip into, though, and out of, and not well suited to control in a typical educational institutional mode. It is also incredibly flexible, adaptable, and extendable, often with associated Marquees within and around the central courtyard and main Ātea as readily occurs on other marae. Rangahaua prioritises hospitality, with a kitchen as main entry point, and reception and offices as a service wing. It has an abstracted but strong Māori expression adapting domestic and Marae forms to create a clearly Māori built identity. Rangahaua is intentionally not a narrative architecture, without applied stories or histories informing it or being carved or woven into it, but it is an architecture of narrative telling its own story through time. And the stories of the people associated with the place emerge and are significant and have created a particular Mauri of this Marae. Kaumātua who have passed on adorn a wall of the Whare Rūnanga. This is resonant with Bill McKay and Antonia Walmsley's description "Buildings are not to be perceived in any one moment as buildings in the round, rather they are to be seen as a series of paepae - steps, portals or gateways on the way through the world".²⁹

"Rangahaua was an active living Marae that coexisted with a tertiary educational institution. It is like a Marae and served as a Marae. It references architectural history, yet it is contemporary and has a practical education function. It has beautiful design lines and a sensitive relation to its landscape. It's not tucked away in a corner of a campus. It has a large Ātea space in front giving an appropriate prominence"³⁰.

It was a building of its time that was created by Māori as part of the response to urgent Māori educational need of that time via multiple Iwi with WRCP active support. Morvin Simon in one of many speeches at the opening of Rangahaua described it as "a new waka,

a new vehicle to take us on a journey from where we are to where we are going". That is exactly what happened and that is its key significance. It is an exemplar bicultural Marae operating temporally between and across different world views. Dr Deidre Brown notes

"The centrality of the marae, as a cultural symbol and ritual space, remains an important concept to this day as demonstrated with Pukenga being recently joined, fifteen years after its opening, by Lyonel Grant's Te Noho Kotahitanga Meeting House"³¹.

Maybe Māori space is as much about a type of communal, accessible occupation and ownership as it is about architectural expression? The historical context that models this Māori space we can identify as being associated with Māori settlement in the form of Marae. Rangahaua demonstrates that Marae on tertiary institutions might also operate as active marae in the traditional sense, with diversity of programme and age groups and occupation as might occur on an occupied local marae. The perceived disruptions to teaching that are definitely associated with this may also inform and deepen cultural learning delivery through the integrity of a holistic world view applied to an educational context. This is potentially a vision of the future as much as the past.

Endnotes

¹ Rogan, June, *Hui held at Pakohe Papers*, Whanganui, 19th Dec 2017.

² Te Awa Tupuna *Celebrating Rangahaua*, 2016, 5

³ Irwin, Kathie, 'Maori Education in 1991: A Review and Discussion', *New Zealand Annual Review of Education*, 1, (1992) 79.

⁴ Simon, Morvin T., *Taku Whare E : My Home My Heart: He Mauri Tu the Spirit Dwells Still*, 2 vols (Moku Whanau Trust 1986), 64.

⁵ Te Awa Tupuna *Celebrating Rangahaua*, 2016, 9.

⁶ Austin, M. R., *A Description of the Māori Marae*, Study paper No30 University of Auckland School of Architecture, 230.

⁷ Irwin, Kathie, 'Maori Education in 1991: A Review and Discussion', 77-112.

⁸ Robinson, Willie, *Specific History of Te Rangakura*, Te Wananga O Raukawa resource, 2018, 2.

⁹ Ibid, 3.

¹⁰ Te Awa Tupuna *Celebrating Rangahaua*, 13.

¹¹ Robinson, Willie, *Specific History of Te Rangakura*, 1.

¹² Simon, Morvin T., *Taku Whare E : My Home My Heart*, 65.

¹³ Bennett, Henry, *New Building for Polytechnic*, Wanganui Chronicle, 22nd April 1991, p3

¹⁴ Austin, M. R., *A Description of the Māori Marae*, 235.

¹⁵ Ibid, 229-240.

¹⁶ Scott, John W., Interview in Christchurch, 17 Jan 2018.

¹⁷ Ibid.

¹⁸ Vreede, Marilyn, *Hui at Rangahaua*, 16th Jan 2018.

¹⁹ Townsend, Janet, *Hui at Pakhoe Papers*, 19th Dec 2017.

²⁰ Robinson, Willie, *Specific History of Te Rangakura*, 3.

²¹ Simon, Morvin T., *Taku Whare E : My Home My Heart*, 66.

²² Vreede, Marilyn, *Hui at Rangahaua*, 16th Jan 2018.

²³ Te Awa Tupuna *Celebrating Rangahaua*, 10.

²⁴ Te Awa Tupuna *Celebrating Rangahaua*, 17.

²⁵ Brown, Deidre, *Māori Architecture: from fale to wharehau and beyond*, Penguin Books Ltd, London, 2009, 148-151, and Jenner Ross, Antipodians, *Lotus International*, 105, 1999, 115-117.

²⁶ <http://www.unitec.ac.nz/marae/>

²⁷ Denton Nicholas, March (prof) Thesis *A Place to Navigate With / In Negotiation of Architecture and Urban Environments in Aotearoa New Zealand*. VUW School of Architecture, 2016, 262.

²⁸ Bennett, Mary, *Hui at Rangahaua*, 16th Jan 2018.

²⁹ McKay, Bill, and Antonia Walmsley. 'Maori Time: Notions of Space, Time and Building Form in the South Pacific.' *Progress: Proceedings of the 20th Annual SAHANZ Conference* (2003): 203

³⁰ Scott, John W., Interview in Christchurch, 17 Jan 2018.

³¹ Brown, Deidre, *Māori Architecture*, 149

Eduardo Torroja, Concrete and Spain's Indigenous Structural Types

Brett Tippey
Kent State University

Abstract

In the first half of the twentieth century, the historicist agenda of Spain's moneyed bourgeoisie created a stifling environment characterized by distrust of, and even hostility towards, creativity, innovation and progressive ideas. Nonetheless, despite this historicism, Spain's material poverty and its obsolete infrastructure, engineer Eduardo Torroja's (1899-1961), experimentation in thin-shell concrete structures produced some of Europe's most technically and aesthetically progressive projects, such as the Market Hall in Algeciras, the Zarzuela Hippodrome and the Frontón Recoletos. Torroja's achievements in thin-shell concrete construction were acclaimed internationally by his peers, including Wright, Neutra, Nervi, Polivka, Otto and Salvadori, yet ironically his avant-garde work was also accepted by Spaniards largely because it was inspired in indigenous structural forms, particularly the Catalan vault. His fusion of this local structural type and the constructive processes of concrete propelled not only Spain's midcentury modernization, but also that of Latin America and other parts of the globe, thanks to its promotion by the Instituto de Construcción y del Cemento, the journal Informes de la Construcción and the International Association for Shell and Spatial Structures, all of which were founded by Torroja.

This paper will argue that, between the mid-1920s and his death in 1961, Torroja used his technological advancements in concrete and his adaptation of indigenous forms such as the Catalan vault as convincing evidence that modern material science, aesthetic theory and innovative form-finding were indeed compatible with traditional structural types. It will consult original, never-published documents extracted from his professional archives in Madrid, including project briefs, cost estimates, conceptual sketches and calculation sheets, and it will cross-reference these documents with theoretical texts such as his 1958 treatise Philosophy of Structures.

Introduction

In 1961, Spanish architectural historian Carlos Flores noted that the work of structural engineer Eduardo Torroja represents Spain's first true exploration of the plastic and technical possibilities of cast-in-place reinforced concrete, and that Torroja's innovations with this material established him as one of the world's most renowned structural engineers.¹ Similarly, José Fernández Ordóñez pointed out that, in concrete, Torroja discovered a material whose monolithic qualities for the first time in history allowed an unlimited range of forms, including thin-shell structures that can simultaneously serve as support, enclosure and skin, with extreme material efficiency.² Eventually, Torroja's experimentation with concrete shells led to the development of unprecedented structural forms.³

By the mid-1920s, concrete had already been used in countless buildings around the world, including several in Spain, among which Flores included Mario Carimiña's Children's Sanatorium (1910-1914, Górliz, Basque Country) and Teodoro Anasagasti's Monumental Cinema (1923, Madrid). However, Flores noted that the antiquated historicism that dominated Spain in the 1910s and 1920s prevented these architects from exploring the plastic and technical possibilities of concrete.⁴

When Torroja graduated from Madrid's School of Engineering in 1923, he took employment with the Compañía de Construcciones Hidráulicas y Civiles (Hidrocivil), one of the largest engineering and construction firms then operating in Spain. In his four-year employment with Hidrocivil, he collaborated with the company's founding engineer, José Eugenio Ribera (1864-1936) on the design for the Sancti Petri bridge in San Fernando (Cádiz, 1926), one of the first bridges to be constructed in Spain with an all-steel superstructure.⁵ Torroja's contribution to this project was the design of the reinforced concrete caissons, whose geometry was Torroja's solution to the loads of the bridge and the properties of fluid dynamics.⁶ To resist the hydraulic pressure, Torroja devised a double-layer thin-wall system constructed of simple hollow bricks with a thickness of 6.9 centimeters.⁷ The outer layer took the form of a hyperbola of revolution, and the inner layer an inverted cone. The void between them was filled with concrete. The complex curving geometry of the caissons at the Sancti Petri bridge foreshadows the forms that eventually dominated Torroja's later works.

Searching for modern forms in Spain's vernacular architecture

In 1927, at age twenty-eight, Torroja left Hidrocivil to found his own studio, Eduardo Torroja, Oficina Técnica, in Madrid. Admittedly, the earliest projects he designed for clients in various locations around Spain reveal none of the innovative structural form-finding of the Sancti Petri Bridge, yet these early independent projects merit mention because they reveal Torroja's interest in Spain's vernacular forms, which would persist throughout his career. That Torroja, a world-renowned structural engineer, would be fascinated with vernacular forms was no surprise to fellow structural engineer Mario Salvadori (1907-1997), who noted that 'Eduardo Torroja is, of course, much more than a great teacher of structures. He is a humanist, a wise administrator of large enterprises, a great engineer, and a zealous researcher,' and that Torroja followed other great humanists who, 'devote their beginning years to a long and thorough study of the fundamentals of their culture.'⁸

Between July 1928 and February 1930 Torroja designed a series of residential projects, most of which were single-family homes for bourgeois clients and small rental vacation houses, which he called *hoteles*. The earliest of these projects, dated between July 1928 and April 1930, was a series of four single-family *hoteles* for a rural site located at the intersection of the La Coruña and Majadahonda highways in El Plantío, at the time an unincorporated tract of agricultural land in the outskirts northwest of Madrid.⁹ These *hoteles* exchange the hyperbolic and conical forms Torroja had devised for the caissons of the Sancti Petri Bridge for the traditional forms of the Castilian and Andalusian vernacular.

The first of these *hoteles* (dated July 1928) was a single-story house with a traditional pitched gable roof clad in typical Spanish clay tile; white stucco walls; rough-hewn timber for lintels, sills and jambs; a wrap-around wood pergola; a garage, whose oversized door resembles those of typical Castilian granaries; and a niche for religious statuary.¹⁰ Clearly, this *hotel* was designed to appeal to the sensibilities of the traditional-minded Spanish bourgeoisie. With a smaller footprint, the second *hotel* for El Plantío (dated October 1928), uses similar vernacular details, but exchanges the steeply-pitched gable for a flat roof, parapet and simple cornice.¹¹ The third *hotel* (dated 10 November 1928), a two-story square with an adjoining garage and WC, also uses a flat roof, parapet and simple cornice.¹² Its façade composition is more minimalist and symmetrical than that of the earlier two, yet it still makes various stylistic references to the Castilian vernacular. Finally, the fourth *hotel* (dated 15 November 1928) is similarly minimalist and symmetrical, yet unlike the other three it replaces the parapet and cornice with a simple rounded corner and it includes a 50 centimeter-high *zócalo* (a non-structural thickening of the wall at its base),

which Torroja had extracted from local sources.¹³ All four of Torroja's *hoteles* are set back from the property line and surrounded by a garden.¹⁴

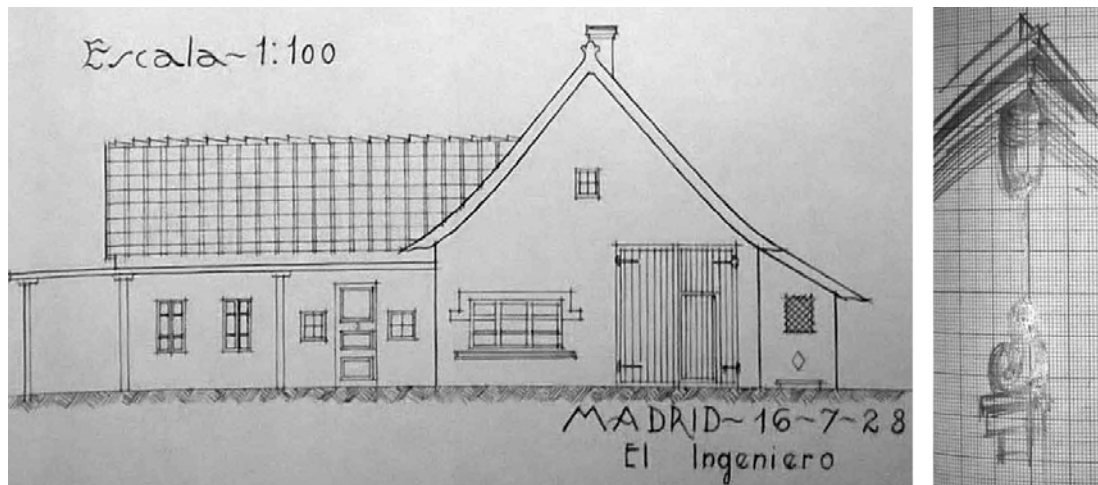


Figure 1. Façade, First 'Hotel' in El Plantío, author: E. Torroja, dated 16 July 1928 (Archivo Torroja, CEHOPU-CEDEX, ETM-014/Caja 004/03 (03 al 06)). **Figure 2.** Sketch, Cornice and Volute Detail, author E. Torroja, undated (Archivo Torroja, CEHOPU-CEDEX, ETM-050/Caja 011/05_04)

While Torroja frequently collaborated with architects such as Agustín Aguirre, Secundino Zuazo, Carlos Arniches and Manuel Sánchez Arcas, to whom he typically deferred in questions of aesthetics and façade composition, the archival evidence for the project in El Plantío makes no mention of collaboration with an architect;¹⁵ therefore, it appears that the façade composition, and the overt references to Castilian and Andalusian sources, were determined exclusively by Torroja, presumably in order to appeal to a bourgeois sensibility. Moreover, his archives also include a number of sketches drawn in his own hand of Andalusian and Castilian vernacular elements such as cornices, corbels and coats of arms.¹⁶ Clearly, these *hoteles* are stylistic copies typical of the period, yet their uniqueness lies in the fact that they were designed by a young structural engineer whose education at the School of Engineering would not have included lessons in composition theory or studies of Spain's vernacular architecture, and who only a few years before had experimented with modern form-finding processes.

Even more importantly, Torroja's structural drawings, cost estimates and calculation sheets reveal that these *hoteles* did not use brick, wood, stone or adobe, which were typically used as structural materials in Spain's vernacular architecture;¹⁷ instead he designed a structural frame consisting of a combination of columns and load-bearing walls, which were to be constructed exclusively in reinforced concrete. Despite the fact that concrete had been

used for residential architecture in France and other parts of Europe even before the turn of the century, prior to 1928 it had not been used widely in Spain for single-family residences;¹⁸ in fact, Flores has noted that during the first decades of the twentieth century, buildings that used concrete as a structural material were often ridiculed by Spaniards in academia, in practice and in popular culture.¹⁹

Although it appears that these *hoteles* were never built, Torroja went to the trouble of detailing columns (L-shaped, T-shaped and cruciform), beams, load-bearing walls and interior partitions, all to be constructed of concrete, and of calculating quantities and estimating material costs of cement, sand, aggregate and reinforcing steel.²⁰ His innovations with concrete in these *hoteles* even included the use of sawdust as an additive, in a primitive attempt at air-entrainment, presumably intended to reduce cost, as well as the self-weight of the concrete.²¹

The Hotel for the Conde de Mejorada in Seville (dated 29 December 1928, never built), also employs concrete for its structural frame, yet it is even more faithful to the local vernacular than the *hoteles* in El Plantío. With arcades, planters, wrought iron balconies and crenellated parapets, Torroja noted the façade of this building, which was designed as a vacation home for the Count, for its ‘extremely sober ornamentation’, and that its ‘ornamentation has been totally eliminated in order to achieve a type of construction that is truly economic, and inspired in the simple and graceful style that is native to Andalusia’.²² Moreover, Torroja described the composition of the façade as a rational result of the programmatic organization of the interior spaces, which he linked directly with the logic of the reinforced concrete structural system.²³ Again, the archival documentation includes no mention of a collaborating architect, for which reason the composition of the facades, the selection of concrete as the structural material and the description of the design rationale are most likely Torroja’s. A number of other projects Torroja designed in the late 1920s and early 1930s reflect a similar attempt to infuse vernacular forms with the logic and constructive process of advanced concrete structural systems.²⁴

From Catalanian vault to concrete shell

In June of 1979, an exhibit entitled ‘Modernity in the Works of Eduardo Torroja’, organized by the Colegio de Ingenieros de Caminos (Madrid) established a link between Torroja’s work and one of Spain’s most unique and iconic structural types, the Catalanian vault (*bóveda catalana*). This exhibit positioned Torroja as a member of an elite group of designers including Rafael Guastavino (1842-1908), Antoni Gaudí (1852-1926) and Joan

Rubió i Bellver (1870-1952), whose work demonstrated a clear attempt to resurrect this traditional structural type in contemporary architecture.²⁵ Their fusion of nineteenth-century technologies, such as mixing slaked lime mortar and Portland cement, with Catalonia's age-old ceramic industry birthed a new breed of pseudo-elastic structures that were unprecedented in both their thinness and their capacity.²⁶

Following in the footsteps of Guastavino, Gaudí and Rubio i Bellver, In his search for inspiration in Spain's vernacular architecture Torroja stated that

It is not out of place to mention the Catalonian vault, as indigenous to the country where it was [sic] originated as are olive trees and groves. It is so marvelous in its realization, that theory is taxed to explain and to evaluate its resistant phenomenon, which was so easily and subconsciously sensed by builders long since buried many centuries ago in the same earth from which they made these remarkable bricks.²⁷

He was fascinated by the Catalonian vault's ability to span relatively long distances between beams, and to provide a substructure for floors above. The Catalonian vault, also known as the *bóveda tabicada*, or built-up brick vault, is composed of thin bricks laid in multiple layers that are laminated together with gypsum mortar; to span in both the x- and y- axes, these vaults are often repeated as continuous parallel barrel vaults, or laid out in a grid of intersecting groin vaults. In more complex manifestations, the traditional Catalonian vault takes on hyperboloid and/or catenary shapes. The void between the vault and the finished floor above is then filled with earth and rubble.²⁸ Torroja recognized the inevitable increase in dead load produced by using structural masonry and rubble fill, yet he pointed out that this mass helps in reducing acoustic transfer from floor to floor, whereas 'contemporary very-light floorings often seem too much like drumheads'.²⁹ He also described this structural type as uniquely appropriate for harsh arid climates such as those of Andalusia and Extremadura, where clay is the dominant soil type.³⁰

Given Torroja's early experimentation on hyperbolic geometries in the caissons of the Sancti Petri Bridge, his innovative application of reinforced concrete in the otherwise traditionalist *hoteles*, and his lifelong appreciation for the Catalonian vault, it is no surprise that, by the early 1930s he would begin to experiment extensively with form-resistant thin-shell structures in reinforced concrete. He noted that, when constructed in reinforced concrete, the cylindrical or hyperboloid shell has fewer structural deficiencies than the typical masonry barrel vault because of the increase in shear resistance that results from

concrete's monolithic quality, the use of reinforcing steel and the possibilities of stiffening along its edges.³¹ The earliest such translation can be observed in the central dome of the Market Hall (Algeciras, 1933 on which he collaborated with architect Manuel Sánchez Arcas).³² To comply with the program, which required a large, flexible continuous space, Torroja applied his knowledge of intersecting Catalanian vaults. This dome, itself a thin-shell concrete structure with a diameter of 47.8 meters and a thickness of only 9 centimeters at its thinnest point, is intersected by eight short cylindrical shells that radiate outward from the center, which serve to stiffen the shell at its edges, and to concentrate the stresses over the eight support columns.³³ It was the first dome of its kind to be constructed in Spain.³⁴ The outward thrust of the dome is counteracted by a steel hoop embedded in the beam that connects the eight supports.³⁵ For this interpretation of the Catalanian vault, Torroja claimed that 'the most suitable material for such domes is obviously reinforced concrete, although there are certain limitations of span as compared with dome shells supported along the whole periphery.'³⁶ Later, he described his choice of reinforced concrete as uniquely appropriate for such thin-shell structures, given that it allows the shell to be thickened near the points of support.³⁷

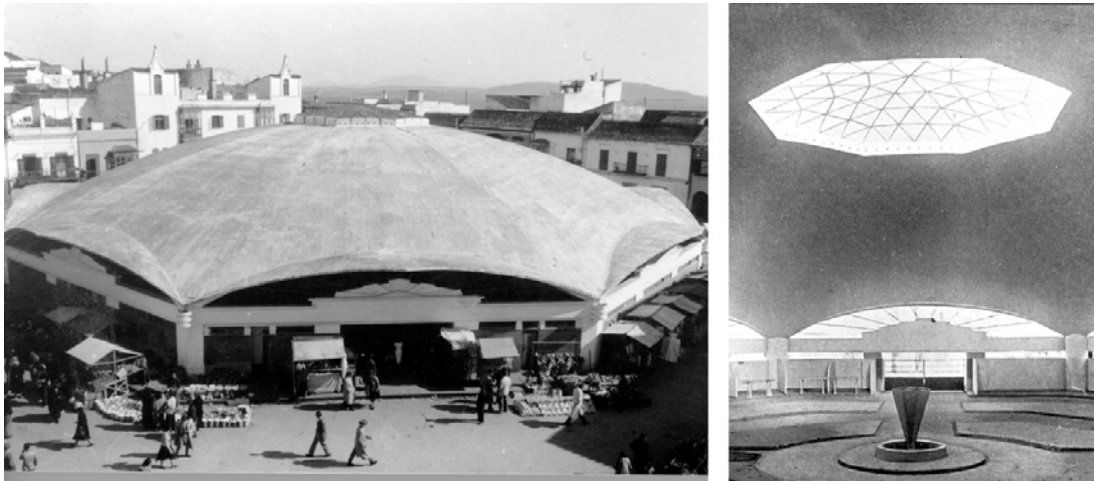


Figure 3. Exterior, Market Hall in Algeciras, photo dated 1933 (Archivo Torroja, CEHOPU-CEDEX, ETM-093-02_01). **Figure 4.** Interior, Market Hall in Algeciras, photo dated 1933 (Archivo Torroja, CEHOPU-CEDEX, ETM-093-06_01)

That same year (1933), Torroja again applied his study of the Catalanian vault to the design for a retaining wall on the campus of the Polytechnic University of Madrid. On its exposed side, the Cantarranas Retaining Wall, which today supports Madrid's A-6 freeway, is deceptively flat and uninteresting; however, the earthen side is bifurcated at mid-height by a series of buttresses connected by shallow thin-shell concrete vaults, on which the weight

of the earth bears, thus resisting the wall's rotational moment.³⁸ For this project, Torroja chose concrete in order to maximize efficiency and economy.³⁹

In 1935 Torroja designed three thin-shell roof structures stiffened by the intersection of multiple vaults, yet instead of intersecting these vaults perpendicularly, as he had done in the Market Hall, the vaults of the Villaverde Church, the Fronton Recoletos and the Zarzuela Hippodrome (all built for sites in Madrid) run parallel to each other, creating a unique seagull-shaped cross-section. At Villaverde he chose to use a large central elliptical vault, which is stiffened thanks to its intersection with two smaller, flanking vaults, also of elliptical cross-section.⁴⁰ Like typical Catalan vaulting, the five-centimeter thick Villaverde vault then rests on a continuous load-bearing wall.⁴¹



Figure 5. Interior, Frontón Recoletos, photo: Castellanos, dated 1935 (Archivo Torroja, CEHOPU-CEDEX, available at http://www.cehopu.cedex.es/img/bibliotecaD/Cubierta_laminar_fronton_recoletos).

For the roof of the Frontón Recoletos, which was designed in collaboration with architect Secundino Zuazo, Torroja initially experimented with steel, first in transverse trussed girders, then in longitudinal girders. However, he quickly determined that the structural, functional and aesthetic results of these two solutions 'proved to be an unsatisfactory arrangement',⁴² and that the vault was superior because it would eliminate all internal structural elements that might obstruct views from the stands, or the smooth ricochet of the *pelota*.⁴³ He must have had the Catalan vault in mind when he stated that 'the hand of the imagination instinctively drew out two arcs, the asymmetry of which rhymes with the asymmetry of the hall itself'.⁴⁴ In 1957 he described his selection of reinforced concrete as well-suited to the double cylindrical thin-shell roof.⁴⁵ Therefore, in the case of the Fronton Recoletos, his selection of reinforced concrete was made to suit the desired form, not vice

versa. The thickness of the thin-shell vault varies between 7.8 and 15.8 centimeters.⁴⁶ To provide an abundance of north light to illuminate the playing court, and a lesser amount of north light to illuminate the upper stands, he designed two unequally-sized vaults; in both cases he perforated the vault with a triangular grid of skylights.⁴⁷

The program of the Zarzuela Hippodrome, which he designed in collaboration with architects Carlos Arniches and Martín Domínguez, required grandstands with unobstructed views of the racecourse; a betting hall linked directly with the paddock and the stairs to the grandstands, which could be observed from above by a staff mezzanine; and a continuous upper promenade for spectators, with views of the racecourse on one side and the paddock on the other. While their first solution represents a sophisticated and compact vertical layering of programmatic elements, and an initial attempt at a cantilevered roof tapered to accommodate the bending stresses, it also included a rather cumbersome system of counterweights, tiebacks, tie rods and a row of support columns that impeded the spatial and visual connection between the betting hall and the paddock.⁴⁸ Torroja himself described this initial solution as 'not very satisfactory'.⁴⁹

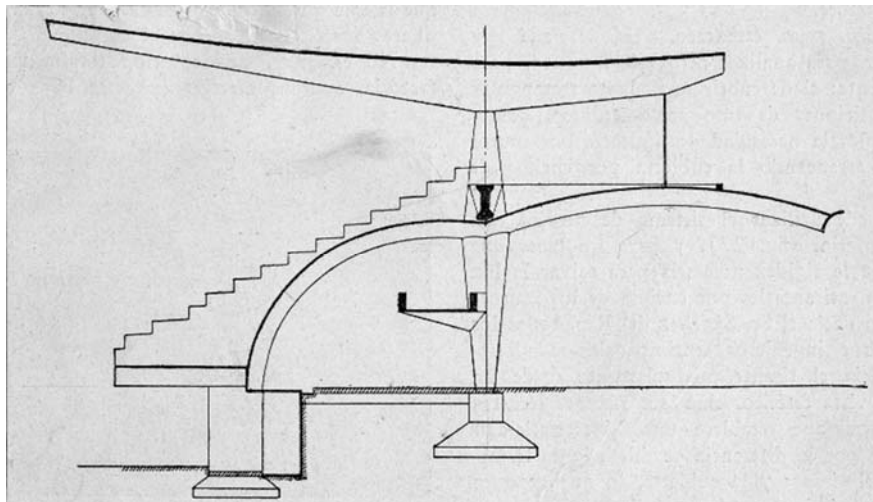


Figure 6. Transversal section (final version), Zarzuela Hippodrome, undated, drawing: E. Torroja (Archivo Torroja, CEHOPU-CEDEX, ETM-115-05_01)

In the first revision they slipped the staff mezzanine and half of the betting hall underneath the grandstands, and eliminated the columns between the betting hall and the paddock by offsetting the weight of the betting hall roof with a more substantial tie member. As a result, the cantilevered roof of the betting hall balances the 13-meter cantilever that covers the grandstands, and the elimination of the columns increases the spatial connection between the betting hall and the paddock.⁵⁰ This revision also introduced a smaller cantilever to

support the staff mezzanine, in order to reduce the obstructions in the spatial flow of the betting hall.⁵¹



Figure 7. Grandstand, Zarzuela Hippodrome, photo: B. Tippey

The first and second revisions also reflect an initial attempt to introduce curvature to the cross-section, but only as a series of straight segments. It was not until the third iteration that Torroja returned to the forms of the Catalan vault; in an attempt to 'refine the ideas further into a clear, well integrated whole', the final revision relied on 'a certain curvature of outline' to the cross-section, which 'seemed so straight-forward and suitable to the purpose that the imagination resisted any new attempt at further development'.⁵² He noted that, as a form-resistant structure, the repeating shell eliminates any need of beams, framework or bracing, thereby providing unobstructed views of the racecourse and the paddock.⁵³ Torroja acknowledged that the ideas behind the structure for the Hippodrome reflect a certain central European influence, particularly that of Ulrich Finsterwalder, Eugène Freyssinet and Franz Dischinger;⁵⁴ however, much like the Catalan vault, the intersection of parallel vaults stiffens the cantilever in the transversal direction, while the curvature permits the shells to act as a deeper beam; this move also allowed him to reduce the thickness of the shells, which ranges from five to fourteen centimeters.⁵⁵

Following the Spanish Civil War (1936-1939), Torroja continued to experiment with concrete and the Catalan vault. The roof he designed in 1950 (never built) to cover the waiting platform at the Ourense train station hybridized his innovations at the Zarzuela Hippodrome with those of the Fronton Recoletos; in the transversal direction he composed it as a pair of intersecting seagull vaults, similar to Recoletos, and to stiffen it in the longitudinal direction he subdivided these vaults into a series of repeating hyperboloid shells.⁵⁶

In 1955, Torroja collaborated with Venezuelan architect Fruto Vivas (b. 1928) on the design of the form-resistant thin-shell concrete roof of the Club Táchira in Caracas (1956-1957).⁵⁷ Torroja modified Vivas' initial concept for the double-curvature roof structure, which stretches over the open-air club spaces, in order to simplify its construction and maximize its structural efficiency, yet without compromising the dramatic organic form.⁵⁸ The ten-centimeter thick curving shell structure, which vaults over a massive plinth, allowed for grand arched openings at the Club's perimeter in order to provide unobstructed views of the surrounding valley.⁵⁹ Torroja augmented his mathematical analysis of the shell's structural properties by fabricating a 1:10 scale model of the roof and loading it proportionally.⁶⁰



Figure 8. Roof Model, Club Táchira, on display at the Museo
Eduardo Torroja, Madrid, photo: B. Tippey

Conclusion

While the work of Eduardo Torroja clearly demonstrates innovative and scientific use of materials, as well as structural form-finding techniques that are representative of modern engineering, his work is also a direct result of his research of Spain's indigenous forms. Even though they were essentially historicist, his earliest independent projects from the late 1920s and early 1930s merged vernacular elements, which he had extracted from rural Castilian and Andalusian sources, with the logic and constructive processes of a reinforced concrete structural frame. Then, his more mature works expanded on the engineering achievements made by Guastavino, Rubió i Bellver and Gaudí. Like these predecessors, Torroja applied his study of the essential properties of the traditional Catalan vault to the design of thin-shell structures, yet his fusion of these properties with the plastic and

technical possibilities of reinforced concrete constitutes a unique contribution to Spain's architecture and structural engineering.

Abroad, Torroja's experimentation with the technical and sculptural potential of reinforced concrete, as well as his exploitation of Spain's vernacular structural types, garnered acclaim from the world's leading architects and engineers. In 1949, Frank Lloyd Wright stated that Torroja "has expressed the principles of organic construction better than any engineer I know";⁶¹ Joseph Siry has pointed out that during the initial design phases of the Guggenheim Museum in New York, Wright considered Torroja as a potential collaborator.⁶² While Wright's collaboration with Torroja never actually came to fruition, Richard Neutra's did. Neutra and his partner Robert Alexander retained Torroja as a consultant on the never-built Trebol la Hayada project (1957, Caracas);⁶³ furthermore, Neutra accepted Torroja's invitation to lecture multiple times in Madrid, and he promoted Torroja's works to architects practicing in the United States, primarily because of Torroja's unique fusion of technical prowess and aesthetic theory.⁶⁴ Although they never met personally, in the late 1950s Frei Otto maintained epistolary correspondence with Torroja, and Otto read *Logik der Form*, the German-language translation of *Philosophy of Structures*.⁶⁵ For young Spanish architects such as Francisco Cabrero and Miguel Fisac, who graduated from Madrid's School of Architecture during the difficult early years of the Franco regime, Torroja was one of the few Spaniards that promoted modern ideas. Similar to Torroja's work, Cabrero adapted the traditional Catalan vault for the Feria del Campo (1948, Madrid). Fisac exploited both the organic forms of animal bones and the plastic potential of precast/pre-stressed concrete in his development of 'bone-beams', which he used extensively in buildings such as the Center for Hydrographic Studies (Madrid, 1961) and the Alonso Tejada residence (Madrid, 1961).⁶⁶

Endnotes

¹ Carlos Flores, *Arquitectura Española Contemporánea*, (2nd edition, Madrid: Aguilar, 1988), pp. 122-128, 131. The first edition of this book was published in 1961. For their help in the preparation of this article, I would like to thank Dr. Elwin Robison for his assistance in interpreting Torroja's technical terminology, and my research assistant Jenny Glowe, who systematically cataloged the documents I extracted from the Torroja Archive.

² José Fernández Ordoñez (ed.), *La Modernidad en la Obra de Eduardo Torroja: Catálogo de la Exposición Celebrada en el Colegio de Ingenieros de Caminos, Canales y Puertos*, (Madrid: Ediciones Turner, 1979), p. 10.

³ Lilia Maure, *Secundino Zuazo Eduardo Torroja: Frontón Recoletos, Madrid, 1935*, (Madrid: Editorial Rueda, S.L., 2004), p. 23.

⁴ Flores, *Arquitectura Española Contemporánea*, pp. 120-122.

⁵ Archivo Torroja, CEHOPU-CEDEX, 'ETM-018. Puente de Sancti Petri. Arsenal de la Carraca. San Fernando (Cádiz)', accessed online on 20 February 2018 at <http://www.cephopu.cedex.es/etm/obras/ETM-018.htm>.

⁶ Archivo Torroja, CEHOPU-CEDEX, 'ETM-018. Puente de Sancti Petri. Arsenal de la Carraca. San Fernando (Cádiz)', accessed online on 20 February 2018 at <http://www.cephopu.cedex.es/etm/obras/ETM-018.htm>.

⁷ Eduardo Torroja Miret, *The Structures of Eduardo Torroja: An Autobiography of Engineering Accomplishment* (New York: F. W. Dodge Corp., 1958), p. 85.

⁸ Torroja Miret, *The Structures of Eduardo Torroja*, p. v.

⁹ This paper consults original copies of the following documents regarding Torroja's design for the *hoteles* in El Plantío, which are kept in the Fondo de Eduardo Torroja Miret, Archivo Torroja, CEHOPU-CEDEX (Madrid). 'Primer hotel de El Plantío: Planos', ETM-014/Caja 004/03 (03 al 06); 'Estudio económico de los hoteles de El Plantío', ETM-014-caja 004-03_02; 'Primer hotel de El Plantío-Cubicaciones', ETM-014/Caja 004/03_01; '2-Hotel de El Plantío', ETM-019/Caja 005/03; '3-Hotel de El Plantío', ETM-020/Caja 005/04; 'Hotel de El Plantío-Cubicaciones/Fachadas', ETM-022/Caja 005/06_01. Hereafter, all references to original documents extracted from Torroja's technical archive will cite 'Archivo Torroja, CEHOPU-CEDEX', the title of the document (in quotes), followed by the call number established by the archive (i.e. ETM-XXX/Caja XXX/XX_XX). The archive's catalog may be accessed at http://www.cephopu.cedex.es/etm/etm_index.htm (last accessed on 13 February 2018).

¹⁰ Archivo Torroja, CEHOPU-CEDEX, 'Primer hotel de El Plantío: Planos', ETM-014/Caja 004/03 (03 al 06).

¹¹ Archivo Torroja, CEHOPU-CEDEX, '2-Hotel de El Plantío', ETM-019/Caja 005/03.

¹² Archivo Torroja, CEHOPU-CEDEX, '3-Hotel de El Plantío', ETM-020/Caja 005/04.

¹³ Archivo Torroja, CEHOPU-CEDEX, 'Hotel de El Plantío Cubicaciones/ Fachadas', ETM-022/Caja 005/06_01.

¹⁴ Archivo Torroja, CEHOPU-CEDEX, 'Primer Hotel de El Plantío – Planos', ETM-014/Caja 004/03 (03 al 06).

¹⁵ Torroja's frequent collaborations with architects is documented in Fernández Ordoñez (ed.), *La Modernidad en la Obra de Eduardo Torroja*, p. 13, 80.

¹⁶ Archivo Torroja, CEHOPU-CEDEX, untitled document, ETM-050/Caja 011/05_04.

¹⁷ Calculation sheets and cost estimates: Archivo Torroja, CEHOPU-CEDEX, 'Estudio Económico de los Hoteles de El Plantío', ETM-014-caja 004-03_02; 'Primer Hotel de El Plantío – Cubicaciones', ETM-014/Caja 004/03_01; '2 - Hotel de El Plantío', ETM-019/Caja 005/03; '3 - Hotel de El Plantío', ETM-020/Caja 005/04; 'Hotel de El Plantío Cubicaciones/ Fachadas', ETM-022/Caja 005/06_01.

¹⁸ Dora Wiebenson, *Tony Garnier: The Cité Industrielle*, (New York: George Brasiller, 1969), p. 14.

¹⁹ Flores, *Arquitectura Española Contemporánea*, p. 90.

²⁰ Different column shapes are detailed in Archivo Torroja, CEHOPU-CEDEX, '3 - Hotel de El Plantío', ETM-020/Caja 005/04.

²¹ Archivo Torroja, CEHOPU-CEDEX, 'Estudio Económico de los Hoteles de El Plantío', ETM-014-caja 004-03_02; Archivo Torroja, CEHOPU-CEDEX, 'Primer Hotel de El Plantío – Cubicaciones', ETM-014/Caja 004/03_01.

²² Archivo Torroja, CEHOPU-CEDEX, ETM 025-006-02 Original quotes: 'ornamentación sumamente sobria'; 'se ha suprimido totalmente la ornamentación para obtener un tipo de construcción verdaderamente económico inspirándose en el sencillo y agraciado estilo nato de Andalucía.'

²³ Archivo Torroja, CEHOPU-CEDEX, 'Proyecto de Hotel en Sevilla para El Excmo. Señor Conde de Mejorada', ETM-025-002/Caja 006/03_01.

²⁴ These projects include: a slaughterhouse in Benifairó de Valldigua (with architect Manuel Paucher Ruas) dated 30 March 1929 (Archivo Torroja, CEHOPU-CEDEX, 'Matadero de Benifairó de Valldigua', ETM-031/Caja 007/03. A house in Seville for the Marqués de las Navas dated between July and October 1929, 'Casa para el Marqués de la Nave', ETM-026/Caja 010/02 and 'Casa en Sevilla para el marqués...', ETM-038.001/Caja 008/06 and 'Casa en Sevilla para el marqués..2', ETM-038.003/Caja 008-08. A house in Larache (Morocco, in collaboration with French architects in Casablanca) dated January 1929, 'Villa en Larache', ETM-38.001/Caja 008/06. A school in Jerez de la Frontera (with Aguirre) dated July 1929, 'Escuela gratuita en Jerez', ETM-039/Caja 009/01 and 'Proyecto de Escuela Graduala en Jerez...', ETM-039/Caja 009/01_01. Workers' housing in Seville dated August 1930, 'Casas de labor en Sevilla', ETM-058/Caja 013/02. A house in Burgos dated 22 January 1934, 'Casa en Burgos', ETM-113/Caja 030/04.

²⁵ Fernández Ordoñez (ed.), *La Modernidad en la Obra de Eduardo Torroja*, p. 23. Torroja cited Antoni Gaudí for saying that 'originality is return to the origin.' Eduardo Torroja Miret, *Philosophy of*

- Structures*, J.J. Polivka and Milos Polivka, trans. (Berkeley: University of California Press, 1958), p. 284. In a 1961 article architectural historian Martin Kermacy connected the 'structural expressionism' of Eduardo Torroja, as well as that of Mario Salvadori, Félix Candela and Pier Luigi Nervi, with Gaudí's work, but the article focuses exclusively on aesthetic comparisons and provides no concrete evidence to directly link these younger designers with Gaudí. Martin Kermacy, 'The Expressionism of Gaudí and Torroja', in Ramon Martinez-Lopez (ed.), *Image of Spain*, (Austin: The University of Texas, 1961), pp. 137-143.
- ²⁶ Fernández Ordoñez (ed.), *La Modernidad en la Obra de Eduardo Torroja*, p. 23.
- ²⁷ Torroja Miret, *Philosophy of Structures*, p. 199.
- ²⁸ Torroja Miret, *Philosophy of Structures*, p. 199.
- ²⁹ Torroja Miret, *Philosophy of Structures*, p. 148.
- ³⁰ Torroja Miret, *Philosophy of Structures*, p. 198.
- ³¹ Fernández Ordoñez (ed.), *La Modernidad en la Obra de Eduardo Torroja*, p. 80.
- ³² Archivo Torroja, CEHOPU-CEDEX, 'ETM-093-001. Gran Mercado de Algeciras: Memoria', accessed online on 20 February 2018 at <http://www.cephopu.cedex.es/etm/pdf/planos/158.302.pdf>
- ³³ Torroja Miret, *The Structures of Eduardo Torroja*, p. 23.
- ³⁴ Archivo Torroja, CEHOPU-CEDEX, 'ETM-093. Mercado de Algeciras', accessed online on 20 February 2018 at <http://www.cephopu.cedex.es/etm/obras/ETM-093.htm>.
- ³⁵ Torroja Miret, *The Structures of Eduardo Torroja*, p. 24.
- ³⁶ Torroja Miret, *Philosophy of Structures*, p. 109.
- ³⁷ Torroja Miret, *Philosophy of Structures*, p. 175.
- ³⁸ Torroja Miret, *The Structures of Eduardo Torroja*, p. 93; Archivo Torroja, CEHOPU-CEDEX, 'ETM-037 - Muro de contención de Cantarranas en la Ciudad Universitaria de Madrid', accessed online on 20 February 2018 at <http://www.cephopu.cedex.es/etm/pdf/obras/ETM-037.pdf>.
- ³⁹ Archivo Torroja, CEHOPU-CEDEX, 'ETM-037 - Muro de contención de Cantarranas en la Ciudad Universitaria de Madrid', accessed online on 20 February 2018 at <http://www.cephopu.cedex.es/etm/pdf/obras/ETM-037.pdf>.
- ⁴⁰ Torroja Miret, *The Structures of Eduardo Torroja*, p. 167.
- ⁴¹ Torroja Miret, *The Structures of Eduardo Torroja*, p. 165.
- ⁴² Torroja Miret, *The Structures of Eduardo Torroja*, p. 34.
- ⁴³ Archivo Torroja, CEHOPU-CEDEX, 'La cubierta laminar del Frontón Recoletos', accessed online on 20 February 2018 at http://www.cephopu.cedex.es/img/bibliotecaD/Cubierta_laminar_fronton_recoletos p. 3.
- ⁴⁴ Torroja Miret, *The Structures of Eduardo Torroja*, p. 34.
- ⁴⁵ Torroja Miret, *Philosophy of Structures*, p. 271.
- ⁴⁶ Torroja Miret, *The Structures of Eduardo Torroja*, p. 37.
- ⁴⁷ Archivo Torroja, CEHOPU-CEDEX, 'La cubierta laminar del Frontón Recoletos', accessed online on 20 February 2018 at http://www.cephopu.cedex.es/img/bibliotecaD/Cubierta_laminar_fronton_recoletos p. 2.
- ⁴⁸ See drawings of various solutions in Archivo Torroja, CEHOPU-CEDEX, 'Estructura de Tribuna de Preferencia', ETM-115-001/Caja 03/07_02.
- ⁴⁹ Torroja Miret, *The Structures of Eduardo Torroja*, p. 4.
- ⁵⁰ Torroja Miret, *Philosophy of Structures*, p. 187.
- ⁵¹ Torroja Miret, *The Structures of Eduardo Torroja*, p. 4.
- ⁵² Torroja Miret, *The Structures of Eduardo Torroja*, p. 6.
- ⁵³ Torroja Miret, *Philosophy of Structures*, p. 299.
- ⁵⁴ Archivo Torroja, CEHOPU-CEDEX, 'Estructura de Tribuna de Preferencia', ETM-115-001/Caja 03/07_02.
- ⁵⁵ Torroja Miret, *The Structures of Eduardo Torroja*, pp. 14-15. Torroja also noted the Hippodrome's ability to withstand unforeseen forces; sitting on the front lines of combat during the Spanish Civil War, the roof structure endured twenty-six direct artillery hits, yet its structural integrity remained uncompromised.
- ⁵⁶ Torroja Miret, *The Structures of Eduardo Torroja*, pp. 29-30.
- ⁵⁷ Archivo Torroja, CEHOPU-CEDEX, 'ETM-405. Edificio principal de Club Táchira en Caracas (Venezuela)', accessed online on 20 February 2018 at <http://www.cephopu.cedex.es/etm/obras/ETM-405.htm>.
- ⁵⁸ See first, second and third solutions in Torroja Miret, *The Structures of Eduardo Torroja*, p. 43.
- ⁵⁹ Torroja Miret, *The Structures of Eduardo Torroja*, p. 44.
- ⁶⁰ Torroja Miret, *The Structures of Eduardo Torroja*, p. 46.
- ⁶¹ 'People', *Architectural Forum*, July (1949), p. 14.

⁶² Joseph Siry, 'Wright's Guggenheim Museum and Later Modernist Architecture', in *The Guggenheim: Frank Lloyd Wright and the Making of the Modern Museum*, (New York: Guggenheim Museum, 2009), pp. 39-70.

⁶³ 'Trebol, 1957-1958', box 1485 folder 12 and box 885 folder 4, Richard and Dion Neutra Papers (Collection 1179). UCLA Library Special Collections, Charles E. Young Research Library, UCLA (hereafter 'UCLA'); Archivo Torroja, CEHOPU-CEDEX, 'Trebol de la Hayda', ETM-410.

⁶⁴ Neutra's appreciation for Torroja's work can be seen most clearly in UCLA 0177-48-01, UCLA box 161 folder 147 and 'Building Abroad: Torroja's Sculptural Concrete', *Architectural Forum*, February (1955), pp. 148-50. See also Brett Tippey, 'Collaborative Exchange between Eduardo Torroja and Richard Neutra', paper presented at the 2016 International Conference of the Society of Architectural Historians, Pasadena.

⁶⁵ Juan María Songel, *A Conversation with Frei Otto*, (New York: Princeton Architectural press, 2010), p. 20.

⁶⁶ See Andrés Cánovas (ed.), *Miguel Fisac: Medalla de Oro de la Arquitectura 1994*, (Madrid: Ministerio del Fomento, 1997).

Media(ted) Practice: The Globalization of Architecture through Standards, Softwares, and Spatial Imaginations.

Aaron Tobey
Yale University

Abstract

In 1980 the World Bank undertook a project at a number of Chinese universities to encourage the development and adoption of Computer Aided Design (CAD) softwares in the country's construction and manufacturing sectors. Two decades later, in 2005, the official magazine of the American Institute of Architects, Architectural Record, published an article entitled "Are We Exporting Architecture Jobs?" in which it detailed the opportunities and challenges for American architects posed by a growing global, particularly near-eastern, architectural workforce versed in American software and standards, whether in the form of offshoring opportunities and market expansion, or increased competition and labor devaluation. In 2014, almost another decade after the Architectural Record article, and three decades after the World Bank CAD project, four near-simultaneous intersections of architecture, economics, and politics made international news: the construction of the 57 story "Mini-Sky-City" in China's Hunan Province in under 19 days, the potential housing market collapse in a growing number of Chinese "ghost cities," Chinese president Xi Jinping's call for an end to the construction of "weird buildings" in China, and controversial statements by Zaha Hadid shirking responsibility for the deaths of migrant workers, mainly of south and eastern Asian origin, on construction sites in Qatar.

What connects this set of occurrences is a decades long series of changes in the practice of architecture reciprocally spurred/enabled by the proliferation of standardized materials and construction practices, the development and deployment of information and communication technologies (ICTs), CAD softwares, and the globalization of media culture surrounding the Financial, Insurance, and Real Estate (FIRE) economic sectors. Largely unstaged by the buildings and controversies it has given rise to, the techno-governmental background which is the topic of this paper

has in fact shaped contemporary architectural practice, cultural imaginations of space, and the spaces of everyday life around the globe.

Narratives of Techno-Globalization

The logics of contemporary architectural production's globalization, an ongoing process since the end of World War II, have received a large degree of critical attention in comparison to the technological developments which have both shaped and been shaped by this process. The introduction of information and communication technologies (ICTs) such as Computer Aided Design (CAD) softwares, the proliferation of standardized materials and construction practices, and the globalization of media culture surrounding the Financial, Insurance, and Real Estate (FIRE) economic sectors, in particular, have had impacts beyond the channeling of capital flows.¹ These technological developments have marked, and continue to mark out shifting intersections of global and local forces, and have given rise to new cultural imaginations surrounding everyday spatial practices.² In doing so, these technological developments implicate architecture and the means of its production in the national policies and international divisions of labor associated with globalization, for which the history of technological developments and the globalization of architectural production in China offer paradigmatic examples.

Examining how technological developments and globalization have informed one another in the context of China provides insights into the interrelationships of space, capital, and technology in a manner that is attentive to the complex, and often contradictory logics of governmentality. Tracing these interrelationships challenges narratives of globalization based on distinctions between “developed” and “developing” countries, capital/technology transfer, and the application of western, capitalist motivational logics to the decisions of diverse actors. Instead, the co-production of technological developments and processes of globalization manifest in Chinese architectural production since the 1980s clearly connects otherwise distinct actions and events into a broader milieu, a kind of spatial imagination. This spatial imagination, as an onto-epistemological regime in which multiple narratives and agendas intersected, formed the conceptual infrastructure through which global and local actors understood their relationship to space and capital.³

The introduction of CAD softwares within the profession of architecture offers a lens for understanding the underpinnings of this spatial imagination by allowing the tracing of connections between local actions and distant built environments as well as its obverse.⁴ Since their conception, CAD softwares have been co-productively entangled with material definitions, construction practices, divisions of labor, and media culture. These entanglements with elements of globalization were/are the overlapping mediums through which governmental power was/is negotiated and exercised.⁵

Transferred Standards, Adopted Practices

While the operational goal of early CAD systems was the mechanization and standardization of drawing production, these technologies originated in the precision, repeatability, and efficiency of Computer Aided Manufacturing (CAM) designed to meet the complexity and scale of post-war industrial production.⁶ Further, as CAD systems became capable of representing large and complex forms, the realization of these forms necessitated precise and standardized materials and fabrication methods.⁷ Issues of materiality and fabrication which are at the forefront of contemporary proposals for the non-representational nexus of CAD/CAM, have therefore been and continue to be central to when, how, and to what ends CAD systems have been developed and adopted.

The introduction of CAD technologies to China in the early 1980s through a short-lived World Bank-funded program was in response to such issues.⁸ The goal of this program, which brought western computer technology and software experts to a number of Chinese universities, was the transformation of China's manufacturing and construction industries through technology transfer. The World Bank program represented a simultaneous attempt by its western funders to create a market for their construction products and exploit a newly available cheap labor pool for manufacturing such goods, as well as an attempt by the Chinese government to attract foreign investment and introduce contemporary technology-based production methods to its newly open economy. To that end, the program focused on building China's capacity for precise standardized mass production and its market for consuming mass produced standardized materials.⁹ (Figure 1)

The program aimed to achieve this market and capacity in a twofold manner. First, by introducing CAD softwares predicated on and encouraging the use of standard materials, spatial

dimensions, and construction practices, it reinforced attitudes towards materiality, construction practices, and imaginations of space associated with China's early socialist era mass production of housing. Second, it tautologically reoriented those attitudes, practices, and imaginations towards the consumption of standardized western products coded as modern and quality because they were representable in CAD softwares.¹⁰ Conversely, by fostering the development of Chinese language-native CAD softwares alongside other government-mandated technology transfers, the program supported the development of a manufacturing and specification base capable of designing and producing objects and buildings which met contemporary international standards. Such developments helped engender the imagination of these spatial standards as the norm.¹¹ However, for a variety of reasons, including the initial lack of both computer availability and Chinese language support in commercially available CAD softwares, as well as the control of construction documentation and administration by government-run design institutes, these transformations were slow to impact Chinese architectural practices.¹²

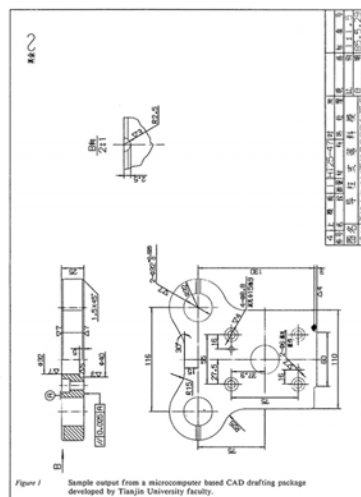


Figure 1. Sample Output from Microcomputer Based CAD Software
Package Developed by Tianjin University Faculty
(Richard Gallagher, "Developing Computer Aided Design Technology in
China," *SIGCHI Bulletin* 18, No. 2 (October 1987), 15.)
Reproduced with permission from Richard S. Gallagher

By the mid 1990s, foreign investment in China by financial, real estate, and other service firms, the development of Chinese "language packs" for softwares, and changes in Chinese law which allowed for subsidiaries of western architectural firms to practice more freely, enabled the realization of these CAD software-based transformations of China's construction industry.¹³

Standardized materials, documentation, and internationally recognized construction/management practices were all required to meet the International Organization for Standards (ISO) and International Building Code (IBC) specifications that foreign investors in China demanded. To meet these demands the central government undertook reforms in national construction and material standards laws, modeling them after those in Australia.¹⁴ In addition, China further encouraged the transfer of design knowledge, with a focus on best practices of CAD usage in architectural production, through a wide range of efforts:¹⁵ permitting the national membership body for Chinese architects, the Architectural Society of China, to join the Architects Regional Council of Asia in 1989;¹⁶ the encouragement of large western architectural practices to form joint ventures or partnerships which employed Chinese architects;¹⁷ the sponsorship of academic exchanges between Chinese and western schools of architecture;¹⁸ and ultimately, the hosting of the 1999 Computer Aided Architectural Design Research in Asia (CAADRIA) conference in Shanghai.¹⁹

Despite being hampered by regulatory complexity, oversight limitations, and resistance to large-scale change, the CAD software-enabled trend towards standardization in materials and construction practices continued with the adoption of Building Information Modeling (BIM) tools by China's national design institutes in 2003. The Chinese government also encouraged contractors to adopt these tools as a mean of ensuring the speedy, efficient, and accurate delivery of complex projects involving international parties/consultants concerned more with material procurement/management than labor.²⁰ By adopting and adapting BIM tools and their standard products and construction details to the Chinese context, contractors, design institutes and their foreign partners began the process of integrating design, documentation, and construction. This laid the groundwork of technology and skills for the delivery of formally adventurous signature buildings that would come to characterize Chinese real estate development. At the same time, the size of the architecture, engineering, and construction (AEC) industry as a proportion of China's economy grew to the point that the national government considered its regulation crucial enough to require the definition of National BIM policies in 2011 and 2016.²¹

Offshore but Close at Hand

Just as they were tied to transformed understandings of materiality and fabrication, CAD softwares also had implications on divisions of labor within the design aspect of architectural

production. Further, as with material and construction standards, the changing divisions of labor informed by CAD softwares in which China was entangled were sites of negotiation with and of processes of globalization. It is through such global spatializations of labor, knowledge, and skills leveraging of differences between local social, political, and economic regimes in pursuit of capital gains that governmental power was and is exercised. Accordingly, it is through the co-production of these spatializations with value-centered imaginations of space that processes of subjectivization and globalization were and are integrated.²²

Even before China's economic opening up in late 1978, or the World Bank-sponsored CAD project two years later, a combination of CAD, CAM, and other ICTs was already allowing architectural firms such as Skidmore Owings and Merrill (SOM) and HOK to take on large-scale projects far from their main offices.²³ As this pattern continued and these firms opened satellite offices, the administrative and technological groundwork was laid for them to globalize their operations and engage China's opening economy in the mid-1990s.²⁴ However, this engagement was not uniform. The divisions of labor it gave rise to were heavily influenced by differing approaches to global practice, ways of negotiating Chinese markets and regulations, and applications of technology. Some firms like Welton Becket and Associates, headed by MacDonald Becket, took a paternalistic and almost neo-colonialist approach to early projects in the 1980s that required technology and knowledge transfer. To avoid this requirement, Becket's approach segregated the design of projects within the United States while relaying drafted information and specifications to representatives overseeing construction in major eastern Chinese cities.²⁵

Other firms, such as SOM, viewed China primarily as a strategic, high growth-potential market in which to expand their business.²⁶ With the aid of ICTs, company-wide CAD software standards, a change in emphasis on the part of the Chinese government from technology transfer to capital investment, and a corporate management style, SOM was able to open offices in mainland China. This allowed them to distribute both design and construction administration work in a manner that leveraged employee's local knowledge, skills, and partners for increased return on investment.²⁷ (Figure 2)

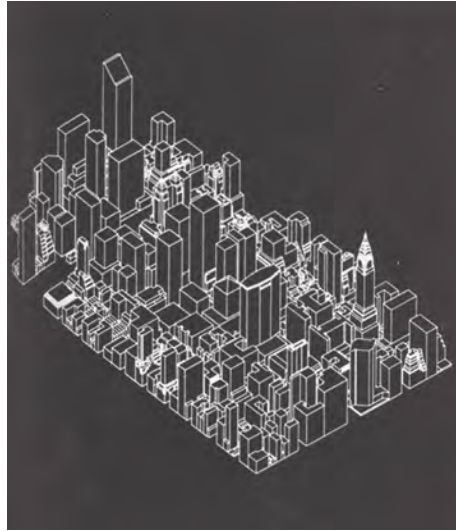


Figure 2. Skidmore, Owings & Merrill (SOM), Midtown Manhattan Digital Model, 1984 (Progressive Architecture, May 1984, p. 145)
Reproduced with permission from Wright's Media

Taking this practice further, the engineering firm Arup used the offices it opened in China as a foothold to expand its global reach. Arup did so by taking advantage of internet connectivity and standardized CAD file-types to transform its global network of offices into a system of twenty-four hour production.²⁸ Under Arup's model, while engineers in their London headquarters slept, their Chinese counterparts continued work on structural calculations, wind models, etc., and vice versa, with the CAD-based information transferring back and forth.²⁹ What Arup's organization amounted to was an imagining of the space of the globe in terms of temporally distributed labor values in a way that increased the speed of project delivery. The ICT-enabled global division of labor pioneered by Arup's office network model eventually became popular with smaller firms which saw an opportunity to increase their productivity at minimal cost.³⁰ For these firms, the growing rate of CAD literacy and awareness of western architecture amongst Chinese architectural workers combined with the comparatively low cost of Chinese labor to make overnight outsourcing of CAD-based documentation work to China a profitable, if sometimes fraught, business decision.³¹

Just as this globalization of architectural production through the western outsourcing of architectural labor overseas followed the outsourcing of other service professions and manufacturing, so too did the questioning and critique of outsourcing architectural production follow the terms by which globalization was being critiqued in the west. By 2005, this practice of

[illegible]

We can understand statements like Zaha Hadid's 2014 denial of responsibility for the deaths of migrant workers constructing projects in Qatar in light of this altered and ICT-driven spatial imagination.³⁵ By spatializing architectural production in terms of market shares, labor pools, and the space-time distribution of work, these imaginations and their associated practices came over time to be reified in a system of techno-epistemic risk isolation/circulation. Through this system foreign and national capital, an international "starchitect," and low-income migrant laborers, mainly from India, southeast Asia, and China, were all brought together and obscured in the realization of a massive, complex, and iconic architectural project.³⁶ Like the Chinese worker to whom CAD drawings were outsourced, the migrant laborer performs as a tool within both architectural production and processes of globalization by their ability to almost invisibly transform information into material capital and absorb systemic risk. Thus, as the division of labor within architectural production becomes imbricated with the control of access to knowledge and agency within the scope of an architectural project, it shapes and is shaped by the globalization of social, economic, and political power regimes. In fact, it was this governmental power, enacted by the technological and legal invisibility of financier, architect, and worker to one another, that was made apparent by Hadid's statement regarding workers' well-being. While her claim that "it's not my duty as an architect... I have no power to do anything about it" was surely callous, what is more disheartening is that it was technically and effectively correct.³⁷

"Weird" Space Circulation

Contrasted with the invisibility of migrant construction workers and Chinese CAD draftspersons, the projects on which they are employed are often spectacularly visible in global finance and media. The 2008 Beijing Olympic Stadium by Herzog and De Mueron, like Hadid's Al-Wakrah Stadium in Qatar, represents the intersection of ICT/CAD-enabled international divisions of labor within architectural production with global media spectacle. In such spectacles, symbolic national identity, the investment of foreign capital, and their financialization are brought together in the form of an iconic, singular piece of architecture.³⁸ (Figure 4) Collapsing image and value into a spatial imagination in which buildings are understood as a kind of investment, such pieces of architecture become both literal financial capital, and images of social, political, and economic power. This image-power, as it is manifest in buildings, becomes an investment in attracting

further financial capital, particularly from the Finance, Insurance, and Real Estate (FIRE) industries for whom this collapse of image and value is a fundamental premise.³⁹



Figure 4. Intr-national Tourists Taking Photographs in Front of the 2008 Beijing Olympic Stadium, Beijing, China March 9, 2014
Photograph by Author

Much like the development and adoption of CAD tools, the standardization of materials and construction practices, and the training of a CAD-literate workforce, the production of a spatialized image of modernity through architecture was ingrained in the official policies of China's central and municipal governments following the inauguration of the Reform and Opening Up program in 1979.⁴⁰ Throughout the 1980s these governments funded a glut of symbolic cultural architecture, including concert halls, train stations, and stadiums in major Chinese cities at least in part for the purposes of attracting foreign attention and investment. In addition, they encouraged the adoption of styling and details from the western architecture firms such as Welton Becket & Associates, I.M. Pei and Partners, and John Portman & Associates who were engaged to undertake signature architecture projects in Beijing and Shanghai.⁴¹ The goal of these projects was the projection of an image of a rapidly modernizing China capable of offering the spatial qualities demanded by the western FIRE corporations whose investment the Chinese government was eager to attract.⁴² As more western firms entered the Chinese market and the Chinese government undertook further economic and land policy reform in the mid 1990s, the engagement of foreign architects in formally adventurous projects became seen as a way to attract investor attention to a specific area of a city.⁴³ In addition, such projects, typified by the 1999 completion of the SOM-designed Jin Mao Tower in Shanghai, ensured return on

developer investment and constructed a municipal brand identity which government officials could tout as they marketed their city for future investment or tourism.⁴⁴ (Figure 5)



Figure 4. Jin Mao Tower, overtaken by its even more spectacular neighbors, Pudong, Shanghai, China, March 3, 2014
Photograph by Author

Crucial to the success of such projects as investment tools was the circulation of their images, but not the CAD-enabled divisions of labor and material practices by which they were realized, in global media ranging from trade journals such as *Architectural Record* to more popular outlets such as CNN and *Time Magazine*.⁴⁵ Connoted in *Time*'s choice to term the new Chinese architecture a "dreamscape" on its May 3, 2004 cover, many western firms came to see efforts by Chinese municipalities and developers to gain investor awareness through architecture as an opportunity for a similar form of double investment. Firms which took work in China believed they could both expand into a new regional market, as well as solicit future commissions by leveraging the circulation of their iconic, virtuosic, and formally/programmatically experimental designs in highly publicized images.⁴⁶ More recently, at the 2017 New Cities Summit, held in Songdo, South Korea, Elie Gamburg of Kohn Pedersen Fox Associates (KPF) reiterated this approach. Citing how KPF's recent projects and office practices in China and Korea has influenced their work in American cities, Gamburg described Asian cities as an architectural "testing or proving ground...that other places around the world can then follow."⁴⁷

The game of formal and economic one-upmanship being played by Chinese cities seeking foreign investments and the western firms seeking notoriety was shaped and shaped by CAD software's impact on project representation and material realization: Photorealistic renderings of

proposed projects made from CAD files became commonplace in the mid 2000s as marketing tools for soliciting global investors and distinguishing municipal or firm identity in state and foreign media campaigns. At the same time, manufacturing processes capable of translating CAD-based digital representations of form into customized but industrially producible and globally available material components were developed.⁴⁸

However, despite these technological advances, the media and financial spectacle of exuberant architecture reached a social, political, and economic limit in October 2014 when Chinese president Xi Jinping called for an end to the construction of “weird architecture,” citing recent scandals over safety, corruption, cost, and a perceived abandonment of traditional Chinese cultural heritage as justification.⁴⁹ Additionally, the central government had been rocked earlier in the year by international news reports of “ghost cities” like Ordos in Inner Mongolia, with flashy foreign-designed but unoccupied architecture that called its urbanization policy into question. Xi responded by reiterating the long-term nature of Chinese planning policy and by undercutting the spatial imagination equating spectacularity with value that had fueled much of the short-term speculation at the center of the news reports.⁵⁰ Implicit in Xi’s pronouncement and its intention to reassert the central government’s control of development/planning was a shift in the image and technical economy as well as in the kind of investment the Chinese government was seeking to attract.

The call to end the construction of weird buildings, as it became instantiated in planning regulations, was ultimately less directed at limiting the building forms that CAD technologies made realizable, and more about embracing concepts of project oversight, coordination, and sustainability as equally valuable symbols of technological development and global awareness.⁵¹ Not coincidentally, these same concepts were simultaneously being promoted by government design institutes alongside their adoption of BIM softwares. Further, Xi’s inclusion of an appeal to traditional Chinese culture can be seen as situating the desire for less “weird” buildings within a broader governmental policy seeking to restructure China’s economy. This policy aimed to give China’s economy a more infra-national focus by integrating the expansion of China’s consumer and professional classes to with an assertion of a strong national identity.⁵² By encouraging the creation of Chinese architecture for the Chinese people by Chinese architects with its subtextual connotation of “weird” as “foreign,” Xi’s statement proclaimed that Chinese architects had achieved, and in fact surpassed, the technological proficiency that was

the goal of the original 1980 World Bank CAD project. The country was now ready and able to define its own technological and architectural future.

Leveraging Contingency

The history of the introduction and adoption of CAD softwares in China offers a concrete example of how such tools have come to mediate architectural practices, cultural imaginations of space, and the spaces of everyday life. It also shows how this mediation shaped and was shaped by governmental policies, professional structures, and financial arrangements that encouraged the globalization of each. By coordinating material specifications, construction practices, and documentation into an international industry integrated by information, CAD softwares connected the economic agenda and national image aspirations of the Chinese government with the imagination of space in terms of quantified standards, supply chains logistics, and total information networks. By connecting the labor of individuals, the organization of firms, and the built environment into a network of communication through which information/documentation could flow, the introduction of CAD softwares intersected with the interests of corporations and the Chinese government as they sought to leverage the increasingly global market for labor and investment that such networks were making possible. By supporting the mediation and financialization of space through the production of spectacular images and spaces they enabled, CAD softwares brought together collective aspirations for the space of everyday life with the understanding of space in terms of literal and symbolic investment. Through an embrace of the images of technical proficiency whose circulation such investments are predicated upon, Chinese national identity became fundamentally interlinked with the globalization of the real-estate market.

What the interconnection of technological development and processes of globalization in each of these areas illustrates is the socially, economically, and politically contingent nature of technological development and processes of globalization. Neither is a necessarily determinate force in the history of architectural production, nor can they be fully understood outside of the material and cultural contexts in which specific aspects of them are manifest. Further, neither can be reduced to the simplistic meta-narratives of developed/developing, east/west, or national/international. Acknowledging the locally contextual social, political, and economic contingency of technological development and processes of globalization implicitly acknowledges agency on the part of those involved in technological development and

processes of globalization to shape them through their everyday practices and the ways they imagine space. Such an acknowledgment allows for these actors to be held accountable for past, present, and future actions, while suggesting that the current state of globalized architectural practice, imaginations of space, and the spaces of contemporary everyday life are not fait accompli. What the myriad forces shaping and shaped by the historical development and adoption of CAD in China show is that different divisions of labor, different understandings of material, different architectural practices, and different ways of imagining space are possible, and that a non-determinist engagement with the history of CAD's role in globalization is an important first step in opening such possibilities.

Endnotes

1. Masaaki Kotabe, *Global Sourcing Strategy: R&D, Manufacturing and Marketing Interfaces* (New York: Quorum, 1992), 6-8; Manuel Castells, *The Information Age: Economy, Society, and Culture, Vol. 1: The Rise of the Network Society*, (Cambridge, MA: Blackwell, 2000), 13, 125.
2. Arjun Appadurai, *Modernity at Large* (Minneapolis: University of Minnesota Press, 1996), 31. Imagination, as Arjun Appadurai has described it, is an "organized field of social practices, a form of work (in the sense of both labor and culturally organized practice), and a form of negotiation between sites of agency (individuals) and globally defined fields of possibility."
3. Greig Crysler, "The Architectures of Globalization: Places, Practices and Pedagogies," *Traditional Dwellings and Settlements Review* 12, No. 1 (Fall 2000), 71.
4. Donald McNeill, *The Global Architect: Firms, Fame and Urban Form* (New York: Routledge, 2000), 5, 51-54.
5. Thomas Maver, "Social Impacts of Computer-Aided Architectural Design," *Design Studies* 7, No. 4 (October 1986), 181, 183.
6. Daniel Cardoso Llach, *Builders of the Vision: Software and the Imagination of Design* (New York: Routledge, 2015), 29-38.
7. Alexander Koutamanis, Gilles Halin, and Thomas Kvan, "Information Standardization from a Design Perspective," *Proceedings of the 12th International Conference on Computer Aided Architectural Design Research in Asia*, Nanjing, April 19-21, 2007, 476-477. Mario Carpo, *The Second Digital Turn* (Cambridge, MA: MIT Press, 2017), 8.
8. Richard Gallagher, "Developing Computer Aided Design Technology in China," *SIGCHI Bulletin* 18, No. 2 (October 1987), 11.
9. Gallagher, "Developing Computer Aided Design Technology," 9; Richard Li-Hua, *Technology and Knowledge Transfer in China* (Burlington VT: Ashgate, 2004), 24-25.
10. Gallagher, "Developing Computer Aided Design Technology," 10.

11. Li-Hua, *Technology and Knowledge Transfer in China*, 42-45; Xufei Ren, *Building Globalization: Transnational Architectural Production in Urban China* (Chicago: University of Chicago Press, 2011), 46-50.
12. Gu Jingwen, "Natural Results from Advances in Computer Techniques: CAAD Teaching in China Yesterday, Today and Tomorrow," in *Proceedings of the First Conference on Computer-Aided Architectural Design Research in Asia*, CAADRIA, Hong Kong: The University of Hong Kong, 1996, 21-26; Doug Guthrie, "Information Technology and State Capacity in China," in Robert Latham and Saskia Sassen (eds.), *Digital Formations* (Princeton NJ: Princeton University Press, 2009), 312-313; Xiaojun Cui, "In-Depth Analysis of PC Industry in China," *International Journal of Business and Management* 4, No. 11 (November 2009), 150-151; Jiefang Yu, "Study on Influence of Computer Technology on Teaching of Art and Design Course," in *Proceedings of the International Conference on Arts, Design, and Contemporary Education*, Moscow, April 22-24 2015, 554.
13. Ren, *Building Globalization*, 14, 51-54.
14. Yimin Zhu and Yaowu Wang, "The Organization of Information Standards in the Chinese Construction Industry," *ITcon* 12 (2007), 207-208; Michael Ting, "Building on Shaky Ground: Quality and Safety in China's Construction Industry in the Wake of the Wenchuan and Yushu Earthquakes," *Australian Journal of Construction Economics and Building* 10, No. 3 (2010), 63-65.
15. Zheng Tuobin, "Retrospect and Prospect of Technology Import in China," in Policy Research and Technology Import & Export Departments of the Chinese Ministry of Foreign Economic Relations & Trade (ed.), *Technology Transfer to China: A Comprehensive Guide* (Hong Kong: Economic Information and Agency, 1986), 4-6.
16. "About Us," Architectural Society of China, accessed January 12, 2018, <http://www.chinaasc.org/news/16.html>.
17. Russell Keune, "Architectural Services in Global Trade in Professional Services," in *Proceedings of the Sixth Service Experts Meeting: Domestic regulation and Trade in Professional Services*, Paris, February 25-26, 2007, 5-7; Ren, *Building Globalization*, 54, 56-58.
18. Ren, *Building Globalization*, 55. McNeill, *The Global Architect*, 11-12.
19. Jingwen Gu and Zhaoji Wei, ed., *Proceedings of the Fourth Conference on Computer-Aided Architectural Design Research in Asia*, CAADRIA, Shanghai, China: Tongji University, 1999.
20. Ruwini Edirisinghe and Kerry London, "Comparative Analysis of International and National Level BIM Standardization Efforts and BIM Adoption," in *Proceedings of the 32nd CIB W78 Conference*, Eindhoven, October 27-29, 2015, 150; Paul Doherty, "BIM Around the World Series: Paul Doherty on BIM in China," BIM Ireland, last modified May 16, 2017, <http://www.bimireland.ie/2017/05/16/bim-around-the-world-series-paul-doherty-on-bim-in-china/>.
21. Bingsheng Liu, Min Wang, Yutao Zhang, Rui Liu, and Anmin Wang, "Review and Prospect of BIM Policy in China," *IOP Conference Series: Materials Science and Engineering* 245, (2017) 2-3; Jiang Bo, Rana Raheel Afzal Khan, Ahmed Vian, and Cheng Zhijun, "BIM Implementation in China: A Case Study Approach," in *Proceedings of the 4th International Conference on Information Technology and Management Innovation*, Shenzhen, September 12-13, 2015, 1106-1108.
22. Robert Adam, "Globalization and Architecture," *The Architectural Review* 223, (2008), 5; Leslie Sklair, "Iconic Architecture and Capitalist Globalization," *City* 10, No. 1 (April, 2006), 33-34.

23. M. Gross, E. Do, R. McCall, W. Citrin, P. Hamill, A. Warmack, and K. Kuczun, "Collaboration and Coordination in Architectural Design: Approaches to Computer Mediated Work," in *Proceedings of the TeamCAD Symposium on Collaborative CAD*, Georgia Tech University, Atlanta Georgia, May 12-13, 1997, 17-18; Paul Knox and Peter Taylor, "Toward a Geography of the Globalization of Architecture Office Networks," *Journal of Architectural Education* 58, No. 3, (2005), 23-25; McNeill, *The Global Architect*, 9-10.
24. Reinhold Martin, "Points of Departure: Notes Toward a Reversible History of Architectural Visualization," in Sabine Ammon and Remei Capdevila-Werning (eds.), *The Active Image: Architecture and Engineering in the Age of Modeling* (New York: Springer, 2017), 13; Kirsten Walker, "Architectures of Globalization," *Places* 14, No. 2, (2001), 7-8; Knox and Taylor, "Toward a Geography of the Globalization of Architecture Office Networks," 29-30.
25. James Hagerty, "MacDonald Becket Pioneered Foreign Investment in China With Great Wall Hotel," *The Wall Street Journal*, December 29, 2017, <https://www.wsj.com/articles/macdonald-becket-pioneered-foreign-investment-in-china-with-great-wall-hot-el-1514556000>.
26. Jeffrey W. Cody, *Exporting American Architecture, 1870-2000* (New York: Routledge, 2003), 162-165; McNeill, *The Global Architect*, 11, 22-27.
27. Michael Phiri, *Information Technology in Construction Design* (London: Thomas Telford Publishing, 1999), 196-197; McNeill, *The Global Architect*, 10-11; Ren, *Building Globalization*, 57.
28. Arindum Dutta, "Marginality and Metaengineering: Keynes and Arup," in Aggregate (Group) (ed.), *Governing By Design: Architecture, Economy, and Politics in the Twentieth Century*, (Pittsburgh, PA: University of Pittsburgh Press, 2012), 239; Knox and Taylor, "Toward a Geography of the Globalization of Architecture Office Networks," 25-26.
29. Jennifer Whyte, Sunila Lobo, Mark Neller, and Sarah Bowden, "Digital Infrastructure and Changing Practices in Engineering Design." *Arup Research Review*, (2010), 50-53.
30. Robert Ivy, "From the Field: Chinese Business Blitz," *Architectural Record* 2003, 114-119; Tom Larsen, "Practice Matters: Doing Business in China: A Primer for the Daring, Shrewd, and Determined," *Architectural Record*, March 2004, 1-2; Ren, *Building Globalization*, 55-57.
31. Larsen, "Practice Matters: Doing Business in China," 1; Phillip Bernstein, "The Increasing Footprint of Architecture in the Digital Age," *Perspecta* 40, (2008), 180-181.
32. Nancy Solomon and Charles Linn, "Are We Exporting Architecture Jobs," *Architectural Record*, January 2005, 3-7.
33. Solomon and Linn, "Are We Exporting Architecture Jobs," 5.
34. Wendy Hui Kyong Chun, "On Software, or the Persistence of Visual Knowledge," *Grey Room* 39, no. 18 (Winter, 2005): 47, <https://doi.org/10.1162/1526381043320741>; Alexander Galloway, *The Interface Effect* (Malden, MA: Polity Press, 2012), 66-68; Frank Chi-Hsien Sun and Tsou Jin-Yue, "Interfacing A New Culture: Pedagogical Realities of Architecture in Cyberspace," *Traditional Dwellings and Settlements Review* 8, No. 1, (Fall 1996), 52.
35. James Riach, "Zaha Hadid Defends Qatar World Cup Role Following Migrant Worker Deaths," *The Guardian*, February 25, 2014, <https://www.theguardian.com/world/2014/feb/25/zaha-hadid-qatar-world-cup-migrant-worker-deaths>.

36. Francoise De Bel-Air, Gulf Labor Markets and Migration: *Demography, Migration, and Labour Market in Qatar*, Florence: European University Institute: Migration Policy Center, 2014, 4, accessed January 11, 2018, http://cadmus.eui.eu/bitstream/handle/1814/32431/GLMM_ExpNote_08-2014.pdf?sequence=1
37. Riach, "Zaha Hadid Defends Qatar World Cup Role Following Migrant Worker Deaths."
38. Sklair, "Iconic Architecture and Capitalist Globalization," 38-30; Ren, *Building Globalization*, 1-10.
39. Reinhold Martin, "Financial Imaginaries - Toward a Philosophy of the City," *Pavilion*, January 13, 2015, accessed December 10, 2017, <http://pavilionmagazine.org/reinhold-martin-financial-imaginaries-toward-a-philosophy-of-the-city/>.
40. Ren, *Building Globalization*, 46-50; Shen Tie-Gang, "Today's CAAD in China," in *Proceedings of The First Conference on Computer Aided Architectural Design Research in Asia*, CAADRIA, Hong Kong, April 25-27, 1996, 249-252; MacDonald Becket, *Leadership in Architecture: My Passion in Life* (Bloomington IN: Author House, 2014), 181-203.
41. Ren, *Building Globalization*, 46-50; Hagerty, "MacDonald Becket Pioneered Foreign Investment in China With Great Wall Hotel."
42. Joe Studwell, *The China Dream: The Elusive Quest for the Greatest Untapped Market on Earth* (London: Profile, 2003), 199-201; Guthrie, "Information Technology and State Capacity," 315-316; Ren, *Building Globalization*, 50-51.
43. Zhengji Fu, "The State, Capital, and Urban Restructuring in Post-Reform Shanghai," in John Logan (ed.), *The New Chinese City: Globalization and Market Reform* (Oxford: Blackwell, 2002), 106-120; Anne-Marie Broudehoux, *The Making and Selling of Post-Mao Beijing* (New York: Routledge, 2004), 25-28; Li-Hua, *Technology and Knowledge Transfer*, 44-46; McNeill, *The Global Architect*, 10-12, 138-141; Ren, *Building Globalization*, 58-61.
44. Neil Brenner, *New State Spaces: Urban Governance and the Rescaling of Statehood* (New York: Oxford University Press, 2004), 173-175; Ren, *Building Globalization*, 58-61; Alan Lew, "The History, Policies, and Social Impact of International Tourism in the People's Republic of China," *Asian Profile* 15, No. 2 (1987), 120; McNeill, *The Global Architect*, 128-130; Saskia Sassen, "The Global City: Introducing a Concept," *Brown Journal of World Affairs* 11, No. 2, (Winter/Spring 2005), 39.
45. Annie Lee, "China's New Dreamscape," in *Time Magazine*, May 3, 2004, front cover; Neville Mars and Adrian Hornsby, *The Chinese Dream: A Society Under Construction* (Rotterdam: 010 Publishers, 2008), 24-26.
46. McNeill, *The Global Architect*, 128-130; Ren, *Building Globalization*, 50-55.
47. Wim Elfrink, Tom Murcott, Ashok Raiji, Elie Gamburg, and Greg Lindsay "The Story of Songdo," *New Cities Summit*, New Cities, Incheon Songdo, July 7-9, 2017, last modified July 18, 2017, <https://www.youtube.com/watch?v=2tAtiJlo384>.
48. Mars and Hornsby, *The Chinese Dream*, 25; Larsen, "Doing Business in China," 2; Steven McKay, "China: One Big Rendering After Another," *Insights*, DLR Group, last modified September 10, 2014, <http://www.dlrgroup.com/insights/articles/mckay-china-renderings-construction/>.
49. Cao Li, "Under Xi, China's Wave of 'Weird Architecture' May Have Peaked," *The New York Times*, December 19, 2014,

<https://sinosphere.blogs.nytimes.com/2014/12/19/under-xi-chinas-wave-of-weird-architecture-may-have-peaked/>.

50. Li, "Under Xi, China's Wave of 'Weird Architecture' May Have Peaked;" Guthrie, "Information Technology and State Capacity," 328-329.

51. Edirisinghe and London, "Comparative Analysis of International and National Level BIM Standardization Efforts and BIM Adoption," 150; Doherty, "BIM Around the World Series"

52. Li, "Under Xi, China's Wave of 'Weird Architecture' May Have Peaked."

R.G.S. Beatson: from student work to Auckland houses

Brenda Vale

Victoria University of Wellington

Robin Skinner

Victoria University of Wellington

Abstract

Prefabrication is again being discussed as a possible answer to the current shortage of affordable houses in New Zealand. This paper looks in detail at another occasion just after WWII when prefabrication of houses was seen as a way of providing houses at less cost, by focusing on the work in this field of Ronald Guthrie Senior Beatson (1903-1996).

*The paper begins with a brief background to the life and work of R.G.S. Beatson and the practice of which he was a founding member in 1940, Massey, Beatson, Rix-Trott, and Carter. It then looks at Beatson's 1939 thesis on prefabrication showing how it drew exclusively on USA sources. The paper then discusses the two prefabricated houses Beatson built for his family and the articles on prefabrication in *Home and Building* during the 10 years he was joint editor.*

This paper is a fragment of a larger project on R.G.S. Beatson and the practice and work of Massey, Beatson, Rix-Trott, and Carter.

Introduction

"My father was an architect. He was also a woodwork teacher, but that was before I knew him."¹

Most of us are satisfied with one career as an architect, but Ronald Guthrie Senior Beatson had several. Not only was he a partner in one of Auckland's leading architectural practices from the 1940s to the 1970s, he was a skilled photographer, made furniture and musical instruments of wood, and was a keen gardener. He was active in the affairs of the New Zealand Institute of Architects and alongside Charles Irwin Crookes he edited *Building Today* (later

Home and Building) from 1937 until 1946. After initially training as a teacher, in the 1930s he studied architecture in Auckland, producing his 1939 BArch Thesis on prefabrication. This would be a life-long interest. This paper on his explorations in prefabrication is a first step in an on-going larger project with the aim of recognising this important figure in New Zealand architecture.

Beatson was a man always ready and willing to tackle the job in hand, whether designing buildings, making toys for his four children, or taking photographs for the journal. Our paper draws on Beatson's thesis, family memories, and articles on the prefabricated buildings designed by Beatson. His fascination with making things in wood and deep knowledge of working with timber contributed to his system for the design and construction of prefabricated houses. Beatson argued that prefabrication in timber was the way "...to produce single family units at a price within the range capacity of the occupants,"¹ a sentiment that is still being repeated today.²

The grandson of London-trained, early New Zealand architect William Beatson (1807–1870),³ R.G.S. Beatson studied wood-carving at the Nelson Technical School, where in 1926 he gained a City and Guilds pass in Grade 1 Carpentry and Joinery and a second class pass in Grade 1 Cabinetmaking.⁴ He started his working life as a woodwork teacher from 1921-23 at the Nelson Technical School and then at Takapuna Grammar School in Auckland before gaining entrance to Auckland University College to study architecture in 1930.⁵ Completing most of his coursework by 1935, the following year he was advertising tenders for his own design as well as contributing to projects by one of the city's leading architects, Horace Lovell Massey (1895-1978); notably drawing, and probably designing, the fitted interiors of the moderne 1936 Cintra House in Auckland, for which Massey won a Gold Medal the following year.⁶

In 1940 Massey and Beatson went into partnership with Beatson's former fellow-students Alwyn Rix-Trott (1906-1994) and George Neild Carter (1909-1999) to form the practice of Massey, Beatson, Rix-Trott, Carter and Co.⁷ That year they were already described in an Auckland Council document as "prominent Auckland

Architects.”⁸ Designing educational, commercial, industrial and domestic projects they developed a national reputation for excellence. Their Norwich Union Insurance Society building (1963) in Queen St was the country’s tallest reinforced concrete building at the time of its construction. They designed educational buildings for Otago, Massey and Auckland universities including Auckland’s university library, the upper and lower lecture theatre building (demolished 2008), its biology building and its Fine Arts School. However, it was their domestic work that shone. In the first 5 years of the 1950s they won 3 of the 6 Bronze medals awarded by the New Zealand Institute of Architects for domestic architecture (the Beatson family possesses one of these medals). In addition other houses by Massey and Rix-Trott had won the award in earlier years. It was a formidable practice.

Despite this success, the practice has attracted only a little attention in subsequent years. Nikolaus Pevsner illustrated none of their projects in his 1959 article in the *Architectural Review* on architecture in New Zealand and the Architectural Centre book project does not appear to have included any of their work.⁹ People were nevertheless made aware of their achievements. In his 1962 account of New Zealand suburban house, Peter Middleton mentioned Beatson’s 1939 thesis study on prefabrication, inferring it as having something of a trailblazing status.¹⁰ In a 1982 lecture to the Architectural Association of Auckland, Imi Porsolt stated that Geoff Rix-Trott’s house in Remuera should never be omitted when listing the pioneer works of modern architecture in New Zealand.¹¹ Despite such acknowledgement, the publication that accompanied the 1992 ‘50s Show’ at the Auckland Art Gallery listed almost 100 biographies of architects, designers and craftspeople, yet failed to include Massey, Beatson, Rix-Trott or Carter.¹² In his 1990 history of New Zealand architecture Peter Shaw discussed a 1950 *Home and Building* article on the firm’s Flynn house, but only because the writer was prompted to ask if a Pacific style could be developing, rather than identifying any merit in the design itself.¹³ Shaw wryly noted, “On the evidence of the design, its architects were hardly familiar with the work of Californian architects.”¹⁴ Douglas Lloyd Jenkins similarly drew attention to the 1950 writer’s speculation towards an emerging Pacific style, but

dismissed the flat-roofed home as a “solid, even conservative...a 1940s house,” adding “By the time this house was published the thinking this house represented had already been superseded by houses that were more progressively open and casual.”¹⁵

Walker and Clark made greater mention of Massey, Beatson, Rix-Trott and Carter in their 2004 text *Looking for the Local*. They noted that the Architectural Centre book project did not include the practice, mentioned Porsolt’s respect for the Rix-Trott house and footnoted Middleton’s acknowledgment of the Beatson thesis on prefabrication along with a reference to the Beatson prefabricated bach at Lake Rotoma.¹⁶ While clearly interested in the work of the practice and its members, this fell outside the scope of their book, and so the practice remained largely undiscussed. In response to the limited attention given to the practice over the past decades, our present paper on Beatson’s investigation and practice of prefabrication seeks to draw attention to the work of both Beatson and the practice.

Prefabrication

“All steel framed windows [were] designed by Dad to fit within the prefabrication grid that he devised.”¹⁷

Beatson qualified as an architect at the University of Auckland as a mature student. His 1939 BArch Thesis, entitled *Unit Design for Mass Production of Houses*, dealt with prefabrication as a means “...to produce single family dwellings cheaply.”¹⁸ This thesis was singled out in the annual *New Zealand Herald* article on the Auckland School exhibition as being of “...unusual and special interest.”¹⁹

In the thesis, having dealt with the post-WWII need for housing in New Zealand, Beatson opens his discussion of standardisation with a quote from *The Auckland Herald* April 14th 1939 (his underlining):

Considering that most dwellings in New Zealand are of wood and have a definitely limited life [referring of course to replacement] the country has a long task before it in providing homes for its people unless pre-fabrication and other methods of producing houses in mass become established here and supersede traditional methods of building.²⁰

New Zealand followed the UK in discussing prefabrication as a way of supplying the much needed houses after WWII at a time when materials were already in short supply.²¹ Prefabrication had also been espoused by modernists, such as Gropius who had built experimental houses for mass production in 1932 in Germany²², and after he had moved to the USA.²³ It had earlier found favour when it came to housing a mobile workforce, or supplying houses for workers, as evidenced by the TVA programme in the USA²⁴, and at a smaller scale the pre-fabricated (strictly pre-cut) railways workers houses made at Frankton and distributed by rail throughout the North island of New Zealand,²⁵ and the later sectional houses for timber workers.²⁶ Within this context a thesis on prefabrication of houses seems timely.

In his thesis Beatson reviewed a number of prefabricated systems, drawing heavily on the three volume study of housing, including what the authors Alfred Bemis and John Burchard called 'Rational Design'.²⁷ This suggests that Beatson's research into prefabrication drew on USA rather than UK published resources. This is confirmed by examining the 21 out of a possible 98 systems Beatson selected for his summary of prefabricated systems for houses. These had originally been described and illustrated in what is called 'The Supplement' to volume three of "Rational Design". Beatson included two further systems that were not part of the supplement. The first was referred to as Fort Wayne and described as a unit house of prefabricated panels. This is in fact housing designed by the Federal Housing Administration (FDA) described in a 1939 article in *Architectural Record*. The FDA "...had just completed fifty plywood houses at Fort Wayne, Indiana. Erection of each unit took only 1 hour and 40 minutes." The factory made houses used prefabricated structural, insulated and plywood faced panels, bolted at the corners to steel ties threaded through them.²⁸ The second was Le Tourneau and refers to the 1937 all steel welded five room houses that

were completed in the shop and then trucked to site by R.G. Le Tourneau's firm,²⁹ although Beatson's interest in this house was because "...it could be transported to site by floating on waterway [sic]."³⁰ This comment refers to six Le Tourneau houses that involved "...floating the completed houses across the Illinois River on their own bottoms."³¹ The inclusion of these two systems both described in USA architectural journals makes clear students at that time were looking to the USA for leading ideas in architecture. This is further supported by the fact Beatson made no reference to a 1936 *RIBA Journal* article on timber building that included the USA timber unit house that could be purchased complete "...even to the food in the larder and the blankets on the bed," and the prefabricated sectional house of timber, which "...has been fully worked out in Sweden."³²

A discussion of the thesis examples is as much interesting in what Beatson left out as what he included. 'The Supplement', which was written by John Burchard, includes the 98 illustrated systems and a further list of another 129 systems, known as the 'Mention List'. The illustrated systems can be broadly broken down into 50% concrete, 38% steel, 10% wood and 1% plastic.³³ Additionally, 73% came for the USA, 17% from the UK, 4% from Sweden (all timber) and 5% others, the latter being three from Germany including that of Gropius, one from Austria and Le Corbusier's system from France of steel frame with straw filled and externally zinc faced wall panels. This was included by Burchard "...because most of the labour can be performed at the factory," with the majority of the elements dry assembled on site.³⁴ Apart from five from the UK and nine from other parts of the world all other systems in the 'Mention List' are from the USA. Beatson only draws his examples from Burchard's main illustrated group. His first three are also the first three in this main group (Aluminaire, American Motohomes,³⁵ and Armco) and then Beatson becomes more selective. He does, however, deal with the next but one entry on Grosvenor Atterbury. This system was based on precast hollow concrete walls and is discussed in more depth than the first three examples, although Beatson made no mention of the fact Atterbury was a pioneer of prefabrication in the USA, and his early interest in prefabricated concrete could well be the reason behind half of Burchard's illustrated systems being in some form of this material.³⁶ In 1902 Atterbury started his investigation into improving construction systems, had travelled abroad, and knew of City Engineer John

Brodie's 1904 three storey flats at Eldon Grove, Liverpool,³⁷ made from prefabricated concrete slabs.³⁸ Atterbury devised a system of lightweight, prefabricated hollow concrete slabs, which in 1918 he used for groups of cottages at Forest Hills Gardens.³⁹

Apart from Buckminster Fuller's Dymaxion House, which Beatson leaves to the end of his examples, the other 20 are presented in the order in which they appear in the supplement.⁴⁰ Of more interest are the examples he chooses to mention at length, including the Dymaxion House. Others are the Forest Products stressed skin plywood bungalow, which was later documented in the UK,⁴¹ and the Neutra Diatom, where the walls are suspended from a number of masts with floor and wall panels precast from steam and pressure treated diatomaceous earth.⁴² Beatson did not comment on the fact the design of Neutra house allowed for sequential purchase of units. The main unit housed small family group of parents and one small child, with later purchases of the separate children's three bedroom unit and a two car garage.

The other named architect in Beatson's selection is John Lloyd Wright, though the entry for his father F. L. Wright does not appear. John Lloyd Wright's system was formed of in-situ concrete poured between precast stack bonded hollow blocks to make a very lightweight concrete house. The system was used in 1930 in Los Angeles for the house for Louis Samuel,⁴³ a somewhat unusual inclusion for New Zealand as this was "...a residence of reinforced concrete, glass, and metal throughout—walls, floors, ceilings, roofs, girders, foundations, doors, windows, and radio antennae included. No wood has been used except during construction for a certain limited amount of temporary scaffolding..." The emphasis on prefabrication using concrete in the examples extended to inclusion of Edison's poured in situ concrete house using cast iron moulds, with Beatson describing it as an example of "A monolithic house made like a machine casting."⁴⁴ Edison applied for his patent in 1908 and built a sample house which was published the following year.⁴⁵

Although the fact Beatson ignored the post-World War I UK prefabricated systems, also developed in response to the housing shortage of the time, both of

concrete (for example the Airey Duo slab) and of steel whether for frame or cladding (for example Atholl and Telford) seems entirely reasonable as not being applicable to New Zealand, the biggest surprise, perhaps, is that only 2 of the 21 thesis examples are prefabricated timber systems (Forest products and Enterlocking). The timber tradition of house building in New Zealand would suggest this would be the direction taken by prefabrication. The four examples of Swedish timber prefabrication, in which building labour by the family that were to occupy them could be substituted for cash,⁴⁶ are ignored by Beatson.

Having gone through the examples and before describing the design of his thesis house, Beatson comments on the Rational Design of Bemis and Burchard. This was a modular system that sought to simplify construction through repeated use of standard members. However, Beatson felt that Rational Design was "...far too complicated for practical consideration, and the unit or module suggested too small."³⁷ His solution was to use a horizontal unit of 3ft 6in which was simply based on the "...smallest common unit of space in a house...—the passage."⁴⁷ The remainder of the thesis is then devoted to explaining how the module would be translated into a buildable, prefabricated house once the foundations were in place. This included a 3ft 6in roof 'tile' that was fixed to rafters gridded with cross members at the same centres.

Not content with supplying a thesis with scale models of the proposed system to become qualified as an architect, and without the massive resources of MIT that were available to Bemis and Burchard, Beatson later built his own prefabricated house to his module and then made a second prefabricated house which was built in the garden of the first. The latter is the house in Hurstmere Road (figure 1), demolished to make way for the Bruce Mason Centre, and the second the family bach at Lake Rotoma.



Figure 1: Prefabricated house at Hurstmere Road, Takapuna
(Source: K. Beatson)

Beatson's view of the prefabrication of houses was of a system rather than complete prefabricated buildings. In writing about the Hurstmere Road house he noted its four main design parameters as the characteristics of the occupants, their housing requirements, potential changes to these in the future, the site characteristics, and its locality.⁴⁸ Setting up a factory on the site, the wall panels were mass produced, although the floor and most of the roof were described as being of normal construction, with the roof covering of asbestos cement sheets and the floors finished in polished rimu. The steel windows and doors were also designed by Beatson to fit in the module.⁴⁹ He was also not averse to recycling with the hall parquet floor being made of squares cut from tea chests.

The Rotoma bach (figure 2) was built and painted in sections in Takapuna, disassembled, shipped on a 10 ton truck and then reassembled high up on a bush covered hillside overlooking the lake, on prearranged blocks and stringers. The erection only took 14 hours. "Erection was begun at 2.00pm on Saturday afternoon and by late Sunday evening the owner was able to sleep in his one-and-a-half-day old cottage."⁵⁰ Beatson referred to himself as "the owner" because the architects of the cottage were given as Massey,

Beatson, Rix-Trott and Carter. The cottage was a long rectangle with the long side facing the view. Looking from the lake at the left hand end were two bedrooms, each with two bunks, which could be curtained off from the main space. The right hand end had a similar bedroom on the lake side and a kitchen on the other. The fireplace was on the back wall and door between it and the kitchen gave access to the outside and right angles to this the door of the lean-to washroom. On the lakeside was a long deck entered off the living room and steps down at the kitchen end.



Figure 2: The bach at Rotoma from the lake
(Source: K. Beatson)

To transport the prefabricated cottage, this simple plan has been cut into 2ft 9in sections for loading on the lorry. This same approach had been used in the UK Temporary Housing programme, where the single storey aluminium AIROH bungalow was built in four sections, each designed to go on the back of a flat-bed truck. The 1945 AIROH prototype was erected in seven hours, from 9.00am to 5.00pm.⁵¹

The walls of the Rotoma cottage were one board thick and were joined by studs placed back and front on site (figure 3). The ceiling and roof were

made on the same principle. All wood was treated with three coats of sprayed creosote after erection and the panels then given a coat of tung oil. Internally the walls were finished with tung oil and the ceiling was painted pale blue. “One novel if unintentional effect rather astonishes visitors to the cottage when they observe the paw-marks of a cat on the ceiling. This particular phenomenon was the result of a cat walking over the freshly painted ceiling lying on the ground in “Takapuna.”⁵²

Recollections of holidays at the bach and of sailing on the lake in a boat also made by Beatson include memories of the building. “The design of the Bach was beautifully simple; there was one main room with four rooms off it—a kitchen and three bedrooms. Each of the bedrooms has two bunks. And to the delight of all us children, each bunk bed had its own porthole window.”⁵³ All fittings were, like those of the Hurstmere Road house, purpose made, including a rack for Lilliput magazines that also housed a radio over the fireplace (figure 3).



Figure 3: Interior of prefabricated bach at Lake Rotoma
(Source: K. Beatson)

Beatson also wrote about prefabrication in *Home and Building*. In 1937 he and Irwin Crookes were appointed editors on the advice of the NZIA starting with the second ever issue. Apart from the three years when Crookes was on active

service, during which time Rix-Trott took over as joint editor,⁵⁴ the pair worked together and, with the rare exception, it is hard to know who wrote the editorials that introduce each issue. One exception is that of January 1943 entitled 'Will Prefabrication "Take on?"'.⁵⁵ This editorial makes reference to a recent issue of *Architectural Forum* that had featured designs for a factory for mass producing small houses.⁵⁶ Beatson suggested that prefabrication of houses should appeal to those with less money, including "...the thousands who wish to be owners with the privilege of paying interests and the other thousands who prefer to be tenants with the privilege of paying rent."⁵⁷ He also noted that proper insulation would be an important ingredient of the prefabricated house some 20 years before the DSIR published their booklet on improving the insulation of New Zealand houses.⁵⁸ Allusion was made to the BArch thesis with the suggestion "...it should be possible to build the ideal home from prefabricated units."⁵⁹

Beatson's authored article on the Hurstmere Road house has been discussed above but the journal included other contributions on prefabrication. The same year the September issue included an article by Gordon Wilson on how prefabrication could aid the national housing programme, pointing out that unlike the monotonous but cheap and practical by-law housing in the UK that was produced to improve the lot of the workers, prefabricating homes could lead to much greater variety in design. Wilson also mentioned evolution in house building and how many items like doors, windows and staircases were already made off site, noting ready-mix concrete as the latest addition to these prefabricated housing components.⁶⁰ In fact the Housing Division of the Ministry of Works had developed a prefabricated storey height panel system in 1942⁶¹ with 200 such houses erected by 1949.⁶² This experiment was not continued because the market was not large enough to sustain it.⁶³

Beatson's last article just before he ended his joint editorship concerned housing for growing families, although prefabrication is no longer the focus. Rather the article looks at designing affordable houses that were not cramped. However, it was illustrated with a photo of the prefabricated Hurstmere house deck complete with two Beatson rocking horses. Although this deck is described as the "...ideal open-air play space...paved with pre-cast concrete slabs" with prefabricated

railings, Beatson is also critical of the design. "There are two disadvantages in the example shown: the horizontal railings which, of course, the children could climb, and the glass doors which have glass within 6" of the floor."⁶⁴ He does offer solutions to both problems. Perhaps more prophetic he also anticipates the kitchen of today. "Some day an enterprising firm will manufacture a range with separate oven and cooking top which can be completely built in, both oven and cooking top at the most convenient height."⁶⁵

In 1945 the journal had an article said to be based on an RIBA pamphlet, which went over the familiar ground of making houses as mass produced as aeroplanes and cars, noting that many Swedish houses were assembled on site from pre-made parts,⁶⁶ as had also been noted over a decade earlier by Burchard. Of more import, perhaps, is that the same issue also featured the Christchurch prefabricated houses designed by Paul Pascoe.⁶⁷

Nevertheless, the Post WWII hope that prefabrication would solve the housing crisis proved groundless, not least because there was no support for creating an artificial market to help get over the tooling up costs of the prefabricated house,⁶⁸ while the prevalence of prefabricated kitchens comes from their much lower setting up costs.

Conclusion

It is difficult to reach a conclusion in an article that is part of a larger investigation. What does emerge is that students at the Auckland School of Architecture in the 1930s were looking towards the journals and books emanating from the USA rather than those of the UK, at least when it came to advances in housing through the use of prefabrication.

¹ Ronald Guthrie Senior Beatson, "Unit Design for Mass Production of Houses," BArch diss. University of New Zealand, 1939, 3.

² Rod Stock, "The Future of NZ housing is prefabs, and 180,000 'tiny' homes," available at <https://www.stuff.co.nz/business/money/101956360/the-future-of-nz-housing-is-prefabs-and-180000-tiny-homes>, accessed 21 May 2018.

-
- ³ Ian Bowman, *William Beatson: A Colonial Architect* (Auckland: Balasoglou Books, 2005).
- ⁴ Document in possession of Beatson family.
- ⁵ "Nelson Technical School," *Nelson Evening Mail*, January 31, 1922, 1; "University Tests," *New Zealand Herald*, October 25, 1930, 15.
- ⁶ "To Contractors" (Beatson tender advertisement), *Auckland Star*, September 8, 1936, 20; Anon, "Cintra," *Building Today* 1, no. 1 (October-December 1936): 19-21.
- ⁷ CPRW Fisher, "History," 2017, available at <http://cprwfisher.co.nz/practice/>, accessed 26 Jan 2018.
- ⁸ John Brown, "Orewa Coastal Retirement Resort Development, 488 Hibiscus Coast Highway and 25- 35 Annalise Place, Orewa," Auckland: Heritage Impact Assessment, 2015, available at <http://temp.aucklandcouncil.govt.nz/EN/ratesbuildingproperty/consents/getinvolved/Documents/luc-60070192-22.pdf>, accessed 26 January 2018.
- ⁹ Justine Clark and Paul Walker, *Looking for the Local* (Wellington: Victoria University Press, 2000), 54-55.
- ¹⁰ Peter Middleton, "A House is a House is a Home: the New Zealand Suburban House and its Image," *Journal of the New Zealand Institute of Architects* 29, no. 6 (July 1962): 152.
- ¹¹ Clark and Walker, *Looking for the Local*, 58.
- ¹² *New Zealand Home and Building Souvenir Edition: the Newstalk 1ZB 1950s Show* (Auckland: Auckland City Art Gallery, 1992).
- ¹³ Peter Shaw, *New Zealand Architecture: From Polynesian Beginnings to 1990* (Auckland: Hodder and Stoughton, 1990), 163; "Is a Pacific Style Emerging," *Home and Building* 12, no. 5 (April-May 1950): 20-23.
- ¹⁴ Shaw, *New Zealand Architecture*, 163.
- ¹⁵ Douglas Lloyd Jenkins, *At Home: a Century of New Zealand Design*, (Auckland: Godwit, 2004), 122.
- ¹⁶ Walker and Clark, *Looking for the Local*, 54-55, 58.
- ¹⁷ K. Beatson, *My Recollections of my Father*, 5.
- ¹⁸ R.G.S. Beatson, "Unit Design for Mass Production of Houses," 3.
- ¹⁹ Anon, "Students' Work," *New Zealand Herald*, October 25, 1939, 12.
- ²⁰ R.G.S. Beatson, "Unit Design for Mass Production of Houses," 8.
- ²¹ Brenda Vale, *Prefabs: a History of the UK Temporary Housing Programme* (London: E. and F.N. Spon, 1995).
- ²² Gilbert Herbert, *The Dream of the Factory-made House: Walter Gropius and Konrad Wachsmann*, (Cambridge, Mass: MIT Press, 1984).
- ²³ Anon, "Prefabrication," *Architectural Forum* 78, no. 6 (June 1943): 89-96.
- ²⁴ Julian Huxley, *TVA Adventure in Planning* (London: The Architectural Press, 1943); Hugh Casson, *Homes by the Million* (Harmondsworth: Penguin, 1946).
- ²⁵ Laura Kellaway, "The Railway House in New Zealand: a study of 1920s prefabricated houses," MArch diss., University of Auckland, 1993.
- ²⁶ Graham Dawson, "House Construction," *Journal of the New Zealand Institute of Architects* 17, no. 3 (June 1950): 45-48.
- ²⁷ Albert Farwell Bemis and John Burchard, *The Evolving House* (Cambridge: The Technology Press, MIT, 1932-36).
- ²⁸ Anon, "Fifty Plywood-panel Houses Built a Rate of One a Day," *Architectural Record* 85, no. 3 (March 1939), 38-40.
- ²⁹ "Products to Practice," *Architectural Forum* 67, no. 1 (July 1937): 53-56, 82.

-
- ³⁰ Beatson, "Unit Design for Mass Production of Houses," 29.
- ³¹ "Products to Practice," 56.
- ³² Richard Furneaux Jordan, "Modern Building in Timber," *Journal of the Royal Institute of British Architects* 43, no. 5 (January 1936), 225-241.
- ³³ Many systems are hybrids so this classification is based on the major structural material. Percentages may not add to 100 because of rounding.
- ³⁴ Norman N. Rice, "The Minimal House: a solution," *Architectural Record* 68, no. 2 (August 1930): 133-137.
- ³⁵ Beatson lists this as Motohomes.
- ³⁶ Peter Pennover and Anne Walker, *The Architecture of Grosvenor Atterbury*, (New York: W.W. Norton and Co., 2009), 254.
- ³⁷ Demolished 1966 although the same system used on the 1906 tram stables at Walton part of which still exists on the corner of Rice Lane and Queens Drive (see <http://streetsofliverpool.co.uk/page/13/?s=st>).
- ³⁸ Anon, "Cheaper Housing: an experiment with clinker slabs," *The Building News*, 88 (June 16, 1905), 848; Christopher Crouch, *Design Culture in Liverpool, 1880-1914: the origins of the Liverpool School of Architecture*, (Liverpool, Liverpool University Press, 2002), 182-13.
- ³⁹ Pennover and Walker, *The Architecture of Grosvenor Atterbury*, 255, 265.
- ⁴⁰ The order is not alphabetical as Beatson does not give the full name and in place substitutes 'Enterlocking' for 'Interlocking'.
- ⁴¹ Richard Sheppard, *Prefabrication in Building* (London: The Architectural Press, 1946).
- ⁴² John Burchard, "Research Findings of Bemis Industries, Inc.," *The Architectural Record* 75, no. 1 (January 1934): 3-36.
- ⁴³ Pauline Schindler, "The Samuel House, Los Angeles: Lloyd Wright, Architect," *The Architectural Record* 67, no. 6 (June 1930): 525-30.
- ⁴⁴ Beatson, "Unit Design for Mass Production of Houses," 21.
- ⁴⁵ Anon, "The Edison Concrete House," *Scientific American* 101, no. 9 (28 August 1909): 141-42.
- ⁴⁶ Linton Wilson, "Sweden's Small House Answer," *Architectural Forum* 60, no. 4 (April 1934): 295-300.
- ⁴⁷ Beatson, "Unit Design for Mass Production of Houses," 36.
- ⁴⁸ R.G.S. Beatson, "The Shape and Shadow of Homes to Come," *Home and Building*, 6, no. 2 (December 1942): 9-11.
- ⁴⁹ Beatson, "The Shape and Shadow of Homes to Come," 9-11.
- ⁵⁰ Anon (but written by R.G.S. Beatson), "A Prefabricated Cottage at Lake Rotoma," *Home and Building* 15, no. 6 (November 1952): 29-31.
- ⁵¹ John Madge (ed.) *Tomorrow's Houses* (London: Pilot Press, 1946), 215.
- ⁵² Anon, "A Prefabricated Cottage at Lake Rotoma."
- ⁵³ K. Beatson, *My Recollections of my Father*, 3.
- ⁵⁴ Rix-Trott worked on the magazine from the January 1942 issue and Irwin Crooks returns for the December 1946 issue.
- ⁵⁵ Editorial, "Will Prefabrication 'Take on?'" *Home and Building* 6, no. 3 (June 1943): 3, 40.
- ⁵⁶ Anon, "Products and Practice," *Architectural Forum* 67, no. 1 (July 1937): 53-56, 82.
- ⁵⁷ Editorial, "Will Prefabrication 'take on?'"

-
- ⁵⁸ Lyndon Bastings, *Handbook on the Insulation and Heating of Buildings with Special Reference to Dwellings*, (Wellington: DSIR, 1964).
- ⁵⁹ Editorial, "Will Prefabrication 'Take on?'"
- ⁶⁰ Gordon Wilson, "Prefabrication as applied to a national housing scheme," *Home and Building* 6, no. 4 (September 1943): 10, 37, 39.
- ⁶¹ Dawson, "House Construction," 47
- ⁶² Gael Ferguson, *Building the New Zealand Dream*, (Palmerston North: Dunmore Press, 1994), 128.
- ⁶³ Dawson, "House Construction," 46.
- ⁶⁴ R.G.S. Beatson, "Can We make out Homes more Attractive to Mr. Stork?" *Home and Building* 7, no. 1 (December 1943): 12-13, 42, 45.
- ⁶⁵ Beatson, "Can We make out Homes more Attractive to Mr. Stork?"
- ⁶⁶ Anon, "Prefabrication—The Answer?" *Home and Building* 8, no. 2 (June 1945): 7-9.
- ⁶⁷ Anon, "Eight Prefabricated Houses in Christchurch," *Home and Building* 8, no. 2 (June 1945): 12-13.
- ⁶⁸ Vale, *Prefabs*, 179.

Intelsat: Satellites, Science and Science Fiction

Paul Walker
University of Melbourne

Abstract

In 1980, the Australian firm of John Andrews International won an international competition for the design of the Intelsat headquarters in Washington. Before the privatization of satellite communications provision, Intelsat was an intergovernmental agency which promoted international collaboration in expanding global communications networks, and ensured participation of developing as well as economically advanced nations in this rapidly evolving field.

The ceremonious spaces of the Intelsat building reflect both Intelsat's status as an organization of the international bureaucracy and the high-tech character of the industry it oversaw: an enormous entry lobby with a stainless-steel ceiling and an upper-level 'moon garden' were adorned with satellite prototypes. But while the project adopted a tech-ish look that the Andrews firm had also explored in earlier projects, it also further developed Andrews's explorations into workplace planning and environmental design. Intelsat was conceived as a series of octagonal modules of several stories, each based on an 85' square with chamfered corners, connected by space-framed atria. These atria and the planting and water features in them were integral to a complex system that managed air-movement through the building, substantially reducing energy use (per area, less than 50% of comparable Washington buildings) through computer-controlled active systems combined with passive environmental design principles. In ongoing collaboration with the mechanical engineer Don Thomas, such principles had been explored by the Andrews office since their 1973 proposal for the Callum offices in Canberra.

But while Intelsat's approach to environmental design in retrospect appears prescient, the modularization that it entailed and the artificial 'nature' of the atria that are core to its design strategy make the building inward looking, an isolated mother-ship in its otherwise rapidly intensifying Washington

neighbourhood. As much as the satellites it managed, Intelsat floats as a glittering technological object in space.

Introduction

The environmental *performance* of buildings is one of the most pressing issues that contemporary architecture faces. But judgements about buildings do not avoid how they *look*. This paper examines an architectural design of the 1980s which was the outcome of a design competition that thematised both performance and look. The design of the Intelsat headquarters building in Washington was selected through a limited competition held in 1979/1980, won by the Australian architect John Andrews. The criteria by which the winning scheme was selected were broad and inclusive, but fall into two groups: those concerned with the question of what the building would look like, and those concerned with its programmatic and environmental performance. Across both these sets of criteria, architecture's relation to science was at stake. As one of the key institutions in the rapidly evolving 'high-tech' domain of satellite communications, there was a tacit expectation that Intelsat's 'image requirements' (to use the language of the competition documents) had to be met by something that appeared technologically advanced. This was certainly one of the deciding factors in the selection of the Andrews design. Science mattered in the Intelsat design, both qualitatively and technologically; imaginatively and performatively. But in examining the Intelsat design and its reception both at the time of the competition and when the building was completed several years later, it seems that judgements about the building subordinated its technical achievements to its aesthetics.

The Intelsat Competition

Intelsat was an inter-governmental agency which had the role of promoting international collaboration in expanding global communications networks, ensuring participation of developing as well as economically advanced nations, predominantly western or non-aligned. It established international protocols and policy, managed the launch and deployment of communications satellites, and coordinated construction of a network of earth stations in member countries. Intelsat was therefore simultaneously a major bureaucracy and a technological enterprise, needing a lot of office space but also more exciting things such as a space craft control center with an adjacent public viewing area, and simulation and testing facilities. Intelsat was also an international agency which required architectural settings suited to diplomacy: a vast board room for representatives from its member nations, along with facilities for simultaneous translation; lavish offices for the organization's director and governors; reception spaces. Its ability to command a prominent site owned by the American government is a measure of the prestige it

enjoyed in the 1970s and 1980s.¹ The Intelsat headquarters building sits among tall oak trees on a sloping site on Connecticut Avenue, one of Washington's main thoroughfares, about 5km northwest of the White House. Just to its west is an enclave of embassies and chanceries known as the International Center.²

Given the intergovernmental nature of Intelsat as an organization, the competition to find a design for its headquarters building had to give opportunity for architects from all Intelsat's member countries. A list of potential architects from each country was gathered (the Australian suggestions forwarded by the Royal Australian Institute of Architects), and a shortlist of six firms determined by Intelsat and its advisors. The six participating firms were Arthur Erickson Architects (Canada); Raila & Reima Pietila (rendered Pietilae in the Intelsat documents) (Finland); Hentrich, Petschnigg und Partner (W Germany); Holabird and Root, and Hellmuth, Obata and Kassabaum (both US); and John Andrews International (Australia). Their design submissions were assessed in Washington in January 1980 by a panel of assessors chaired by Intelsat's then Deputy Director, Andrew Caruso, which included senior Intelsat executives and three architects: Michael Austin-Smith of the UK, Marco Zanuso of Italy, and Pietro Belluschi, also Italian but who had practiced in the United States since the early 1920s.

Belluschi was selected to serve on the Intelsat design competition assessment panel because he had a long and distinguished career, including serving as Dean of Architecture and Planning at MIT from 1952 to 1965, and most significantly serving as a key advisor to the Foreign Buildings Operation of the US State Department³, which guided the American embassy building program of the 1950s and 1960s toward a ceremonious and somewhat monumental modernism.⁴ Austin-Smith and Zanuso were not as senior in the profession as Belluschi, but both were well-regarded architects, and had held important institutional appointments, Austin-Smith as president of the Architectural Association and Vice-President of the RIBA, and Zanuso as director of the Milan Architecture and Design Triennale. Both had also designed buildings or fit-outs for 'high-tech' clients, Austin-Smith for IBM⁵, and Zanuso for IBM and Olivetti.

The assessment panel provided a lengthy report on the Andrews design that considered it in relation to 'Design Considerations', 'Accommodation of INTELSAT's Use Requirements', and 'Implementation and Costs'. A note on the report indicates that the comments on the 'Design Considerations' were prepared by the 'Architect-Assessors' alone; presumably the other elements of the report reflected not only their views, but also those of the Intelsat executives on the jury for their expertise in legal, procurement and

engineering matters. There were six design considerations: 'Distinction, excellence and quality of architectural design'; 'Fulfilment of the space program requirements in a functional, appropriate and imaginative design'; satisfaction of 'the image requirements and goals of Intelsat'; 'Satisfaction of the urban design requirements of Washington, D.C.'; 'Sensitivity to the environment and energy efficient'; and 'Practicality of the facility, both in terms of a reasonable cost of construction as well as long term maintenance and operating costs'. The expectations that the Intelsat design had to meet, then, were wide ranging, from qualitative criteria of 'distinction', 'excellence', and 'image', to technical and pragmatic issues including energy efficiency and operating costs.

Sources of the Intelsat design

The Andrews project was resolved as a series of octagonal office 'pods', each based on an 85' square, with chamfered corners [fig. 1]. The pods vary from four to six stories each. Between the pods are courtyards, or atria, with pools and – in most cases – extensive planting designed by Andrews's friend and frequent collaborator, the Canadian landscape architect Richard Strong. The courtyards are enclosed by glazed roofs that 'pop-up' between the office pods. Strong also designed roof gardens for most of the office pods.



Figure 1. Intelsat Building, Washington, John Andrews International. Photo: Paul Walker

The glazed courtyards are traversed at upper levels by open walkways, and some feature vertical circulation cores at their centres. There are also staircases in cylindrical towers of concrete and mirrored glass blocks placed on the exterior of the building between the

office pods. At the western, ceremonious entrance to the building, the lower levels of two 'pods' and what would otherwise be a courtyard between them are subsumed into a sequence of public and quasi-public spaces [fig.2]. At the top level of this part of the building is a conservatory-like space called 'the moon garden'.

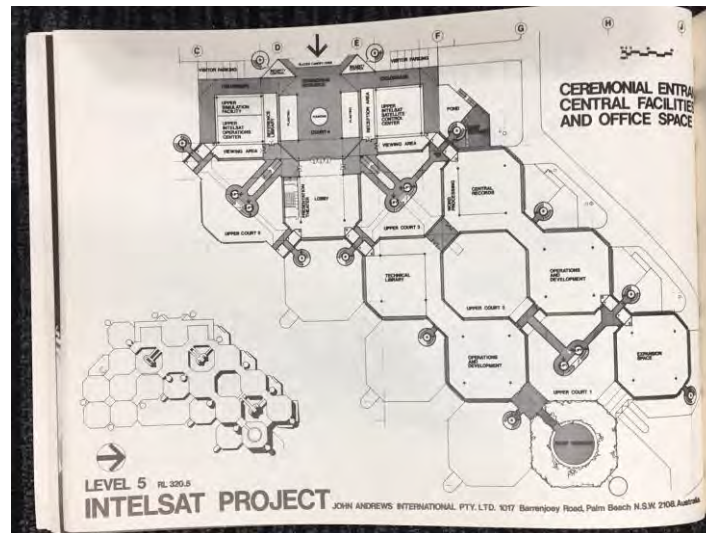


Figure 2. Page from Andrews's Intelsat design competition report showing stage 1 design

The modular design approach facilitated the staging of Intelsat's construction, with the first part consisting of nine office pods, three courtyards and public entrances at the west and north-east, being completed in 1986, and the second stage of another four pods and two courtyards being completed two years later. While the discovery by Andrews's Washington office of a scheme by Intelsat executives and the second stage contractor to embezzle project funds led to Andrews being sacked from the project before stage 2 was complete⁶, it was nevertheless built to the Andrews design. Reports on Intelsat in the architectural media remained oblivious to these problems. A third stage was also envisaged, which would have added more office pods at the southern end of the site. Various configurations for this were explored but it did not go ahead.

Despite its troubled delivery, the Intelsat design has an important place in Andrews's oeuvre. Andrews and his office completed several significant projects after Intelsat, including facilities for the University of Sydney's School of Veterinary Sciences (1990) and the Age of Fishes Museum at Canowindra, NSW (1998). There are also interesting unbuilt projects contemporaneous with Intelsat – a schematic design from 1985 for another inter-governmental satellite organisation, Arabsat, to have been built in Riyadh; an office and hotel complex for Los Angeles called Park Place; and a 50-storey office

tower for Bond Street in the Sydney CBD, to have been partly hoisted above late 19th c mercantile buildings on the site by a gigantic 15-storey pier.⁷ But with the Sydney Convention Centre, completed like Intelsat in 1988, Intelsat was the last of Andrews's projects to be widely published. It was also the last project Andrews completed outside Australia, and his only North American project fully designed in the Sydney office.

Intelsat is also conceptually important as its design entailed the final point of development for several lines of inquiry that had developed across the entirety of the architect's career. Since his second-placed design for the Toronto City Hall design competition of 1957-58, Andrews had considered environmental performance as a major driver of building form. This interest was developed further in the period from 1958 to 1969 when he lived in Toronto, and confronted the challenge of designing for its cold winter climate, both while employed in the office of John B Parkin Associates until 1961, and then in his own office. From 1963, he had also investigated designs for the extreme conditions of Arctic Canada in his teaching in the architecture program at the University of Toronto.⁸

Several key Andrews buildings of the 1960s adopted a megastructure approach to respond to climate, such that circulation systems – enclosed, but at an urban scale – drive overall building form. This is clearly the case at Scarborough College (completed 1965), which was to be a celebrated example in Reyner Banham's 1976 book *Megastructure: Urban Futures of the Recent Past*.⁹ This megastructural approach lingers in the design of Canberra's Cameron Offices (1968-1976). But after his return to Australia in 1969, Andrews developed a strategy for the design of large, horizontally-oriented building complexes which no longer gave primacy to circulation in determining building form. Rather, buildings were conceived of as additive systems in which building form emerged from the composition of repeated elements drawn from a kit of parts. These parts were primarily inhabitable building volumes, with landscaped voids between. This approach was developed in two Australian projects which are important precedents for the Intelsat design: the unbuilt Monarto city centre of 1975, a project for a central business area and community facilities for a new city in South Australia, and the design for the Callum Offices in the Canberra suburb of Woden of 1973. In both these cases, Andrews collaborated with the Sydney-based mechanical engineer, Don Thomas – with whom he worked first on the Cameron Offices project – to develop an environmental performance strategy that would be integral to the building design.



Figure 3. Callum Offices, Canberra, John Andrews International, 1973 proposal

Commissioned in 1973, Callum offices had been anticipated to accommodate some 6000 Australian federal government civil servants [fig. 3]. The Callum plan consisted of 24 office pods each based on a 30-metre square, with chamfered corners, virtually of the same scale and geometry as Intelsat's corresponding pods, and similarly dispersed across a regular grid and connected by circulation towers and walkways. The major difference between them is that at Intelsat, the spaces between the pavilion/towers are roofed with glazed space-frames to become a necklace of atria through the building, while at Callum spaces between pods are open and they are connected by elevated walkways suspended above the flood-plain on which the complex was to have been built. Moreover, each of the Callum pods are hung structurally from four centrally grouped columns, while the Intelsat pods have conventional steel frames.

As we have seen, the plan approach adopted by Andrews at both Intelsat and Callum is one that lends itself to incremental expansion. But it also lends itself to subtraction. As a government office project, Callum was cancelled in 1975¹⁰, to be subsequently realized in part – three pods only – as a college of technical and further education (in Australian parlance, a TAFE).

Despite the much-diminished scale of the Woden TAFE, Thomas honed his environmental approach there:

Three modified modules of the Woden scheme, for use as a technical college (with expected future additions for other uses), were constructed in

1979. In this scheme, heat is recovered from the refrigeration plant, laboratory discharges, and general space use, for storage in late water tanks adequate to accommodate all winter loading fluctuations. The tanks will also store heat from solar collectors (integral parts of the original design) once (if) they are installed.¹¹

The Woden design also uses the same screening system over its glazed facades as adopted at Intelsat. A triangulated frame of stainless steel tubes supports walk-ways and transparent screens just beyond the building façade, both reducing direct solar gain and encouraging a stack effect which in summer draws warm air away from glazing. Together with the articulation of hanging structure, walkways and vertical circulation nodes, this gave Woden a high-tech look. Woden's façade screening system had first been used by Andrews on the American Express building, completed in Sydney in 1976. It perhaps owes something to the design by Louis Kahn and Ann Tyng for the Philadelphia City Hall project that had been published in *Perspecta* in 1953, the cladding of which was depicted as a triangulated space-frame.¹²

The modular plan approach found at Woden and at Intelsat is also found in Andrews's 1975 design for the Monarto town centre [fig. 4]. Monarto was planned by the South Australian government to be a new city 80km east of Adelaide. Intended for an environmentally challenging site with very high summer temperatures and low winter ones, the Andrews design addressed the expectations of environmental responsiveness with a range of design elements. Some of these were fanciful, for example an 'energy tower' that would harvest wind and solar energy in ways that were not explained. Others were more straight-forward. Andrews envisaged most of the central Monarto buildings as a sequence of three-storey bars arranged to form square courtyards between, with vertical circulation cores at the corners. In section, the buildings grouped around their courtyards would be staggered down a gentle incline, producing in profile the look of a contemporary hill-town. Pools were to be constructed within the Monarto courtyards to produce both physiological and psychological cooling.¹³ Though the Monarto design remained schematic – the project was put on hold in 1976 and abandoned by the South Australian state government three years later – its pools and its picturesque profile are directly matched by those of Intelsat.



Figure 4. Monarto city centre, John Andrews International, 1975

Assessing Intelsat's environmental performance: science fact?

The overall form, plan and section arrangements of the Intelsat design were described by the architects as being the outcomes of their analysis of the organization's needs, its preferences for cellular rather than open-plan offices (the pod and atrium design maximized the number of perimeter offices), and a combination of passive energy principles and active systems. This is apparent in the report the Andrews office supplied as part of their competition entry, which set out all the measures that would achieve major energy savings, including the atria and the façade screens.¹⁴

As has already been mentioned, the assessment criteria for the Intelsat design competition included 'Design Considerations', 'Accommodation of INTELSAT's Use Requirements', and 'Implementation and Costs'. The competition jury produced an extensive assessment of the Andrews design in relation to these criteria.¹⁵ The first of the six design considerations – 'distinction, excellence and quality' – emphasized the integration and coherence of the entire design, and on this point, Belluschi, Austin-Smith and Zanuso suggested that the Andrews design excelled: 'It is this test which the recommended design has met in a much more brilliant manner than any of the other entries.'¹⁶ Of the other design criteria, three were essentially technical in nature, and two aesthetic. But even in considering the Andrews design against such technical matters as space requirements and environmental performance, the architect jurors for Intelsat consistently returned to the question of what the design would look like and how it would be experienced. They had nothing to say at all in their report on the design criterion of

construction and running costs, deferring instead to the full jury's report, which in turn deferred to Andrews's design report.

Under the design criterion of 'Fulfilment of the Space Program Requirements in a Functional, Appropriate and Imaginative Manner', the architect jurors commented that the winning design's 'checkerboard' of office modules and interior courtyards facilitated flexibility, expansion, and service requirements. The linking of courtyards at their corners was praised for creating 'a flowing pattern' of movement. While the jury touched on pragmatic issues such as entry points, car access, the disposition of services and plant rooms, and the integration of 'low energy principles', it said little on the technical detail of these matters, rather focusing on how elements used in the Andrews design to address environmental performance drove how the building looked: 'The overall appearance of the building is largely determined by the energy saving requirements.'¹⁷

Further on, under the consideration of 'Sensitivity to the environment and energy efficient', it is again the aesthetic outcome of the design's environmental and energy strategies that is endorsed rather than their technological resolution:

Even the tri-dimensional screens, placed as a protection of the exterior walls, become important architectural elements when we think of the richness of effect which can be derived from the very complex casting of shadows by the elements of the screens themselves and of the light-weight structures which support them.¹⁸

The design's focus on energy issues is 'not expressed in reduced or punitive terms but is optimistically suggested as a development of explicit and expressive volumes, which especially at night when lighted will communicate the image of a positive technology rich in imagination, both vital and essential.'¹⁹

Perhaps it is not surprising that the architects serving on the Intelsat design competition jury did not undertake any technical analysis of the design. But the full jury, including Intelsat's Director of Engineering, also avoided making technical assessments, instead citing the architect's claims about technical performance of his design. This is especially apparent in the jury's analysis of the Andrews design in relation to energy use. Under the heading 'Accommodation of INTELSAT's Use Requirements' it was noted that the Andrews design involved much lower lighting costs than were usual in Washington:

In a typical Washington office building with an annual energy consumption of 65,000 BTU's [sic] per square foot, some 30,500 BTU's are associated with lighting. In the Andrews design, by providing much exterior exposure, a photocell automatic turnoff system and the use of a space-frame to give insulation without blocking wanted light, a projected light energy budget for INTELSAT headquarters is estimated to be only 12,830 BTU's.²⁰

This was transcribed directly from information supplied by the Andrews office: the figures of 65,000, 30,500, and 12,830 BTUs all appear in the Andrews's Intelsat design report, easily graspable in a clear diagram [fig. 5].²¹

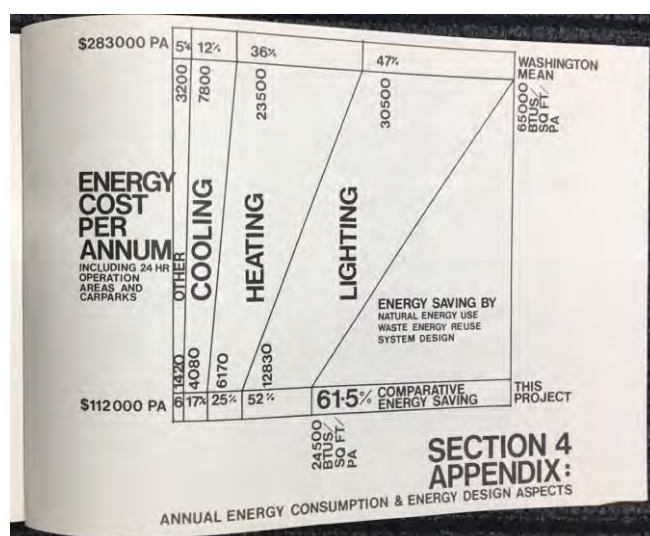


Figure 5. Diagram from Andrews's Intelsat design competition report

These numbers or close variations of them were then widely reported in the architectural media. Writing in April 1980 on the selection of the Andrews design, the *Washington Post's* architectural critic Wolf von Eckardt noted 'While the average Washington office building consumes 65,000 Btu's [sic] (British thermal units) per square foot per year, the Intelsat building is estimated to require only 24,000 per square foot per year.'²² After the first stage of the Intelsat was completed, while BTU consumption – both Intelsat's and the Washington norm – had apparently gone up, reports in the architectural media nevertheless continued to riff the Andrews claim of a '61.5% comparative energy saving' in the Intelsat design: *Architectural Record* suggested that Intelsat's energy use was 'less than 40 percent of the norm for comparable Washington buildings'; Peter Buchanan in *Architectural Review* noted 'energy consumption is less than 40 per cent of the norm for comparable buildings in Washington'. Reporting the same BTU figures as appeared in

Architectural Record, 'N.R.G.' in *Architecture*, at least acknowledged that such figures were estimates only.²³

Intelsat as an image: science fiction

Of the six design considerations on which the Intelsat jury made its judgements, two were more overtly based on appearance than the others. These visual criteria were about Intelsat's 'image': the chosen design needed to 'Satisfy the image requirements and goals of INTELSAT'; and about context: 'Satisfaction of the urban design requirements of Washington, D.C.'.

Belluschi, Austin-Smith and Zanuso wrote in their assessors' report that Intelsat's 'image goals' were such that the selected design 'must reflect an optimistic view of mankind, a belief in its ability to grow in awareness, to be inspired and to create new relationships and new environments.' This the jury deemed the Andrews design to do – 'innovative in appearance, yet solidly related to the past in general character', respectful of the hillside topography and the trees 'which are such an ornament to the site'. The urban design requirement was also deemed to have been successfully addressed through the organization of the building on the site, with green space, parking, and vehicular movement all suitably handled, and linking well to Connecticut Avenue by offering an entry point there, close to the location of a new metro station, and forming a suitable landmark on a key city thoroughfare.

Technology was not relevant merely to the Intelsat headquarters building in relation to its services and environmental performance. It was also central to its look. While the particular attention paid to the shading treatment of the fenestration at Intelsat produced a glitter of stainless steel and glass, the fragmented, office-pod, stair-capsule, and space-frame look of the place took this much further than was needed merely for technical purposes, perhaps somewhat towards the HAL-9000 inhabited spaceship *Discovery One* from 2001: *A Space Odyssey*. Playing on Intelsat's 'off-planet' responsibilities, architectural critics writing on the building could not help themselves in making such sci-fi connections. On these they were ready to be inventive and speculative, fulsome in a way in which they were not on the building's energy performance. While rejecting the architect's claims that the appearance of his building was simply the outcome of the application to the design of 'common sense', the architectural critics who wrote on Intelsat entirely accepted his claims about the building's energy use. For Wolf von Eckardt, the Intelsat headquarters was precisely 'Architecture for Year 2001'.²⁴ Writing in *The Architectural Review* soon after the first phase of the building opened in 1986, Peter

Buchanan claimed that Intelsat's staff affectionately called the building 'Starship Enterprise'.²⁵ Meanwhile, under the title 'Uncommon sense' *Architectural Record's* Margaret Gaskie wrote

Perhaps through subliminal confusion of the building with the client, the [Intelsat] headquarters has since it first began to rise on Connecticut Avenue near Embassy Row evoked the space-city imagery of *Star Wars*, and indeed its shimmering many-faceted pavilions seem rather to float than to march up the thickly wooded hill on which they rest....²⁶

And under the headline 'High-Tech Castle on a Wooded Hill', 'N.R.G.' wrote in the American Institute of Architects' journal *Architecture* that the building was a 'futuristic' 'tour de force', suggesting that one of the atria was reminiscent of Russian Constructivism (the central stair tower), Barragán (the pools), and 'with a little Darth Vader thrown in'.²⁷ Darth Vader was as 'noir' as the sci-fi references went – no-one mentioned the contemporaneous 'Alien' or 'Bladerunner'. However, the space references were not entirely without critical allusion. This is perhaps most overt in a *Washington Post* article titled 'Intelsat: The Space-Age Stunner', by Benjamin Forgey, a *Post* staff writer and architectural critic. Forgey makes the point that many architects were disdainful of the Intelsat building because it is a 'suburban building in an urban setting'.

What is at stake in Forgey's comment is the problem of the building's relationship to its context. Visually arresting and intriguing, the Intelsat building sits on a major arterial road in a well-heeled part of Washington. But in its beautiful park, it floats at a visual and conceptual distance from its surroundings. While its immediate neighbours are the embassies to its west, the broader neighbourhood of Cleveland Park is a late nineteenth century residential district, inhabited now by professionals and politicians.²⁸ It was a neighbourhood that successfully organized to stop a freeway in the 1960s, and to subsequently attract one of the first trunk-lines of the Washington Metro, which started construction in 1969. The Metro station at the corner of Connecticut Avenue and Van Ness Street just north of the Intelsat site opened in 1981. The stretch of Connecticut Avenue through Cleveland Park and as far north as Van Ness is described by Forgey as 'the city's most urbane residential boulevard, lined with fine masonry apartment buildings', a pattern that was reinforced by developments that followed on from the building of the Metro. But for the most part, these buildings are banal. Commenting on the contextualism with which most Washington architecture complied at the time the Andrews Intelsat design was selected, von Eckardt, Forgey's colleague at the

Washington Post, wrote of buildings then being put up close to the Intelsat site by the University of the District of Columbia that they exemplified 'the current Washington vogue of making institutional buildings as gravely monumental, ponderous, heavy and pharaonic as possible. They are thin architectural concepts set in thick concrete, as though the architects felt their idea might otherwise too readily blow away.'²⁹

Forgey, however, does not find Intelsat entirely alien:

The issue of the building's style is not an easy one to decipher. I watched it go up with increasing fascination. It just got busier and busier, until the notion of high-tech, space-age imagery almost disappeared and I found, to my great surprise, that the building began to assume a highly romantic, somewhat 19th-century character. What building in Washington, excepting the Smithsonian Castle, has a more active, picturesque profile?

Conclusion

The Intelsat Headquarters Building could be considered a satellite building for satellites. Compared to new commercial and institutional buildings being erected at the same time in its neighbourhood – indeed, through most of Washington and much of the rest of the western world – it eschewed post-modern contextualism, as noted by von Eckardt. Instead, it adopted an approach that ostensibly foregrounded the building's energy performance on the one hand, and the physiological and psychological comfort of its inhabitants on the other. These matters focused design on the building interior. Maintaining the park-like aspect of the site, this approach therefore turned away from the signs of urban intensification that were otherwise appearing in its vicinity. It gave the building a kinship with American suburban corporate complexes, as noted by Forgey, and to the government complexes of Canberra's 1960s and 1970s expansion to which the Andrews office had already applied considerable thought.

This, however, is too simple. While the Andrews design for the Intelsat headquarters was legitimated substantially in relation to building science measures and environmental strategies, the jury which selected the design consistently subordinated the question of the design's environmental performance to the question of its appearance. Science was subordinated to science's look. For the architect members of the jury, this might not be remarkable, but it seems that the technical members also acquiesced in this move. As we have seen, this was then repeated in critiques of the Intelsat design that appeared in the *Washington Post* and in the international architectural press.

This is not to say that the Intelsat building did not perform as its designers' analyses demonstrated that it would. Rather, this aspect of the design still did not matter enough in architectural culture to be scrutinized. And Intelsat's beguiling appearance – a techy-looking complex glittering among the trees – could be reclaimed for imaginative speculation, to be construed as an updated Victorian pile or cinematic space-ship. Science fiction veiled – and prevailed over – science fact.

Endnotes

¹ On the site ownership, see Wolf von Eckardt, 'Pods and Pools', *Washington Post*, (April 19, 1980): C4.

² In the face of growing competition from private providers of satellite communications services – exacerbated by changes in relevant American policy and legislation – Intelsat was privatized in 2001. In 2014 it moved to an anonymous office block in Tysons Corner, an enclave of bland office buildings beyond Washington's western periphery. The Intelsat building is now occupied by tenants including embassies and the University of the District of Columbia. On the move to Tysons Corner see https://www.washingtonpost.com/news/digger/wp/2014/07/27/intelsat-moves-into-new-tysons-office-part-of-a-wave-of-tenants-wooed-by-silver-line/?utm_term=.52baa794b06d. Accessed 26 Feb 2018.

³ Timothy M Rohan, *The Architecture of Paul Rudolph*, New Haven & London: Yale University Press, 2014: 33-34

⁴ Belluschi had coincidentally met Andrews in 1956 while travelling to Australia to speak at the RAA convention of that year.

⁵ <http://www.austinsmithlord.com/story/>. Accessed 26 February 2018.

⁶ See 'Intelsat Suspends 2 Top Officials After Unauthorized Payments', *Washington Post* (November 25, 1986): A7; 'Ex-Intelsat Head Sentenced', *New York Times* (September 23, 1987)

⁷ Paul Walker, 'No. 2 Bond Street', in *Augmented Australia: Regenerating Lost Architecture 1914-2014*, Australian Pavilion, 14th International Architecture Exhibition, La Biennale de Venezia, ed Philip Goad, Canberra: Australian Institute of Architects, 2014: 70-73

⁸ 'Architect Looks North for Man's Next Home', *Globe and Mail*, Toronto (July 23, 1963)

⁹ Reyner Banham, *Megastructure: Urban Futures of the Recent Past*, London: Thames and Hudson, 1976: 105, 133-35, 167.

¹⁰ Jennifer Taylor and John Andrews, *John Andrews Architecture A Performing Art*, Melbourne: Oxford University Press, 1982: 133-135.

¹¹ Taylor and Andrews, *John Andrews Architecture*: 156.

¹² Paul Walker and Antony Moulis, 'Before Scarborough: John Andrews in the Office of Parkin Associates 1958-1961', in Gevork Hartoonian and John Ting, eds, *Quotation: What does history have in store for architecture today?* proceedings of the 34th annual SAHANZ conference, Canberra: SAHANZ, 2017: 778-786; Louis I Kahn, 'Toward a Plan for Midtown Philadelphia', *Perspecta* 2 (1953): 10-27.

¹³ Paul Walker, Jane Grant and David Nichols, 'Monarto's Contested Landscape', *Landscape Review*, 16: 1 (2015): 20-35

¹⁴ John Andrews International Pty. Ltd., 'Intelsat Project, Washington D.C.', report, January 1980.

¹⁵ 'Report of the Assessment Panel for the Limited Invited Architectural Design Competition for the New INTELSAT Headquarters, 5 February 1980'. The Andrews archive collection has recently been transferred from Andrews to the State Library of New South Wales who are currently in the process of accessioning it. Access by the author was to the archive when it was still in the possession of the Andrews family.

¹⁶ 'Report of the Assessment Panel.... Annex A to Attachment no. 6': 2

¹⁷ 'Report of the Assessment Panel.... Annex A to Attachment no. 6': 8

¹⁸ 'Report of the Assessment Panel.... Annex A to Attachment no. 6': 13

¹⁹ 'Report of the Assessment Panel.... Annex A to Attachment no. 6': 13

²⁰ 'Report of the Assessment Panel.... Annex B to Attachment no. 6': 10

- ²¹ John Andrews International Pty. Ltd., 'Intelsat Project, Washington D.C.', report, January 1980, 'Section 4 Appendix: Annual energy consumption & energy design aspects'.
- ²² Von Eckardt, 'Pods and Pools': C4
- ²³ Margaret Gaskie, 'Uncommon Sense', *Architectural Record* (October 1985); Peter Buchanan, 'Intelsat Interlock', *Architectural Review*, CLXXX no 1076 (Oct 1986): 103-108; N.R.G., 'High-Tech Castle on a Wooded Hill', *Architecture*, 74: 11 (November 1985), 68-75.
- ²⁴ Von Eckardt, 'Pods and Pools': C1 & C4.
- ²⁵ Buchanan, 'Intelsat Interlock': 104
- ²⁶ Gaskie, 'Uncommon Sense'
- ²⁷ N.R.G., 'High-Tech Castle on a Wooded Hill': 72.
- ²⁸ Zachary M Schrag, *The Great Society Subway: A History of the Washington Metro*, Baltimore: Johns Hopkins University Press, 2006: 41
- ²⁹ Von Eckardt, 'Pods and Pools': C4

Acknowledgments

The call for papers resulted in the submission of 128 abstracts. Of these, ninety-four abstracts and forty-eight full papers were accepted for presentation at the conference. Thirty-seven papers were presented at the conference and are included in the proceedings. The double blind peer-review process adopted for all SAHANZ annual conferences guided the acceptance of all papers. The convenors would like to thank the academic referees who gave their time and expertise to referee these papers. The convenors would also like to acknowledge the support of the Faculty of Architecture and Design and the School of Architecture at Victoria University of Wellington. We are grateful to the University of Sydney for co-sponsoring the visit of keynote speaker Prof. Claire Zimmerman from the University of Michigan. We would also like to thank Tane Moleta for organising the generous support of the Embassy of Japan and the Japan Foundation.

Conference Convenors and Editors of the Proceedings

Michael Dudding, Christopher McDonald and Joanna Merwood-Salisbury
Victoria University of Wellington

Conference Organising Committee

Michael Dudding, Victoria University of Wellington
Nigel Isaacs, Victoria University of Wellington
Christopher McDonald, Victoria University of Wellington
Joanna Merwood-Salisbury, Victoria University of Wellington
Nan O'Sullivan, Victoria University of Wellington
Emina Petrović, Victoria University of Wellington
Peter Wood, Victoria University of Wellington

Academic Committee

Julia Gatley, University of Auckland
Gevork Hartoonian, University of Canberra
Andrew Leach, University of Sydney
Charles Rice, University of Technology Sydney
Robin Skinner, Victoria University of Wellington
Jan Smitheram, Victoria University of Wellington
Naomi Stead, Monash University
Lee Stickells, University of Sydney
John Ting, University of Canberra

Referees

Mike Austin
AnnMarie Brennan
Julia Gatley
Philip Goad
Janina Gosseye
Gevork Hartoonian
Paul Hogben
Nigel Isaacs
Andrew Leach
Hannah Lewi
Mike Lloyd
Harry Margalit
Anthony Moulis
Elizabeth Musgrave
Nan O'Sullivan
Emina Petrović
Charles Rice
Marc Aurel Schnable
Christoph Schnoor
Peter Scriver

Ari Seligmann
Robin Skinner
Jan Smitheram
Naomi Stead
Lee Stickells
John Ting
Paul Walker
Nigel Westbrook
Peter Wood

Administrative Support

Anne Keogh
Jess Mackenzie
Kirstin Va'a
Anna Cunningham
Shaun Rosier
Bronya Webb

Logo and Graphic Design

Hemi Takimoana

Cover Photograph

Demonstration house, 1949
Karori, Wellington.
New Zealand Free Lance:
Photographic prints and negatives.
Ref: PAColl-0785-1-175-01.
Alexander Turnbull Library,
Wellington, New Zealand