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ARCHITECTONICS OF SEISMICITY:
Building and colonial culture in Japan and Taiwan from
the Meiji Period to the Second World War

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ABSTRACT

Architectural tectonics and the relationship of structural expression to ornament has been one of the oldest and most consistent themes in western architectural theory. For instance, the discussions of architectonics can be seen in the foundational literature from the Classical period, is present in Neo-classical architectural styles, in debates associated with modernist architecture, and in the latest digital interpretations of architecture. Tectonics and the idea that architecture ought to draw its aesthetic effects from its structural and material composition has, as a consequence, become a normative aspect of architectural theory and practice. Yet, in many situation cultural and geographical contexts this position does not have such a normative status. This thesis examines the legacy of this theme in architectural theory and practice in the particular cultural and geographical context of Japan and Taiwan. It focuses on the colonial cultural relationship between these countries, and to the West, as well as considering the seismic conditions that govern the culture of building around the Pacific West coast – the Ring of Fire.

The argument that I will propose is that although the discussion of tectonics in westernised Japan has been scanty, the attitude and strategies the Japanese adopted for designing architecture and considering the relationship between structures and architectural surfaces can be framed differently. The difference between the traditional Japanese approaches to these questions and conventional Western considerations, is, in part, related to the significance of earthquakes to Japanese culture. The two traditions are not isolated. Japan was famously quick to adopt Western technologies and knowledge in the early twentieth century. In the context of architecture and building, this relationship produced a complex hybrid architectural culture in which the Japanese developed their own construction system and their attitude to the relationship between the structures and architectural surfaces.

The thesis examines a further layer to this technological and cultural hybrid by examining the relationship between Japan and its colony Taiwan. The thesis argues that Japan’s relationship to the West, and its adoption and hybridization of architectural culture is evident in a complex way through their own colonial relationship to Taiwan. Through reviewing debates on structure and ornament in architecture in the Far East, the thesis adopts the concept of skeuomorph into this theoretical frame. Locating the concept of skeuomorph in this frame and interpreting the Japanese and Taiwanese cases by this concept allows us to reconsider the normative status of architectonic principles in architectural theory, and contribute to an understanding of colonial architectural history in the East Asia.
By signing this declaration I certify that:

- This thesis was composed only by myself.
- The thesis comprises is my own.
- This work has not been submitted for any other degree or professional qualification except as specified.

The author

Nan-Wei Wu
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT</td>
<td>II</td>
</tr>
<tr>
<td>COPYRIGHT DECLARATION</td>
<td>III</td>
</tr>
<tr>
<td>TABLE OF CONTENTS</td>
<td>IV</td>
</tr>
<tr>
<td>LIST OF ILLUSTRATIONS</td>
<td>VII</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>XIII</td>
</tr>
</tbody>
</table>

## CHAPTER 1  INTRODUCTION

1.1 **The Complexity of Architecture on Shaky Ground**  1

1.2 **Earthquakes in the Western World**  10

1.2.1 The 1906 earthquake in San Francisco, USA  11

1.2.2 The 1908 earthquake in Messina, Italy  18

1.2.3 The 1925 earthquake in Santa Barbara, USA  22

1.2.4 The 1931 earthquake in Napier and Hastings, New Zealand  27

1.3 Motivation  37

1.4 **Archive material in Japan, Taiwan and the UK**  41

1.4.1 Archival documents in the UK  41

1.4.2 Archival works in Japan  42

1.4.3 Archival works in Taiwan  44

1.5 **Illustrations of Conceptual Sketches**  46

## CHAPTER 2  FROM STRUCTURE/ORNAMENT TO SKEUOMORPH  53

2.1 **Theoretical Structure/Ornament Debates**  53

2.1.1 Surface layer as architectural surface - ornament or finish?  57

2.1.2 Surface layer and architectural construction  62

2.1.3 Surface of construction and the architectural construction itself  71

2.2 **Sample Projects: Louis Kahn versus Robert Venturi and Denise Scott Brown**  76

2.2.1 Louis Kahn and the Indian Institute of Management, Ahmedabad  76

2.2.2 Robert Venturi and Denise Scott Brown and the Lewis Thomas Laboratory  81

2.3 **Semiotics in Architecture**  88

2.4 **Skeuomorphy in Architecture**  94

## CHART 1  107
CHAPTER 3   THE HISTORICAL BACKGROUNDS OF JAPAN AND TAIWAN FROM 1853 - 1945  109

3.1  JAPANESE AND TAIWANESE WESTERNISED HISTORIES  109

3.2  JAPANESE ARCHITECTURAL AND SEISMOLOGICAL HISTORY  116

3.2.1  INITIATING CONTACT WITH THE WEST: BEFORE THE MEIJI RESTORATION (1853-1868)  118

3.2.2  OVERWHELMING WESTERNISATION: BEFORE THE 1891 NOBI EARTHQUAKE (1868-1891)  121

3.2.3  CONFLICT CONCERNING THE CONTINUING PROGRAMME OF WESTERNISATION: BEFORE THE DEBATE ABOUT JAPAN'S FUTURE (1891-1910)  133

3.2.4  GRADUAL GROWTH IN JAPANESE SELF-CONFIDENCE: BEFORE THE 1923 KANTO EARTHQUAKE (1910-1923)  144

3.2.5  INVISIBLE WESTERN INFLUENCES: BEFORE THE SECOND WORLD WAR (1923-1945)  147

3.3  TAIWANESE ARCHITECTURAL AND SEISMOLOGICAL HISTORY  151

3.3.1  ADAPTATION AND EXPERIMENT: BEFORE THE 1904 EARTHQUAKE (1895-1904)  154

3.3.2  NEGLECT OF TAIWANESE PROBLEMS AND SUPERIOR COLONIAL INFLUENCES: BEFORE THE 1922 EARTHQUAKE (1904-1922)  155

3.3.3  TAIWANESE EARTHQUAKES SEEN AS INFERIOR TO JAPANESE EARTHQUAKES: BEFORE THE 1930 EARTHQUAKE (1922-1930)  160

3.3.4  BECOMING A SATISFACTORY COLONY FOR THE JAPANESE: BEFORE THE 1935 EARTHQUAKE (1930-1935)  165

3.3.5  CULMINATION AND END OF COLONIALISM: BEFORE THE END OF THE SECOND WORLD WAR: (1935-1945)  168

CHART 2  173

CHAPTER 4   STUDIES OF JAPANESE ARCHITECTURAL PROJECTS  175

4.1  THE BRITISH CONSULATE (1869) AND BRITISH NAVAL BUILDINGS (1877)  178

4.2  THE ORIGINAL MR HUNTER’S RESIDENCE (KYUU HANTAASHITEI) (1889)  184

4.3  THE TOKYO STATION (1914)  193

4.4  THE IMPERIAL HOTEL (1923)  203

4.5  THE KATAKURAKAN (1928)  218

CHAPTER 5   STUDIES OF TAIWANESE ARCHITECTURAL PROJECTS  231

5.1  THE TAI-CHUNG STATION (1917)  233
5.2  THE GOVERNOR GENERAL BUILDING (1919) 246
5.3  THE MAIN LIBRARY OF THE TAIHOKU IMPERIAL UNIVERSITY (1929) 256
5.4  THE CHIA-YI STATION (1933) 268
5.5  THE TAIPEI PUBLIC HALL (1936) 281

CHAPTER 6  DISCUSSION: ARCHITECTONIC RESPONSES TO SEISMOLOGICAL IMPACT AND CULTURAL CHANGE IN JAPAN AND TAIWAN 297
6.1  JAPAN’S WESTERN SYMBOLS AND YATOI’S IGNORANCE OF SEISMIC HAZARD 302
6.2  WESTERN AND MODERN ICONS FOR JAPAN AND TAIWAN 310
6.3  INDEXICAL COMBINATION AND BALANCE OF WESTERN SYMBOLS, MODERN ICONS AND SEISMIC CONCERNS 323

CHAPTER 7  ALTERNATIVE ARCHITECTONICS IN THE FAR EAST 343
7.1  WESTERN CONSIDERATIONS REGARDING ARCHITECTONIC EXPRESSION 344
7.2  SEISMOLOGICAL CONSIDERATIONS FOR ARCHITECTONIC EXPRESSION 353
7.3  JAPANESE CONSIDERATIONS OF IDENTITY AND COLONIALISM FOR ARCHITECTURAL EXPRESSION 361
7.4  ARCHITECTURAL AMBIVALENCE AND SKEUOMORPH IN ALTERNATIVE ARCHITECTONICS 375

CHAPTER 8  CONCLUSION: THE INTERPLAY OF ARCHITECTONICS, GEOGRAPHY AND CULTURE 381

BIBLIOGRAPHY 395
LIST OF ILLUSTRATIONS

1-1 An example illustration showing the combination of the diagram of the tectonic expression. ...................................................... 50
2-1 Laugier’s rustic hut................................................................. 59
2-2 Le Corbusier’s diagram of Dom-ino skeleton.......................... 59
2-3 Wall section of Wagner’s Post Office Savings Bank. .................. 63
2-4 Semper’s Caribbean Hut......................................................... 67
2-5 Non-window exterior view of the Beinecke Rare Book and Manuscript Library. _______ 73
2-6 Translucence of the interior of the Beinecke Rare Book and Manuscript Library.________ 73
2-7 Exterior appearance of the Indian Institute of Management, Ahmedabad. ....................... 77
2-8 Detail of the hand-made bricks of the Indian Institute of Management, Ahmedabad. _______ 77
2-9 Wall section of the Indian Institute of Management, Ahmedabad. ____________________ 78
2-10 Wall section of the First Unitarian Church. ____________________ 80
2-11 Wall section of the Exeter Library. ______________________________ 80
2-12 Entrance part of the north elevation of the Lewis Thomas Laboratory. ______________ 83
2-13 Detail photo of the south elevation of the Lewis Thomas Laboratory (above) with the comparison of Kahn’s project (below) shown in Figure 2.11. ________________________________ 83
2-14 Wall section of the Lewis Thomas Laboratory. ____________________ 84
2-15 Exterior photo of the Indian Institute of Management, Ahmedabad. ......................... 94
2-16 Kahn’s sketch of the Indian Institute of Management, Ahmedabad. __________________ 94
2-17 Photo of the main entrance of the Lewis Thomas Laboratory. __________________________ 95
2-18 Preliminary study of the entrance and elevation of the Lewis Thomas Laboratory. ______ 95
2-19 Archaeological vessels and skeuomorphic illustrations. .................... 97
2-20 Greek temples and skeuomorphic ornaments..................................... 97
2-21 Detailed view of the wall of the SOAS library building. .................... 102
2-22 Detailed vision of the wall of the New National Theatre in Tokyo. ____________ 102
3-1 The timeline of the government and interruptions (in italics) of Taiwan from 1624 to 1895. _________________ 113
3-2 Locations and years of occurrence of influential earthquakes in Japan during 1853-1945. ____________ 117
3-3 Diagram of construction layers of the namako-kabe. __________________________ 120
3-4 Archival photo of Ginza housing project of Thomas James Waters. ________________ 122
3-5 Chuta Ito’s comparison between Horyuji and the Parthenon temple. ________________ 138
3-6 Section of earthquake-proof housing. ________________________________ 138
3-7 Scale, location of epicentres, and dates of key earthquakes in Taiwan between 1895 and
1945. ___________________________________________________________ 152
4-1 Map of Japan showing the location of projects and areas hit by earthquakes with year and intensity. _____________________________176
4-2 Archival photograph of the British Consulate in Yokohama. _____________________________178
4-3 Archival photograph of the British Provisional Legation. _____________________________179
4-4 Ground floor plan of the British Consulate in Yokohama and its surrounding facilities. __180
4-5 Archival drawing of the site plan of the Royal Naval Victualling Depot at Yokohama in 1877. ___________________________________________________________ 181
4-6 Archival drawing of the floor plan of the Royal Naval Victualling Depot at Yokohama. __182
4-7 Archival drawing of the façade of the Royal Naval Victualling Depot at Yokohama. _____182
4-8 Archival drawing of the section of the Royal Naval Victualling Depot at Yokohama. ___183
4-9 Archival drawing of a detailed section of the walls of the Royal Naval Victualling Depot at Yokohama. ___________________________________________184
4-10 Photograph of the Original Hunter’s residence from the south. ______________________185
4-11 Photograph of the Original Hunter’s residence from the northwest. ________________186
4-12 Scale drawing of the ground floor plan of the Original Hunter’s residence. _________187
4-13 Scale drawing of the southern elevation of the Original Hunter’s residence. __________188
4-14 Scale drawing of the northern elevation of the Original Hunter’s residence. __________189
4-15 Scale drawing of an east-west section of the Original Hunter’s residence. ____________189
4-16 Scale drawing of a south-north section of the Original Hunter’s residence. ____________190
4-17 Sketch of the arrangement of the wall crossing the structural timber of the Original Hunter’s residence. _______________________________ 191
4-18 Diagram showing the relationship between the constructive materials of the northern wall of the Original Hunter’s residence. ______________________________ 192
4-19 Photographs of the interior verandah of the Original Hunter’s residence. _____________193
4-20 Archival floor plan of the ground floor of the Tokyo Station. ________________________196
4-21 Archival sketch of the Western elevation of the Tokyo Station. ________________________196
4-22 Photograph of the entrance of the royal partition of the Tokyo Station. _______________197
4-23 Detailed drawing of the foundation section of the Tokyo Station. ______________________198
4-24 Detailed drawing of the structure of a pilaster of the Tokyo Station. _________________199
4-25 A structural brick and a brick-like tile with a mark of their sizes of the Tokyo Station. 200
4-26 Sketch of the brick construction of the Tokyo station. ________________________________200
4-27 Sketch of the relationship between the exterior, the structure and the interior of the Tokyo Station. ___________________________________________201
4-28 Original drawing of the detail of the façade and its wall section of the Tokyo Station. __202
4-29 Sketch of the original location of the Imperial Hotel in Tokyo, surrounded by theatres and office buildings. ___________________________________204
4-30 Archival scale drawing of the Ho-o-den Temple, the Japanese pavilion at the International World’s Columbian Exposition in 1893. 204
4-31 Photograph of the lobby of the Imperial Hotel, now in the Meijimura Museum. 205
4-32 Photograph and collocating drawing of a horizontal section of a column of the Imperial Hotel. 208
4-33 Archival photograph of the Imperial Hotel showing the main structure as columns with rebar. 209
4-34 Wright’s sketch of the wall construction of the Imperial Hotel. 210
4-35 Wright’s sketch of the concrete for the base of the Imperial Hotel. 210
4-36 The relationship between the inside and the outside of the opening of the Imperial Hotel. 210
4-37 Four of scale drawings of wall sections of the Imperial Hotel. 211
4-38 Scale drawing of a wall vertical section of the Imperial Hotel. 211
4-39 Attachment of ‘scratched bricks’ of the Imperial Hotel imitating the stretcher bond of brickwork. 212
4-40 Photograph of the terra-cotta tiles of the Imperial Hotel employed as border finishing. 212
4-41 Photograph and scale drawings of the Oya stone columns around the lobby area of the Imperial Hotel. 214
4-42 Photograph of a part of the first floor of the Imperial Hotel. 215
4-43 Photograph of the lobby of the Imperial Hotel. 215
4-44 Detailed drawing of a section of Oya sculpture and reinforced concrete of the Imperial Hotel. 215
4-45 Section of the entrance partition of the Imperial Hotel. 216
4-46 Scale drawing of the relationship between the external façade and the section of the Imperial Hotel. 217
4-47 Model of the Katakurakan. 219
4-48 Floor plans of Katakurakan: the ground floor is the lower plan and the first floor is the upper plan. 221
4-49 Ground floor plan of Katakurakan. 222
4-50 Eastern façade of Katakurakan. 223
4-51 Southern façade of the southern partition of the Katakurakan. 224
4-52 Northern façade of the northern partition of the Katakurakan. 224
4-53 Attached tiles and the pattern of attachment of the Katakurakan. 225
4-54 Stucco finish of the northern partition of the Katakurakan. 225
4-55 Foundation of the northern partition of the Katakurakan. 226
4-56 Foundation of the southern partition of the Katakurakan. 226
<table>
<thead>
<tr>
<th>Image Number</th>
<th>Description</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-57</td>
<td>Marble cladding of the southern porch of the Katakurakan.</td>
<td>226</td>
</tr>
<tr>
<td>4-58</td>
<td>Interior of the southern partition of the Katakurakan.</td>
<td>227</td>
</tr>
<tr>
<td>4-59</td>
<td>Interior of the northern partition of the Katakurakan.</td>
<td>227</td>
</tr>
<tr>
<td>4-60</td>
<td>Interior of the first floor of the Katakurakan.</td>
<td>228</td>
</tr>
<tr>
<td>5-1</td>
<td>Map of Taiwan showing the location of projects and earthquake epicentres.</td>
<td>232</td>
</tr>
<tr>
<td>5-2</td>
<td>Photograph of the Tai-Chung Station now.</td>
<td>234</td>
</tr>
<tr>
<td>5-3</td>
<td>Original plan of the Tai-Chung Station.</td>
<td>236</td>
</tr>
<tr>
<td>5-4</td>
<td>Original drawing of the main façade and modern detail photographs of the Tai-Chung Station.</td>
<td>237</td>
</tr>
<tr>
<td>5-5</td>
<td>Original drawing of the northeast façade and modern detail photographs of the Tai-Chung Station.</td>
<td>238</td>
</tr>
<tr>
<td>5-6</td>
<td>Modern detail photographs marked on the original drawing of the main façade of the Tai-Chung Station.</td>
<td>239</td>
</tr>
<tr>
<td>5-7</td>
<td>Structural brick and cladding of the Tai-Chung Station.</td>
<td>240</td>
</tr>
<tr>
<td>5-8</td>
<td>Ordinary tile for the façade of the Tai-Chung Station.</td>
<td>241</td>
</tr>
<tr>
<td>5-9</td>
<td>Corner tile for the corner of the façade of the Tai-Chung Station.</td>
<td>241</td>
</tr>
<tr>
<td>5-10</td>
<td>Photographs of interior pebbledash cladding.</td>
<td>242</td>
</tr>
<tr>
<td>5-11</td>
<td>Diagram of the central part of the wall from the exterior, structural section to the interior of the Tai-Chung Station.</td>
<td>243</td>
</tr>
<tr>
<td>5-12</td>
<td>Diagram of the walls of the waiting rooms from the exterior, structural section to the interior of the Tai-Chung Station.</td>
<td>245</td>
</tr>
<tr>
<td>5-13</td>
<td>Historic photograph of the Taiwan Pu-Cheng-Shi-Shi Ya-Men.</td>
<td>246</td>
</tr>
<tr>
<td>5-14</td>
<td>Uheiji Nagano’s proposal for the Governor General Building of Taiwan.</td>
<td>246</td>
</tr>
<tr>
<td>5-15</td>
<td>Scale drawing of the site plan of the Governor General Building today.</td>
<td>250</td>
</tr>
<tr>
<td>5-16</td>
<td>Combination of the scale drawing and a modern photograph of the main façade of the Governor General Building.</td>
<td>251</td>
</tr>
<tr>
<td>5-17</td>
<td>Detail photograph of a corner of the façade of the Governor General Building.</td>
<td>252</td>
</tr>
<tr>
<td>5-18</td>
<td>Photograph of the collocation of cladding materials of the Governor General Building.</td>
<td>252</td>
</tr>
<tr>
<td>5-19</td>
<td>Photographs of the eastern elevation of the Governor General Building.</td>
<td>253</td>
</tr>
<tr>
<td>5-20</td>
<td>Part of an archival drawing of the eastern elevation.</td>
<td>254</td>
</tr>
<tr>
<td>5-21</td>
<td>Archival drawing and modern photographs of the Governor General Building.</td>
<td>255</td>
</tr>
<tr>
<td>5-22</td>
<td>Historic map of the Taihoku Imperial University.</td>
<td>258</td>
</tr>
<tr>
<td>5-23</td>
<td>Plan of the first floor of the original library of the Taihoku Imperial University.</td>
<td>259</td>
</tr>
<tr>
<td>5-24</td>
<td>Archival drawing of the southern elevation of the original library of the Taihoku Imperial University.</td>
<td>260</td>
</tr>
<tr>
<td>5-25</td>
<td>Detail photograph of the attachment pattern of exterior tiles on the library of the Taihoku Imperial University.</td>
<td>261</td>
</tr>
</tbody>
</table>
5-26 Detail photograph of the attachment pattern of exterior tiles of the buildings in the Tokyo University. _______________________________________________________________261
5-27 Modern photograph of the original library of the Taihoku Imperial University. _________________262
5-28 The cladding of the entrance to the original library of the Taihoku Imperial University. _______________________________________________________________263
5-29 Diagram of the surface finishing from the exterior to the interior of the main entrance to the original library of the Taihoku Imperial University. ___________________________________________264
5-30 Diagram of the surface finishing of the exterior; the section from the interior to the exterior walls of the southern partition of the library; and the internal elevation of the original library of the Taihoku Imperial University. ___________________________________________266
5-31 Diagram of the surface finishing of the exterior; the section from the interior to the exterior walls of the northern partition of the library; and the internal elevation of the original library of the Taihoku Imperial University. ___________________________________________267
5-32 Lamination of historic maps of the area around the Chia-Yi Station showing the industrial rail connections. ___________________________________________________________269
5-33 Contemporary photograph of the Chia-Yi Station. ___________________________________________270
5-34 Floor plan of the Chia-Yi Station. _________________________________________________________272
5-35 Eastern elevation of the Chia-Yi Station. _________________________________________________272
5-36 Archival drawing showing the arrangement of rebar (reinforcing steel) of the Chia-Yi Station. _______________________________________________________________273
5-37 Detail photographs of the main entrance to the Chia-Yi Station. ______________________________274
5-38 Detail photographs showing pebbledash employment of the Chia-Yi Station. _______________275
5-39 Comparison between the classical egg-and-dart frieze and the head edge lining on the elevations of the Chia-Yi Station. _______________________________________________________276
5-40 Employment of different kinds of veneer of the Chia-Yi Station. __________________________277
5-41 Scale drawings of internal elevations and detail photographs of the main hall of the Chia-Yi Station. _______________________________________________________________278
5-42 Carving of fake attachment pattern on the elevations of the Chia-Yi Station. ______________279
5-43 Diagram of the surface finish from the exterior, and the section to the interior of the exterior walls of the Chia-Yi Station, with modern photographs of the external façade and the interior elevation. _______________________________________________________________280
5-44 Site plan of part of the Taiwan Exhibition of the Fortieth Anniversary of Governance. __282
5-45 Modern photograph of the Taipei Public Hall. ______________________________________________283
5-46 Ground floor plan of the Taipei Public Hall. ______________________________________________284
5-47 Eastern elevation along with details framed of the Taipei Public Hall. ______________________285
5-48 Archival drawing of the steel beam over the performance hall of the Taipei Public Hall. _______________________________________________________________285
5-49 Detail photograph of the northern elevation of the Taipei Public Hall. 286
5-50 Detail of the general cladding of the elevations of the Taipei Public Hall. 287
5-51 Overall cladding of the interior of the main entrance of the Taipei Public Hall. 287
5-52 Internal shape of the rhombus-shaped window of the Taipei Public Hall. 287
5-53 External shape of the rhombus-shaped window of the Taipei Public Hall. 287
5-54 Archival southern elevation and detail photographs of the Taipei Public Hall. 289
5-55 Diagram showing the relationship between the enclosures of the eastern elevation of the Taipei Public Hall. 290
5-56 Diagram of the claddings of the partly southern elevation, the section with horizontal circulations and the opposite internal elevation of the Taipei Public Hall. 291
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Chapter 1

Introduction

1.1 The Complexity of Architecture on shaky Ground

The pursuit of authenticity is one of the oldest themes in architecture. Yet buildings have been clad with masonry veneers for many centuries, despite veneer being regarded, in modernist theory at least, as an inauthentic form of building. In the twentieth century, for example, Modernists believed that architectural authenticity should be demonstrated in the honest and truthful use of materials, and they condemned the employment of masonry veneers which they regarded as being contrary to this ethos. Even so, many well-known Modernist projects struggled with the ethos of material honesty and truthfulness. Many Modernist projects could not escape from the logic of veneers, facades and cladding.\(^1\) Such long-standing dilemmas can be seen expressed in contemporary debates about structure and ornament.

Theoretical discussions about architectonics and debates on structure and ornament have been particularly lively in the Western world, including historical, contemporary and also

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\(^1\) Mark Wigley, White Walls, Designer Dresses: The Fashioning of Modern Architecture
virtual architecture. If we consider the approach and background of the theorists and architects who have put forward their ideas about these issues, we find that most of them have had very similar cultural backgrounds and theoretical approaches. Their education in classical architecture was largely based on Greek and Roman architecture and temples, with Vitruvius’s *Ten Books on Architecture* as a fundamental source. However, if we approach this theme from another angle, we might find that most of the major scholars had little experience of other countries and their cultural influences. Obviously this would be a problem if they were to attempt to employ their theories to examine empirical works outside this particular cultural background.

Social and cultural contexts also affect architectural performance; referring to Andrew Ballantyne’s address on the subject of architecture as evidence, Elvan Altan Ergut asserted that ‘the material evidence (the building) may not be enough in itself; it has to be supplemented with the knowledge of the “context” that can be acquired from textual evidence. And the built space, often shaped by “aesthetic” concerns, constitutes a setting for “social performance” that renders historical study of architecture an enterprise about aesthetical, utilitarian and social issues.’ If we agree with this idea, then any discussion of the tectonic expression of architecture in a non-Western world should include these various considerations alongside conventional theoretical tectonic discussions.

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In addition to the cultural differences that might colour the old debate on architectural structure and ornament, geographical aspects of a particular context also have an important influence on the parameters of this debate. In geographical areas which are vulnerable to seismic activity, for example, the relationship between structure and ornament is likely to be recast in significant ways. Where buildings are likely to shake, literally, then the question of how the expressive functions of architecture relate to its structural ones is clearly very important. Taken together, cultural and geographical specificity will inevitably impact on discussions of structural stability, architectural tectonics, cladding, ornament and architectural expression.

Jacques Derrida’s famous appropriation to architecture offers a good example of the difficulties with geographical specificity. When Derrida articulated his philosophical project around a mistrust of conventional and foundational assumptions of reason, he insisted that paying attention to the detailed differences in a text was important. He referred to this kind of close reading quite directly as ‘a sort of great earthquake, a general tremor’.\(^4\) When he talked about the theoretical understanding of institutional structures in California, where he had been invited to speak, and where there exists an obvious literal seismic hazard, his metaphor confronted a more literal geographical condition.\(^5\)

\(^4\) ‘Deconstruction mistrusts proper names: it will not say “Heidegger in general” says thus or so; it will deal, in the micrology of the Heideggerian text, with different moments, different application, concurrent logics, while trusting no generality and no configuration that is solid and given. It is a sort of great earthquake, a general tremor, which nothing can calm.’ Jacques Derrida, ‘I Have a Taste for the Secret’, in *A Taste for the Secret*, Giacomo Donis and David Webb (eds) (Cambridge, UK: Polity, 2001) p. 9.

\(^5\) At a symposium held in California, USA, in the Spring of 1987, Derrida clarified his idea about states and theory by stating that ‘we are used to theoretical earthquakes here, and institutional architectures are erected to respond to the seisms or seismisims of all the new
Just as Derrida employed the Californian earthquake to illustrate his Deconstructivist concepts, Mark Wigley also used it to clarify ‘an effect of the repression of the uncontrollable movement in its very foundation’, while the uncontrollable movement was literally linked to seismic trembling.\(^6\) Because Wigley used the resemblance of trembling to reveal concepts of Deconstructivist architecture,\(^7\) and Derrida used the analogy of seismology to explain the understanding of Deconstruction, it appears that metaphorical seismic effects could provide a basis for them to demonstrate the differences in their thinking from conventional approaches. Based on this evidence, if we bring seismology from the metaphorical back to the literal, geological condition of the shaky ground, what will we encounter?

Whenever architecture emerges from a set of specific cultural or geographical conditions, theories that were developed outwith those conditions are unlikely to be directly applicable. Often where the theory of architecture is developed in one place and then applied to another, we can see difficulties in adapting it. For instance, we can think of the difficulty that architects had in adapting long-standing conventions about stability and security to the earthquake prone parts of the world in west coast America, Italy or New Zealand.


\(^7\) 'This estrangement sets up a complicated resonance between the disrupted interior of the forms and their disruption of the context, which calls into question the status of the walls that define the form. … The wall breaks open, and in a very ambiguous way. There are no simple windows, no regular openings puncturing a solid wall; rather, the wall is tormented – split and folded'. Mark Wigley, 'Deconstructivist Architecture', in Deconstructivist Architecture, Philip Johnson, Mark Wigley and Museum of Modern Art (eds) (New York N.Y.) (Boston: Little, Brown, 1988) p. 18.
The architectural professions in countries which suffer from seismic hazards often struggled to come to terms with the seismic threat in material and theoretical terms. Japan is a perfect illustration of this condition. The Japanese had a sophisticated understanding of traditional construction techniques and a sense of tectonics was integrated into their apprenticeship system long before the influx of Western technology as they to Japan. However, they rarely discussed the theoretical ideas would be recognised by Western academics. Even nowadays, after more than a century of Westernisation, Japanese architects do not usually discuss the theoretical issues relating to seismological conditions in Japan. In such circumstances, directly employing conventional theoretical discussions to examine this kind of architecture is inappropriate.

However, introducing an entirely new theory and concept for discussing tectonic expression in architectural projects in seismological regions might also be unsuitable. On the one hand, it will be seen in later discussions that theories and discussions regarding tectonic expression have been developing over a long time. It would be too ambitious to abandon this development entirely and establish a new concept in order to discuss this complex issue. On the other hand, to create a significantly new discussion system also makes it too difficult to communicate with the rest of the world. It might be considered as a barrier to people attempting to understand different concerns around the world.

Architecture today emerges, after all, from both global and local systems of production. Nonetheless, merely noticing the diversity of cultural and geographical contexts would not help anyone to understand the architectural theories and related debates in a particular context and, more importantly, it would obfuscate communication to the general public on the meaning of architecture. What might such theories mean for a
building which could literally ‘shake’ in this milieu? The adaptation of theories developed for diverse conditions will require additional interpretations to communicate the meaning of this specific kind of architecture. The way in which we can understand diverse architectural objects is to identify certain expressions which may seem eccentric from a conventional understanding but which actually represent important local concerns.

Such representations actually signify those factors, and the way that the buildings transmit meanings is a semiotic issue. The connection between semiotics and architecture has been developing for several decades and metaphorical signs are still, through the debate on iconic buildings, for example, popular in architectural design and its critical interpretation. If we step back for a moment to review historical architecture in general, it should not be difficult to realise that cultural phenomena and meaningful implications are ubiquitous in architectural discourses. Indeed, many semiotic terms are frequently referred to, either consciously or unconsciously. Therefore, our concerns about the architectonic expression of architecture in the non-Western world, especially where there are seismic hazards, should be approached with a refined sensitivity. The semiotic interpretation of tectonic choices could perhaps provide a ‘platform’ from which to understand the meaning of architecture and the metaphorical implications of the cultural and geographical conditions.

This thesis, therefore, opens with an exploration of the impact of seismology on the Western architecture, and why it is overlooked in discussions about tectonics and in the debates surrounding structure and ornament. The kind of natural disaster that can occur through seismic activity in the Western world was certainly problematic but is elided in
most debates on ornament and structure. It seems that the complex conditions on shaky
ground distracted the scholars from orthodox considerations of architecture.

My motivation and methodology in the research presented in this thesis needs to be
clarified, as any attempt to formulate an alternative interpretation of architectonic
expression for projects located in different geographical and cultural settings requires
explanation. The unique cultural and seismological milieu of buildings in Japan warrants
some discussion. Japan, which was isolated from the rest of the world for hundreds of
years, was forced to open its borders in 1853. This historic event and, later, Japan’s
willing Westernisation created a unique cultural environment. Moreover, Japan’s
Westernisation strengthened its powerbase, enabling it defeat China, and gain the colony
of Taiwan as part of the spoils of war. Taiwan became a dependency of Japan (between
1895 – 1945); but its geographical proximity also meant similar seismic hazards. So this
thesis takes both Japan and Taiwan as its geographical and cultural context. Both places
are subject to similar seismic threats, and each is related to the other through the
relationship of coloniser (Japan) to colonised (Taiwan). I shall detail this aspect together
with the consequent practical outcomes in my research. My archival and fieldwork for
this research is fully documented, and the concept of interpreting illustrations of
empirical material in Japan and Taiwan is also set out in later sections.

An understanding of the various architectural debates, specifically concerning the
relationship between ornament and construction, is a crucial component of this thesis. It
appears that the related discussions have been numerous but their arguments have been
complex. I propose, therefore, to catalogue the different criteria of the relationship
between ornament and structure in order to understand their inter-connectedness. This is
followed by a detailed examination of the work of two architects whose work embodies related but distinctive attitudes towards structure and ornament, namely Louis Kahn and Robert Venturi. Following an analysis of some of their well-known built work, and some of the concepts and academic interpretations that emerged from it, I propose to trace the origin of the relevant semiotic terms and map out their link to architecture. Architecture often embodies a meaningful consideration of certain complex conditions such as materiality. In reading the meanings of architecture, it seems reasonable to borrow from semiotics - the communicative system of signs.\(^8\)

Semiotic interpretation should help us to read architecture. Moreover, as a means of articulating the wider questions of structure and ornament, their meanings and how they change in different environments, I shall borrow a term from archaeology: skeuomorph. This archaeological term, which has a techno-ornamental morphology, was actually understood in the architectural profession for a long time without being named. However, it deserves to be properly understood, as this will help to clarify the cultural and geographical factors related to architectonic expression.

The later chapters represent the core section of this thesis, where the historical background and physical information of empirical material are discussed. The Western invasion of an isolated Japan and attendant Westernisation inform the specific milieu in order to create a more complete picture of the Japanese approach to architectonic expression. In this respect, it is important to consider the role of Taiwan in Japan’s adoption of Western values. I have therefore selected ten architectural projects in Japan

and Taiwan for particular study because of their significance in the development of tectonic form and cultural expression. Projects by Western practitioners were favoured in order to demonstrate Western influence on Japanese culture. Projects by local architects are also presented to illustrate their tectonic predilections. Additionally, the selection of the final Japanese project was based on the architect’s earlier experience in Taiwan. The differences between this architect’s work in Taiwan and the work he undertook in Japan not only highlight the contrast between Japan and Taiwan, but also reveal some important developments that were driven by a response to seismic activity, in this case the Great Kanto Earthquake (1923). Moreover, the Taiwanese projects were selected as being representative of general national traits. Only tectonic information is provided in this section of the thesis, but a broader discussion of the projects and the influences of the relative factors are addressed in the final section.

I intend to set out my argument for an alternative approach to examining architectonics in the Far East, especially from the Westernising period until the end of the Second World War. Using conventional notions concerning structure and ornament (as reviewed in the second chapter) for the selected projects is somewhat limiting. Such interpretation might generate two kinds of theoretical approach, and each project might contradict an other. Certain theoretical ideas could explain several kinds of material expression but appear to be dramatically different. The architectonic form of such projects appears to be ambiguous. Indeed, contemporary debate regarding ornament/structure and architectonic expression cannot be assessed under universal conditions. It is inappropriate therefore to employ conventional thinking in regard to architecture in the Far East, given the complexities of context and culture conditions including the threat of earthquakes and the legacy of Westernisation. To address this complex state of things, I propose to consider
the material form of specific architectural projects within their individual cultural and geographical milieu, and the morphological implications derived from semiotic expressions of their material forms. The combination of architectonics, skeuomorphy and semiotics can provide an alternative perspective for projects in this context. It can also expand on the current debates regarding structure and ornament, even if my argument will be shaped by the interplay of specific geographical, cultural and tectonic conditions.

It should be noted that the research presented in this thesis does not provide a general account of all Japanese and Taiwanese architecture during the pre-war period. Instead, the selected projects will enhance understanding of architectonic expression (particularly the Western-influenced projects) especially in terms of their interior and exterior cladding. I have excluded the majority of traditional Japanese architecture, especially religious architecture, which is still constructed in timber using ancient construction methods, and largely escaped the effects of Western influence.

1.2 Earthquakes in the Western World

It is not feasible to employ conventional theories and philosophies when considering architectural projects located in areas affected by extreme physical manifestations, such as earthquakes. Moreover (as mentioned above), the cultural impact of different (non-Western) backgrounds and the various attempts to imitate Western models, has had a significant influence on architectural form. However, given the complexities of my proposed approach, I shall first review the relatively simple seismic impact on the Western world, and discuss other aspects in greater detail in the subsequent section.
Those earthquakes, which occurred in the nineteenth and twentieth centuries along the Pacific coast of the United States, in Italy and in New Zealand, offer empirical data for this approach. The geographical phenomenon of seismicity has already had documentable effects on different architectural traditions, and architecture built on shaky ground is never simple.

1.2.1 The 1906 earthquake in San Francisco, USA

Before 1906, San Francisco had suffered many serious disasters, including six fires in three years (from 1849 to 1851), and two earthquakes in 1865 and 1868. On the one hand, astonishingly frequent fires led to considerable concerns about fireproofing construction. As a result, flammable materials such as wood were avoided for building, and masonry construction was the preferred choice. In addition, in 1852 city planners also introduced the first building regulations stipulating fire-resistant construction and the introduction of the concept of a ‘fire district’ to prohibit the use of flammable materials for new construction.9

Of course, the switch to masonry construction was promoted because of its fireproof characteristics, rather than any resistance to seismic activity. Fireproofing had been the crucial issue in San Franciscans’ minds until a major earthquake on 8th October 1865 - estimated at 6.5 magnitude on the Richter scale.10 Thereafter, experts focused on the

10 Since the Richter scale was not developed until the 1930s when Charles Richter was working at the California Institute of Technology, the scales for earthquakes happening before then are all estimated. Ibid. pp. 40-1.
hazards of filled ground, which originally was not proper ground for building, and the falling of stucco finishes from exterior walls. They argued that the ground was inherently unstable and any buildings were likely to be at risk. Stucco, which was often employed to imitate expensive stone and could be fastened to a structural backing using iron rods or brackets, came to be a threat to public safety.

Although the 1865 earthquake drew attention to the dangers of filled ground and collapsing exterior cladding, it did not alert public understanding to the dangers of pure masonry construction in seismic shakes. Except for an editorial in *Alta California* appealing that brick should no longer be considered, it seems that most people had insufficient time to consider the use of different materials before the next earthquake occurred.\(^\text{11}\)

Three years after the 1865 earthquake, another more serious earthquake hit San Francisco on the morning of 21\(^{\text{st}}\) October 1868 - estimated at 7.2 on the Richter scale.\(^\text{12}\) This earthquake seems to have sparked greater concern than the previous, because soon after city officials founded the Joint Committee on Earthquakes to investigate the consequences. Although the official committees established to investigate the earthquake aftermath did not publish a completely final report, various publications by individual committee members contained their summary comments. Wood was now considered the most suitable earthquake-resistant material, if the flammability of wood could be overcome mechanically or chemically. The poor quality of masonry mortar was considered a major cause of damage, and the use of iron ties to bind buildings together

was also widely discussed. It was suggested that brick, stone and cast iron should be avoided, but timber and wrought iron were recommended. Soft ground was the primary concern of one sub-committee. In terms of building regulations, some codes were drafted but none were examined critically, or put into practice.\(^{13}\) However, some different types of reinforcement of brick construction, such as bond iron and iron bracing, were introduced.

The damage done by the 1868 earthquake resulted in the development of enhanced earthquake-resistant structures built especially of brick with iron. At the beginning of the subsequent reconstruction of the city, timber frames with brick walls were widely used to create earthquake-proof structures. The characteristic of this kind of construction was ‘cheap, dependable interior timber frames’ and became the preference of many architects and engineers. This offered ‘flexibility for their brick buildings’, since the fastened wood frames were attached to exterior brick walls by iron anchors.\(^{14}\) However, reinforced brick construction, namely brick with iron bonds, gradually became a more popular construction system for later projects. The assertion that ‘wood had yielded its place as an earthquake-resistant structural material to innovations in brick and iron’ probably indicates many local architects’ and engineers’ perceptions regarding the permanence of brick.\(^{15}\)

In addition, steel-frame construction was introduced in the later decades of the nineteenth century, especially for high-rise buildings. Architects and engineers adopted steel framed structures in preference to wood framed around the 1880-90s. But they still used brick

\(^{13}\) *Ibid.* pp. 53-7.
\(^{15}\) *Ibid.* p. 82.
and granite on the exterior walls to clad the steel frame. They used iron brackets to fasten the masonry façade onto the steel frame to counter earthquake damage and spalling. However, the issue of earthquake resistance gradually disappeared from the pages of the major newspaper publications of San Francisco. It seems that the threat of earthquake damage was downplayed, although several small earthquakes hit the city during the 1880-90s.

Another seismic disaster shook the city at 5:13am on 18th April 1906 and the subsequent fires compounded the immediate damage. The quake measured 7.9 on the Richter scale and resulted in the collapse of numerous buildings, and immediately sparked several fires both inside and outside the ‘fire district’ – the designated zone where flammable materials had been prohibited in all post-1852 construction. Fatalities due to the earthquake and fire were estimated at almost 1,500. The post-quake firestorm lasted three days and devastated the city centre.

Obviously, San Franciscans had to face up to the problems of seismic and fire hazards simultaneously. Tobriner catalogued the damage done by either seismic shock or fire from photographs and panoramas taken before and after the calamity. So much was in ruins, and although some buildings survived the earthquake their wooden or steel frames

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16 Ibid. p. 91.
18 It was estimated as having a Richter magnitude of 8.25, but later seismologists downgraded it to between 7.7 and 7.9. Ibid. p. 106 and Gordon Thomas and Max Morgan-Witts, Earthquake the Destruction of San Francisco (London: Arrow, 1981).
were destroyed by the heat of the subsequent fire.

The built fabric of San Francisco in 1906 could be divided into two categories: one consisted of timber or steel frame buildings clothed with brick, stone or terra-cotta tiles fastened with bolts or anchors. The second category comprised masonry construction, mainly of brick, while some structures were reinforced with iron bonds. The assumption was that framed structures would have had a greater likelihood of surviving the quake. But if the surface cladding had spalled, and resulted in the loss of the fireproofing, then a building might not survive the fire. Fire-treated timber, as proposed by the Joint Committee on Earthquakes sub-committee in 1868, was never really popular, and obviously untreated timber in a fire was hazardous. However, steel frame could not survive a great inferno either because the heat of the fire would easily reduce the compressive strength of the iron. Examples such as the Grand Hotel, built in 1870 of wood-framed brick strengthened by iron bolts and anchors, and the Chronicle Building, built in 1889 as a combination of load-bearing walls and an iron and steel support frame, were both famous projects which illustrated these phenomena.

Although some brick buildings were reinforced with iron straps and other materials (developed after 1868), the loss of masonry buildings was less than people had anticipated. Certainly, un-reinforced masonry constructions were seriously damaged. Falling bricks, cornices and parapets crushed people in the streets below and collapsing

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chimneys destroyed neighbouring roofs and the people inside.  

Reinforced concrete, now considered to provide optimum resistance, was not approved of at the time as a reliable material. Before the quake, concrete was often used for columns and floors in steel-framed buildings but was not permitted in high rise structures or load-bearing walls. However, the Stanford Museum, constructed in reinforced concrete, performed well in the earthquake, whilst nearby brick buildings failed terribly. Nonetheless, concrete was eventually recognised in the building codes after the earthquake, despite many objections from rival manufacturers and a sceptical general public with an aesthetic dislike. The support of several professional organisations and an urgent need for rebuilding helped sway the authorities.

The new code (introduced in 1909) also reshaped the classification of structures. So, concrete walls were deemed appropriate for use in Class A buildings, where the entire structural loading was borne by a frame structure. Whereas a reinforced concrete frame in Class B assumed that the exterior wall carried its own weight and the frame carried the primary loads. Many architects and engineers now viewed reinforced concrete as an appropriate substitute for brick and suitable both earthquake and fire proofing, although a steel structure was still favoured as the modern earthquake-resistant building type.

Cladding façades in brick, terracotta and plaster not only provided ornamentation but also protected the structure. The danger inherent in the failure of the exterior cladding

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26 Ibid. pp. 204-5. The classification is based on its fire resistant ability. ———, Bracing for Disaster: Earthquake-Resistant Architecture and Engineering in San Francisco, 1838-1933 p. 140.
has been mentioned above; but the existence of a cladding layer over a structure was still necessary for the protection of the structure and favoured for aesthetic reasons. Professor of Engineering, Charles Derleth, condemned the use of terracotta for ornament and structural protection as insufficient, since some steel frames might still undergo stress and buckle because of the heat of an intense fire. Brick cladding however might crack but remained largely intact. Certainly, brick and/or terracotta claddings could not be banned in San Francisco, since they were still acceptable in both New York and Chicago, whose building codes were much more stringent (despite the low occurrence of seismic quakes).  

According to the San Francisco code, the choice in exterior cladding for a Class A building could be either brick, terracotta or concrete. The stone-masquerading terracotta tile was very popular before and after the 1906 earthquake, as it was considered the most adaptive material available and was employed as ‘faux stone’ in some projects. Because of the heightened risk of seismic activity, cornices were required to be securely attached with anchors onto steel supports and parapets required appropriate reinforcement with iron brackets.

It should be noted that the inadequacy of pure masonry construction in case of seismic hazard was already identified in the nineteenth century. But the stereotypical image of the heavy, stable, stone façade proved enduring. Therefore, on the one hand, reinforced masonry construction remained a popular option until the earthquake-resistant reinforced concrete construction had proved itself after the 1906 earthquake. However, on the other hand, the reliability of timber frames under seismic stress was also favoured by many

28 Ibid. pp. 206, 217.
29 Ibid. p. 205.
architects who employed framed structures but then clad them in imitation of pure masonry façades. A timber frame with a masonry façade was an attractively economical option, and this bias later shifted to steel frames clad in masonry-like surfaces.

Despite the advice recommending that surface cladding should be abandoned after the 1865 earthquake, and repeated after the 1868 and 1906 earthquakes, it was difficult to ban it by legal regulations. The negative effects of attaching surface materials were highlighted; for example, it could be weakened during the quake and might fall and injure people. Nonetheless, the employment of surface cladding had another purpose, namely; to protect the hidden structure from weathering and, more importantly, from fire hazard. For these reasons as well as people’s aesthetic preferences and economic considerations, it was retained. Architects and building professionals could only attempt to find stronger mechanisms for fixing the attachment on architectural surface.

It appears that even when faced by both kinds of natural disaster, most people could still not abandon their conventional understanding of the structural system and their preferred taste in façade treatment. They could only attempt to learn some lessons from earlier disasters and conventional approaches. As San Franciscans reconstructed their city from the ruins of the 1906 disaster, earthquakes occurred in other places as well. The most terrible occurred in southern Italy at the end of 1908.

1.2.2 The 1908 earthquake in Messina, Italy

On 28th December 1908, a major quake estimated at 7 on the Richter scale hit southern
Italy, and the towns of Messina and Reggio suffered particularly badly. The earthquake not only led to subsequent fires, but also a tsunami with a maximum wave height of twelve metres. In seismological scale this quake was less powerful than the 1906 earthquake in San Francisco and the 1891 earthquake in Mino Plain, Japan (estimated at 8.4 on the Richter scale and to be discussed in detail in a later chapter), but, the casualties and destruction caused were probably the most disastrous of these three events. This 20-second shock killed nearly 100,000 people living in un-reinforced masonry buildings in the centres and the region. The casualties in Messina (60,000 people) comprised some 42% of the population - an awful level of fatality. Moreover, around 98% of the houses in the area collapsed totally or partially.

The accompanying tsunami and fire worsened the damage even more. An earthquake occurring around the coast usually generates a tsunami, and this one proved no different, with high waves, ‘as if a mine had exploded underneath [the tsunami] and … a mountain of water’ were witnessed. As had happened in San Francisco in 1906, the raging fires in

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Messina were very serious, but, fortunately, not so in Reggio.  

The seismic damage was investigated, and provides a valuable source for our understanding of the problems relating to construction and materiality. The Japanese seismologist, Fusakichi Omori, visited Messina and Reggio to investigate the effects of the earthquake. He published his findings in the first issue of the English version journal of the Imperial Earthquake Investigation Committee in 1909. He not only surveyed the ruinous buildings but also remarked on the lethal nature of this earthquake compared to the Nobi earthquake (1891) in Japan. Omori asserted that an inadequate construction system i.e. masonry construction, had resulted in higher levels of fatalities and casualties.

An Italian engineer, Alfredo Montel, also examined the crumbled remnants and put forward his ideas about construction and suitable materials for the seismic conditions. He believed that the serious casualties confirmed the unsuitability of the local construction methods. He considered timber as the ideal material for earthquake resistance as well as iron, since both are elastic. However neither of them could survive a conflagration. He also confirmed that, in his understanding, the masonry/brick construction was the primary system in both cities. He admired the fact that masonry construction was heavy but he ascribed the blame to the mortar bond: not elastic, fragile but with an uncertain tensile strength. He specifically referred to reinforced concrete as a recently-developed

39 Montel, Building Structures in Earthquake Countries, p. 15.
material that showed great promise in enduring earthquakes as well as fire. As a result, he proposed reinforced concrete to be the ‘perfect’ material for earthquake resistance.\(^\text{40}\) After the quake, the Italian Government instituted a new seismic code to stipulate the resistance to lateral force for all buildings and the requirement for timber-framed masonry construction and reinforced concrete.\(^\text{41}\) According to Montel, it appeared that reinforced concrete was widely accepted by professionals in preference to other construction methods. Although the timber-framed masonry construction was stipulated in the relevant regulation, and both Omori and Montel agreed over the seismic resistance of wooden frames, they suggested some caution regarding traditional masonry construction. Montel did not recommend wooden frames for the Italian reconstruction, primarily due to the flammability of timber, thus disregarding the fact that San Franciscans considered that masonry cladding could protect the structural timber frame from the fire hazard.

The Japanese expert expressed doubts about the masonry construction; whereas the Italian scholar insisted on seeking the improvement of masonry construction or the use of reinforced concrete. In fact, reinforced concrete resolved Montel’s dilemma and could substitute for structures. However, this report showed that masonry, although still inadequate in terms of earthquake resistance, remained popular and difficult to abandon. Construction methods with a similar appearance, i.e. reinforced concrete, were strongly recommended as an alternative. Although Montel attempted to provide scientific evidence concerning seismic resistance, the cultural preferences and ideological

\(^{40}\) Ibid, pp. 26-7.

conventions still predominated.

Information from both the 1906 earthquake in San Francisco and the 1908 earthquake in southern Italy highlighted the appropriateness of reinforced concrete in terms of earthquake proofing. The timber frame, however, was still not favoured as either a visible or concealed structure. In Montel’s understanding flammability was the major factor in the decision to reject or to hide it, but a non-convention of timber frame has been shown to be the important reason of his decision.

1.2.3 The 1925 earthquake in Santa Barbara, USA

The Pacific Rim seismic belt again caused serious seismic damage in 1925. This occurred in Santa Barbara, on the western seaboard of the United States, and sparked further debate about construction systems and architectural style. Unlike the southern Italian towns, which had evolved over hundreds of years, Santa Barbara was a relatively new city. Santa Barbara’s cityscape, although distinctively American, could also boast of the special characteristic in its ‘legacy of the old Spanish adobes’. In the 1840s, an English sea captain, Sir George Simpson, described the city, recalling memories of Europe and the Mediterranean, as ‘the whitewashed adobes and the painted balconies and verandas [sic] form a pleasing contrast with the overshadowing roofs’, which ‘was transferred from its Hispanic past to its Anglo years’. Moreover, these *esprit du corps*

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42 David Gebhard, *Santa Barbara, the Creation of a New Spain in America: An Exhibition Organized for the University Art Museum* (University Art Museum, 1982) p. 10.
43 Sir George Simpson, *Narrative of a Voyage to California Ports in 1841-42, Together with Voyages to Sitka, the Sandwich Islands & Okhotsk, to Which Are Added Sketches of*
images had been protected since the 1890s. A neo-Spanish colonial movement started with the Mission Revival for Housing on the Crocker Estate designed by the San Francisco architect, Page Brown, and completed in 1894.  

A connection to their Mediterranean architectural heritage was important for the townsfolk of Santa Barbara. They not only supported preservation initiatives from as early as the end of the nineteenth century, but also promoted this for the future mainstream in the first two decades of the twentieth century. Besides the Mission Revival, another favoured style in pre-1920 Santa Barbara was the Mediterranean Style, with stucco and tiled roofs. Santa Barbara and California possessed an Hispanic adobe tradition: and because they favoured this particular style, decided, after the First World War, to make their new business blocks Hispanic/Mediterranean in design.

The Plans and Planting Committee (PPC) in Santa Barbara was founded in 1922 and its aim was to ‘increase public awareness of and appreciation for architectural quality and integrity’ and to act as the guide for ‘the necessary rebuilding according to its own uniform architectural and stylistic program’. At the beginning of the 1920s, the nineteenth century adobes were restored by the PPC in order to rehabilitate the existing adobes and erect new Hispanic/Mediterranean buildings to create a citywide homogeneous

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44 Gebhard, *Santa Barbara, the Creation of a New Spain in America: An Exhibition Organized for the University Art Museum*, pp. 11-12.


architectural imagery. Not only was the City Planning Commission (CPC) formed in 1923, but, the following year, the Architectural Advisory Committee (AAC) was also established by the PPC, to wrest control of the building codes and amend the zoning.

The public attitude towards the adopted architectural styles was shaped by professional enthusiasm before the earthquake, and would be confirmed immediately after the disaster happened.

The earthquake hit Santa Barbara at 6:44am on 29th June 1925 between 8 - 9 on the Rossi-Florel scale, the equivalent of around 6.2 on the Richter scale. The fact that casualties were low, namely twelve deaths and fifty injured, was due to the early hour of its occurrence. At that early hour, the pavements, streets and schools were not crowded with people, so that people were not killed by falling ornaments on streets. In fact, the quake reduced about thirty blocks to mere debris, so it still caused dramatic damage. The city needed not only to be reconstructed but problems had also been revealed regarding construction methods instituted to safeguard against future seismic hazards.

The destruction caused by the earthquake was undoubtedly serious, and an accurate

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50 Gebhard, *Santa Barbara, the Creation of a New Spain in America: An Exhibition Organized for the University Art Museum*, p. 20.
52 Gebhard, *Santa Barbara, the Creation of a New Spain in America: An Exhibition Organized for the University Art Museum*, p. 20.
analysis was vital. Arthur Carl Alvarez was commissioned to report on the quake’s effects on buildings and provide his findings about the structural damage caused by the disaster. Un-reinforced masonry buildings performed badly.\(^5^6\)

Moreover, the cladding of exterior walls also suffered significant damage. Parapet walls of brick, cut-stone or hollow tiles as the veneers of façades and cornices, which were often not properly tied back to the structure, fell into the streets and smashed.\(^5^7\) This kind of damage had led to significant injuries for people on the streets in San Francisco in 1906. The findings from San Francisco suggested that surface ornamentation should be avoided but this proposal was ignored. This suggestion was partially followed in the reconstruction projects in Santa Barbara, but primarily because it accorded with the architectural style decided before the earthquake not the warning of falling ornaments.

Following the earthquake, reconstruction work was complex and diverse. For developing policy strategies, the Committee of Public Safety and Reconstruction, which consisted of local architects and other professionals as well as businesspeople, was founded immediately by the City Council and tasked with handling reconstruction.\(^5^8\) A Community Drafting Room was also formed to provide professional assistance for people whose property had been damaged, but who were unable to afford an architect’s services.\(^5^9\)

In this major reconstruction programme, local architects had many opportunities to boost


\(^5^9\) Ibid. pp. 408-9.
their workloads. In fact, the serious earthquake damage provided Santa Barbara with a rare opportunity to refashion its cityscape. Moreover, the newly-established committees and boards guided the reconstruction of ordinary houses in the city to be in their favourite Hispanic style. The chair of the AAC, Bernhard Hoffmann, provoked people by seeking to ‘[arouse] a desire and appreciation for good design especially along our local traditions’.

Because of the damage caused to cornices and cladding, and the promotion of the authorities, many architects abandoned designing complex ornamentation and started to adopt the newly-popular Hispanic style. Alvarez, however, urged that the building ordinance should limit the threat of falling cladding in design. The AAC was also required to review the new Building Code in order to absorb the lessons from damage caused by the quake. In 1926, prompted by failures highlighted after this earthquake, new municipal codes for Santa Barbara and Palo Alto were introduced to explicitly address seismic concerns. In 1933, after another serious earthquake hit the Long Beach area, the use of un-reinforced brick was eventually prohibited.

The 1925 earthquake in Santa Barbara produced relatively different reconstruction work compared with the 1906 earthquake in San Francisco and the 1908 event in Messina. Although the replacement of some old buildings had been proposed before the

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60 Gebhard, *Santa Barbara, the Creation of a New Spain in America: An Exhibition Organized for the University Art Museum*, p. 20.
61 Hastings, 'The Rebuilding of Santa Barbara'. p. 408.
63 Hastings, 'The Rebuilding of Santa Barbara'. p. 408.
earthquake, the damage provided an excuse to promote the Hispanic style. Because of this, the change in the construction system from masonry construction to reinforced concrete appears to have been relatively simple, with un-reinforced masonry being banned as the result of later quakes. Also, deriving from stylistic prejudices, surface ornaments were relatively fewer than those on buildings in San Francisco or Messina.

The practical strategies to ensure seismic resistance seemed very technical and scientific, but actually reflected wider cultural considerations. The abandonment of certain ornaments and construction systems was introduced relatively more easily in Santa Barbara (than in other regions mentioned above) mainly because of the local conviction regarding their architectural style.

1.2.4 The 1931 earthquake in Napier and Hastings, New Zealand

The other side of the Pacific Ocean also experienced a seismic disaster several years later. Napier in New Zealand, established in 1844, had been considered an English-style seaside resort, with a reputation for a warm and sunny climate.

Robert Park notes the fact that the city authorities in Napier had been immigrants from non-earthquake countries who brought their traditional European building procedures to this shaky ground. Although several serious earthquakes occurred in the mid-eighteenth century,
they were far before the period when immigrants arriving.

In 1926, probably the first book about earthquakes published in New Zealand entitled *Earthquake and Building Construction*, focused on the study of Japanese and American earthquakes. Charles Reginald Ford, the author, showed that the legal regulations for earthquake-resistant building construction in New Zealand were generally defective. However, neither the consensus nor the authorities took Ford’s warning into account until after the tragedy.

A disastrous earthquake occurred around Hawke’s Bay in New Zealand at 10:46am on Tuesday, 3rd February 1931, seriously damaging the cities of Napier and Hastings. It was recorded as 7.9 on the Richter scale and there were 258 casualties. As with many other earthquakes, fires broke out and destroyed even more buildings. Although both cities suffered due to the earthquake and subsequent fires, Hastings experienced less damage than Napier, and its rehabilitation and reconstruction was also faster. Thus, more people refer to this earthquake as ‘the Napier earthquake’ in regard to the city’s more serious loss.

The consequent fires and problems with inappropriate masonry construction resulted in even greater damage. Fires ignited in chemists’ shops in Napier’s business centre and razed the entire district. As Geoff Conly noted, ‘[what] the earthquake did not destroy in

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the business heart of Napier, fire did’. Most masonry constructions collapsed during the quake. What was even worse was that falling decorative features resulted in most of the casualties.

Relief and reconstruction work in New Zealand encountered severe difficulties due to the worldwide economic depression at the time. However, ‘Tin Town’ was the most notable post-earthquake construction in Napier. Trevor Geddis and James Fletcher proposed to build a shanty shopping centre, i.e. ‘Tin Town’, into temporary premises for retailers until the Public Works Department (PWD) cleared the city’s debris. On 16th March, fifty-four shops were opened in ‘Tin Town’, which was named after its shanty temporary character and its constructive material, located in Clive and Memorial Squares. So whilst it functioned as both a shopping centre and a social centre, it also signified a return to normal life and economic activity.

A range of construction methods and materials was reviewed and examined in advance of the reconstruction. Although brick became a suspect building material, due to its failure in terms of earthquake resistance, the chimney rebuilding was still expected to be undertaken in brick but employing additional reinforcement as well as more mortar being adopted to increase stability funded by the Government. However, suspicion surrounding brick was very strong, at least in the mind of the Minister of Education, who stated that all school construction in brick should cease. Not surprisingly, the Brick

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71 Ibid. p. 40.
72 Ibid. p. 3.
73 Shaw and Hallett, Art Deco Napier: Styles of the Thirties, p. 6.
74 Conly, The Shock of ’31: The Hawke’s Bay Earthquake, p. 100, 140.
75 Ibid. p. 150.
77 Ibid. pp. 203, 159.
Manufacturers’ Association was seriously concerned about the Minister’s edict and initiated a debate within the Building Advisory Committee (BAC), but there are no records indicating that the ban was lifted.\textsuperscript{78}

Timber construction was also reviewed and its performance was deemed to be generally good. But most timber buildings suffered damage from collapsing chimneys and lime-mortar plaster falling from ceilings and walls. Some inadequate diagonal bracing in roofs and walls also resulted in collapse. In addition, the conjunction of different materials, such as steel or concrete with brick or timber, also caused problems.\textsuperscript{79}

The Government established the Building Regulations Committee (BRC) after the earthquake with instruction ‘to prepare a report embodying such recommendations as it thought fit, with a view to improve the standard of building construction in the Dominion in relation to earthquake resistance’. The BRC formulated several new requirements, including clauses for incorporation into a universal building code throughout New Zealand whereby every building functioning for public meetings could be constructed using a structural frame of steel or reinforced concrete.\textsuperscript{80} This resulted in the establishment of a Building Code Committee (BCC) in 1934. The first Standard Model Building By-laws were issued in 1935 and in the same year, the BRC of the Department of Scientific and Industrial Research was established. In 1949 it became the Building Research Bureau and has retained its function to issue every building permit in New Zealand.

\textsuperscript{78} Ibid, p. 203.
\textsuperscript{79} Ibid, p. 208.
Zealand. Nonetheless, media reports as opposed to institutional actions largely shaped public opinion and the drive for reconstruction including the choice of architectural styles. Within a fortnight of the earthquake, a local newspaper published an article referring to the reconstruction of Santa Barbara and arguing for the need to prioritise a ‘uniform style for buildings’. This article mentioned the advocacy of the Spanish style in architecture and listed various advantages, including economy, simplicity and safety. An American-born architect, R.A. Lippincott, who lived in Auckland, supported this idea by commenting that ‘the elements of Santa Barbara's post-earthquake problems were identical with Napier's’. A more effective reason for the style employed was the cooperation of local architectural practices. J.A. Louis Hay, who was a founder member of the Napier Reconstruction Committee (NRC), was also a member of the Associated Architects of Napier (AAoN), which consisted of Hay himself, C.T. Natusch & Sons, Finch & Westerholm and E.A. Williams. The AAoN strongly lobbied the NRC to ensure that local architects rather than outsiders got the work. Thus, their discussions and decisions played a pivotal role in Napier’s subsequent rebirth.

The reconstruction projects undertaken by the above four architectural firms can be categorised into three kinds of approach: the Spanish Mission; the Chicago School, including design inspired by Frank Lloyd Wright; and the European Art Deco style, such as smooth stucco surfaces, geometrical forms and moulded angular relief decoration.

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81 Conly, *The Shock of '31: The Hawke's Bay Earthquake*, p. 211.
Certainly the Spanish style was preferred by Finch & Westerholm, while some works by C.T. Natusch & Sons and E.A. Williams were also executed in the Spanish style. This can be largely accredited to the impact of recent Californian architecture and the influences of the media and various publications.

The influences of the Chicago School were mainly reflected in Louis Hay’s work, although his early works in 1911 showed considerable impact of the English Arts & Crafts movement. His interest in Louis Sullivan and Wright could be discerned not only from his collections of their portfolios but also as indicated in his formal design and architectural ornamentation.

The so-called European Art Deco style was principally employed by E.A. Williams, and was also followed by J.T. Watson, who started practising in Napier after 1932. Stanley Natusch had brought back many images of what he had seen at the influential 1925 Paris Exhibition, L’Exposition Internationale des Arts Decoratifs et Industriels Modernes.

It is worth noting that indigenous Maori motifs were also adopted for several projects. The Wellington firm of Crichton, McKay & Haughton, for example, used Maori art in designing the stripped-back, typical Art Deco features on the façade of the Bank of New Zealand building.

As Paul Walker has suggested, ‘the Hawke's Bay earthquake gave impetus to the
stripping of ornament and meaning from the built, pushed architecture nearer to the status of the empty sign of modernism. The debate concerning architecture and earthquake is not only about construction systems and choice of materials but also concerns ornamental expression and the meaning of architecture. The governing authority of the relatively newly developed city and its residents did not have any experience of seismic hazards, so the warnings did not elicit any significant reaction. Although the earthquake and subsequent fire inevitably 'shook' them both literally and mentally, some of the subsequent reactions to the disaster were similar to previous circumstances in other cities, whilst others were unprecedented.

Although Napier’s amendments to the building regulations were not very thorough, the strategies adopted for reconstruction work proved very different from previous empirical cases. For instance, ‘Tin Town’ was very important in encouraging people who had suffered terribly to rediscover their self-confidence and retrieve livelihoods - certainly this kind of temporary support had not been introduced before. In addition, the protection of work for local architects was also unprecedented. Moreover, the legislation against brick in the construction of new school buildings was introduced, disregarding the objections of relevant industries.

However, the restoration of brick chimneys still suggested a conventional understanding of buildings. Although the damage done by the falling chimneys was very serious, the general consensus of public opinion wanted buildings with chimneys. Therefore, the Government bore the additional cost of restoring a chimney for each individual house.

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An unexpected connection with Santa Barbara was the choice of architectural style for the reconstruction. The decision to adopt the Hispanic style soon after the earthquake in Santa Barbara was reported in Napier. Other local architects also favoured the Art Deco style and therefore the proliferation of complicated ornamentation on façades was no longer popular.

In reviewing these disasters from the Western world, we realise that architecture built on shaky ground is very complicated. Any architecture which ignores earthquake resistance may not only succumb to structural collapse and loss of cladding, but also may lead to casualties, even fatalities.

The inadequacy of masonry construction in terms of seismic hazard has been evident since the 1868 earthquake in San Francisco. However, the prohibition of non-reinforced masonry construction was not practised anywhere until 1931 in Napier. Montel observed in Italy that its use was so widespread that it could not be easily banned. In Santa Barbara, for a variety of complicated reasons, including the press and political lobbying, it could not be easily prohibited either. Masonry construction, or more correctly, the masonry façade, was so important, that, before 1906, San Franciscans even developed a wood-framed masonry structural frame clothed with masonry materials.

The danger associated with façade cladding and attached ornamentation was also evident after the 1868 earthquake, and again in 1906. Although the 1925 earthquake luckily escaped this problem (due to the seismic event occurring in the early morning, when less people on streets who might be hurt by falling ornaments than ordinary daytime), the 1931 earthquake did cause a considerable number of casualties. Ironically, the abandonment of the attached ornamentation did not derive from escalating casualty
figures but from a shift in architectural style.

In the reconstruction work at Santa Barbara, they practised the Hispanic style as planned before the earthquake, but the reduction in surface ornament derived from their earlier plans rather than it being a reaction to the seismic hazard. Moreover, the introduction of a specific architectural style in Santa Barbara was considered an opportunity for Napier to abandon imported British conventions. They also abandoned masonry surface ornamentation because of an aesthetic preference for the new Art Deco style instead any seismic risks.

The seismic resistance of reinforced concrete had been confirmed during the 1906 earthquake. Before 1906, masonry construction still played a significant role, although San Franciscans understood that reinforcement of masonry construction was required. They understood the reliability of timber or steel frames, and employed surface treatments, such as masonry blocks or terracotta, to protect the framework from fire. The flammability of timber and steel’s susceptibility to intense heat still caused them to hesitate.

In Italy, although Montel understood the lateral elasticity of timber frames (which is good for seismic resistance), he was not able to shift attitudes on the employment of timber. Instead, he began to consider if reinforced concrete could be the preferred alternative. In Santa Barbara and Napier, they all employed reinforced concrete as the major structural material for their reconstruction work. It appears that although both timber and reinforced concrete frames offered good resistance to seismic lateral force, they chose instead a construction system similar in appearance to masonry construction.
In San Francisco, in Santa Barbara and in Napier, the governing authorities established several temporary reconstruction committees to undertake investigation and help guide the subsequent restoration. In Messina, the professionals also undertook similar tasks and embraced updated regulations of building codes to prevent inappropriate constructive elements, materials or systems from being continuously employed.

Unfortunately, conventional thinking inhibited sufficient forethought to minimise the potential dangers of such disasters. The strategy for these committees should have been practical and scientific, but, in fact, some of their decisions were influenced by cultural and conventional concerns. For instance, the fallen chimneys in Napier caused tremendous damage, and the elimination of chimneys should have been seriously reviewed. However, the Government paid for the restoration of a new chimney for each house. It appears that the psychological significance of the chimney for a house was stronger than the seismic hazard.

For architecture built on shaky ground, physical factors have influenced the structural design as well as the façade design. Moreover, as shown above, conventional and cultural concerns had greater bearing on the determination and choice of structural materials and the formulation of building regulations than relevant physical factors. Those physical aspects, including evidence of the inappropriateness of unreinforced masonry and the danger of falling ornamentation, seemed very scientific. However, those factors did not always determine the scope of the reconstruction work. On the contrary, the conventional understanding of construction such as the reliability of masonry construction, or the image of the house with a chimney, or the deliberate promotion of a new architectural style (such as the Hispanic style in Santa Barbara and Art Deco in Napier), determined
the restoration agenda.

It appears that people living in these regions were preoccupied with seismic-related problems and paid little attention to the bigger issues relating to ornament and structure. This may be one of the key issues being discussed in the Western world but it would be too arbitrary to suggest that these philosophical debates are not important for people living in seismic regions. On the contrary, it is essential to understand these discussions in order to further comprehend the problems faced by seismic hazard regions.

Here the choice of building material was crucial, and the combination of structure and surface ornament was practically embodied in diverse ways. The relationships between structure and ornament, therefore, were diverse and meaningful. Moreover, some cultural and conventional concerns discussed in the four selected cities were also crucial when considering architectonic form. As mentioned before, only being aware of this aspect was unsatisfactory.

1.3 Motivation

An architectural surface, often assumed to be merely the outer cladding of a building, is actually usually much more complicated. The architectural surface that we can see and touch usually conceals other layers in the construction. Furthermore, surface layers not only provide protection for the building structure and interior spaces, but also shape the aesthetics and meaning of the architecture. Handling the surface is one of the key issues for architects in managing the weather proofing of a building as well as presenting specific aesthetic effects and meanings.
The various debates on ornament and structure, specifically as they are activated, transformed and adapted in the context of the shaky and cross-cultural grounds of earthquake prone areas (described in previous chapters), has motivated my research for this thesis. It is clear that seismological considerations did not impact on structure-ornament debates which will be discussed in the next chapter, although these debates were often structured around cross-cultural matter. Some scholars, such as Gottfried Semper and Frank Lloyd Wright, seized on ideas from the non-Western world as a way of framing their understanding of ornament in architecture. Wright, who I will discuss in greater detail below, is the exception who engaged with both cultural and seismological issues. Generally speaking, the Western debates were not directly translatable to a consideration of Japanese or other non-Western architectures.  

From the discussion so far, we recognise that the surface layer can be understood in terms of what it signifies rather than being merely the cover for some essential truthful material, core to the architecture. For instance, some ornaments on an architectural surface imply some construction traces presenting imprinted phenomena for spectators. These ornamental effects do not merely decorate the surface; rather, they signify what we cannot actually see. Moreover, other influential factors can affect the architectural surface and generate meaningful phenomena.

As mentioned above, concern about the threat of earthquakes is crucial for anyone living in seismically vulnerable zones, and this is likely to impact the material nature and

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89 The influence of the Caribbean hut on Semper’s thinking and that of the Japanese Ho-o-den temple on Wright’s architectural concepts were both famous. However, they did not attempt to understand those cultures. Additionally, the term ‘West’ is generally refer to the European and American countries for the Japanese in the nineteenth century. For them, the UK, Germany or America were not easily to distinguish. This general term will be detailed in the later chapter of the historical background.
tectonic expression of a building. The most effective strategies to resist seismic disturbance usually impact on the architectonic form. This desire to safeguard against earthquakes influences the architectural expression. However, the obvious lack of any such considerations in conventional debates on structure and ornament could result in a misreading of architectural expression.

Identifying a number of specific projects within different geographical and cultural backgrounds will help us to elucidate the debate on structure and ornament, as well as the issue of architectural surface. The seismological catastrophes in Santa Barbara and Napier illustrate the dire consequences of not considering earthquake resistance in the Western world, where architecture thought is still dominated by conventional theoretical principles.

Non-Western ideas need to be carefully considered, but such concepts and materials cannot be easily developed in this context. However, non-Western regions which are nonetheless engaged with Western culture and technology through trade could readily absorb different approaches to architecture. These regions, such as Japan and, by extension, Taiwan, are interesting sites where Western and Eastern cultures and technologies of building mingle, intersect and overlap. Certainly, it is inappropriate to merely apply Western theories when considering the built culture in such regions as these. Instead we should focus on the ways in which the two cultures of building interact.

In considering a range of appropriate built projects for this thesis, we find that Gregory
Clancey offers us excellent advice in referring to his research as ‘a work of history’. He investigates Japanese attitudes to Western notions and their approach to the seismological threat. His account opens in 1870s and proceeds to dissect the impact and aftermath of the Kobi Earthquake of 1891. His research concludes by considering the consequences of the Kanto Earthquake in 1923.

Japan’s drive towards Westernisation and the subsequent struggle between Western and Japanese traditions and its effects for seismological concerns are explored in detail. Clancey’s important text, however, does not deal with the specific institutional context for building culture in Japan. Japan’s architectural profession and its vicissitudes are not discussed, for example. Also, the attitude of Westernised Japan towards the rest of the world is not addressed in detail either. Neither does Clancey’s text examine the distinction in Japan’s attitude towards the West or its colony Taiwan. We need to consider the Japanese understanding of the West in tandem with their attitude towards themselves and their Taiwanese outpost as a means of coming to the wider architectural aims of this thesis.

Based on this consideration, my field of research encompasses not only Japan and its architecture (1853 – 1945), but also her former colony, Taiwan, and its architecture. It might be naïve to simply impose the deliberations regarding structure and ornament directly onto the built projects in the Far East. Nevertheless, Western technology and ideas have flooded into the Far East in different forms from the second half of the nineteenth century. It is worth scrutinising, therefore, what happened in the historic

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mainstream and how the Far East responded to, and manipulated, Western influences. After understanding the specific influences, it might be possible to consider how to adapt the structure/ornament debates.

1.4 Archive material in Japan, Taiwan and the UK

1.4.1 Archival documents in the UK

As this research focuses on the Westernised/Westernising Japan, understanding Western influences is important in order to appreciate Japanese attitudes towards the West and its culture. Western architects operating in Japan after 1853 not only served Westerners needing accommodation (both commercial and domestic) but also provided the Japanese with a Western model to pursue. British entrepreneurs and other Westerners went to Japan essentially for business during the middle of the nineteenth century. The so-called ‘yatoi’ commissioned a number of new buildings in Japan and created opportunities for the Japanese to learn orthodox Western construction techniques.

After the Meiji Restoration of 1868, the Japanese believed that in order to be equal with the West, they should learn how Western people practised a diverse range of professions, including architecture. Therefore, Western-designed projects acted as influential models in directing Japan’s wider Westernisation. For the same reason, Western-designed projects also played a significant role in shaping the early stages of this research.

Two Western-designed projects (discussed in Chapter 4) act as useful examples of the West’s growing influence. Certainly the British architectural profession proved very influential on the Japanese profession and they even named a British architect, Josiah
Conder, as ‘the father of the Western architecture in Japan’. We shall therefore examine two British projects in Japan as a means to assess the West’s influence.

The first example is actually a combination of two projects. The British Consulate in Yokohama (built in 1868) and the British Naval Building (built in 1877) were both British official buildings in Japan. Sadly, neither of them has survived, but their documentation can be found in the National Archives in London. Even though they are two separate projects, the logic and methodology informing their construction is similar. They represent British construction attitudes in Japan and provided the Japanese with opportunities to witness ‘orthodox’ Western architecture. They were quite conventional projects to Western eyes, and just happened to be built overseas, similar buildings can still be found in India and other parts of the former British Empire.

1.4.2 Archival works in Japan

A further Western-design project is introduced in Chapter 4 in order to consolidate our understanding of the Western approach to Japan. This project was built in 1889, just before the Great Nobi Earthquake of 1891. Clancey discussed the Nobi earthquake in great detail. We will then review Japanese-designed projects in Japan and in Taiwan in order to explore the Japanese understanding of Western architecture.

The collection of archival documents on the Japanese projects during that period became

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a crucial task. However, securing access to historic documents in archival institutions in Japan required a particular interpersonal relationship. Any general request for, and consultation of, the original documents is usually not successful. My lack of personal connections, or formal introductions, resulted in some difficulties in accessing primary archival sources.

Libraries in Japan, however, have proved to be important and accessible repositories of archived newspapers and other publications. Second-hand and antiquarian bookshops offered an invaluable alternative for some rare publications, as well as personal friendships with Japanese people who helped in the collection of data. Indeed their general hospitality helped access some secondary data. Of course, visiting the built projects also provided important opportunities to understand the impact of their tectonic expression on spectators.

Three other architectural projects located in Japan that I will discuss in detail (in Chapter 4), have been restored or rebuilt, so in these cases some original records and publications could be traced. One of these in particular, the second project in Chapter 4, Mr Hunter’s residence, was moved from its original site to a designated tourist area and restored, and the building itself has been reinforced. Local government officials recorded its re-erection in some detail. The third project, the Tokyo Station, is very important in Tokyo and, has been partly restored. The original drawings, however, could only be accessed by those directly involved in the reconstruction project. Nonetheless, they are...

well preserved by the East Japanese Railway Company and related institutions, and a selection was published by a group of well-known Japanese scholars. I have relied on drawings published in related publications as an alternative source. The fourth project, the Imperial Hotel, was partly moved to another site, while the residue was destroyed. Before the demolition, however, detailed records were made and published, providing clear description of the construction process.93

The fifth project had some measured drawings which were kindly provided by the staff working for that institution. As the building is still used for its original function, staff use the scale drawings (plans and elevations) for everyday maintenance. Those drawings were photographed for this research, and although a vertical cross section was unavailable, the thickness of the walls can be inferred from the extant drawings.

1.4.3 Archival works in Taiwan

Projects built in Taiwan during the Japanese colonial occupation are also important in my research. Japanese practice in Taiwan during that period reflects their thinking and might reveal more in terms of testing Japanese ideas outside of their homeland. Under the West’s influence, the Japanese adopted a relatively humble attitude at home. However, in their colony (acquired following their victory over China in 1895) they could explore different concepts, perhaps pushing ideas in a much more explicit manner given the absence of what were presumed to be the judging eyes of Western observers.

In Japan, the Meiji Emperor clearly declamed Westernisation as a form of subservience. But in Taiwan he claimed that the Japanese sought the Modernisation of a backward island. The difference between Westernisation and Modernisation actually signifies an important aspect of the Japanese approach to colonialism. As a result, the projects in Taiwan built under Japanese colonialism are crucial if we are to discuss the wider relationship of Japan to the West and to modernity.

Based on this approach, built projects in Taiwan have been selected on the basis of their Japanese ‘Modernisation’. The selected works were all built during the timeframe between the establishment of colonial governance and Japan’s involvement in the Second World War. All five selected projects satisfy this restricted criterion.

Two general approaches were employed for the data collection. In some cases, archival documents were found while, in others, the material had to be collected from secondary resources. There are surviving architectural drawings from the Japanese colonial period for three projects out of the five. Maintenance reports also contained specific tectonic information from a practical point of view, as they document the building during repair and restoration procedures. A number of contemporary scale/measurement drawings were also available.

After all the data was collected, interpretation and comparison was important, as tectonic expression is the fundamental aspect of this research. Therefore, architectonic illustrations are tackled in several different ways in order to clarify the relationship between the projects and significant events and earthquakes, as well as the relationship between the surfaces and the construction.
1.5 Illustrations of conceptual sketches

As well as the usual photographs and drawings employed to illustrate key ideas, several sketches/illustrations have been introduced in this research in order to clarify my arguments. I shall outline the technique I used at this point to avoid any later misunderstanding regarding layout or purpose.

The drawing technique that Edward Ford uses in his book *Details of Modern Architecture* offers a very clear illustration of the construction materials and methods of particular buildings.94 Figure 2.9, Figure 2.10 and Figure 2.11 showcase Ford’s method, revealing the construction methods employed in different buildings showing the configuration of different materials and how hidden connecting elements work in holding the building together. Using Ford’s method, I have adopted a similar procedure to draw the construction detail of Robert Venturi’s Lewis Thomas Laboratory (discussed in the second chapter of this thesis) and presented in Figure 2.14.95 The comparison between Kahn’s tectonic methods (as drawn by Ford) and Venturi’s construction logic becomes clear and is discussed in detail.

In order to understand the relationship between built projects and significant seismic events and colonial relationships I have prepared three charts with timelines which are placed in Chapters 3, 4 and 5.

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Chart 1 is placed at the beginning of Chapter 3 and indicates the timeline from 1850 - 1945, identifying the various earthquakes in Japan during this period with respective magnitude recorded. Earthquakes in Taiwan are presented below the timeline. Photographs/drawings and names of projects in Japan and Taiwan (as discussed in Chapters 3, 4 and 5) are shown at the top and the bottom respectively. They are linked to the timeline by year of construction. In addition, the geographical position of projects and seismic epicentres are also illustrated on maps of Japan and Taiwan. The scale of the maps is the same and quake magnitude is indicated not only by the Richter scale but also in epicentric circles, but geographical distance is disregarded. The construction date of each project and the magnitude of each earthquake are also noted in brackets adjacent to the names of projects and earthquakes on the maps.

Except for the maps, all the information on Chart 1 is repeated on Chart 2. This chart is placed at the end of Chapter 3 just before the detailed information on each project. As well as the data shown in Chart 1, any significant events in Japan are marked above the timeline, while those in Taiwan are noted below the timeline. Moreover, the historic periods (as recognised by architectural scholars in Japan and/or Taiwan) are also included on the chart, with the appropriate nomenclature.

The information in Chart 2 is also repeated and supplemented in Chart 3, which is placed at the end of Chapter 5. The additional data included in Chart 3 is a sectional detail from each project. These drawings show in detail the material build-up of the walls and columns for each project. Examples are shown on the left-hand side of the chart: the external part of the wall faces the photo/drawing of each project, while the interior faces the timeline. The scale of each detail is identical and is shown on the right-hand side of
the chart with illustrations of the materials for each example. Where necessary, columns are cut through the middle and linked to the wall construction, but the lengths of the wall shown between each pair of columns are not consistently at the same scale.

Some details in the charts require further clarification. For example, the maps of Japan and Taiwan (shown in Chart 1) do not reflect the actual distance between these two regions. And, of course, some earthquakes had sizable magnitudes but without causing a considerable damage. Usually this was due to the epicentres being very deep and remote from densely populated areas. The occurrence of earthquakes was surprisingly frequent but as some of them were not very serious and did not result in significant damage, they have been omitted from the charts. The earthquakes which are listed are therefore those that had strong effects with magnitudes higher than 6.0 on the Richter scale, and/or generated significant destruction.

The historic periods applicable to both regions and significant events are selected and shown in relation to each project. Two different approaches are adopted. One, technical/material approaches indicating the material build-up, and the development of techniques. And two, stylistic approaches presenting design preferences or the results of significant events and/or the occurrence of earthquakes. The former approach reflects

the materiality and tectonic expression. The latter approach represents both specific cultural and/or geographical circumstances and the surface tectonic expression.

Tectonic information (at an identical scale) relating to each project is incorporated in Chart 3. For each individual project, the arrangement and build-up of construction materials can easily be read in scale. Each detail comprises two half columns and a horizontal section of wall.

Although the thickness and material build-up of each wall section are to the same scale, the length of wall between each pair of columns is fixed because of the chart’s arrangement, and does not reflect actual grid spacing between columns. The projects are arranged chronologically and show the main changes in use of materials in the selected projects. In addition, the projects can be compared alongside the significant events, historical periods and frequency of earthquakes. This arrangement provides the basis for a discussion of the potential inter-connections and influences of events to buildings.

Tectonic information relating to the walls of each project integrates drawings and images for vertical wall sections. Provided that the data is compatible, the combined illustration for each project will show the tectonic drawing on the right-hand part of the plan diagram (as shown in Figure 1.1). The location of each cross section is identified on the relevant plan (as shown in Figure 1.1).

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An example illustration showing the combination of the diagram of the tectonic expression. This exemplifies the integration of the diagram of the tectonic data: the sample plan is shown on the left-hand side while the diagram is shown on the right-hand side.

As indicated on the plan (on the left-hand side) the vertical section relates to a particular part of the plan, while the external façade and the internal elevation share this part of the wall. The drawing on the right-hand side shows the external façade, vertical section and the internal elevation to be unfolded. The vertical wall section is arranged in the middle of the combined illustration, while the exterior façade is placed at the left-hand side, and the interior is located on the right hand side. In other words, the external façade is mirrored by the internal elevation based around the vertical section.

The integrated illustration usually comprises a scale drawing, but the exact proportion of the wall construction might be left blank, depending on available information. The

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97 The original graphic of Figure 3-1 refers to drawings and pictures in the appendix in the reconstruction report. See Hyougoken Kyouiku Iinkai [Hyogo Prefectural Board of Education 兵庫県教育委員会], ed. Kyuu Hantaashitei Ichiku Kouji Houkokusho [A Report on the Removal and Reconstruction of the Original Residence of Mr E.H. Hunter, 旧ハンター氏邸移築工事報告書] (Kobe 神戸: Hyougoken Kyouiku Iinkai (Hyogo Prefectural Board of Education, 兵庫県教育委員会), 1964).
external façade and the internal elevation sometimes combine photographs and scale drawings. These diagrams are accompanied by detailed information on each project in Chapters 4 and 5. By means of this integration and composition, the cladding of the exterior and the interior finishes can be read simultaneously and compared.

In the beginning of this chapter, discussing the complexities of architecture on shaky ground is evident that even Western cultures have evolved a response to such complicated phenomena. Obviously many architects have experienced real earthquakes; but subsequent discussions regarding architectonics and the debates surrounding ornament and structure remain relatively undeveloped in these regions.

In the next chapter, therefore, the conventional debates on ornament and structure will be reviewed. Subsequent sections will explore the relationship between architecture and semiotics, and this will instil a deeper understanding of the cultural and conventional implications for architectural expression. Later in this thesis, more complicated empirical works will be introduced: if architecture is built on shaky ground in dramatically different milieu, such as the Far East (remote from the prevalent Western tradition), how should we think about its architectural expression?
Chapter 2

From Structure/Ornament to Skeuomorph

‘The term ‘atectonic’ describes the manner in which the expressive interaction of load and support in architecture is visually negated or obscured.’

2.1 Theoretical structure/ornament debates

If we consider the conventional pursuit of modern architecture in terms of rational construction and materials, then the idea of ‘tectonics’ is typically one of the conceptual lenses used to explore this theme. However, a more recent examination of modern architecture reveals that several contrasting, even ‘atectonic’, expressions related to architectural tectonics have been presented either consciously or unconsciously.

‘Tectonic’ theoretically presents the ontology and essence of the architecture and its constituent material. If we focus on the expression of architectural surface, which is the most tangible part of architecture for spectators, architecture without any stone, slate or brick attached, in other words, without any ornament or ‘finish’ on its façade, might suit the expected expression of ‘tectonics’.

Nonetheless, tectonics has been defined in various ways, such as ‘of or pertaining to

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building, construction in general’. Tectonics is also ‘the art of [construction] systems ...the doctrine of that which is scientific in our cognition in general and therefore necessarily belongs to the doctrine of method ... rational concept of form of a whole’; it is that ‘which rises most above the trammels of necessity and may become powerfully representative of deep feelings’. In contrast, Sekler’s definition of atectonics in the middle of the twentieth century, not long before Charles Jencks’s declaration of ‘the death of the modern architecture’, has generally been widely accepted. Kenneth Frampton, David Leatherbarrow and Mohsen Mostafavi also referred to Sekler’s definition as the foundation of a wider discussion. For instance, Sekler’s also refers to atectonics as ‘tectonic negation ... which tend[s] to disturb the viewer’, and Frampton argues that some projects at the beginning of the modern movement were actually partly atectonic, such as Peter Behrens’s AEG Turbine Hall.

Two significant scholars have both revealed that a thin surface layer on the façade of

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modern architecture is generally ignored in conventional discussions on tectonics. Frampton has provided his interpretation on thoughtful construction and not only offers details about construction and materials in relation to architecture and the development of architects’ theories in general, but also emphasises the existence of the thin layer of paint on the architectural surface. This layer was not usually considered to be the finish and, therefore, ignored.  

Mark Wigley learnt from Jacques Derrida in his literary analysis of Deconstruction and employed a similar approach when analysing Modernists’ discourses and stressed the significance of the ignored thin layer. He asserted that the whitewash on an architectural surface was a type of fashion, even though fashion was generally eschewed by Modernists. For this reason, Modernists attempted to ‘[scratch] the surface’ and to consider whitewash as the ‘deep skin’ of modern architecture. Wigley referred to Stuttgart’s Weißenhof Siedlung and various Modernists’ discourses, including Adolf Loos and Le Corbusier, to promote his argument that whitewash was used deliberately, and should be understood as a form of fashion and a symbol of modern architecture. Wigley argues that the surface layer of modern architecture is obvious, yet deliberately invisible for Modernists.

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It is clear, even though we have not treated in detail Frampton and Wigley’s arguments, that the relationship between architectural surfaces, which could refer to the surface layer or the surface of a structure and ornament, which might sometimes be considered as finish, are actually complex and closely related to semiotic terminology. It should be noted that the relationships mentioned above could go in the opposite direction, if architectural surface refers to either surface layer or structural surface. Discussion on the subject of architectural surfaces often focuses on the status of a surface or considering it as the ignored/deliberate finish. The expression of architectural surface also struggles between showing the construction itself or the additional ornament. As it is difficult to find something without a surface, and the surface is often the most tangible part of a building, the semiotic implications of the surface could be a very important and significant part of understanding a building from a visual approach.

Certainly the relationship between architectural surface, construction and ornament is complex and there are numerous arguments about the relationship. It might be simpler therefore to discuss them separately. Initially, the surface layer as the architectural surface will be discussed and whether it is considered to be either ornament or finish. Then, the relationship between the surface layer and the architectural construction and the relationship between the surface of the construction and the architectural construction will be reviewed with the relevant theoretical debates considered separately.

2.1.1 Surface layer as architectural surface - ornament or finish?

Discussions about architectural surface generally address whether the surface layer is an ornament or a finish. The distinction between ornament and finish is complex, which is going to be discussed in detail later. However, the expression ‘architectural surface’ can generally mean two things: an additional surface layer or the direct surface of construction. It appears that most of the debates surrounding architectural surface focus on accepting, ignoring or condemning additional surface layers. In contrast, the surface of construction has had less attention. Therefore, we shall analyse the surface layer and address the surface of construction later, as it will evoke more complicated arguments.

Arguments about surface layers usually fall into two categories: one is to accept (or more specifically to ignore), and the other is to condemn. As mentioned earlier, Debra Schafter has declared that people generally think that architecture should represent its ontology and essence; so theoretically, a surface layer on the architectural surface should not be added. However, as Frampton and Wigley revealed, surface layer has been employed in practice but ignored in discussions both in classical periods and in modern times.

It is difficult to judge with certainty whether painting an architectural surface is an innocent finish or a condemned ornament. This mainly depends on the spectators’ understanding rather than on universal values, since this category would involve in the social contexts and viewpoints of spectators. For instance, some people consider whitewash to be a finish, but others consider it to be either an ornament or a mask. If it is considered to be a finish, the necessity and visibility of the finish and its symbolisation

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13 Schafter, The Order of Ornament, the Structure of Style: Theoretical Foundations of Modern Art and Architecture, p. 3. 
are questioned, and ‘amoral’ arguments about finish/painting are usually ignored. If it is recognised as an ornament, this would extend to further discussion of whether it is necessary or it should be condemned. It is insufficient, therefore, to judge surface layers as an ornament or a finish at the moment, as the influential factors of this judgement are intertwined and can be objected as mentioned above. Rather, the aim is to clarify how people have ignored and criticised the surface layer, so that the hidden reason for the distinction between ornament and finish could be understood.

Firstly, the phenomenon of taking the surface layer for granted should be understood. Obviously, any construction has a surface, but it is not often intended to be the surface of the architecture. However, it appears that there has been a long history of people being accustomed to an additional surface layer on the architectural surface. Additional surface layers have been categorised into two types: one is deliberate, ornamental and complex, and disregards the nature of the construction beneath (which in Modernist terms is generally condemned); whilst the other is generally a very thin ‘technical’ layer and easy to ignore. The latter definition was widely employed in Modernist architecture.

The latter approach is closer to the conventional guidelines on modern architecture, and is sometimes considered to have developed from Abbé Laugier’s famous text on the primitive hut (Figure 2.1). In the eighteenth century, surface ornament had become so complicated that Marc-Antoine Laugier proposed the idea a primitive rustic hut in order to re-consider the structural nature and essence of architecture.¹⁴ He not only affirmed that the concept of the rustic hut should always be kept in mind, but also reminded us

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that every component of a building should be so crucial that the building would collapse if lacking any of its elements.15 As Wolfgang Hermman points out, for Laugier the essential elements of architecture were classical in nature, namely, column, entablature and pediment.16 Laugier’s used logs as columns forming the basic frame of the hut, and he also covered the hut on the top to have the roof to stop sun and rain, but the hut did not have wall to screen off the wind. Laugier’s attempt to clarify the essentials of architecture involved emphasising a reduced number of classical elements and excluded what he regarded as redundant or ornamental elements from architecture.

William Curtis’s explanation of Le Corbusier’s Dom-in-o house (Figure 2.2) demonstrated that Modernists architects pursued ideal prototypes in architecture, similar to what Laugier found in relation to the rustic hut. Le Corbusier’s Dom-in-o, in its

15 Ibid. pp. 12, 152.
17 Figure 2.1 refers to the frontispiece of Laugier, An Essay on Architecture.
18 Figure 2.2 refers to William J. R. Curtis and Le Corbusier, Le Corbusier: Ideas and Forms (Oxford: Phaidon, 1986), p. 43.
elemental form of pure column and pure slab is, as Curtis points out, ‘an industrialised equivalent to Laugier’s primitive hut.’

It seems that Modernists of the twentieth century also pursued a supposedly pure architecture. Joseph Rykwert considered the significant role of the idea of the primitive hut in the development of architectural history more generally, and Laugier’s rustic hut certainly played a crucial role in Rykwert’s account. However, the architectural enclosures, i.e. walls, were not mentioned in Laugier’s discussion of the rustic hut. Likewise surface painting and finish is hardly discussed in Modernist discourse.

Modernists promote idealised industrialised images with structural elements even though they have employed surface finish conventionally without thinking or questioning why. They did not consider painting as an additional surface layer, although it obviously was not the essential surface of the construction. They just considered painting as a finish. However, the definition of ‘finish’ in the Oxford English Dictionary is general but directly points out that a finish is ‘the last coat of paint or plaster laid upon a surface’.

This definition reveals the characteristic of finish as the additional layer.

Secondly, the other consideration is the groundswell of criticism in architectural discourse of the surface layer. In the eighteenth century (which Wolfgang Herrmann considered to include the rococo period), Laugier expressed his interest in returning to simpler forms. This could be interpreted as a dissatisfaction with redundant

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ornamentation. More than a century later, Adolf Loos used more trenchant terms to condemn ornament in his famous “Ornament and Crime” polemic, which is often considered as a prelude to the Modern Movement.

Loos employed different arguments to express his disgust of ornamentation (although, as we will see below, his attitude towards ornament is more complicated than this ‘disgust’ suggests). He strongly refused to employ ornamentation to represent contemporary styles and instead declared that ‘ornament [was] no longer a natural product of its culture, and therefore represents backwardness or even a degenerative tendency’. He not only appreciated white ceramics, which he regarded as being cheap without exploiting the people who made them; he also promoted his appreciation of white walls devoid of any ornamentation. He asserted that adopting decoration was wasteful in many ways including manpower, health and materials as well as capital. Loos considered ornament to be low-level art and believed that the demise of ornamentation would allow people to concentrate on other more worthy objects and develop other arts to a higher level.

Surface layers and ornamentation on architectural surfaces have been judged differently, but how they relate to construction and what they represent needs to be discussed. Moreover, how the surface of a construction, which could also be an architectural surface, relates to the body of a building also requires a detailed explanation. This will be

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26 Ibid. p. 100.
27 Ibid. p. 102.
2.1.2 Surface layer and architectural construction

The complex relationship between surface layer and construction will be examined in this section. First of all, if the relationship is coherent, it should conform to the tenets of modernism, although this might not be as authentic as it seems. If the coherent relationship is presented, the surface of the architecture is actually another layer on the surface of the construction: it represents the construction but it is not really part of the construction itself.

This coherent connection between the surface and architecture is, strictly speaking no longer a tectonic matter but an atectonic one, since it is this iconic surface (not the surface of the construction) that interrupts people’s appreciation of the built fabric and, in the modernist view, confuses their understanding. Some might be deceived due to the iconic similarity of surface and construction, that is, they might assume the surface to be the construction itself.

Otto Wagner’s Post Office Savings Bank (Figure 2.3) is one typical project which is regarded as embodying this confusing phenomenon. It appears that metal bolts on its façades function as riveting elements to secure marble slates. But, as V. Horvat Pintarić pointed out, the bolts on the surface of the Bank do not actually have a structural
function, they just give that impression. Edward Ford examined the wall section and notes that brick is actually the main construction material, concealed behind the marble cladding.

The above relationship is mainly found in empirical projects rather than in theoretical arguments. Many commentators discussing the authenticity of materials incline to agree with the concepts of tectonics theoretically, but they often do not appreciate, or maybe ignore, the fact that such an orthodox understanding of tectonics is not always practised.

However, the relationship between surface layer and construction can sometimes be correlative in theoretical discourses. Theorists realise the differences between surface

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30 Figure 2.3 refers to *ibid*. p. 222.
and structure, but (using the conventional concepts mentioned above) often attempt to link surface and structure in certain ways. The distinction is evident in Karl Bötticher’s definition of Kunstform, (art-form) and Kernform (core-form), which is one of the earliest ideas relating to this kind of distinction. Moreover, he also adopted other dualities, namely Kunstformen (art components) and Werkformen (structural members) for similar interpretations.

Bötticher’s ideas are largely developed from his studies of Hellenic architecture, which he considered as perfect representations, unrivalled by any earlier or more prototypical architecture. In his treatise, core-form means a mechanically necessary and statically functional structure. Art-form refers to the ‘characterisation by which the mechanical-statical function is made apparent’. This distinction between art-form and core-form and their inter-dependence are also emphasised in Wolfgang Herrmann. As a result of Karl Friedrich Schinkel’s influence, Bötticher distinguished ‘architecture’ from ‘buildings’ and emphasised the importance of the artistic representation of architecture. He considered Kunstformen as the representational language of Werkformen. Moreover, he believed that the Kunstform could be regarded as the qualitative attribute of each element of a building: each Werkform is clothed by an appropriate covering, namely Kunstform, which is closely

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32 Herrmann, Gottfried Semper: In Search of Architecture, p. 141.
33 Ibid. p. 143.
linked to *Werkform* and whose design should be affected by *Werkform* due to the representative characteristic. In his opinion, art-form and core-form were very closely related to each other. Architectural representation therefore became ‘a matter of correspondence between a structural concept and an allegorical dressing, a hermetic relationship with no references to a reality outside the work itself’.  

Although the relationship between these two can be very arbitrary and symbolic, as Saussure and Peirce have suggested, it has generated countless influences.

Bötticher’s concept of *Kunstform* and *Kernform* almost immediately affected contemporary scholars. For example, Gottfried Semper and his principle of *Bekleidung* (dressing) was an illustration of this influence, although Semper disagreed totally with Bötticher’s distinction by asserting that it would result in slavish tendencies of the relationship between architectural surface and the construction.  

Semper was also very active in both architectural and archaeological professions and, according to Mari Hvattum, Bötticher’s distinction influenced Semper, and this effect produced Semper’s idea of *Bekleidung*. If we recall Laugier’s hut, the enclosure was ignored; in contrast, both Bötticher and Semper emphasised the importance of the enclosure although in different attitudes. However, Semper’s emphasis on the dressing and his discourse on hanging carpets can be considered to embody the alienated relationship between the surface layer and the construction, although he did not over emphasise the distinction.

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Semper developed his principle of hanging carpets as originary for architecture after viewing the Caribbean Hut in the Great Exhibition of 1851 and reiterated his ‘principle of dressing and incrustation’ in a later unfinished publication.  

38 Semper summarised his observation of the Caribbean Hut through four basic elements of architecture: the hearth, the roof, the enclosure and the mound. Of these elements, he paid special attention to the enclosure and the hanging carpet.  

39 He asserted that the masonry wall was ‘the wall fitter’ as a successor of the ‘wickerwork [which] was the essence of the wall’. He also made the following significant statement.  

40 Hanging carpets remained the true walls, the visible boundaries of space. The often solid walls behind them were necessary for reasons that had nothing to do with the creation of space; they were needed for security, for supporting a load, for their permanence, and so on. Wherever the need for these secondary functions did not arise, the carpets remained the original means of separating space. Even where building solid walls became necessary, the latter were only the inner, invisible structure hidden behind the true and legitimate representatives of the wall, the colorful woven carpets.  

41 According to Semper, a spatial enclosure is more crucial than an invisible structure. He also applied this to his deliberations on the principle of dressing (Figure 2.4). He highlighted the importance of ‘incrustation’ by stating that it is actually the essence of architecture. He even referred to the term ‘art-form’ as essential and impossibly separate:  

‘[in] Greek architecture that art form and decoration were so profoundly and intimately bound and influenced by this principle of surface dressing that it is impossible to

38 Semper, Style: Style in the Technical and Tectonic Arts; or, Practical Aesthetics, p. 243.  
40 Ibid. pp. 103-4.  
41 Ibid. p. 104.
consider them separately’ (the italic emphasis is marked in Semper’s text).\(^{42}\)

2-4 Semper’s Caribbean Hut. Semper’s idea of dressing is embodied in this drawing. The main structure is columns and the wall is rather the dressing than a load-bearing support.\(^{43}\)

It appears, that for Semper, the surface dressing/layer is natural and inherent. The issue is how it is operated and designed. In addition, he considered that the polychrome painted layer on marble in, for instance, Greek architecture, is reasonable because polychrome can exclude visual influences of marble and can thus ‘achieve its emancipation from the material’ so that people can concentrate on the essence of Greek architecture itself instead of any materials that have been used.\(^{44}\) In his sense, if the context of marble is not covered, spectators might be preoccupied when watching the material context. In this

\(^{42}\) Semper, Style: Style in the Technical and Tectonic Arts; or, Practical Aesthetics, p. 246.

\(^{43}\) Figure 2.4 refers to Semper, Style: Style in the Technical and Tectonic Arts; or, Practical Aesthetics, p. 666.

\(^{44}\) Ibid. p. 393.
way, the design of the architecture would be ignored. According to Harry Mallgrave, Semper’s polychrome dressing served to “mask” the material reality of the marble … allowing “form” … to appear as a dematerialized, autonomous creation of man’. In other words, cladding for Semper is deliberate and functional so that the materiality of the structure can be ignored.

Semper’s idea is directly echoed by Adolf Loos with exactly the same German term, *Bekleidung*, although it is translated as ‘cladding’. Loos expounded his idea by employing the same German term as in the title, ‘The Principle of Cladding’, for his article. He not only supported Semper’s idea that ‘the principle of cladding forbids the cladding material to imitate the coloration of underlying material’ but also clarified the importance of cladding by directly affirming that ‘to invent this frame [to hold carpets] is the architect’s second task’ after detailing the significance of cladding/carpets.

Moreover, Loos declared that he agreed with surface cladding and wallpaper as long as it did not imitate or pretend to be another material. He condemned some kinds of cladding as imitations that were used by ‘the vain contractor’ and ‘parvenus’ who used inexpensive materials but required more hours of labour. Loos even accepted the

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47 *Ibid*. p. 68 for the former quotation and *ibid*. p. 66 for the latter quotation.
cladding of stuccowork with any kind of ornament, with the exception of rough
brickwork.\footnote{50}

Karl Bötticher’s distinction between art-form and core-form also influenced Otto
Wagner’s thoughts on architecture and are evident in his celebrated publication *Modern
Architecture*, where he states that: ‘every architectural form has arisen in construction
and has successively become an art-form’.\footnote{51} Indeed Henry Mallgrave’s introduction to
Wagner’s book, acknowledges Bötticher’s influence on Wagner’s distinction between
constructional and artistic form.\footnote{52}

It appears that both Semper and Loos agreed with the dressing/cladding of architectural
surfaces: for them architectural surface is crucial, while the architectural structure is
secondary. However, their concepts of dressing/cladding were not identical; Semper
believed that dressing should be the essence of architecture, while Loos thought that
people should not confuse cladding with different materials and in particular that
cladding should not imitate expensive materials. Loos’s idea of cladding is not far from
the loose relationship between surface layer and construction material that developed
later in the twentieth century.

Robert Venturi and Rem Koolhaas, both significant architects in the second half of the
twentieth century, have revealed the differences between surface layer and construction

\footnote{50} Loos, 'The Principle of Cladding', p. 67.
\footnote{51} Otto Wagner, *Modern Architecture: A Guidebook for His Students to This Field of Art*,
Julia Bloomfield, Kurt W. Forster and Thomas F. Reese, eds, trans. Harry Francis
Mallgrave, Texts & Documents: A Series of the Getty Center Publication Programs (Santa
\footnote{52} Harry Francis Mallgrave, 'Introduction', in *Modern Architecture: A Guidebook for His
Students to This Field of Art*, Otto Wagner and Harry Francis Mallgrave eds, (Santa Monica:
and have supported a loose relationship between surface layer and construction. Venturi distinguishes the inside from the outside in his first well-known publication and clarifies the difference between the ‘duck’ and the ‘decorated shed’ in terms of understanding ornament in the book that he co-authored with Denise Scott Brown. Meanwhile, Koolhaas proposed his concept of ‘lobotomy’ for discussing the characteristics of architectural surface and its ‘disconnection’ from the organisational logic of a building’s interior.

Venturi asserted the contradiction between the inside and the outside at the beginning of his essay ‘The Inside and the Outside’ and stated that the external configuration is usually simple and the interior structure is often complex. He employed classical as well as modern projects to extend his argument. The development of any design either from the inside to the outside or from the outside to the inside results in contradiction and conflict in the interplay. Venturi makes his argument by including architects who often asserted precisely the continuity between inside and outside, such as Aldo van Eyck and Louis Kahn.

Rem Koolhaas affirmed the phenomenon of ‘lobotomy’ for skyscrapers in his book Delirious New York, where he maps out the difficulties for conventional architecture to be authentic because: ‘the “honest” façade speaks about the activities it conceals.’ He considered the existing ‘break’ between the façade and the rest of the architecture and the

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54 Ibid. p. 82.
symptom of auto-monumentality/skyscrapers to be both reasonable and acceptable. Furthermore, he proposed that lobotomy, ‘the surgical severance of the connection between the frontal lobes and the rest of the brain to relieve some mental disorders by disconnecting thought processes from emotions’, was an adequate term to describe the ‘break’. He suggested that separating the exterior and interior architecture by a ‘lobotomy’ could resolve the intricacies and difficulties of ‘honesty’.

The ‘lobotomised’ relationship also helps explain the separation not only horizontally but also vertically in certain building types. Horizontally, the term helps explain the differences between the exterior and the interior: the exterior form could be the sculpture in a metropolis and the interior could support multiple and changeable uses. Vertically, different storeys of skyscrapers typically serve diverse purposes, so the discrepancy inside between different floors could become irrelevant in this schismatic point of view.

After reviewing the above debates about the relationships between the surface layer and construction, we should continue by discussing the relationship between the surface of the construction and the construction itself. This is particularly important for Modernists ideally who want to present the surface of construction as ‘honest’.

2.1.3 Surface of construction and the architectural construction itself

If we consider the surface of the construction, two kinds of expression can generally be found: one shows the surface of the construction, even though this distinction can be

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56 Ibid. p. 104.
57 Ibid. p. 105.
further refined; whilst the other shows the ornamented surface of the construction. Ornament can be applied in various ways, such as carving into the construction materials. The latter expression, showing the ornamented surface of construction, can be further categorised: it either presents something that is obviously irrelevant to the construction (such as mythological sculptures of Greek temples), or it shows some figures that might resemble some constructive relevance, which will be detailed later.

Directly expressing the surface of a construction as an architectural surface has a respectable position in architectural discourse, since the surface of a construction and the construction body are definitively inseparable. This kind of surface expression can be further categorised; for example, employing a particular material but respecting its inherent characteristics. At the very end of the nineteenth century, Adolf Loos held the same view: 'every material possesses its own language of forms, and none may lay claim for itself the forms of another material'. Forms should be used appropriately and materials should be used correctly. Also, materials should not be presented as characteristic of other kinds of materials; for instance, timber construction should not mimic a stone building.

Moreover, the following famous extract from Louis Kahn’s lecture at the Pratt Institute touches on this approach to material expression and highlights Kahn’s sensitive approach to materiality, is this case the use of brick:

If you think of brick, for instance, and you consult the orders, you consider the nature of brick. This is a natural thing. You say to brick, “What do you want, brick?” And brick says to you, “I like an arch.” And you say to brick, “Look, I want one too, but arches are expensive and I can use a concrete lintel over you, over an opening.” And then you say, “What do you think of that, brick?” Brick says, “I like

This ‘conversation’ with brick is significant as it serves not only to present the constructive material, but it also respects its properties and nature. So the combination of reinforced concrete with brick as the principal materials on a façade can work, but significant expression of brick’s properties (such as arches for openings) should not be shown as the openings might be better constructed from reinforced concrete instead.

According to Alexandra Tyng, Kahn believed that materials have an order. He also thought structure and construction had an order too; for example for a brick construction the wall should present the ‘characteristics of brick’.  

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61 Figure 2.6 refers to Yale University Beinecke Rare Book and Manuscript Library, 'About the Library Building', http://www.library.yale.edu/beinecke/brblinfo/brblslides_tour.html, accessed on 2 November, 2009.
However, the surface treatment of a building can still diverge from the conventional expression of a material’s properties. Stone, for instance, generally provides a solid and resolutely opaque image but it is perhaps eccentric to consider stone or marble as being transparent or translucent.

Nevertheless, the exterior wall of the Beinecke Rare Book and Manuscript Library (Figure 2.5) located on Yale University’s campus and designed by Gordon Bunshaft of Skidmore, Owings & Merrill (SOM) is an excellent illustration of precisely this kind of approach.\(^62\)

In this particular building, the thin marble’s translucency does not accord with conventional tectonic ideas of the material (stone). According to Bunshaft, he was looking for a particular material for the exterior walls which would screen direct sunlight from entering the building, due to the precious and light-sensitive nature of the rare books and manuscripts within. The 32mm thick marble panels are hung within a concrete frame (Figure 2.6). Onyx and thick glass were considered but were eventually rejected.\(^63\) Although the blocks of stone and laths of stone are very different technically, people’s assumption and conventional idea of stone could not reflect on this difference. Marble is used because of its particular properties. But it differs from our conventional assumptions for stone. Given our understanding of tectonics, this empirical project could be categorised as an expression of atectonics. Here a typical property of this material,


stone, is its opacity. However, if we consider the expression of the property of the material itself to be a tectonic embodiment, then this is also a fine example of tectonics. Although both statements seem reasonable, they actually contradict each other.

If we think of another kind of expression of a building’s surface, in particular how the surface is ornamented, we can probably find another kind of relationship between the surface of the construction and the construction body. Some ornamentation might be practised directly on the surface material by carving or other methods. This ornament might be irrelevant to the properties and characteristics of the constructive material; or it might indicate specific traces or clues which relate to the constructive material.

Some decorative elements on the surfaces of Greek temples, for instance, have no connection with the properties of the materials, specifically the white marble and limestone. The pediment sculptures of Greek temples do not reflect on the property of marble and limestone used for the sculptural art. The architectural surface might not have an additional layer but might instead show the surface of the constructive material. This may be barely discernable because of the proliferation of carved figures or mythological diagrams on the surface of the materials. Although the surface of the constructive material is shown, carved figures on the surface distract spectators from the material itself. This surface ornamentation rather provides a *distanced* relationship between the surface of a construction and the construction/material body. Even if the surface of sculpture might be painted originally, the painting did not reflect on the property of material either, although this would make the relationship between architectural surface and the constructive material goes back to what I have discussed in the previous section.

Alternatively, decorative elements can imply that some materials existed in the past but
are no longer employed or available today. For example, some decorations on Greek temples are not just random figures; they were carved in stone and represent particular ornaments such as guttae, and were similar to some timber constructive elements. In this way, the elemental figures are not entirely irrelevant to the constructive material because they were intended to remind us of the earlier timber construction period.

This phenomenon will be discussed in further detail at the end of this chapter. The theoretical arguments outlined above will now be examined using specific projects by Louis Kahn and Robert Venturi.

2.2 Sample Projects: Louis Kahn versus Robert Venturi and Denise Scott Brown

Louis Kahn and Robert Venturi are two very important figures in regard to the above discussion. Their individual approaches are evident in their practice; Kahn’s projects and his ideas are generally accepted as refined modernism and highly tectonic, whereas Venturi offers a perspective on Post-Modern ideas. Their differing theoretical concepts help illuminate various aspects of the structure/ornament debate, which will figure centrally in my subsequent assessment of buildings in Japan and Taiwan.

2.2.1 Louis Kahn and the Indian Institute of Management, Ahmedabad

Edward Ford categorised Kahn along with Frank Lloyd Wright in terms of their
appreciation of unfinished pure exterior walls and their sustained investigation into the ‘layered nature of the modern wall’. He claims that general modern architecture (where steel lintels are hidden and invisible) could not satisfy Kahn’s expectations of material expression. Kahn’s concept of brick as a structural material accords with his belief that: ‘every brick contributes to [the] structural support of the building’.  

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<thead>
<tr>
<th>Image</th>
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<tbody>
<tr>
<td><img src="image1.jpg" alt="Image 1" /></td>
<td>2-7 Exterior appearance of the Indian Institute of Management, Ahmedabad. The general material of this project can easily be seen and the combination of brick with concrete lintels is also visible.</td>
</tr>
<tr>
<td><img src="image2.jpg" alt="Image 2" /></td>
<td>2-8 Detail of the hand-made bricks of the Indian Institute of Management, Ahmedabad. The earthiness of hand-made bricks can be observed in this detailed picture.</td>
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For example, Kahn employed monolithic brick walls in his Indian Institute of Management (Figure 2.7) using hand-made bricks (Figure 2.8) without other concealed lintel materials, such as steel, for the wall construction. Ford’s illustration indicates the build-up of the walls with no additional layer of material and confirms that the surface of

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66 Actually, it seems that Louis Kahn was not aware that this project is located in a seismic zone, which experienced a magnitude 6.9 earthquake in 2001, since he did not mention anything related to seismic problems. Moreover, it is generally believed that brick without reinforced steel is not an ideal earthquake-proofing material.
the architecture is the surface of the construction (Figure 2.9).\(^{67}\)

![Wall section of the Indian Institute of Management, Ahmedabad. A indicates a solid brick wall constructed with bricks.](image)

Kahn’s philosophical approach to materiality is apparent when we study his ‘conversation’ with brick, which was cited in the previous section. Indeed, the primary principle for Kahn when employing materials is to follow the characteristics and features of the given material. He believes that there is only one way to deal with a material: namely to honour and glorify it, certainly not treat it as an infill material. He emphasised the nature and order of every material, especially brick. He was concerned with the law of nature about bricks and considered this to be the essence of creativity, harmony, beauty, intuitive wonder and value.\(^{69}\) When required to combine two materials, it appears that Kahn did so very carefully, since, according to Alexandra Tyng, Kahn asserted that even joint-making was ‘the beginning of ornament.’\(^ {70}\)

This project embodies many of Kahn’s ideas and used local hand-made bricks as the

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\(^{67}\) Ford, *The Details of Modern Architecture*, pp. 323, 325.

\(^{68}\) Figures 2.9, 2.10, and 2.11 refer to Ford, *The Details of Modern Architecture*, p. 325.


main structural material, in a Flemish bond. Klaus-Peter Gast wrote that this use of raw brick for the exterior can be considered an emblem for the institute as this kind of brick is obviously different from any materials used in Kahn’s other projects. The façade incorporates concrete lintels above openings and can be viewed as an icon because its visual characteristics are so easily identified.\(^{71}\) The unfinished manner of the façade allows the project to ‘brim with primitive tectonic energy’.\(^ {72}\)

Kahn’s manuscripts and sketches reinforce his belief that architecture should be considered as a whole and the architectural façade should always be designed in tandem with the plans and apertures. Most of his 195 published drawings present his exploration of plans with elevations, or elevations with studies of apertures and openings.\(^ {73}\) Individual brick courses are even shown in his sketches, which highlight his fascination with construction.

However, not all of Kahn’s projects entirely embody his love of brick and his ongoing ‘conversation’ with brick. Edward Ford’s cut-away details of wall construction show several of Kahn’s other projects and illustrate his use of brick as a cladding to other constructional materials. For example, thermal insulation and cavities do exist within the walls of the First Unitarian Church, Rochester, USA (Figure 2.10) and the Exeter Library, New Hampshire, USA (Figure 2.11) where a 12-inch thick concrete masonry wall

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supports the exterior brick skin.  

David Bruce Brownlee also mentioned brick veneers in regard to the construction methods often employed by Kahn prior to the Indian Institute of Management. Nevertheless, Kahn’s brick veneers still follow the main characteristics of masonry, i.e. load-bearing construction system, but with the surface of the load-bearing material still

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partly displayed on the façade. Based on Sekler’s definition of atectonics, these projects all embody the concept of tectonics.

Even more interestingly, Robert Venturi (an influential figure in architectural Post-Modernism) actually had a close connection to Louis Kahn. Venturi worked in Kahn’s office for several years, and they taught together at the University of Pennsylvania for a considerable period. Denise Scott Brown confirmed that Venturi contributed his knowledge of Mannerism to Kahn’s design and inflection in form; ‘through [Venturi], [Kahn] investigated the layering of enclosed spaces and the layered juxtaposition of walls and openings’.\(^76\) Scott Brown suggests that Kahn’s project incorporated Venturi’s ideas, but the spectators’ understanding may be somewhat different. It is important, nonetheless, to gain an understanding of Venturi’s concepts as well as his own projects.

### 2.2.2 Robert Venturi and Denise Scott Brown and the Lewis Thomas Laboratory

Robert Venturi’s formative experience of working with Kahn provides an important foundation in comparing their ideas. Although Venturi employed the term ‘plus ça change’ to describe his approach to architecture which is not against the general provoking of Modernist architecture, his advocacy may be different from the conventional understanding of the Modernist architecture.\(^77\) He insisted that his idea of architecture was actually similar to the original notion of Modern architecture, even


though the mainstream concept of Modern architecture had been twisted.

Venturi appreciated an ornamented surface and pattern over the architectural elevation because it could endow architecture with character. It seems this understanding could be found in most of his projects. He argued that a building’s symbols and form expresses meaning and cited a cross-cultural example from Iraq to explain his idea. This specific building can be constructed in reinforced concrete with pre-cast panels as it might be built elsewhere in the world. But surface ornamentation can clarify its local features and characteristics, which must be different from buildings in other places. According to him, this strategy of employing surface ornamentation can ‘conform to the desires of [their] clients to [symbolise] national character and express cultural heritage in their architecture’.

Other scholars’ observations of Venturi, Scott Brown & Associates’ projects also reflect their intention and concepts. For instance, Deborah Fausch argued that their decorated shed had proclaimed the ‘separation between structure and significance’ as well as the ‘loss of deep truth of structure’. She cited the keystone feature of their Wu Hall as an example of their ‘brick panel’, even though brick is an essentially load-bearing material rather than being a panel. This expression of material use represents Venturi’s disregarding of the conventional understanding of the property of brick as load-bearing material. Venturi confirmed this attitude and considered the surface appliqué as ‘independent of the architecture in content and form’ and ‘nothing to do with the spatial

\[78 \text{Ibid. p. 10.}\]
or structural elements".

2-12 Entrance part of the north elevation of the Lewis Thomas Laboratory. This drawing shows their different graphics divided by the window openings of the façade design.

2-13 Detail photo of the south elevation of the Lewis Thomas Laboratory (above) with the comparison of Kahn’s project (below) shown in Figure 2.11. The photo of the laboratory indicates that the brick pattern only shows on the plain elevation but does not extend continuously to the dimension of wall thickness of openings as the transparent green block shown. The comparison of Kahn’s brick construction project shows the brick pattern on the wall thickness of the openings marked with transparent green block as well. (Drawing, Author 2009)

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80 Venturi, "Diversity, Relevance and Representation in Historicism, or Plus Ça Change ... Plus a Plea for Pattern All over Architecture ...", p. 11.
Venturi and his colleagues have designed several projects for Princeton University (New

Acknowledgements to Venturi Scott Brown Associates, who provided detailed information about this project.)
Jersey, USA) including the Lewis Thomas Laboratory for Molecular Biology. This laboratory employs a variety of façade effects. According to Stanislaus von Moos, Venturi was only responsible for the façade and the design of the building’s environmental strategy, whilst the rest of the design was handled by Payette Associates because of the building’s specialist nature. Moos quotes a statement from the architects claiming that: ‘the variety and texture of the surfaces create several orders of scale, lending interest to the extremely long facade and complementing the traditional collegiate Gothic architecture’.  

According to Sanmartin, Venturi achieved considerable ‘surface richness’ in the façade of the Lewis Thomas Laboratory by employing brick, granite and cast stone trim to echo surrounding buildings. The façade comprises bands of patterned brick with cast stone and large windows. The façade at the main entrance in the north elevation alludes to such superficial surface treatment, while the entrance in the south elevation highlights the alienation between the surface and wall construction. As shown in Figure 2.12, the façades not only present the textile-like pattern of brick-like tile attachments but also the dramatic change of material, namely the surface materials shifting from brick-like tiles to marble slabs.

Venturi’s exploration of superficial patterns can be seen in the detail of the cladding, as shown in Figure 2.13. Comparing this detail with typical brick construction shows that the vertical façade does not have a continuous pattern. So, the view in Figure 2.13 whilst very similar to real brick construction, still reveals itself as an imitation of brick

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construction. Here the architects detailed it in a way that would allow spectators to see the superficiality of the finished façade.

Careful analysis of the above illustrations exposes some of Venturi’s ideas about façade composition. His façade design is generally seen as pattern making or playing with surfaces. Figure 2.14 indicates that the façade of the upper floor represents a rhombus shape with marble and slate tiles which are attached in stretcher-bonded squares, with the wall between the windows on the different floors is decorated with rhombus shapes of Flemish bond and three different coloured tiles.

The sketch in Figure 2.18, though not exactly illustrating the final design, reveals that the design concept of the entrance façade is about superficially graphic patterns which gradually vanish and become blank marble, as can be seen in Figure 2.17.

Venturi’s appreciation of symbolism is apparent. He asserted that the works of Frank Lloyd Wright and Louis Kahn placed greater emphasis on architectural form rather than symbolism per se. However, Venturi referred back to historical contexts concluding that ‘[it] encourages ornamental surface over articulated form, pattern over texture, and sometimes pattern all over’. He claims that the schism between form and symbol in architecture should be reassessed as symbolism reflects its potential for diversity and cultural relevance. He argues that traditional symbolism can enrich architecture and the use of ornamental pattern can trigger more diverse expressions.

Venturi’s engagement with symbolism and his approach to façade treatment can be

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86 Venturi, ‘Diversity, Relevance and Representation in Historicism, or Plus Ça Change ... Plus a Plea for Pattern All over Architecture ...’, pp. 7-8.
deduced from his work. But Stanislaus von Moos emphasises the contradiction between a representative façade and a functional structure. He also highlights the differences between the duck and the decorated shed as symbols and applied symbols respectively.

Moos shares Venturi’s belief that façade and structure should be treated separately, so that structure can be completely functional without needing to consider aesthetic aspects. The façade therefore can be free to signify symbols which are meaningful for architectural expression.\(^{87}\) Moos considers architecture that has a concrete frame and a brick skin to be relatively taut, and suggests that the brick skin is a ‘mask’. This analogy accentuates both Venturi and Moos’s thoughts about the role of superficial brick surfaces and façade symbolism.\(^{88}\)

In summarising Venturi’s contribution to architectural language, Moos mentioned ‘the use of monumental façade “screens” behind which there are “functional” and conventionally built spaces’, ‘ghost architecture as a symbolic representation of architecture that no longer exists’ and ‘decorative façade patterning with [coloured], glazed brick tiles or marble panels’.\(^{89}\) In Moos’s opinion, Venturi’s idea about a façade as a screen and symbolic representation is obviously supported in his projects and writings.

Based on Moos’ analysis, what is interesting but little mentioned is Venturi’s ‘ghost architecture’\(^{90}\). ‘Symbolic representation of architecture that no longer exists’ actually reminds us of another morphological term: skeuomorphy, which was first used in

archaeology at the end of the nineteenth century. Before detailing the idea of skeuomorphy, we should clarify the role of semiotics in architectural studies because semiotic terms, such as ‘symbolic’ (as referred to above) have been frequently adopted.

2.3 Semiotics in architecture

Semiotic terms have frequently been adopted in architectural discussions, although the employment of semiotic rhetoric sometimes does not conform to the definitions accepted by semiotic professionals. However, since these typically semiotic terms are frequently employed and can be found in the above discussions about structure and ornament, they should be understood and employed appropriately. Ferdinand de Saussure’s definition of the signified and the signifier along with Charles Sanders Peirce’s distinction between iconic, indexical and symbolic modes might be the most useful terms in relation to the semiotic implications for architecture and surface.

In the context of the themes I have been discussing, it is fundamental to understand the essential definitions of the terminology linking semiotics and architecture. Saussure’s idea of arbitrariness for the connection between signified and signifier is an important concept when we consider the connection between objects such as surface ornament and

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construction.  Moreover, it is essential to review Peirce’s definition of the three modes before starting a more detailed discussion.

Peirce asserted that an icon is ‘a sign which refers to the Object that it denotes merely by virtue of characters of its own, and which it possesses, just the same, whether any such Object actually exists or not’; an index is ‘a sign which refers to the Object that it denotes by virtue of being really affected by that Object’; a symbol is ‘a sign which refers to the Object that it denotes by virtue of a law, usually an association of general ideas, which operates to cause the Symbol to be interpreted as referring to that Object’.

Chandler expanded on Peirce’s definition of semiotic modes and refers to icon as resembling or imitating the signified, so that a portrait, a scale-model or a metaphor would be categorised as icons in this approach. Next, the indexical mode might not look identical to the signified, but the connection between the index and the signified is directly observed or inferred without arbitrariness. For instance, smoke, footprints, echoes, a knock on a door and a directional signpost are also counted as indexes. In contrast, a symbol is an arbitrary and conventional signifier mode. Here the signified does not have natural links with the signifier, and the link needs to be agreed upon or learned. Languages in general (even traffic lights) are filed under this heading.  With this fundamental understanding of semiotics as a basic communication system, it should be reasonable to apply this communication science in the field of architecture.

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The connection between semiotics and architecture began with dense arguments. Before the 1970s, Charles Jencks and George Baird had collaborated with many architectural scholars to clarify the relationship between architecture and semiotics.\(^{96}\) By reviewing the development of architecture chronologically, Christian Norberg-Schulz reminded us of the fact that the meaningfulness is as important as the functions of architecture.\(^{97}\) He employed ‘symbol-systems’ as tools to interpret and understand meaning in architecture. When the function of architecture is stressed due to pragmatic consideration, the meaningful approaches cannot be ignored due to its symbolic system of social contexts.

Jencks contended the fundamental concept about semiology/meaning in architecture as ‘the idea that any form in the environment, or sign in language, is motivated, or capable of being motivated’.\(^{98}\) According to Jencks’s ideas, almost nothing could be free from the possibility of being meaningful. In other words, he proposed a basic importance of semiology for accessing the meaning of everyday environments. Semiology is attuned to this everyday meaningfulness and elevates our capacity to ‘read’ the city or built environment.\(^{99}\) Moreover, he suggested that a proper understanding of context and background is crucial to avoid misunderstanding any architectural expressions. As surroundings significantly affect architecture, the extrinsic explanation would be required to relate to the intrinsic meaning and provide the overall vision for

\(^{96}\) Jencks and Baird eds, *Meaning in Architecture.*


architecture.\textsuperscript{100}  

The initial volume provided a first step to connect semiotics and architecture, but the subsequent publication (also edited by Jencks and his colleagues), offered further explanation on the relationship between the two.\textsuperscript{101} Structure and function were both crucial for architecture, and Geoffrey Broadbent and Umberto Eco employed them to link architecture with semiotics.

Broadbent employed archaeological evidence to illustrate that ‘deep structure of architecture’ is intuitive needs: besides being a container for human activities, ‘cultural symbol’ was one of the transformations inherent in deep structure.\textsuperscript{102} With this understanding of architecture, the construction materials offered the pragmatic approach in architectural design, while the mental image of a particular culture supplied the typological approach. Visual analogies could provide an analogical approach, which included aspects such as the prototype Greek temples which translated timber structures into stone.\textsuperscript{103} In Broadbent’s treatise, we can find the mental structure of architectural meanings and ornament transformed from the constructive structure and thus augment architecture’s connection to semiotics.

On the other hand, Eco explored the function of architecture in terms of communication. Although he clarified any doubts that architectural objects might only function but not communicate physically; he also verified the unavoidability of the cultural phenomena in

\textsuperscript{100} Ibid. pp. 16-17.  
\textsuperscript{101} Broadbent, Bunt, and Jencks eds, \textit{Signs, Symbols and Architecture}.  
\textsuperscript{103} Ibid. pp. 139-142.
architecture as well as the nature of semiotics as ‘a science studying all cultural phenomena’.

Eco asserted that the semiotic perspective allowed us to recognise architecture as a sign-bearing vehicle to further distinguish architectural denotation and connotation. In addition to introducing new functions or forms, Eco clarified that the progressive transformation (or deformation) from well-known functional items appears necessary in architectural denotation to prevent people’s rejection of new items.

By taking the case of the throne, he proved that physical function could be less important than the connotation. Most people will recognise the fact that the person who can sit on this particular chair will be the one whom people think he/she is the leader of the country, but very few people would consider that it is a normal chair. In this case, the function of the chair is less important than its connotation of the throne. Moreover, after clarifying that both the primary and secondary functions could be changed, Eco connected them with the styling and the employment of new rhetorical forms. By providing new ideas and maybe new phrases, he affirmed that ‘styling in this case could result not merely in new surface connotations, but in new connotations that would have ideological repercussions and lead to a comprehensive re-codification of the object and its functions’.

Besides architecture, other related disciplines, such as visual design, material culture and

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105 Ibid. pp. 20-23.
106 Ibid. p. 44.
anthropology, also folded semiotics into their discussions. For instance, Gunther Kress and Theo van Leeuwen specifically addressed materiality and meaning in their discussions of visual design. They employed printed books as an example to explain the materiality of the object as a semiotic resource. The nature, colour and texture of materials have been often neglected but they all contain their own characteristics and communicative functions.\(^\text{107}\) Another example is Alfred Gell’s posthumous text, which applied semiotics to anthropology to provide a new perspective on anthropological theory in cross-cultural aesthetics.\(^\text{108}\) Looking at art produced within a particular social milieu, Gell showed that the meaning of the object would be affected by given social context and traditions.

If we turn back to architecture, we might find that, in most circumstances, it is inevitable that some architectural signs embody more than one signal mode (according to Saussure and Peirce’s definitions given above). For instance, Schafter categorised ornament into four kinds of function: emblem, sign, symbol and signifier.\(^\text{109}\) In other words, in her understanding, architectural ornament contains multiple semiotic categories.

If we recall Venturi’s theory on ghost architecture, i.e. the ‘representation of architecture that no longer exists’, this expression indicates a morphology (a skeuomorph, no less) introduced by an archaeologist. Broadbent’s treatise also referred to element transformation from timber to stone construction, which we had reviewed above of his


\(^{109}\) Schafter, *The Order of Ornament, the Structure of Style: Theoretical Foundations of Modern Art and Architecture*, p. 3.
‘The Deep Structure of Architecture’. It is appropriate to compare Kahn’s and Venturi’s approaches to façade design as a prelude to really comprehending the idea of skeuomorphy.

### 2.4 Skeuomorphy in architecture

If we compare these two architects, we will register that Kahn and Venturi had relatively different preoccupations evident in their designs. For Kahn, as shown in Figure 2.15, architecture is an entirety so that, as he designed the plan, he also thought about openings in the building as well as the elevations and the construction, just as illustrated in Figure 2.16. The material (bricks) present themselves, but the materiality of the bricks speak louder than the semiotics.

| 2-15 Exterior photo of the Indian Institute of Management, Ahmedabad. This shows the relationship between the entire mass and its openings.  
110 | 2-16 Kahn’s sketch of the Indian Institute of Management, Ahmedabad. Kahn’s sketch presents not only his proposal for the opening for the project but also his designing logic for the opening which is that the design of the opening should be considered with the design of sections and constructive methods.  
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110 Figure 15 refers to Gast, *Louis I. Kahn: Das Gesamtwerk = Complete Works*, p. 131.
111 Figure 16 refers to Kahn, *The Louis I. Kahn Archive: Personal Drawings. 4, Buildings and Projects, 1962-1965*, p. 126.
Conversely, when Venturi designed his elevation (Figure 2.17 shows its final iteration), his sketch drawings (Figure 2.18) instead present the surface pattern display; with scant consideration of the relationship between plan and elevation. Yet, it would be too simplistic (even inappropriate) to assert that Kahn practised the idea of tectonics in his works, while Venturi was more interested in the idea of atectonics. I want to suggest that we should take greater account of semiotics, and more specifically ‘ghost architecture’, or, to borrow from archaeology, the concept of the skeuomorph.

The professions of architecture and archaeology were closely related in the nineteenth century. Several important architectural theorists were also seriously involved in

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112 Figure 17 refers to Brownlee, DeLong and Hiesinger, Out of the Ordinary: Robert Venturi, Denise Scott Brown and Associates: Architecture, Urbanism, Design, p. 103.
archaeology. For instance, Gottfried Semper and Karl Bötticher were both considered to be architects as well as archaeologists. It was not surprising, therefore, when Colley March employed Greek temples as an example to clarify his term ‘skeuomorph’ for this morphology.

In 1889, March introduced the concept of skeuomorphy, a kind of morphology used to explain the reasons why some patterns existing on vessels or some decorated ornaments in classical architecture. March explained that the ornamented patterns that we see on recent vessels are the result of antique production procedures. In ancient times, when vessels first started being produced, unfired vessels were structurally required to be secured in order to prevent them from collapsing during the firing procedure. After this firing procedure, it was natural and inevitable that the pattern of the securing ropes would endure. This is because the ropes were fastened tightly touching the surface of vessels before and after the procedure, so that the traces had been left on the surface after the ropes had been removed.

When vessel production technique was eventually perfected, it was no longer necessary to secure them before baking. However, people were accustomed to the surface patterns, even though the patterns had now become superfluous. Therefore, potters deliberately decorated the surface of their vessels with similar patterns, even though there was no longer a practical or functional reason for doing so.\footnote{H. Colley March, 'The Meaning of Ornament, or Its Archaeology and Its Psychology', \textit{Transactions of the Lancashire and Cheshire Antiquarian Society} 7 (1889), p. 166.}

Some of the patterns shown in Figure 2.19 (top left) indicate these fastening features. The other example that March used to clarify the term was the ‘gutta’ of Greek temples.
He claimed that, for similar reasons, the structural timber elements near the top of the elevation of timber buildings (Figure 2.20, top left) had a structural function. Although Greek stone temples do not need this component, (because people were still used to seeing this element on architecture,) ‘guttae’ were incorporated in stone temples (as shown in the top right-hand part of Figure 2.20).

After March, many other scholars referred to skeuomorphy and have identified and diversified skeuomorphs to extensive studies. Significantly, the idea of the skeumorph

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115 Ibid. p. 171.
116 Figures 2.19 and 2.20 refer to ibid.
117 See Henry Balfour, The Evolution of Decorative Art: An Essay Upon Its Origin and Development as Illustrated by the Art of Modern Races of Mankind (London: Rivington, Percival, 1893), Alfred C. Haddon, Evolution in Art: As Illustrated by the Life-Histories of
has clear semiotic aspects. Here, it is important to emphasise the connection between skeuomorphy and indexical and symbolic metaphors, as Karl Knappett proposed, when he employed semiotic concepts to interpret skeuomorphy.\footnote{See Carl Knappett, 'Photographs, Skeuomorphs and Marionettes: Some Thoughts on Mind, Agency and Object', 
\textit{Journal of Material Culture} 7 (March), no. 1 (2002).}

Based on the hypothesis that ‘objects have social lives’, Knappett used several recent archaeological and anthropological investigations as examples to illustrate some notions of icon, index and symbol. In general, he considered a skeuomorph to be like a footprint in the snow, but thought it had more of an indexical meaning. However, when analysing the phenomenon of skeuomorphs further, he suggested that they could result from different origins, especially if they were found in different materials such as metal or basketwork.

The metal skeuomorph (which is actually ceramic imitating metal vessels) was introduced to imitate valuable items, such as silver cups to represent elite groups. The implication of skeuomorphic ceramic objects could be an iconic sign of the prototypical form it represents, namely the referred metal object. The basket skeuomorph, which was similar to March’s original example, might operate as a composite of both icon and index: while iconic similarity is undoubted, and the indexical representation can reveal the connection to the physical traces.

Knappett suggested that the fact that the metal skeuomorph could be considered to be an index results from its visual likeness, instead of its technical implication. In contrast, the

basket skeuomorph was produced from vestiges of the prototypical technique. However, the probable intention of having a metal skeuomorph was to imitate and to provide an illusion of value. In other words, he supposed that the metal skeuomorph was intended to deceive: ‘[the] tension between honesty and deception can be traced back to the ambiguous relationship between the icon and the index’.  

Some well-known architects and scholars have provided their interpretation of ornamentation with similar concepts, although the term ‘skeuomorph’ was not used. Vitruvius addressed his ideas about the timber origins of beams, rafters and other elements on Greek temples. Antonie Chrysostôme Quatremère de Quincy also confirmed similar ideas while discussing the term ‘architecture’. He argued that the memory of the use of timber in the construction ‘may have transmitted’ to ornamental motifs in later centuries in stone construction. Gottfried Semper referred to Carl August Böttiger’s work on ancient adornment affirming that ‘in architecture and ceramics – in fact, in all the arts – netting is used for surface decoration and is often applied structurally and symbolically as an ornament for projecting or bulging parts, such

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119 See ibid. p. 113.

120 See Pollio Vitruvius, Thomas Noble Howe, and Ingrid D. Rowland, Ten Books on Architecture (Cambridge: Cambridge University Press, 1999), p. 56. However, it should be understood that some scholars have held different opinions: the origin of timber is still a controversial issue, although this does not undermine the definition of skeuomorphy. For instance, see Indra Kagis McEwen, Socrates’ Ancestor: An Essay on Architectural Beginnings (Cambridge, Mass.; London: MIT Press, 1993) and Mark Wilson Jones, 'Tripods, Triglyphs, and the Origin of the Doric Frieze', American Journal of Archaeology 106, no. 3 (2002).

as for the belly of vases'.

Indeed, his idea has been further extended by Philip Steadman: ‘a pattern executed in one material is then imitated in another, as for instance floor mosaics imitating carpets, or wall tiles imitating wall cloths’. Banister Fletcher referred to skeuomorphic phenomena at the beginning of his publication: ‘[m]any constructive features offer to us a manifestation of the tendency, always existing, which consisted in transforming into a decorative feature that which previously was only a practical need’. Adolf Loos also mentioned that cheaper materials were often used to imitate expensive ones. This echoed Knappett’s findings about metal skeuomorphs: employing cheaper ceramics to imitate metal production. Even Le Corbusier, probably the most influential Modernist architect, adopted skeuomorphs for his design of early cars and railway coaches in the form of horse-drawn carriages. In the connection between semiotics and architecture, Broadbent also mentioned visual analogical design employing the translation from timber structure into stone.

If we connect the concept of skeuomorphy to the debates about structure and ornament

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122 See Semper, *Style: Style in the Technical and Tectonic Arts; or, Practical Aesthetics*, p. 221.
125 See Loos, 'Building Materials', pp. 64-5.
(as previously discussed), we note that the idea of skeuomorph can explain some of the phenomena of architectural surfaces and the use of materials. They can be separated into two types: skeuomorphic expression either ornamented directly on to the surface, or on to the surface layer attached to the construction.

The first skeuomorphic expression can be found on the carved surfaces of vessels as well as on architectural constructions. For instance, the walls of the SOAS library (Figure 2.21), designed by Sir Denys Lasdun in 1973, express some similar surface patterns, although the timing of the technical existence was different. If we recall March’s example mentioned above, the knotting pattern was carved and sometimes painted on to the plain surface of vessels produced by the new techniques. In respect of architecture, architectural surface could express the plain surface of the material, i.e. raw concrete. However, in Lasdun’s project, the surface of the concrete had been left with the pattern of the wooden shuttering, instead of the plain surface of raw concrete.

This is different from the conventional assumption regarding tectonics. The surface of the given material (concrete) expresses the textural pattern of the other material (timber), rather than its own properties. The wall does not seem to express the material itself, but it can be considered to express the temporary (timber) formwork, while the concrete was cured. This expression is actually very similar to the vessel production process that March referred to. The fastening procedure and the remaining vestiges are similar to the formwork for concrete with its timber pattern left by the temporary shuttering. Although the pattern of the temporary shuttering does not represent certain procedures which had

no longer been used, it still represents the pattern which deliberately left mainly for ornamental purpose, instead of necessary techniques, since the temporary shuttering can leave nothing on concrete surface without difficulties.

This kind of expression in concrete construction is not unique; the surface of the New National Theatre (Figure 2.22) in Tokyo, Japan, designed by Takahiko Yanagisawa, also presents similar timber patterns of the surface of the principal material, namely concrete. 

For the ceramics which March discussed, the skeuomorphical expression indicates antiquated techniques which are no longer used. As mentioned, concrete

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102

construction often presents a (timber) textural pattern, while the skeuomorphic expression represents the unavoidable part of construction procedures, namely the formwork, even though the formwork can be done with many kinds of material, but the conventional is timber boarding.

The second skeuomorphic approach employs an additional surface layer to achieve this expression. As mentioned above, architects and spectators have been accustomed to an additional layer being applied on the surface of the actual construction. This convention is prevalent in new materials and technology. Hermann Muthesius suggested that ‘it is unusual for some new invention to find its “definitive form” immediately when it first appears’. 131 For instance, if it is alright to take another relatively well-known project from the western world to illustrate this approach, Frank Lloyd Wright’s Martin House, built in 1904, employed a concrete and steel composite structural system, but neither of these two structural materials can be seen from the outside. Instead, the surface is covered with ‘Roman’-sized brick, which is thinner than ordinary facing brick. 132 The relatively newer construction materials (concrete and steel) are concealed, but a more traditional material (brick) covers the exterior surface. In this case, brick is not actually used for the building’s structure, only for the envelope.

It appears that both the skeuomorphic phenomena mentioned above imply certain semiotic connotations. Those skeuomorphic traces on the surface are not merely iconically connected with the past, or with the time when the building was constructed;

132 Ford, The Details of Modern Architecture, pp. 183 and 163.
they are also indexical signs for people’s memories and past phenomena. Moreover, if we recall Moos’ description of Venturi’s ghost architecture, it should be indexical representation rather than symbolic representation.

Along with semiotic ideas, skeuomorphical understandings provide a very helpful approach for interpreting architectural expression. It would be too arbitrary to simply categorise empirical projects into certain approaches regarding ornament/structure, as cultural phenomena are unavoidable in architecture. Ornament and the material form that it takes might have some more complex meanings and implications for architecture, whether structural, social, or aesthetic. However, with the concepts of skeuomorphy and the semiotic implication of complicated cultural and geographical contexts, debates on ornament and structure might be redefined under certain circumstances as we assumed in previous texts.

Even if we attempt to elide seismological concerns (for a while) in order to concentrate on conventional issues, we still need to explore and reflect on the relationship between ornament and structure. Our understanding of the semiotic implications of architectural expression, skeuomorphy and seismology become important clues to help clarify the distinction from conventional debates on ornament and structure. In designing architecture for different cultural and geographical backgrounds, we require specific amendments to the various theoretical debates (as discussed previously) in order to further examine architecture in such contexts.

My aim is to take this refined understanding of the structure ornament debate, and its broader semiotic, material and cultural implications, to the particular geographical and historical context of Japan and Taiwan in the pre-war period as a means of understanding
a particular set of cross-cultural architectural projects. However, before this, we need to understand the different cultural, architectural and seismological contexts and the sample projects in detail. The projects will be outlined in the next chapter.
Chapter 3

The historical backgrounds of Japan and Taiwan from 1853 - 1945

As I have suggested in previous chapters, most debate on the relationship of ornament and structure in architectural theory unfolded in a relatively abstract way with little direct contact with other (non-Western) cultural or geographical contexts. I have also suggested that the specific case of a seismic geography has direct and physical consequences for the structure-ornament issue. To explore both the cultural and geographical consequences of these other contexts, this section focuses on the Westernised Far East, including its history and architecture through specified case studies. It does so to supplement and enrich the conventional positions in the debate on structure and ornament in architecture. I will begin by reviewing the seismological and architectural histories of Japan and Taiwan before investigating the tectonic characteristics of a set of individual architectural case studies that will exemplify them.

3.1 Japanese and Taiwanese Westernised histories

The Meiji Restoration of 1868 marks the official start of Westernisation in Japan, but in
Taiwan it began somewhat later with the Japanese colonisation in 1895. So although Western influences seeped into Japan from 1853 (when it was forced to abandon the isolationist policy of ‘sakoku’), substantial Westernisation only began in 1868 when the Japanese Emperor decided that the country should embrace Western ideas. There is little evidence, however, of Western influence in Taiwan until almost the end of the Ch’ing Dynasty when the colonial government introduced comprehensive ‘Modernisation’ (the Japanese terminology for Westernisation).

In 1853, the self-imposed isolation of Japan, which had lasted for more than two hundred years, was brought to an end by the arrival of the American Commodore Perry and his fleet (known as the ‘Black Ships’).¹ Japan had been ruled by feudal political systems since around the thirteenth century and trade with the outside world effectively ceased in 1639.² However, this policy was overthrown by Commodore Matthew Calbraith Perry’s arrival at Uraga in Edo Bay. Perry forced the Japanese to open their ports for trading and negotiated a trade treaty. This accelerated the flow of Western immigrants and their know-how into the country.³ A brick-built Western cotton-spinning mill in Kagoshima was one immediate sign of their arrival. Between 1853 and 1867, a select number of

² During the feudal political periods, the Japanese emperors, the Mikado, had no actual powers to rule the country. Nonetheless, during the isolation, the Japanese still provided a special planned artificial island, Dejima or Deshima, in Nagasaki harbour for a limited amount of Dutch trade, and this was the only way that the Japanese could contact the West. For further information, see *Ibid.* p. 61 and Dallas Finn, *Meiji Revisited: The Sites of Victorian Japan* (New York: Weatherhill, 1995), pp. 5-6.
³ The sweeping reference to ‘westerners’ may be relatively simplistic. However, this term refers to the Japanese’s general understanding of Europeans and Americans at that time. As mentioned above, before 1853, rangaku represented knowledge and almost everything of the whole European and American world for the Japanese; then, after 1853, for the Japanese, suddenly there were so many foreigners that it was too difficult for the Japanese to recognise their nationalities and differences, except for the Chinese or Koreans, who the Japanese found easy to recognise. This situation may also have been similar for Europeans and Americans at that time: their understanding of the ‘Far East’ was of one entity.
Japanese attempted to learn from such new technology.

The Meiji Restoration led to the Westernisation of various aspects of Japanese society. Between 1853 and 1868, an increasing number of unequal treaties were initiated by Western entrepreneurs, so that the contemporary feudal government, the Tokugawa Shogunate (in Japanese, ‘shougunke’), was become untrusted for other feudal leaders, so it was forced to outlaw such conventions and returned governing power to the Meiji Emperor. This action was known as ‘taisei horakan’ and it signified the beginning of the Meiji era. The Emperor quickly introduced major changes to the country’s political and social structure including many Western methods and attitudes. Numerous innovations were launched and inculcated a sea-change in political, economic, social and cultural mores.4

The initial purpose of the Meiji Restoration was to facilitate a re-negotiation of the unequal treaties with Western countries, and Japan’s strategy was to learn from the West in various respects.5 The new government therefore dispatched contingents to Europe and America to learn how to become as strong as the countries which had imposed treaties which were unfair in political, economic and social terms.6

The government also recruited Westerners to teach the Japanese how to perform like them in a wide range of professions. This included the education system which would enable them to train future bureaucrats and technicians with knowledge of Western thinking

6 The contingent in 1871 was named the Iwakura Mission. For further information, see Ibid. p. 17.
to serve in the government. With this end in mind, the authorities employed many foreigners to work and teach in academic institutions.\(^7\) The Japanese phrase ‘\textit{fukoku kyohei}', meaning ‘to enrich the nation and to strengthen the military’ is perhaps the most apposite term in respect of the Meiji era.\(^8\)

The Meiji rule of Japan lasted for more than forty years, and led to changes across society, and influenced the subsequent Taisho and Showa periods. The success of the Westernisation doctrine during the Meiji Restoration is reflected in the Japanese victory in the Sino-Japanese War in 1895. A clear sign was the defeat of China at the end of the nineteenth century, and part of the spoils was to subsume Taiwan, Japan’s first colony.

The Westernisation policy was intended to transform Japan into an equal with other powerful countries. The acquisition of a colony, Taiwan, confirmed Japan’s own status and helped in the re-negotiation of international treaties which was finally realised in 1902 when Japan entered into an Anglo-Japanese alliance.\(^9\) From this point on, the connection between Japan and Taiwan had become so strong that it is difficult to overlook the inter-relationship between the two countries.


\(^8\) \textit{Ibid.} p. 16. Historians have also asserted that the Japanese searched for security and self-respect during this period. For further information, see Benson and Matsumura, \textit{Japan, 1868-1945: From Isolation to Occupation}, p. 57.

\(^9\) Moreover, in 1905, Korea also became a Japanese colony as part of the consequences of the Russo-Japanese War. For further information, see Benson and Matsumura, \textit{Japan, 1868-1945: From Isolation to Occupation}, p. 59, and Storry, \textit{A History of Modern Japan}, p. 70.
Before becoming the first Japanese colony, Taiwan had limited engagement with Westernisation, and its primary contact with the West was when it was being attacked or occupied (see Figure 3.1). Taiwan had been attacked and/or occupied for long periods after it was first named ‘Formosa’ (or ‘beautiful place’) by Portuguese traders who saw the island when navigating through the Taiwan Strait around 1544. In the seventeenth century, Taiwan was partly occupied simultaneously by the Spanish and the Dutch, who used it as a trading post. Before the end of that century, however, after a series of battles, Taiwan was claimed as part of the territories of the Ch’ing Dynasty. The Ch’ing had taken little interest in the development of the country until the very end of their rule. In the nineteenth century, foreign countries shaped the history of Taiwan following

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11 The Dutch defeated the Spanish but were themselves defeated later by people from Mainland China called Ch’eng-Kung Cheng. However, Cheng and his followers were defeated again by the Ch’ing in 1662. For more information, see Ibid. pp. 95, 101-2, and W. G. Goddard, Formosa: A Study in Chinese History ([East Lansing]: Michigan State University Press, 1966), p. 49.
negotiations with the Ch’ing and the opening of several ports in China and Taiwan to facilitate foreign business activities. Moreover, many countries had frequently attacked Taiwan between 1841 and 1884. Eventually, the Ch’ing Dynasty abandoned the governance of Taiwan under the Treaty of Shimonoseki which followed the war in 1895.

Taiwan experienced some dramatic changes and rapid Westernisation during the colonial period. The Japanese developed Taiwan to align with their vision of modernity, and adjusted their ambitions for Westernisation from being an equal partner to being a super power in the East.

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13 The Ch’ing Dynasty claimed that it governed Taiwan from 1683, and people were even prohibited from travelling from Mainland China to Taiwan until the second half of the nineteenth century. The Ch’ing Dynasty did not begin to develop the infrastructure in Taiwan until 1885. For further information, see Leonard H. D. Gordon, 'The Cession of Taiwan: A Second Look', *The Pacific Historical Review* 45, no. 4 (1976), pp. 558-559, and Harry J. Lamley, 'Taiwan under Japanese Rule, 1895-1945: The Vicissitudes of Colonialism', in *Taiwan: A New History*, Murray A. Rubinstein ed. (Armonk, N.Y. London: M.E. Sharpe, 1999), p. 203.
14 This included hygienic facilities, development of the railway, education and so on. For more information, see Che-Chi 郭修復, 'Rihjhih Shihci Taiwan Weisheng Gongcheng Guwun Jishih Burton Dui Taiw Chchengh Jindaihua Yingsiang Jhih Yanjiou [Research on the Influence of Modernity by Sanitation Engineer William Kinnimond Burton in Taiwan's Cities During the Japanese Governance of Taiwan, 日治時期台 湾衛生工程顧問技師爸爾登對臺灣城市近代化影響之研究]' (Chung Yuan Chirstian University, 1998); Shu-Hwa 施華 莫林, 'Rihjhih Cianci Taiwan Zongguan Tielu Jhih Yanjiou [Research on the Railway of Taiwan at the Beginning of the Japanese Colonial Period (1895- 1920), 日治前期臺灣縱貫鐵路之研究(1895-1920)]', (National Taiwan Normal University, 1998). and Pei-Hsien 余賢 許, 'Taiwan Jindai Syuesiao De Dansheng: Rihben Shihdai Chudeng Jiaoyu Tixi De Chengli [The Establishment of Taiwan's 'Modern School' in the Japanese Period, 台灣近代學校的誕生—日本時代初等教育體系的成立(1895-1911)]' (National Taiwan University, 2001). In addition, the historian Tadao Yanaihara has affirmed that the Japanese government considered Taiwan to be the standard example of colonialism, so that they attempted not only to modernise but also to ‘Japanise’ the whole of Taiwan, rather than merely exploiting it. As well as colonial ambition, the physical development of the country was the excuse for this. Tadao忠雄 Yanaihara矢内原 and Ming-Te 林, *Rihben Diguo Jhuyi Sia Jhih Taiwan [Taiwan under the Japanese Empire,日本帝國主義下之臺灣]* (Taipei: Wu San-Lian Taiwan Shhhliao Jijin Huei [吳三連台灣史料基金會], 2004).
After their victory in 1895, the Japanese went on to defeat the Russians in 1905, and began their occupation of north-eastern China. Before 1905, Russia had physically controlled north-eastern China, but by 1905, it lost control of the area and Japan took over. In 1906, the Japanese founded the South Manchuria Railway Company (‘Minami Manshu Tetsudo Kabushikigaisha’ in Japanese) in this new territory. This company not only managed the railway but also many industrial developments. In fact, the role of the South Manchuria Railway Company was similar to that of the East India Company of the British, except that domination had shifted from the British Empire to the Japanese Empire. The impetus to Westernise had turned into a determination to establish an empire in the East.15

The original programme of Westernisation in Japan focused on Modernisation, which in the context of Taiwan turned into the form of a full-blown colonialism. Colonialism, as one aspect of a wider Modernisation and Westernisation project, had been prioritised in government policy in the 1930s, and the colonial ambitions of the Japanese empire led to introduction of ‘kouminka’, which literally means ‘to be imperial citizens of Japan’, into Taiwan.16

This imperialist strategy ceased at the end of the Second World War, when Japan finally surrendered in 1945. International agreement required that the Japanese occupation of Taiwan cease, and as a result, Japan’s political hold was terminated. Despite this, the effects of Japan’s involvement in Taiwan remained a significant aspect of the post-war era. The knowledge around architecture and building performance under seismic

15 Benson and Matsumura, Japan, 1868-1945: From Isolation to Occupation, p. 68.
16 The practical strategies of kouminka included changing the language spoken, renaming people’s surnames, imposing religious worship, and so on.
conditions of contemporary Taiwan had been formed since the pre-war era, under Japanese colonialism and in direct relation to debates and experiences in Japan. And, as we have seen, Japan’s involvement in Taiwan, in turn, implicates the West through Japan’s own policy of Westernisation.

Chart 1 attempts to set out the basic outlines and connections between Japan and Taiwan against the background of key earthquakes and through the lens of selected architectural case studies. Before detailing the relationship between the occurrence of earthquakes and the selected projects, the wider histories of architecture and seismology in each place should be stitched together to reveal a clearer picture of Japan and Taiwan during their periods of Westernisation.

3.2 Japanese architectural and seismological history

The unprecedented changes which took place in Japan after 1853 were largely due to Western influences. Japan’s architectural and seismological professions were also shaped by the pervasive nature of Westernisation. The changes wrought before the end of the Second World War can be divided into several phases. Japanese architectural scholars have suggested a taxonomy in terms of either stylistic or technical/material approaches. This taxonomy is set out in Chart 2.

However, when discussing architectural expression, another kind of register is useful in terms of the sequence of large earthquakes and several significant events relating to Japanese architecture and the science of seismology. These include the 1855 Ansei Earthquake (the first serious earthquake after the arrival of the ‘Black Ships’ in 1853) as well as the Meiji Restoration itself. The 1891 Nobi Earthquake physically and
psychologically shook Westernising Japan, especially the seismological profession. The widespread debate in 1910 on a future direction for Japan’s architecture can be considered a watershed in its consequences. The 1923 Kanto Earthquake was so serious and influential (impacting on both Japan and Taiwan) that it can be counted as a significant event in the run-up to the Second World War.

3-2 Locations and years of occurrence of influential earthquakes in Japan during 1853-1945.

The occurring years of earthquakes are marked on the map of Japan.\(^7\)

\(^7\) The original map, on which the ported opened to foreigners during the Meiji Period, were marked, appears in Katsuhiko Sakamoto, *Meiji No Ijinkan 1858-1912 (Japan's Western Architecture in the Meiji Era, 明治の異人館)* (Tokyo: Asahi Shinbun-sha, 1965), p. 2.
3.2.1 Initiating contact with the West: before the Meiji Restoration (1853-1868)

Before 1853, conventional Western professions such as ‘architecture’ and ‘seismology’ did not exist in Japan. There were no architects, only ‘daiku’, or carpenters, who were skilled craftsmen who had trained under a rigorous system of apprenticeship. After the introduction of Western culture, the ‘o-yatoi gaikokujin’, or foreigners, employed by the Japanese government introduced the idea of ‘architecture’ as an independent profession. Even in the Western world, the term ‘seismology’ was not defined until Robert Mallet observed the Neapolitan Earthquake of 1857.\(^\text{18}\) In the history of traditional Japan, many tales and myth were attached to earthquakes, so it was difficult for a proper scientific discipline to disengage from this story-telling backdrop.

After 1853, because of the iniquitous treaties between Japan and foreign countries, more and more foreigners visited for business and other reasons. So the Japanese had glimpsed ‘genuine Western towns on [Japan’s] own soil’ and examples of Western architecture even before the Meiji Restoration.\(^\text{19}\)

Military facilities including forts and batteries were also introduced during that time and were often welcomed as symbols commanding the respect of other countries.\(^\text{20}\) As a


\(^{19}\) Finn, *Meiji Revisited: The Sites of Victorian Japan*, p. 4.

result, Japan began to witness several kinds of Western-style architecture. It is noteworthy that the Westerners undertook their building works without any consideration of traditional Japanese construction methods and materials.

Having observed foreigners and their buildings, some inhabitants began to build Western-style structures. Certainly the foreigners could not construct their buildings alone and had to employ Japanese as labourers to carry tiles and lay bricks or stone. Therefore, some ‘daiku’, such as Kisuke Shimizu and Tadahiro Hayashi, had the opportunity to co-operate in building Western-style architecture for Westerners’ use. They could then learn the style, appearance and construction methodology. For example, Shimizu initially co-operated with R.P. Bridgens (predating the Meiji state) before practising independently. In fact Bridgens was one of the few architects who had practised before 1868 and continued thereafter. His detail will be discussed in the next chapter with his project, British Consulate in Yokohama.

The great fire in Yokohama in 1866 obliged Westerners to worry about the flammability of timber constructions. Shimizu and Bridgens employed a traditional Japanese treatment, ‘namako-kabe’, to the surface of their projects as a fireproofing agent. As shown in Figure 3.3, ‘namako-kabe’ was a cladding system comprising of square black terracotta tiles joined together with white extruded lime plaster as pointing to protect the timber structure beneath. This approach to construction was similar to opus reticulatum.

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22 Kirishiki 関敷, Meiji No Kenchiku [Meiji Architecture, 明治の建築].
(also known as reticulated brickwork). Several years later, Bridgens refined timber construction and the ‘namako-kabe’ finish to develop a timber-framed masonry construction (*mokkotsusekizou* in Japanese). The inner structure was timber frame, which was similar to *namako-kabe*; the outside cladding was brick or stone, which looked like masonry construction.\(^{23}\) This construction system played significant role after 1868.

> 3-3 Diagram of construction layers of the *namako-kabe*.

Different materials for constructing the *namako-kabe* are indicated in this diagram.\(^{24}\)

many facilities in the eastern area of Japan: 200,000 people died and 15,890 buildings were destroyed.\footnote{Ichizo一三 Hattori服部, 'Destructive Earthquakes of Japan', \textit{Transactions of the Asiatic Society of Japan} 6, no. 2 (1878), p. 269. However, according to more recent publications, the casualties were about 7,000 people dead and 15,756 buildings destroyed. See Misao中村 Nakamura et al., 'Ansei-Edo Jishin No Edo-Shi No Higai [Damage caused by the Ansei-Edo Earthquake (1855/11/11) in Edo City, 安政江戸地震 (1855/11/11) の江戸市の中の被害]', \textit{Rekishi Jishin [Historical Earthquake, 歴史地震]} 18 (2002), p. 78.} Yet, well-known publications hardly mention this disaster at all. Moreover, references to the Ansei Earthquake in Gregory Clancey’s book are mainly anecdotal tales about catfish and an illogical story about the ‘Black Ships’ as dramatic shocks, with wood-block prints as records.\footnote{Gregory K. Clancey, \textit{Earthquake Nation: The Cultural Politics of Japanese Seismicity, 1868-1930} (Berkeley, California: University of California Press, 2006), pp.123, 130.} The devastation inflicted by this earthquake was neglected, as was its connection with architectural development.

\section*{3.2.2 Overwhelming Westernisation: before the 1891 Nobi Earthquake (1868-1891)}

As mentioned above, the Meiji Restoration in Japan was dominated by a powerful ethos of Westernisation. Most Japanese believed in the superiority of Western technology because of the enthusiastic endorsement that their Emperor gave it, an enthusiasm that was shared by Westerners in Japan. Most people in Japan at that time admired or believed that the progressive notions of the West were beneficial for the rest of the world (including Japan) and very few registered concern regarding the project of Westernisation.

Foreign architects, contributed to this sense of superiority of Western technology by denigrating traditional Japanese architecture (often of timber construction) as fragile and
ineffective. They advocated, instead, their ‘reliable’ masonry construction system. During the first decade of the Meiji westernisation, the government employed many foreigners in various professional fields, including architecture to practise western construction systems and to educate the native Japanese.

R.P. Bridgens, Thomas James Waters and Josiah Conder were very well known architects during this period. Bridgens promoted an interesting, culturally hybrid approach to building construction, i.e. timber-framed masonry construction, which was simply introduced above. Although Thomas James Waters arrived in Japan before the Meiji Restoration, it took several years before he became well known. He had completed a number of factory buildings before securing the most significant commission in his career. This was the Ginza housing project which consisted of two-storey, stuccoed brick buildings. The arcaded walkways and façade were completed around 1873, and the whole scheme was finished in 1877. This project, shown in Figure 3.4, was born from the

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28 His projects included several factories around 1867 and the Osaka Mint Factory in 1871. For more information, see Gregory, Earthquake Nation: The Cultural Politics of Japanese Seismicity, 1868-1930, pp. 68-69; and Finn, Meiji Revisited: The Sites of Victorian Japan, pp. 18-19.
ashes of a fire in 1872, and it survived another fire in 1907, but eventually collapsed in the 1923 earthquake. Nonetheless, it marked an important moment in Japan’s embrace of Western architecture.

Waters described the project as being ‘solidly built of stuccoed brick, supported by cast-iron pillars, lit with stone-trimmed arched windows[,] covered with a fireproof roof of earth, brick, and Japanese [tiles]’. The proper use of brick in the foundations and the walls was illustrated in diagrams showing a mixture of Flemish and English bond.29 This scheme provided the Japanese with an ‘orthodox’ view of Western architecture, and although its appearance signified the West at that time, its iconic image remains valid even in the early twentieth century.

Another well-known English architect from the Meiji era was Josiah Conder, who was employed by the government but was committed to both practice and teaching. From 1877 to 1884 he taught architecture at the Imperial College of Engineering (‘Kobudaigakk’o in Japanese) and nurtured the first generation of native Japanese architects. He is often referred to as ‘the father of Western architecture in Japan’.


30 Terunobu, Fujimori, ‘Zyosaia Kondoru to Nihon [Josiah Conder and Japan, ジョサイア・コンドルと日本]’, in Shika Na Kan No Kenchiku Ka: Zyosayia Kondonru Ten [鹿鳴館の建築家：ジョサイア・コンドル展 (Josiah Conder)], ed. Hiroyuki, Suzuki, et al. (Tokyo: 東日本鉄道文化財団, 1997), p. 17. Until 1884 when his contract ended, he had nurtured twenty-one Japanese to become fully qualified architects. In addition, the Imperial College of Engineering converted to Tokyo Imperial University later. More details see Fujimori, Nihon No Kindai Kenchiku Ue Bakumatsu Meiji Hen [Japanese Modern Architecture, Vol.1, 日本の近代建築（上）幕末明治篇], pp. 170-71. (However, twenty-three architects were educated by according to ———, ‘Zyosaia Kondoru to Nihon [Josiah Conder and Japan, ジョサイア・コンドルと日本]’).
The Japanese government obliged him to practise Western-style architecture in masonry construction and, during this period, he promoted the idea of red brick being an important feature in Western-style, or Victorian Gothic, architecture. His dexterity in masonry construction was even more influential because of his academic standing, and was confirmed by his former pupils’ involvement in discussions about the rebuilding programme after the Nobi Earthquake. One of his most influential students was Kingo Tatsuno who designed the Tokyo Station.31

Apart from undertaking live projects, foreign architects published papers condemning traditional Japanese timber construction and the newly developed timber-framed masonry method as unreliable.32 For them, traditional Japanese architecture was exclusively timber construction and the works of ‘daiku’.33 In fact, they did not trust Japanese construction, because they failed to understand that the flexibility of a timber frame was ideal for architecture in a seismic hazard zone.

Although most were aware that seismological issues were an important concern in this Far-Eastern country, they thought that, due to its solidity, a masonry construction would be far more reliable than a timber one. This was especially true of British and German architects who, of course, had no experience of earthquakes in their own countries. They thought that Japanese culture had no interest in safeguarding itself against earthquakes.34

According to Clancey:

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34 Ibid. p. 43.
‘In European accounts, “wooden” was often used interchangeably with “Japanese”, though it was the full range of Japanese decisions and actions that were under critique, the choice of material being only one. British engineers believed [that] wooden structures might also be made earthquake-resistant through devices that imparted rigidity and strength, such as diagonal braces and iron fittings’. 

Both Conder’s and R.H. Brunton’s attitudes could strengthen Clancey’s assertion. Conder demonstrated a lack of interest in indigenous earthquake-proofing methods by assuming that it was simply selecting a material, namely timber. Except for this, he believed that ‘[there was] nothing in the construction of Japanese buildings which in any way [made] them suited to earthquakes’. 

It is fair to say that European architects followed their Western training and believed that masonry structure was the only proper means of earthquake-proofing. Unsurprisingly, they disputed the efficacy of this new timber-frame masonry construction system, despising this hybrid method and calling it a ‘mongrel system’. R.H. Brunton predicted that ‘the timber frame work [will prevent] the outside lining of stones or other covering from being precipitated inward’ if experiencing a seismic shock. 

Although a few Westerners had doubts about their colleagues’ dismissive attitudes towards traditional Japanese construction, their caution was largely disregarded. 

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39 William Edward Ayrton’s warning was a remark on Brunton’s condemnation of Japanese construction; David Murray’s address about the destructive effects of earthquakes upon brick buildings was referred to by Clancy in his texts about Cawley. See William Edward Ayrton, ‘Remark of Construction Art in Japan, Part Two’, Transactions of the
the majority, the ‘observational’ seismology, which in fact was not at all scientific, seemed reliable enough for their concern about potential Japanese earthquakes.\textsuperscript{40}

Nonetheless, the development of Japanese architecture during this period can be categorised into two groups. On the one hand, many local architects embraced Western styles and masonry construction.\textsuperscript{41} Many had learnt from the Westerners since 1853 and others were taught by Western tutors from the 1870s. They were seduced by the seeming certainty of Western aesthetics, architecture and their construction methods. However, according to historical publications, a minority group had doubts about Western input and stayed loyal to traditional methods of timber construction.

Some ‘daiku’ and their descendents raised doubts about Western technology and construction systems. They believed that the traditional methods had been proven over Japan’s long history, and pointed buildings that had survived from earthquakes. They argued that they were more reliable in terms of earthquake-proofing.\textsuperscript{42}


\textsuperscript{40} Clancey, \textit{Earthquake Nation: The Cultural Politics of Japanese Seismicity, 1868-1930}, p. 64.

\textsuperscript{41} It should be clarified that local architects mean people design buildings and responding to supervise the construction in general, although, before, 1879, no Japanese would be recognised as ‘architects’ by Westerners. It was because that, for Westerners, an architect should be taught under Western architectural educational system.

\textsuperscript{42} Daiku Tomokata Tachikawa has stated that some traditional Japanese architecture had withstood earthquakes for more than a thousand years. Therefore, he asserted that it was wrong to think that wooden buildings could not survive disasters. See Tomokata 立川, ‘Koubushou Yontou Gishu Tachikawa Tomokata Shoshin’ [工部省四等技手立川知方上申’], in \textit{Kindai Nihon Kenchiku-Gaku Hattatsu Shi} (Modern Japanese Architectural History, 近代日本建築学発達史), Nihon Kenchiku Gakkai (Architectural Institute of Japan) ed. (Tokyo: Maruzen Kabushiki Gaisha文生書院 丸善株式会社, 1972), p. 14 for more information. In respect of the timing of Tachikawa’s suggestion, in his two publications dated 1972 and 1976, Teijirou Muramatsu provides
The Japanese people also divided into two categories in terms of their attitude to Westernisation. The first category consisted of people who had learned the Western style by practising with foreigners, but employed timber-framed masonry constructions. The second comprised a group who had studied Western architecture in academic institutions, and who generally believed and practised an ‘orthodox’ Western approach in accordance with Western dogma.

People like Kisuke Shimizu and Tadahiro Hayashi, practised Western architecture before and after 1868. Given their earlier experiences, they co-operated with some Westerners, like Bridgens, in building with ‘namako-kabe’ and the timber-framed masonry method. After 1868, they practised independently usually employing the same construction system.\(^{43}\)

In fact, the timber-framed masonry system provided a satisfactory alternative for them. Primarily because they were either cautious about, or were not familiar with, Western technology and construction, especially pure masonry construction. Nonetheless, this timber-framed masonry system had been introduced also by a Westerner, namely, these two different years when referring to Tachikawa’s suggestion. Since he gave the year 1879 for Tachikawa’s statement in his later publication, Nihon kindai kenchiku gijutsushi, it seems likely that the later date is the correct one.

Bridgens. It resulted in the fact that although both pure brick construction and timber-framed masonry construction systems were available for the Japanese, the timber-framed was the more frequent used one than the other. It should be noted that it is not easy to distinguish these two construction systems from their appearances. It appears that the Japanese preferred Western-style architecture, or more specifically its appearance, for new-build work. This demonstrates that the visual aspect of buildings was very important for the Japanese, and any materials employed as surface finish were also required to look Western-style regardless of their (unseen) structural backing.

Many projects were built in such a fashion, including the British Consulate and the original Mr Hunter’s residence (or ‘Kyuu Hantaashitei’ in Japanese) (Figures 4.2 and 4.10). Indeed, the hybrid construction system used in this building became the fashionable method of choice during the 1870s and 1880s.\textsuperscript{44}

Many students undertook the Western architectural education offered at the Imperial College of Engineering from 1877. It was Conder (educated at the University of London) who taught the first generation of Japanese architects to appreciate architectural beauty and the principles of Victorian Gothic.\textsuperscript{45}

However, the resultant attitude of the Japanese scholars varied. Many simply transferred their learning and philosophical ambitions into practice, whilst others considered

\textsuperscript{44} Kirishiki鯉敷, Meiji No Kenchiku [Meiji Architecture, 明治の建築], pp. 105-107.

\textsuperscript{45} In fact, William Anderson and Shastle de Boinville were the first teachers at the Imperial College of Engineering but they did not inspire students effectively, so the Japanese government decided to replace them with Conder. For more details see Fujimori藤森,'Zyosaia Kondoru to Nihon [Josiah Conder and Japan, ジョサイア・コンドルと日本]', pp. 18-19.
themselves to be representative of Japanese culture for a Western audience.\textsuperscript{46} For example, Tatsuo Sone’s graduate thesis of 1879 ably demonstrated his understanding of ‘daiku’ as embodied in the previous architectural tradition. He stressed that the only shortcoming of Japanese carpentry was its flammability, not its structural weakness, which was the Westerners’ familiar condemnation of ‘daiku’.

Tatsuno Sone agreed with Tachikawa’s opinion that traditional Japanese construction was more earthquake-resistant than Western masonry construction.\textsuperscript{47} However, Kingo Tatsuno adhered to Conder’s concepts and accepted that the future cityscape should comprise masonry construction reinforced with iron straps and buttresses. Tatsuno articulated his belief in earthquake-proofing by the reinforcement of the masonry construction.\textsuperscript{48} It should be noted that neither traditional adherents, nor proponents of Western concepts, could completely trust European engineering knowledge in regard to the real danger of earthquakes in Japan.

Given the government’s candid policy of Westernisation, some Japanese scholars went abroad to acquire a more diverse education encompassing not only orthodox Western culture but also essential Japanese values. Tatsuno, for example, having completed his education with Conder, then visited London to study and undertook a two-year internship. Like Conder, he studied at the University of London under Roger Smith’s supervision. He continued to follow Conder’s footsteps and gained valuable practical experience in


\textsuperscript{47} \textit{Ibid.} p. 59.

the office of William Burges.\textsuperscript{49}

On his return to Japan, Tatsuno perfected his own version of the brick-with-stone-trim Queen Anne style of architecture. This was consequently named ‘the Tatsuno style’ and became the height of fashion.\textsuperscript{50} Several other Japanese students travelled overseas to study and train to be architects.\textsuperscript{51} Therefore, although the architectural education of this generation appears to have been relatively diverse, it was still grounded in core Western values.

Back in Japan, Tatsuno channelled his experience and explored potential alternatives for the future of the Japanese architectural profession. He promulgated a greater understanding of British Victorian Gothic and introduced some novel concepts, such as melding Japanese tradition with the academic profession. During Tatsuno’s internship in London, Burges quizzed him on traditional Japanese architecture but his lack of

\textsuperscript{49} After graduating in Japan in 1879, Tatsuno stayed in London from 1880 to 1882. Before going back to Japan in 1883, he had a long journey through France and Italy. See Shirotori 白鳥, ed. Kougaku Hakase Tatsuno Kingo Den [A Biography of the Doctor of Engineering Kingo Tatsuno, 工学博士辰野金吾伝], pp. 31-34. Burges did not agree with the so-called Queen Anne style, but probably due to Burges’s death in 1881, Tatsuno did not have the chance to understand his ideas. Thus, Tatsuno still supported his ‘loose, if [recognisable], version of the so-called Queen Anne revival’. See Mark Girouard, \textit{Sweetness and Light: The 'Queen Anne' Movement, 1860-1900} (Oxford: Clarendon Press, 1977), p. 59, and David Butler Stewart, \textit{The Making of Modern Japanese Architecture: From the Founders to Shinohara and Isozaki} (Tokyo, New York, London: Kodansha International, 2002; reprint, 1987), pp. 37-8 for more details.


\textsuperscript{51} Yorinaka Tsumaki gained his first architectural degree at Cornell University in 1879 and received further training in Berlin. Tsumunaga Matsugasaki spent thirteen years in the German educational system, graduating in 1884. For more details see \textit{Ibid.} pp. 236-37, 235-36.
knowledge was embarrassing and started him thinking.52

So when he replaced Conder as the Dean of the Architectural Department in the Japanese academy in 1884, he introduced courses on traditional Japanese architecture taught by Kiyoyoshi Kigo (starting in 1889). This brought greater diversity to Japanese architectural education, and was further developed following the Nobi Earthquake.

I would now like to turn to explore the seismological side of my research agenda. In order to explore the seismological profession, it is necessary to consider the pioneering Westerners in Japan. In 1880, about twenty years after Robert Mallet defined the word ‘seismology’, the Seismological Society of Japan (‘Nihon Jishin Gakkai’) was founded. Most of the Society members were foreign faculty members of ‘Kobudaigakko’.53 The society was the result of John Milne’s experience of a minor earthquake in 1880, which caused little serious damage to Tokyo or Yokohama. Milne, as a yatoi of the Imperial College of Engineering, arrived in Japan in 1876 to teach geology and mining,54 but the 1880 quake focused his attention on seismology. He quickly founded the Society but also researched Robert Mallet’s observational seismology and connected European studies

into earthquakes.\footnote{John Milne, ‘The Earthquake in Japan of Feb. 22, 1880’, \textit{Transactions of the Seismological Society of Japan} 1, no. 2 (1880).} 

Milne and the Society attempted to record the scale of each quake. He attempted to establish a scientific system for measuring earthquakes, based on an understanding that observational seismology (as developed by Mallet) could only record the damage done to masonry constructions and not timber ones. Milne realised that seismic tremors had had negligible effect on the timber construction, since it returned to its original position after the quake subsided.\footnote{Ibid. pp. 1-2 and \textit{———, ‘Notes on the Recent Earthquakes of Yedo Plain, and Their Effects on Certain Buildings’, Transactions of the Seismological Society of Japan} 2(1880), pp. 27-35. Milne and his colleagues in the College, James Ewing and Thomas Gray, invented a new seismograph named the Ewing-Gray-Milne seismograph by 1887 for this purpose. See Clancey, \textit{Earthquake Nation: The Cultural Politics of Japanese Seismicity, 1868-1930}, pp. 72-3, for more details.} 

However, Milne and his colleagues still did not fully appreciate the earthquake-proofing characteristics of traditional timber architecture. Instead, they insisted that traditional Japanese architecture was insubstantial and had little to contribute to combating the hazards of working in a country subject to frequent earthquakes.\footnote{Clancey, \textit{Earthquake Nation: The Cultural Politics of Japanese Seismicity, 1868-1930}. p. 71, \text{Minoru Tayama, Fusakichi Omori 大森, and Seikei Sekiya 豊谷, ‘Dainihon Jishin Shiryo [Earthquake History of Great Japan, 大日本地震史料], Shinsai Yobou Chousakai Houkoku [Bulletin of the Imperial Earthquake Investigation Committee, 震災予防調査報告] 46, no. 1 (1904), and Minoru Tayama, Fusakichi Omori 大森, and Seikei Sekiya 豊谷, ‘Dainihon Jishin Shiryo [Earthquake History of Great Japan, 大日本地震史料], Shinsai Yobou Chousakai Houkoku [Bulletin of the Imperial Earthquake Investigation Committee, 震災予防調査報告] 46, no. 2 (1904).}} The Japanese, in turn, barely reviewed seismic history, and made scant reference to seismic strategies in their discussions.\footnote{For example, Ichizo Hattori, who was a professor at the \textit{Kaisei Gakko}, published a paper about records of historical earthquakes in 1878. Hattori 服部, ‘Destructive Earthquakes of Japan.’} 

\footnote{Seikei Sekiya, who studied under Ewing and later Milne, refuted Basil John Milne, ‘The Earthquake in Japan of Feb. 22, 1880’, \textit{Transactions of the Seismological Society of Japan} 1, no. 2 (1880).}
Hall Chamberlain’s assertion that there was the lack of records on the Ansei Earthquake. He was able to list eighty Japanese works from the literary to the scientific about the earthquake against Chamberian’s bias. However, his own summary of historical earthquakes in Japan, in which he co-operated with Fusakichi Omori, was not published until 1904.\(^{59}\) Westerners’ confidence (bordering on arrogance) was increasingly expressed, not only because they believed in their own superior thinking, but also because of the Japanese admiration for the West in general. However, this situation began to change after the devastation of the Nobi Earthquake.

\[3.2.3 \text{ Conflict concerning the continuing programme of Westernisation: before the debate about Japan’s future (1891-1910)}\]

The 1891 Nobi Earthquake not only physically shook the territory. It also shook Japan’s architectural and seismological professions psychologically. On 28\(^{th}\) October 1891, a powerful quake shook the Mino Plain in central Japan between Osaka and Tokyo. The magnitude was approximately 8.4 on the Richter scale.\(^{60}\)

After the earthquake, the pervasive influence of Westerners gradually declined across the whole of Japan and the indigenous people began to gradually develop some self-confidence. By 1910 they had begun to discuss their own ideas but neither Terunobu Fujimori, Hiroyuki Suzuki nor Hiroshi Yamaguchi (three influential contemporary historians of Japanese architecture) even mentioned the Nobi Earthquake or its


\(^{60}\) Ibid. p. 113.
subsequent effects.\(^{61}\) This suggests an ambiguous tension in the technical and stylistic approaches of Japan’s architectural profession.

For the Japanese, the earthquake quite literally undermined the direct influence of the Westerners. As Clancey notes, it was ‘the collapse of the “foreign” structures that began to bring the “natural” disaster into [a techno-cultural] focus’.\(^{62}\) However, for the Westerners in Japan, the Nobi Earthquake did not ‘decrease the fragility of “Japan” in the West’.\(^{63}\)

When faced with the failure of masonry construction, they condemned the poor construction of the buildings but disregarded the fact that most timber structures had performed better than the masonry equivalent.\(^{64}\) Even important figures in the architectural and seismological professions, such as Milne and Conder, were stunned and could offer little guidance on how to deal with the disaster. Indeed, they chose to report on the damage anonymously.\(^{65}\) Furthermore, they only addressed part of the truth in

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\(^{64}\) The condemnation of the poor construction can be seen in Milne and Conder’s addresses. Although a few westerners made a contradictory observation, their words did not attract any attention. See *Ibid.* p. 119 for more information.

their reports which mainly discussed the destruction of the timber structures and hardly mentioned the destroyed masonry structures. Latterly, they did shift their opinions slightly when the reports were published under their real names.

Although many other Westerners continued to insist on the reliability of masonry construction after the earthquake, Conder and Milne eventually admitted the part played by the weakness of the masonry construction in the seismic damage and agreed on the benefits of timber construction. Conder contended that masonry construction needed to be developed and improved with Japanese input. Disregarding the conventional appeal to aesthetics, he remarked that, in Japan, architects and seismologists, as ‘scientific men’, should ‘[search], [probe] and [speculate] upon the hidden and unknown mysteries of unrevealed science’. Whilst Milne adopted more ideas and concepts of Eastern origin than Conder, he still avoided making any definitive recommendation on the inappropriateness of masonry construction for earthquake resistance. He fused the origins of seismology with oriental philosophies and attempted to draw parallels between Eastern and Western views. He concluded that Western studies of seismology should extend the existing Chinese and Japanese-based studies (in Japan) rather than replace them. Again, he seemed to

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68 Conder, 'The Effects of the Recent Earthquake Upon Buildings'.

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superficially adopt Eastern ideas, but in fact, still tended to rely on the Western technology of the time. Although both Conder and Milne distanced themselves from the debate on the reliability of masonry construction, the direct intervention of Westerners gradually decreased from 1891. Indeed, by 1910, evidence of their involvement was hard to find.\(^{69}\)

Nonetheless, previous influence had a strong effect on the choice of materials and construction methods employed by Japanese architects. It can be seen in Chart 2 (attached at the end of this chapter) that although Muramatsu defined the period from 1891 as the modern timber period because of the general revival in Japanese traditions, another historian, Shinzirou Kirishiki, admitted that the popular employment of red brick (influenced by the West) still existed in this period, and Japanese attitudes confirmed this point.\(^{70}\)

The damage wrought by the Nobi Earthquake on masonry construction seemed to confirm the warning of the ‘daiku’. But Japanese architects did not entirely reverse their Western bias in construction and architecture.\(^{71}\) Standing by their teacher, Conder, most Japanese architects refused to openly condemn the shortcomings of masonry construction. Instead, they joined force with Conder to explain the collapse of masonry construction in

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\(^{70}\) Kirishiki asserted that the red-brick-style architecture begun in the Meiji period continued to have a wide influence throughout most of the Taisho period; Kirishiki 萃敷, *Meiji No Kenchiku [Meiji Architecture, 明治の建築]*, p. 127. Indeed, this had been continued until the occurrence of the 1923 earthquake.

\(^{71}\) Although there were a few extreme Japanese who insisted on strict westernisation after 1891, they were relatively quiet and did not have a significant influence. As a result, their argument is omitted from the main texts. However, more information can be found in Kenneth Pyle, *The New Generation of Meiji Japan: Problems in Catural Identity, 1885-1895* (Stanford, Calif.: Stanford University Press, 1969), pp. 107-108, and Clancey, *Earthquake Nation: The Cultural Politics of Japanese Seismicity, 1868-1930*, p. 120.
order to improve their methods and develop a more appropriate system. They generally believed that Conder’s propositions could still work in Japan, and attempted to find solutions to the problem of earthquakes in terms of masonry construction, including inserting additional steel (rebars) into masonry fabric.\(^\text{72}\)

Apart from its reaction to the Nobi Earthquake, the architectural profession had altered as a consequence of changes within professional education. From 1884, when Tatsuno took over Josiah Conder’s academic position, architectural education in Japan could be seen to be moving to the next stage. The first generation of Japanese architects began to practise and tutor students, who then became second-generation architects. These second-generation architects not only practised Western-style architecture (as they had been taught) but also integrated more traditional architecture into the academic syllabus. This was the result of Tatsuno’s introduction to Kigo’s teaching in 1889.\(^\text{73}\) It is clear that these two figures attempted to establish a greater sense of identity but still under the shadow of Western influence.

Although Western ideas were still unavoidable, Chuta Ito became one of the most important architects under the burgeoning influence of traditional architecture. His graduation thesis, ‘Horyuji kenchikuron’, (‘An architectural theory of Horyuji’) set forth his ideas on the relationship between traditional Japanese architecture and ancient Greece.

\(^{72}\) Kirishiki倉敷, Meiji No Kenchiku [Meiji Architecture, 明治の建築], p. 127.

and allowed him to give both Japanese and Western traditions equal standing. Figure 3.5 shows a crucial illustration in his essay and indicates a comparison between the architecture of Japan and of the Western tradition. This was published in 1893 and was accessible to the entire Japanese architectural profession. Nonetheless, residual Western influence could still be discerned when he denounced any notion of abandoning masonry construction.

3-5 Chuta Ito’s comparison between Horyuji and the Parthenon temple.
Ito employed the height of the elements and the proportion of the façades as evidence of his theory of the connection between Japan and the West.

3-6 Section of earthquake-proof housing.
This illustrated Tamekichi Ito’s idea of the improvement of traditional Japanese construction for seismic resistance.

Instead, Ito proposed a rational style of construction for the future of Japanese

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74 Chuta忠太 伊東, 'Horyuji Kenchikuron [an Architectural Theory of Horyuji, 法隆寺建築論]', Kenchiku Zasshi [Journal of Architecture and Building Science, 建築雑誌] 7, no. 83 (1893). Figure 4.4 also refers to this source.
architecture after the Nobi Earthquake. He also attempted to connect the West and Japan through a concern about the translation of the term ‘architecture’, of which there were two versions. One was ‘kenchiku’ (which is still currently used) and the other was ‘zouka’, which literally means ‘house construction’. So he appealed to the profession to adopt ‘kenchiku’ as being the correct translation, since it emphasised the important Western idea that architecture combined art and science. In this regard, he seems ambitious to maintain a Western understanding of architecture, and the connections between the East and West.

Another important figure during that time was Tamekichi Ito, who integrated Western technology and Japanese tradition. Unlike other Japanese architects, he first studied architecture as an apprentice, and then assistant, to the Italian architect Giovanni Cappelletti in San Francisco during the 1880s. Just after the Nobi Earthquake, he claimed to be an ‘American architect’ in his publications, and introduced the use of metal joints for the improvement of traditional structures.

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77 ———, "a-Kitekuchu-Ru' No Honji O Ron Shi Yaku Ji O Senjou Shi Waga Ka Zouka Gakukai No Kaimei O Nozomu [Discussion of the Original Meaning of 'Architecture' and Expectation of Renaming the Institution of 'Zouka', 「アーキテクチュール」の本義を論じて共著字を撰定し我学造家協会の改名を望む]', Kenchiku Zasshi [Journal of Architecture and Building Science, 建築雑誌] 8, no. 90 (1894). What should be clarified is that the idea of the term ‘zouka’ has more connection to Japanese traditional idea of construction, but it has less links to the idea of ‘building’.
78 Muramatsu村松, Yawarakai Mono E No Shiten: Itan No Kenchikuka Ito Tamekichi [Viewpoint to Softness: Heretic Architect, Tamekichi Ito, やわらかいものの視点—異端の建築家伊藤為吉], pp. 11-12.
79 The book was entitled kenchiku kozo kairyoho, which he translated as Improved Architecture of Japanese Dwellings, and it was endorsed by Dairoku Kikuchi, Tetsutaro Nakamura and John Milne. See Ibid. p. 234. The idea was also published in Tamekichi為吉 Ito伊藤, Taishin Teki Tetsu-Gu (Kanagu) Shiyou No Konnan O Ron Shi Te Mokusei...
The often strong relationship between teacher and student effectively demarcated them as different within Japanese society. Certainly, Tamekichi Ito did not belong to the orthodox Japanese architectural society (as educated by Conder) and was eventually edged out of the newly-founded Imperial Earthquake Investigation Committee (IEIC). Nonetheless, he and his ‘American’ title represented the intellectual superiority of Western ideas in Japan, even though Western technology had to be improved and the intervention of Westerners had decreased.

However, the viewpoints of the ‘yatoi’ architects and seismologists became less and less influential after the 1891 earthquake. This was largely because extensive damage to masonry constructions had raised doubts about the foreigners’ suggestions. The Japanese had also developed a more professional ability in managing their work. People began to rethink the balance between Westernisation and Japanese tradition, and started to re-assess their native values. A good illustration of this was the development of seismological societies in Japan.

The original Seismological Society of Japan, founded by the ‘yatoi’ in 1880, was replaced by the IEIC, another Japanese society, established by Dairoku Kikuchi one year after the Nobi Earthquake. John Milne was the only non-Japanese member invited to join the IEIC (in contrast with the policy in the early Meiji period). The establishment of the IEIC demonstrated that the Japanese had not only developed greater self-confidence, but

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also that they had more doubts about Western expertise on earthquake issues.\footnote{Clancey, \textit{Earthquake Nation: The Cultural Politics of Japanese Seismicity, 1868-1930}, p. 160.}

Important research papers were not only published in Japanese from 1893 onward but also in English from 1898.\footnote{Two versions of English publications were issued with the titles ‘Publications of the Imperial Earthquake Investigation Committee in Foreign Language’ from 1898 and ‘Bulletin of the Imperial Earthquake Investigation Committee’ from 1907.} These publications contained diverse reports about earthquakes across the globe, as well as research on the strength of various materials and structures in resisting earthquake damage.\footnote{Shinsai Yobō Chōsakai [Imperial Earthquake Investigation Committee 震災豫防調査会], ed. \textit{The Contents of the Publications of the Imperial Earthquake Investigation Committee, Eng. & Jap.} (Tokyo: Shinsai Yobō Chōsakai [Imperial Earthquake Investigation Committee 震災豫防調査会], 1913). presented the contents of the titles of the publications.} Since they literally named the English version ‘the European language’ in Japanese, this could be considered as an attempt to ensure that their voices were heard not only domestically but internationally.\footnote{They published the contents of the English version in the Japanese one. The English version was entitled as ‘The report of the European language’. This signified that they assumed that the English version could be communicated to European countries, as well as the United States.}

As a first-generation seismologist, Fusakichi Omori could be considered to be a very important figure in the IEIC.\footnote{Seikei Sekiya was another first generation seismologist in Japan, but unfortunately, he died in 1896 so that he did not have a chance to see more of the development of Japanese seismology. See Clancey, \textit{Earthquake Nation: The Cultural Politics of Japanese Seismicity, 1868-1930}, pp. 71, 154, for more information.} Along with his teacher John Milne, Omori began his field investigations with the damage caused by the Nobi Earthquake. After graduating in Japan in 1894, he undertook further studies in Germany and Italy before returning to Japan in 1896 to teach at the University. Omori not only investigated the ruins caused by earthquakes in Japan, but also that in San Francisco (1906) and Messina (1908).
Omori, however, did not wholly accept the research results of seismologists in Europe. For example, after examining the Rossi-Forel scale, he developed his own scale (the Omori scale) which he considered to be more useful. For instance, he included the maximum level of intensity to represent an acceleration rate of 25,000 millimeters per second per second. He also reviewed Western standards on inspection and in 1904 adopted alternate values when teaching the Taiwanese about the Japanese experience.86

The analysis of the damage wrought by the earthquakes on buildings in the West (as studied by Omori) can be distilled into two approaches. Firstly, the subsequent fire aroused great fear of the flammability of timber construction and, secondly, the devastating collapse of masonry construction led him to abandon traditional masonry construction.87

Omori’s investigation into the 1906 San Francisco earthquake and its subsequent fire specifically highlighted the fact that the area which was burned down by this fire was six times larger than that destroyed in the Great Fire of London in 1666.88 The serious fire caused by the 1855 earthquake in Japan may have also focused Omori’s concerns. This investigation resonated with the Japanese fear of timber’s flammability, and further accelerated the shift from timber to reinforced concrete in the subsequent development of

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86 *Ibid.* p. 155. More discussions about earthquakes in Taiwan are presented later in this chapter.
88 Fusakichi Omori, ‘Preliminary Notes on the Cause of the San Francisco Earthquake of Apri. 18, 1906’, *Bulletin of the Imperial Earthquake Investigation Committee* 1, no. 2 (1907). In addition, the Great Fire of London in 1666 could only be stopped eventually by the demolition of complete rows of timber buildings to form firebreaks.
Omori argued that this warranted a shift because the construction system and materials used for buildings were so fundamental to the efforts to limit casualties in the event of earthquakes. Omori considered timber to be a better material than masonry in terms of earthquake-proofing because, when timber houses collapsed, there were fewer casualties than when masonry buildings fell, although this confident assertion did not appear in his review of the Nobi Earthquake around the turn of the century.

The Italian seismologist Alfredo Montel agreed with Omori’s reasoning but was not prepared to condemn the use of masonry construction altogether, as it was an integral part of traditional Italian building practice. Instead, he proposed that reinforced concrete was a more suitable material as a construction system, combined with the adaptation of masonry construction. These two surveys essentially prepared for Japan’s shift towards the use of reinforced concrete in the near future.

At that time, Japan considered itself an equal to Western countries, and many

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second-generation architects faced a primary problem of the twentieth century, namely; the selection of an architectural style. One of Tatsuno’s students, Chuta Ito, was one of the first to raise this issue based on his study of Japanese architecture in a global context. Kirishiki used the Japanese victory in the First Sino-Japanese War, and the upsurge in Japanese ‘nationalism’, as a prelude in his historiography to initiate a debate on architectural style. This stimulated wide debates and culminated in discussions on an appropriate style for the National Diet Building.

3.2.4 Gradual growth in Japanese self-confidence: before the 1923 Kanto Earthquake (1910-1923)

Before the end of the Meiji period, Japanese society had acquired sufficient confidence to discuss its architectural and seismological development, rather than slavishly absorbing the ideas of the West. In terms of an architectural approach, discussion focused on which style they should employ. They investigated quake damage overseas and shared their research and studies with people across the world. Therefore, they bridged these two professional fields in discussing the relationship between art and the engineering of architecture in relation to concerns about earthquake-proofing.

Arguments about future architectural styles were clearly outlined by Chuta Ito in 1909, and sparked widespread discussion in the Japanese architectural profession. As well as

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reviewing Japanese architectural history, Ito set forth his views on the evolution of architecture, materiality and style in the Eurasian world. He opposed eclecticism and Westernisation and instead proposed that the future direction of Japanese architecture should be ‘evolutionism’, which would combine an improvement in materials and construction methods together with a change in style.94

In 1910, the question of an appropriate style for the new National Diet Building caused a matter of lively debate, so much so that the Architectural Institute of Japan organised a conference entitled ‘Warekuni Shourai no Kenchiku Youshiki Oikaganisubekiya’, which means ‘What Architectural Style Should We Adopt for the Future?’, which clearly describes the purpose of the event.95

Attendees included important figures from Japan’s architectural profession including first-generation Japanese architects and younger figures, such as the winner of the competition for the design of the Governor General Building in Taiwan.96 Speakers concluded that Western influence was not a directly imported architectural style but its domination had spurred the Japanese to reassess their own architectural style for both homeland and colony. Referring back to Classical Greek and Roman precedents, Uheiji Nagano emphasised that the most powerful countries at that time (such as Britain and

96 The conference was held over into two days, and eighteen papers with the same title were presented in the conference and published in two issues of the monthly journal of the Institute. Some of these papers are referred to later in this dissertation.
Germany) had their own architectural styles.\textsuperscript{97}

In this atmosphere, some Japanese continued to endorse Western approaches, while others attempted to combine architecture with seismology, which was invariably a local concern rather than a Westerner-promoted concept. Tastuno, for example, promoted his beloved British style for his Tokyo Station design (as seen in Figure 4.22 and detailed in a later chapter). In contrast, Ito promulgated his commitment to ‘architectural evolutionism’ and ‘modern Japanese’, which is referred to in Fujimori’s periodisation in Chart 2.\textsuperscript{98} From this debate, they did not reach any agreement to monolithically persuade certain style, although some totalitarian concept happened in the middle of the 1930s.

On the other hand, some architects concentrated more on the issue of seismology, since seismic concerns had existed much longer in Japan than the Western idea of architecture. Toshikata Sano concentrated on earthquake-proof architecture following the 1891 Nobi Earthquake and prioritised safety rather than beauty.\textsuperscript{99} He not only studied with Omori, but also accompanied him during his investigative journeys to Taiwan and San Francisco. After finishing his studies, Sano was appointed as a lecturer in the University when Tatsuno retired. In regard to future architectural styles, Sano also considered

\textsuperscript{97} Nagano was the winner of the competition of the Governor-General Building in Taiwan. Uheiji宇平治 Nagano長野, 'Warekuni Shourai No Kenchiku Youshiki Oikaganisubekiya [What Architectural Style Should We Adopt for the Future, 我国将来的建築様式を如何にすべきや]', \textit{Kenchiku Zasshi [Journal of Architecture and Building Science, 建築雑誌]} 24, no. 282 (1910).
\textsuperscript{99} Sano studied architecture but was more interested in seismological safety. He even stopped his study once due to his lack of interest in aesthetic architecture. See \textit{Ibid.} p. 125, and Clancey, \textit{Earthquake Nation: The Cultural Politics of Japanese Seismicity, 1868-1930}, p. 213, for more details.
constructional concerns and the science of structure. An article entitled ‘Technological Non-Art Theory’ by one of Sano’s students, Toshihiku Noda, strongly endorsed Sano’s stance, which not only contradicted Conder’s teaching, but also the conventional understanding of architecture in the West.

By the end of this period, Japanese architecture was beginning to become more diverse. Japanese seismology was already well developed and had engaged with the rest of the world. Reinforced concrete was promoted following an investigation into the results of seismic damage but was not really adopted until the next period. Thus direct Western influence diminished but, of course, circumstances changed again after the 1923 Kanto Earthquake.

3.2.5 Invisible Western influences: before the Second World War (1923-1945)

Japanese society changed dramatically between the 1923 Kanto Earthquake and the end of the Second World War. However, the seismological profession resisted outside influence and considered itself sufficiently knowledgeable. On the other hand, the architectural profession was still in thrall to foreign architects, especially after the Kanto Earthquake.


The Kanto Earthquake rocked the Kanto region (which included Tokyo) on 1st September 1923, and measured 7.9 on the Richter scale. Sano and his colleagues were expected to play an important role in reconstruction, since they had experience of this kind of disaster especially after the initial quake. According to historians, the Japanese were confident that, having learnt from the 1891 earthquake, their earthquake-proofed buildings would survive this disaster. In fact, the entire architectural profession contributed considerably to the reconstruction phase, not only revising the earthquake-proof building codes, but also providing numerous architectural ideas, some imported from the West, some derived from Asian tradition.

Sano’s recommendations, formulated in the 1910s, emphasised the use of reinforced concrete as an appropriate construction material, and the necessary regulations on earthquake-proofing were rapidly put into practice. Meanwhile, the damage to the capital provided politicians with another opportunity to rebuild Tokyo as the heart of their new empire. This attitude was very similar to the strategy adopted after the 1872 fire in Tokyo, when the Japanese employed Waters for their Ginza housing scheme. Ironically, the brick Ginza housing scheme was razed in the 1923 earthquake, but this time they opted to rebuild the city in a more Japanese way.

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103 Fujimori藤森, Nihon No Kindai Kenchiku Shita Taishou Showa Hen [Japanese Modern Architecture, 日本の近代建築（下）大正昭和篇], pp. 127-132, 140. In addition, Omori, who was a very important figure in the IEIC and had contributed tremendously to the development of Japanese seismology, did not participate in the work subsequent to the 1923 earthquake. This was because he was attending an overseas conference when the earthquake occurred; sadly, although he attempted to get back to Japan as soon as he could, he died on the journey.
Clancey affirmed that this was the reason that Japanese seismologists rapidly lost their faith in the ability of modern Western technology to be applied to modern architecture; ‘the Japanese architectural world was less impressed with the survival of [Frank Lloyd] Wright’s hotel than with the damage to another American-designed landmark in the [centre] of Marunouchi itself’. At that time, many people, especially seismologists believed in their ‘own’ knowledge and technology, regardless of the fact that they still adopted the use of concrete and methods not originally from Japan. Clancey’s analysis, however, is not endorsed by all Japanese architectural historians.

In fact, Japanese architects still practised under Western influence even after 1923, but in a way which was different from the time of the Meiji Restoration. Although earthquake-proofing had become crucial to the profession, many architects still bore Conder’s instruction in mind to appreciate the beauty of architecture, and ranked this as equal to seismic concerns. Although Clancey addresses Japanese seismologists’ disregard of the earthquake-proofing of the Imperial Hotel from the architectural aspect, the subsequent influence of this project (see Figure 4.31) was still significant, and will be detailed in the next chapter.

Wright's influences included the use of structure as a surface finish, and this approach

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was adopted (or imitated) by many architects.\textsuperscript{107} This is evident not only in the historian’s descriptions of architectural finishes, but also in the built work. Although the conventional approach to surface finish could not be wholly abandoned (as suggested by seismologists), its popularity had shifted.\textsuperscript{108}

Muramatsu’s technical periods (shown in Chart 2) echo this shift, and even Fujimori’s stylistic periods also emphasise social concerns about earthquake-proofing and fireproofing. As Frank Lloyd Wright’s Imperial Hotel successfully survived the quake, its surface suggested a measure of safety and therefore was widely imitated. Matsunosuke Moriyama’s project from the 1920s, the ‘Katakurakan’ (see Figure 4.47) replicated Wright’s approach.

After the 1930s, the ideology of the Japanese imperial authority not only focused on political policies, but also stressed architectural projects and their particular style. The Imperial Crown style (‘teikan yoshiki’ in Japanese) was the emblem of Japanese nationalism and expansionism, and is confirmed in Fujimori’s classification.\textsuperscript{109} Almost all architects employed this kind of Japanese-Chinese roof on the top of almost all projects to demonstrate their faith in Imperial Japan. The same dogma applied in its colonial territories.

\textsuperscript{107} Danto Kabushikigaisha (Danto Corporation 淡陶株式会社, Tomoho友保 Katou加藤, and Hiroshi弘 Tanaka田中, Nihon No Tairu Bunka [Japanese Tile Culture, 日本のタイル文化] (Osaka, Japan: Danto Kabushikigaisha (Danto Corporation, 淡陶株式会社), 1976), pp. 97, 104.


However, this stylistic motif did not affect the tectonic expression of the walls. It endured until after the Second World War which ended in 1945. Japan lost the war, as well as its imperial ambitions, so that this ‘nationalistic’ style was deemed no longer acceptable. The relationship between Japan and Western powers also changed again, but that is another story. At this point, we need to consider the circumstances in Taiwan for a later discussion.

### 3.3 Taiwanese architectural and seismological history

After considering the history of architecture and seismology in Japan during this period, it is important to understand the situation in Taiwan. The development of Taiwanese architecture and seismology helps to clarify changing Japanese attitudes towards the West and Taiwan. This is illustrated in Chart 2 and underpins the tectonic approach to projects in Taiwan. The chart also provides related background for discussion in the following section.

Before the Japanese occupation, very little attempt had been made to research either architecture or seismology in Taiwan. The island possessed only a few public buildings but a plethora of ordinary residential ones. Following the opening of the Treaty Ports to foreigners, there were several structures erected by the Dutch, some offices used by the Ch’ing government and a handful of private residences for an elite set.\(^{110}\) Although the

\(^{110}\) On the one hand, the Dutch constructions were located in Tam-sui and An-p’ing (near Tainan) but they did not influence Taiwanese architecture in general, since there were very few and they were mainly built for military functions, which were far removed from ordinary people’s lives. On the other hand, the buildings owned by the Ch’ing government and some elites generally followed the traditional styles of Chinese architecture, and they
Japanese colonial government initially used some traditional Chinese-style buildings for the sake of convenience, they demolished others and recycled the materials for their new buildings.¹¹¹

3-7 Scale, location of epicentres, and dates of key earthquakes in Taiwan between 1895 and 1945.

Earthquakes occurred are marked on this map based on the railway map of 1938.¹¹²

had very little effect on the Japanese in Taiwan during the colonial period. See Robert Gardella, 'From Treaty Ports to Provincial Status, 1860-1894', in Taiwan: A New History, Murray A. Rubinstein ed. (Armonk, N.Y. London: M.E. Sharpe, 1999), for more details.¹¹¹


The scale and location of the epicentres of earthquakes are based on the database of world-wide earthquakes on http://iisee.kenken.go.jp/utsu/ (accessed on 5 November 2008). The map refers to Chun-Ming俊銘 Huang 黃, ed. Jia-Yi Shih Shihding Guji Jia-Yi ¹¹²
Rather than consider individual architects, it is more appropriate to review Taiwan’s architectural history by considering the leading figures from either the Section of Architecture or the government’s Division of Architecture. During this period many significant projects were public buildings, designed by a team of architects and designers employed by the relevant government departments.

It is noteworthy that during the occupation the colonial government did nothing to cultivate individual architects. This accorded with Japanese conventions which often referred to a team leader or members of a department when buildings were completed, rather than individual architects. Also there was no permanent professional seismological organisation throughout the entire colonial period.

Development can be divided into several periods during the fifty years of Japanese rule. Figure 3.7 illustrates these periods, the frequency, scale and location of key earthquakes along with other important events. The stylistic and technical periods are also presented in the chart.\(^{113}\)

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\(^{113}\) Huochejhan Diaoacha Yanjiou [Investigation and Research into the Chia-Yi Station as a Municipal Historical Property of the Chia-Yi City], 嘉義市市定古蹟嘉義火車站調查研究 (Chia-Yi嘉義: Cultural Affairs Bureau, Chiayi City 嘉義市文化局, 2003), p. 36.

Kaoru Ide, who worked in either the Division of Engineering or the Division of Architecture in the colonial government more than thirty years, and was the leader of the team for more than ten years, categorised architecture in Taiwan into five divided periods using a technical and material approach. See Kaoru薰 Ide井手, ‘Taiwan Ni Oke Ro Kenchiku No Konjaku [Taiwanese Architecture in the Past and Now], 亜洲亜細亜史 Bulk Three [Bibliography of the Progress of Taiwan Second Volume], 覚進臺灣大觀總篇, Seiken清賢 Ootsuka大塚 ed. (Tokyo: Chuugai Mainichi Shinbun Sha 中外每日新報社, 1939), for more information. The end of the fifth period that Kaoru Ide proposed should be clarified here. His division was presented in 1939, and he died in 1944. In Taiwanese publications, when people refer to Ide’s division, most of them directly consider the end of the fifth period as being the end of the Japanese rule, namely the year 1945. See Li李, Taiwan Jindai Jianjhu: Ciyuan Yu Zaoci Jhuh Fajhan [Taiwanese Modern Architecture: The Origin and Early Development
Before the Japanese colonialism, there were no ‘architect’, which Westerners would recognise, in Taiwan. Traditional buildings were constructed by craftsmen and carpenters in apprenticeship system. 1895 was the start of the colonial period and during the first ten years or so the island suffered the two Chia-Yi earthquakes (1904 and 1906) obliged the Japanese to take notice of seismology in Taiwan. However, the completion of the first phase of the western railway in 1908 demonstrated that Japanese colonialism had gone beyond an experimental period. Although the 1922 earthquake in Taipei did not raise serious concerns, the 1923 earthquake in Tokyo definitely affected the architectural profession in Taiwan.

Certainly the 1930 Tainan Earthquake provided an opportunity for Japanese architects in Taiwan to investigate the damage from a practical perspective. The 1935 Taichung Earthquake also attracted much attention, even from seismologists in Japan, since it happened just before the Taiwan Exhibition celebrating the Fortieth Anniversary of Governance. Both occurrences were important in seismological and architectural fields.

3.3.1 Adaptation and Experiment: before the 1904 earthquake (1895-1904)

The first decade of Japanese colonialism was an experimental period. Initially, the

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1860-1945, 台湾近代建築：起源與早期之發展 1860-1945], p. 55. The historian Chao-Ching Fu, who is a professor in Taiwan and is particularly interested in the architectural history of the Japanese colonial period, broke the fifty colonial years into four periods, which mainly referred to architectural styles and several significant events in the colonial authority. See Chao-Ching 朝卿 Fu, Tuo-Shuotaiwan Jian-Jhu Wen-Hua Yi-Chan Rih-Jhih Shih-Ci Pian [Architectural Heritage in Taiwan - Japanese Period 1895-1945, 圖說台灣建築文化遺產－日治時期篇 1895-1945] (Tainan 台南: 台灣建築與文化資產出版社, 2009), pp. 8-9, for more information.
Japanese attempted to take over the surviving facilities of the Ch’ing Dynasty, but also tried to appease the Taiwanese people into accepting their governance. However, they lacked colonial experience (Taiwan was their first colony), and many experiments were undertaken in an attempt to understand Taiwanese society and its people.

During this period, some basic facilities, such as post offices and hospitals, were built using relatively rough materials.\textsuperscript{114} Armed resistance to colonial rule and a lack of transportation delayed development.\textsuperscript{115} Ide’s technical experiments and Fu’s conventional models, which could be read in Chart 2, were an appropriate reflection of architecture in Taiwan at such a time. Coincidently, no serious natural disasters occurred in Taiwan between 1895 and 1903. The 1904 earthquake provided the first real test for the colonial government.

3.3.2 Neglect of Taiwanese problems and superior colonial influences: before the 1922 earthquake (1904-1922)

Several events at the beginning of this period signified a shift to the second period of the Japanese occupation. The earthquake of 1904 was the first natural disaster faced by the government and, two years later, the earthquake of 1906 occurred in a nearby region. The

\textsuperscript{114} See Kuniyoshi, 'Thoughts Coming out from the Meiji Period (Part 1)', \textit{Taiwan Kenchiku Kaishi} [Journal of the Architectural Institute of Taiwan, 台灣建築會誌] 13, no. 2 (1941), pp. 91-92, and Chao-Ching, \textit{Rihjih Shihci Taiwan Jianjhu [Taiwanese Architecture in the Japanese Colonial Period, 日治時期台灣建築]}, vol. 5, 大地別冊 (Taipei 台北: 大地地理, 1999), p. 132, for more information about infrastructures during this period.

government therefore was obliged to take the problems seriously. However, the start of railway operations in 1908 and the initial phase of the north/south railway in Taichung enabled colonial governance to be extended across the whole island except for the mountain region. It also completed the first stage of the island’s roads infrastructure.

The damage caused by the two earthquakes in Chia-Yi (1904 and 1906) was recorded by members of Japan’s Imperial Earthquake Investigation Committee (IEIC), although neither was mentioned in the Ide or Fu periods. It appears that the colonial government could not afford to repair the damage caused by the earthquake (magnitude almost 6.3 on the Richter scale) in November 1904.

By contrast, Omori and Sano (members of the IEIC) visited Taiwan specifically to investigate the damage done by the earthquake. Sano published his report soon after returning to Japan, and Omori also disseminated his research with historical records in 1906. Sano condemned adobe as an ineffective material for earthquake-proofing, while Omori recounted his experience of the Nobi Earthquake to criticise the response in Taiwan. However, the reports’ contents were mainly about the damage supported by some analysis of construction problems. However, they lacked any significant proposals for rebuilding, or detailed analysis. In fact, some of the construction methods criticised by Sano and Omori were initiated by the Japanese before the earthquake.

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The 1906 Chia-Yi earthquake measured almost 6.8 on the Richter scale\textsuperscript{117} and records are more substantial than previously. Omori and Sano again visited Chia-Yi to make detailed investigation and Omori presented the results of their efforts in an article (in English) framed by a discussion on the aftermath of the 1904 event. This time, they not only examined the damage caused by different construction methods but also proposed some policies for effective rebuilding. In addition, the colonial government reacted positively this time and provided funds for reconstruction projects. It subsequently published an entire record of the quake, including basic information, damage done to buildings, and other aspects, such as funding the recovery and plans for reconstruction, for future reference.\textsuperscript{118}

The review of construction methods encompassed several different materials including timber, bamboo, brick, and timber-framed masonry construction. It recommended that timber construction should be prohibited because of problems with termites, and bamboo was recommended for seismic resistance. Recommended alternative materials were steel, steel, and reinforced concrete.

\textsuperscript{117} The earthquake caused the deaths of 1266 people. 2476 people were wounded, 7284 dwelling houses were destroyed and 30021 dwelling houses were partly destroyed. Fusakichi\textsuperscript{117}Omori大森, 'Preliminary Note on the Formosan Earthquake of Mar. 17, 1906', Bulletin of the Imperial Earthquake Investigation Committee 1, no. 2 (1907).

\textsuperscript{118} In terms of the funding issue, see Otsuji\textsuperscript{118}辻, 'Meiji Jidai No Omohi De (Sono Ichi) (Thoughts Coming out from the Meiji Period (Part 1)', 明治時代の思い出 (其の一)); for the official report, see Taiwan Soutoku Fu Minsei Bu Soumu Kyoku [General Affairs Section. Government Section. Taiwanese Governor-General Prefecture 台灣總督府民政部總務局], Kagi Chihou Shinsai Shi [Report of the Earthquake in Kagi Region, 嘉義地方震災誌] (台北: 台灣日日新報社, 1907).
brick or ‘dokaku’, namely sun-dried blocks.\(^{119}\)

Following their investigations, Tatsutarou Nakamura and Toshikata Sano recommended that brick constructions should have extra iron reinforcement added to the top of brick arches to avoid damage due to cracks.\(^{120}\) It should be noted that timber-framed masonry constructions were recommended in the official publication following this earthquake.\(^{121}\)

After 1906, the law was improved, especially in terms of construction safety for residential projects. Many government offices and buildings were established during this period and new regulations (relating to construction materials) were introduced in accordance with recommendations from seismologists and architects. Other new guidelines related to urban planning in an attempt to avoid indirect damage from

\(^{119}\) In respect of timber, Hampei Nagao, who was the head of the Division of Engineering, raised the problem of termites ravaging timber construction. He suggested that timber constructions should be prohibited and that alternative materials could be steel, brick or dokaku. See Hampei 南平 Nagao 長尾, ‘Taiwan Tatemono to Shiroari [Taiwanese Architecture and Termites, 台灣建物與白蟻]’, *Kenchiku Zasshi* [Journal of Architecture and Building Science, 建築雜誌] 23, no. 272 (1909), and ———, ‘Nagao Kyokuchou Saigai Dan [Nagao’s Talk About the Disaster, 長尾局長災害談]’, *Taiwan Nichi Nichi Shimbun* [台灣日日新報], 27, 28 March 1906, for more information. In addition, the problem of termites was specifically studied and published in Masamitsu 正満 Oshima 大島, ‘Shiroari Ni Shuu Te Ichi: Saiichikai Shiroari Chousa Houkoku [the First Report of the Investigation into Termites, 白蟻に就て(一): 第一回白蟻調査報告]’, *Kenchiku Zasshi* [Journal of Architecture and Building Science, 建築雑誌] 23, no. 276 (1909), and ———, *Dainikai Shiroari Chousa Houkoku [the Second Report of Investigation into Termites, 第二回白蟻調査報告]* (Taipei 台北: Taiwan Soutoku Fu Doboku bu [Department of Engineering, Taiwanese Governor-General Prefecture, 台灣總督府土木部], 1911). With regard to bamboo, the fact that the stereotype of bamboo was a kind of cheap and informal material prevented its popular employment. See Taiwan Soutoku Fu Minsei Bu Soumu Kyoku [General Affairs Section; Government Section; Taiwanese Governor-General Prefecture 台灣總督府民政部總務局], *Kagi Chihou Shinsai Shi* [Report of the Earthquake in Kagi Region, 嘉義地方震災誌], p. 401, for details.

\(^{120}\) Otsuji 末吉, ‘Meiji Jidai No Omohi De (Sono Ichi) (Thoughts Coming out from the Meiji Period (Part 1), 明治時代の思い出 (其の一))’, p. 94.

\(^{121}\) Taiwan Soutoku Fu Minsei Bu Soumu Kyoku [General Affairs Section, Government Section; Taiwanese Governor-General Prefecture 台灣總督府民政部總務局], *Kagi Chihou Shinsai Shi* [Report of the Earthquake in Kagi Region, 嘉義地方震災誌], p. 108.
earthquakes.

Many buildings were erected and most were new-built, with some being designed to replace earlier rough-hewn ones. Except for religious shrines being in timber, most architecture was built using masonry construction, and the surface usually appeared as either brick or stone construction. For instance, the Tai-Chung Station (see Figure 5.2) was built to replace the original rough structure, and its façade appears to be of brick. The Governor General Building (see Figure 5.16) was also new-built and its appearance indicates a combination of brick-with-stone-trim.

Given the colonial relationship, almost all Taiwanese architects had been educated in Japan under the influence of Kingo Tatsuno, and his well-known Tatsuno style was widely practised in Taiwan by his pupils during this period.

The general construction materials from this period are set out in Ide’s periods. As shown in Chart 2, he classified this period as essentially brick, as it was the most popular construction material. However, he categorised the next period from 1919 as ‘light-coloured tile’ although, this did not to start until 1923. Nonetheless, in respect of a stylistic approach, Fu considered the period 1908 - 1923 as being the typological era. His assertion of typological character was based on architectural elements of built projects and can be discerned in the appearance of Western-style architecture. The probably most well-known type, for instance, that Fu could refer to about this discernment was the Tatsuno style.
3.3.3 Taiwanese earthquakes seen as inferior to Japanese earthquakes: before the 1930 Earthquake (1922-1930)

As mentioned above, the 1922 earthquake around the north of Taiwan did not concern either Ide or Fu. Indeed, compared with the 1923 Great Kanto quake, it was generally ignored. Fu’s attitude reflects the colonial government’s neglect of the damage caused by the 1922 earthquake. Although some experts investigated the 1922 quake and made some recommendations, it seems that the government was not really concerned about the attendant problems. Instead, the subsequent 1923 earthquake in Japan affected Taiwan more than the island’s own earthquake.

The colonial government did not pay much attention to this local disaster, and no members of the IEIC made a special trip to Taiwan. The authorities did not commission any official reports, although they had some on the 1906 disaster. The most relevant review of this seismic issue can be found in Ide’s articles, which were continuously published in most popular newspapers for a period of about a fortnight.

Ide provided some recommendations for construction, including that public buildings should be constructed in steel or reinforced concrete, and that timber-framed masonry

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123 The 1922 earthquake in Taipei (or Taihoku, in Japanese pronunciation) occurred in September and caused the destruction of more than 1000 dwelling houses. See Ibid, p. 39, for details.
124 Kaoru薫 Ide井手, 'Jishin to Kaoku No Kenchiku [Earthquakes and Dwelling Buildings, 地震と家屋の建築]', Taiwan Nichi Nichi Shimbun [台灣日日新報], 26 September, 27 September, 28 September, 29 September, 30 September, 1 October, 3 October, 4 October and 5 October 1922. Besides these articles, Ide also suggested that ordinary people should have common sense about the safety of their dwelling houses, and the use of dokaku was again considered as being unsuitable for resisting earthquakes.
construction and sun-dried blocks were frail and should be avoided at all costs. Curiously, the latter methods were actually promoted for reconstruction work after the 1906 earthquake in Chia-Yi.

In addition, the recommendations outlined in the newspapers were meaningful and the historian Chen has asserted that it was encouraging that seismic knowledge could be shared with ordinary citizens.¹²⁵ Ide was appointed as leader of the Section of Architecture in the Bureau of Engineering by the colonial government. Nonetheless, he still published his own article about the 1923 Great Kanto quake and his personal recommendations for the future in a Taiwanese newspaper (in Japanese).¹²⁶ His advocacy concerning safety and resistance to earthquakes was highlighted in his description of its impact on the Taiwanese. Apart from official government publications, Japanese newspapers were probably the only option for Taiwanese readers in 1922.

Before the establishment of the Architectural Institute of Taiwan, Japanese architects in Taiwan could only understand the situation at home through available newspapers. In 1922, a series of articles about buildings in the area of the Tokyo Station, namely Marunouchi, was presented in the same newspaper which published Ide’s articles, and some were even published on the same page.¹²⁷ These reports focused on projects such

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¹²⁵ To learn more about Ide’s intentions, see Chen, 'Rihjih Shihci Taiwan Dijhen Zaihai Duei Jianjhu Yu Dushih Fajhan Yingsiang Jhie Yanjiou [Research on the Influence of Earthquake Disaster in Architecture and City Development During the Japanese Governance of Taiwan, 日治時期台灣地震災害對建築與都市發展影響之研究]', p. 40.
¹²⁶ Kaoru Ide, 'Kantou Chihou No Daishinsai to Shourai No Kenchiku [The Great Earthquake in Kanto Region and Architecture in the Future, 関東地方の大震災と将来の建築]', *Taiwan Jihou* [The Taiwan Times, 台灣時報] 1924.
¹²⁷ Zaikyou Ichi Kisha [a reporter in the capital 在京一記者], 'Marunouchi No Konjaku to Sorekenchiku [the Marunouchi Area and Architecture around the Area Now and in Former Times, 丸の内の今昔と其建築]', *Taiwan Nichi Nichi Shimbun*, 20 September, 21 September, 24 September, 28 September, 30 September and 3 October 1922. The Japanese
as the recently-completed Mitsubishi Bank Headquarters, designed by Sakurai, and the Imperial Hotel, designed by Frank Lloyd Wright. In fact, more than half of this report concerns the Imperial Hotel and gives a detailed description of the project including the palette of materials and spatial arrangement. The report portrays Wright as an important figure in American architecture.

About a year after the Taipei quake, the 1923 Kanto Earthquake attracted much more attention. Fu recognised the repercussions of the Kanto Earthquake for Taiwan with the end of the Typological Period and the new Transformational Period began from 1923. He asserted that the expressed transformational characteristic was the result of the 1923 quake, which persuaded the Japanese to revert to indigenous architectural ideology instead of continuing with Westernisation. The Tatsuno style ended in this circumstance, but the new expression begun after 1923 in Japan, such as Wright’s influences, provided the transformational opportunities in architectural design.

Despite the enduring influence of Western styles on the Japanese architectural profession (after the Kanto Earthquake), Japan still exerted a vivid influence on Taiwanese projects. The similarity of the architectural surfaces of buildings in the Tokyo University and the College buildings in the Taihoku Imperial University (see Figure 5.27) reinforce this point. Nonetheless, the surface finishes of the College buildings in Taihoku University affirm Ide’s approach, although the timing was different.

Certainly Ide referred to the impact of the Kanto Earthquake, but at a slightly later date. He defined the period between 1917 - 1926 as the ‘light-coloured tile’ era, since the pronunciation of the bank building was Mitsubishi Ginkou Honten and the architect of the building was Kotarou Sakurai.
Cladding was usually brick. He postponed the influences of the Kanto Earthquake upon Taiwanese architecture to the next phase, the period of reinforced concrete, between 1926 - 1935.

However, like their counterparts in Japan, architects in Taiwan did not display unfinished reinforced concrete on the façade. The same approach to surface cladding in Japan is repeated in Taiwan with the adoption of a similar dressing of the façade, including the attachment of tiles or terracotta panels.

Due to the circumstances of the Kanto Earthquake, Japanese seismological experts visited Taiwan. Akitsune Imamura (the director of the IEIC) duly dispatched Tadashi Taniguchi and a group of professionals to Taiwan in April 1930 to investigate potential seismic weaknesses in the buildings. Taniguchi only published his report in Japan but clarified that the purpose of the investigation was to enhance resistance to future quakes.\(^\text{128}\) He indicated some worrying problems in many buildings (mainly dwelling houses in Taipei, Taichung, Chia-Yi, Tainan and Kaohsiung) and considered most of the brick buildings in Taipei to be poorly constructed.\(^\text{129}\)

However, most of the timber buildings in Taichung, Chia-Yi and Tainan were built with diagonal supporting elements and were considered relatively safe. Moreover, he found that the resistance-capability of the buildings in Chia-Yi was better than in other regions, and he speculated was the result of having suffered more seismic damage previously than other places and having assimilated its lesson.


\(^{129}\) Ibid. pp. 1740-1756.
Many of the buildings in Tainan were old and worn, and would be prone to seismic damage. Taniguchi also stressed the safety of public structures such as school and marketplace buildings, as such places were to be used as disaster shelters.\footnote{Ibid. pp. 1763-1775.} Major concerns in his report were the safety of structures and the rules of urban planning. Compared to the discussion after the Kanto Earthquake, any consideration of architectural styles was largely absent.

Fortunately, a professional organisation for the promotion of architecture was launched in 1929, and the Architectural Institute of Taiwan (or Taiwan Kenchiku Kai in Japanese) was also founded.\footnote{In terms of the naming of the Institute, some people translate it as Taiwan Kenchiku Kai, or the ‘Taiwan Architecture Association’. However, a similar organisation in Japan is called ‘the Architectural Institute of Japan’. Since this was founded based on the background of the Japanese colonialism, it may be appropriate to follow the similar method to translate it. In addition, the publication of this organisation is translated as ‘the Journal of the Architectural Institute of Taiwan’ here, while some people translate it as ‘the Journal of the Taiwan Architecture Association’.} The establishment of the institute (and the publication of its related journal) provided architects with a valuable platform to communicate and absorb professional information. Moreover, the Division of Eizen (in effect the Division of Architecture in the colonial government) was also formed in the same year. In the past, this department was either supervised by the Division of Civil Engineering or the Division of Accounting for about thirty years in the colonial government. The independence of this department within the government hierarchy demonstrated the growing standing of architecture to be equal to Division of Civil Engineering and the Division of Accounting directly attributed to the colonial government.

Eijirou Arai addressed the construction system in the inaugural issues of the Institute’s publication. Although the failings of the construction had been identified before the 1930
earthquake, Arai examined and compared both positive and negative characteristics of timber buildings against those of brick buildings, before recommending a reinforced hybrid version of timber and brick structures. However, soon after Arai’s second article was published, another earthquake occurred in Taiwan.

3.3.4 Becoming a Satisfactory Colony for the Japanese: before the 1935 Earthquake (1930-1935)

Just after experts had completed their surveys of seismic resistance, the earthquake in Tainan occurred at the end of 1930. The subsequent record of the damage caused by this quake was provided by the Architectural Institute of Taiwan, whereas previous seismic disasters had been investigated by visiting experts from Japan. The construction materials and methods were still central factors in terms of resisting earthquakes: but the issue of construction strength and relationships within the industry itself were also examined. The reports were published in the journal of the newly-established institute and the government did not produce other records.


133 The disaster caused 43 casualties, and more than 800 dwelling houses were destroyed. Chen, 'Rihjihh Shiheii Taiwan Dijhen Zaihai Duei Jianjhu Yu Dushih Fajhan Yingsiang Jhih Yanjiou [Research on the Influence of Earthquake Disaster in Architecture and City Development During the Japanese Governance of Taiwan, 日治時期台灣地震災害對建築與都市發展影響之研究]', p. 56.
Noboru Itamoto and Hideyasu Hamu (both members of the Architectural Institute of Taiwan) published their survey in 1931 and focused on the range of structural materials. With photographs and drawing illustrations together with textual descriptions, they clarified that the damage to brick buildings was relatively serious, whereas reinforced concrete construction was considered to have functioned better. The cheaper alternative was to reinforce the brick structure. The reinforcement was recommended to provide an effective supplement not only to brick but also to timber structures.

Ornamentation was another issue and Hamu suggested that brick gabling should be avoided, whereas Itamoto advocated the use of reinforced concrete without decoration. In addition, the most serious problem for them was to recognise the fact that some public buildings (constructed after the 1906 earthquake) which had adopted the new regulations, had been seriously damaged by the 1930 quake. This sparked widespread public discussions in newspapers and forced the government to review possible shortcomings in construction process.

Eijirou Arai participated in these discussions and introduced various kinds of bricks and practical techniques. He also reviewed the regulations controlling masonry construction.

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135 Chen, 'Rihjih Shihci Taiwan Dijhen Zaihai Duei Jianjhu Yu Dushih Fajhan Yingsiang Jhih Yanjiou [Research on the Influence of Earthquake Disaster in Architecture and City Development During the Japanese Governance of Taiwan, 日治時期台灣地震災害對建築與都市發展影響之研究]', p. 56.
in Japan and further amended regulations in Taiwan.\textsuperscript{136} Although some architects in Taiwan still employed masonry construction, the Japanese regulations were the recognised standard.

Many public buildings of the colonial government, which had been built in brick, were replaced by reinforced concrete constructions. In appearance most of them continued the ‘eclectic’ Western style with simplified decorative elements. However, some Japanese architects adopted ideas of Art Deco in developing their ‘transitional’ style, as identified in Fu’s stylistic classification.

Many buildings still carried some decoration and shied away from any rigorous expression of Modernism. The Chia-Yi Station shown in Figure 5.33 and the Taipei Public Hall (see Figure 5.45) will be discussed later, but can be considered as good

examples of this approach. At the end of this period, preparation for the Taiwan Exhibition of the Fortieth Anniversary of Governance commenced and this event signalled the beginning of the next colonial period.

3.3.5 Culmination and end of colonialism: before the end of the Second World War: (1935-1945)

The 1935 earthquake distracted the colonial government’s attention from its preparations for the Exhibition (due to take place in October and November). This earthquake was the most serious one in the Japanese colonial period and was so severe that support was enlisted from other areas of Taiwan, Japan and other foreign countries. Important political, architectural and seismological figures in Japan and Taiwan all deliberated on the damage and possible recovery measures. Because the timing of the disaster, their reaction could be seen as an attempt to rapidly restore normality in order to present the Exhibition.

Co-incidentally, when the earthquake happened, the principal politicians in the colonial government had a strong connection with the Japanese seismological profession. So Imamura and Sano were invited to undertake an investigation and provide suggestions for future reconstruction projects. Their research was published in Japan, and (unusually)

137 The 1935 earthquake shock hit the middle area of Taiwan in April and caused more than 15,000 casualties and more than 54,000 buildings were destroyed.

138 The governor, Kenzou Nakagawa, had been the leader of the IEIC in Japan and a minister in the Management and Coordination Agency of the colonial government, and Hiroyoshi Hiratsuka was the governor of Tokyo for the period after the Kanto Earthquake.
also in Taiwan – unlike previous investigations of Taiwanese earthquakes. Eminent professionals in Taiwan also contributed to the subsequent investigation and provided their own suggestions. They specifically pointed out the problems of construction methods and proposed more appropriate construction systems in their reports.

The results of the various investigations and the proposed construction regulations were relatively similar, and some repeated recommendations from previous investigations. For example, they strongly opposed the use of sun-dried blocks and timber construction. They proposed that existing buildings should be reinforced, and stressed the necessity to earthquake-proof using reinforced concrete.

After a rapid investigation into the damage, the colonial government immediately turned its attention to the Exhibition, which was seen as crucial to the governance of the colony.

The Taiwan Exhibition of the Fortieth Anniversary of Governance was held as scheduled

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140 See Kaoru Ide 伊瀬, ‘Kengi Sho [A Recommendation for Rebuilding, 建議書], Taiwan Kenchiku Kaishi [Journal of the Architectural Institute of Taiwan, 台灣建築會誌] 7, no. 3 (1935); Yoshio Shirakura白倉, ‘Kenchiku Ue Yori Mi Taru Chuubu Taiwan No Shinsai [the Observation of the Earthquake Disaster in the Middle of Taiwan in Terms of Architecture, 建築より観たる中部震災], Taiwan Jihou [ The Taiwan Times, 台灣時報] 1935; and Suketaro Chijiwa千利 and Harehachiro Nakai中井, ‘Taiwan Chuubu Jishin Ni Oke Ru Kenchiku Butsuhigai Ni Tsui Te [the Buildings Damaged by the Earthquake in Central Taiwan, 台灣中部地震に於ける建築物被害に就いて], Taiwan Kenchiku Kaishi [Journal of the Architectural Institute of Taiwan, 台灣建築會誌] 7, no. 3 (1935).

141 One of the few different proposals was to establish a consultation system for ordinary people to enquire about their buildings.
and illustrates how well organised Taiwan was under the colonial rule.\textsuperscript{142}

The historian Chen has noted that a change in architectural styles took place after the 1935 earthquake, even though architectural style was still not mentioned in the seismic reports. Clues and elements of an Art Deco style could be found on the façades of ordinary people’s dwellings, but there is doubt as to whether or not the credit for this change can be attributed to the Exhibition or to seismic concerns.\textsuperscript{143} It is conceivable, of course, that the consultants involved the 1935 earthquake were influenced by the Exhibition and said that is influence filtered down to ordinary houses.

Indeed, during the Exhibition, the (almost complete) Taipei Public Hall was used to display the exhibitors’ plans. After the Exhibition, the Hall reverted to its original use and was completed in 1936. This project not only served its primary function but also represented the success of colonial rule. It embodies an architectonic expression much favoured by the colonial government’s architects.

Ide’s classification of architectural periods identified 1935 as an important point, but primarily due to the Exhibition rather than the serious earthquake. The earthquake is mentioned but is no more than a cursory review. By contrast, Fu’s classification of the Totalitarian Period begins in 1937 with the outbreak of the Japanese war against China.

\textsuperscript{142} The purpose of the Exhibition can be seen in Mitsuo光雄 Kanomata鹿又, ed. \textit{Hajime Seiyon Juashuuen Kinen Taipei Hakurankaishi [Summary of the Taiwan Exhibition of the Fortieth Anniversary of Governance, 始政四十周年記念臺灣博覽會誌]} (Taipei台北: Hajime Seiyon juashuuen Kinen Taipei Hakurankai 始政四十周年記念臺灣博覽會,1939), pp. 1-3.

\textsuperscript{143} Chen陳, 'Rihjhih Shihci Taiwan Dijhen Zaihai Duei Jianjhu Yu Dushih Fajhan Yingsiang Jhih Yanjiou [Research on the Influence of Earthquake Disaster in Architecture and City Development During the Japanese Governance of Taiwan, 日治時期台灣地震災害對建築與都市發展影響之研究]', pp. 108-109.
Japanese imperialist ambitions in eastern Asia were also expressed in architectural styles. Most of buildings designed during that period in Japan and all of its colonies had the particularly uniformed roof style to demonstrate their importance of Japan in Pan-Asian regions, although this did not encompass different types of wall construction. Due to the indifference of the wall construction, this discussion of selected projects concludes with the Taipei Public Hall.

Given the complex historical cultural background including Westernisation, modernisation, colonisation and seismological faults (as mapped in Chart 2) the architectonic form of built projects in Japan and Taiwan carries more complex implications than anywhere else in the world. Asians with Western or ‘modern’ influences appear to have had different approaches towards architecture. This was partly as a result of their isolation from (and non-communication with) the outside world but also embedded traditional and geographical factors.

Developed European countries had generally fewer worries about seismological occurrences, whereas countries located on the Pacific seismic belt, such as Japan and Taiwan, could not ignore such concerns. As mentioned above, the seismological threat significantly affected architectural development in this part of the world.

To resist seismic damage, the construction system and choice of material were both crucial. Moreover, as has been discussed, cultural factors also affected the material selection for architectural construction and cladding. The examination of built projects in Japan and in Taiwan will help in understanding their reaction to cultural and seismological issues. As indicated previously, five case study projects from each country will be studied in detail in the following chapters in order to explore their significance.
and possible implications for the wider concerns of this thesis. The construction system for wall and frame, as well as the cladding of interior and exterior, will illustrate their respective cultural and geographical influences.
Chapter 4

Studies of Japanese architectural projects

Western influence began to be felt in Japan in 1853 but intensified after 1868. The subsequent political and cultural events (as noted on Chart 2) provided a unique background for architectural and seismological development. Japanese society underwent some dramatic changes which also affected architectural expression. The five selected projects built during this period (and outlined in the previous chapter) embody the prevailing changes in architectural form. These projects and several significant seismic epicentres are identified on Figure 4.1, together with project completion dates and the date and magnitude of the ‘quakes are given in brackets.

These five projects will be discussed chronologically and their materiality will be examined in detail in this chapter. The first two projects will present Western-style architecture built by foreigners in Japan. They represent standard examples of architectural activity in Japan during that period. The British Consulate, which is the first of these, was located in Yokohama and completed in 1869. This was one of the very earliest projects using timber-framed masonry construction. However, there is a dearth of available archival data on its construction, so the British Naval buildings (built around 1877) will also be considered as they share a similar background and construction
methods.

4-1 Map of Japan showing the location of projects and areas hit by earthquakes with year and intensity.

The completed years of projects are noted, and occurring years of earthquakes are marked on the map.¹

¹ The original map, on which the ported opened to foreigners during the Meiji Period, were marked, appears in Katsuhiko 勝比古 Sakamoto 坂本, Meiji No Ijinkan 1858-1912 [Japan’s Western Architecture in the Meiji Era, 明治の異人館] (Tokyo: Asahi Shinbun-sha 朝日新聞社, 1965), p. 2.
The second such project is a foreigner’s residence (1889), constructed in timber with brick infill, built at a time when timber-framed masonry construction was very popular in Japan as the country embraced Westernisation.

The third project, the Tokyo Station (completed in 1914), will illustrate tectonic form as influenced by both Western architectural ideas and seismological concerns. The façade design, featuring red brick-like tiles and white pebbledash bands, was branded the Tatsuno style. After the building of the Station, the use of brick-like tiles as a surface finish became popular all over Japan.

The fourth project, the Imperial Hotel (completed in 1923), embodies another kind of Western influence. More importantly, its seismic resistance to the 1923 earthquake resulted in even more significant subsequent effects. The fact that the Kanto earthquake occurred precisely during the inauguration of the hotel dramatised this project. It represented a particular Western ethos encompassing construction system and surface cladding which was widely imitated in later architectural projects.

The final project, the Katakurakan, was completed in 1928. As noted in the previous chapter, this project indicated a shift in architectural style from the Tatsuno style to that of Wright’s Imperial Hotel. Previously, the architect responsible for the Katakurakan project had strictly followed a style similar to that of the Tokyo Station, but this project showed a dramatic change in his thinking. It should be noted that the change was not merely a consequence of the architect’s personal predilection but reflected a general shift throughout Japan, and later in Taiwan.
Western influence began to be felt in Japan after 1853, when Commodore Perry forced the Japanese to start trading with outside nations. In terms of architecture, however, the period between 1853 - 1870s not only confirmed that the Japanese did not know how to build Western-style architecture but also that Westerners did not recognise the Western-style projects as built by the Japanese. Essentially, only Westernder-designed architecture would satisfy Westerners themselves and provide an example of ‘orthodox

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2 This refers to James R. Anglin, 'Illustrations', The Far East, 17 July 1871.
Western architecture’ for the Japanese. In this thesis, therefore, it will be helpful to begin with the architectural form of such an ‘orthodox architecture’, that is a Westerner-built, or Westerner-designed, building.

The British Consulate in Yokohama (see Figure 4.2) was designed and completed by the American architect R.P. Bridgens in 1869. Before this project, Bridgens had co-operated with Keisuke Shimizu to complete the British Provisional Legation also in Yokohama (see Figure 4.3). Here Shimizu employed the finish ‘namako-kabe’ (see Figure 3.3) for this 1866 project. Aftermath, the subsequent timber-framed masonry system was developed probably to reflect a concern about fire resistance by Bridgens.

Fujimori has confirmed that, for Bridgens, the difference between these two construction...
systems was the cladding material. The finish material of ‘namako-kabe’ was non-load bearing whereas that of timber-framed masonry construction became load bearing and changed the façades’ appearance.

4-4 Ground floor plan of the British Consulate in Yokohama and its surrounding facilities. The differences in the thickness of the walls imply the employment of different materials for the construction, but the detailed material employment remains unknown.

However, detailed tectonic information on this structure remains scant, and the archival drawing shown in Figure 4.4 is not detailed enough. Therefore, other buildings of similar backgrounds offering more detailed information are considered in order to supplement our understanding of the tectonic form. The British Naval buildings from the 1870s, which were another examples of foreign companies, residences and military buildings around Yokohama, are suitable projects to furnish such information.

The Royal Naval Victualling Depot at Yokohama comprised several separate facilities and was built between 1875 - 1877. Most of them were constructed in timber combined with brick, which has also had in the construction of the chimneys. Figure 4.5 shows a

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7 This archival drawing is taken from J.J. Marshall, Yokohama. Plan of Consulate, produced by the UK Foreign Office (1877), (MFQ 1/1075), held in the National Archives, UK.
site plan of the Depot, and the residential building of the Storeman’s Quarters shown in the top-left corner of the plan was a single-storey building built in 1877.

4-5 Archival drawing of the site plan of the Royal Naval Victualling Depot at Yokohama in 1877. The location of the Storeman’s Quarters on the site is shown in the top-left corner.  

According to the colour coded hatching on most of the archival drawings, a variety of architectural systems are evident. Figure 4.6 shows the position of the main entrance (also indicated in Figure 4.7) and a range of materials indicated by the different colours. Generally speaking, brick (in red) was used for fireplaces, chimneys and steps. Timber (brown) was employed for the columns of the verandahs (see Figure 4.6). Stone (grey) was adopted for the base of the columns and foundations of the building (as seen in

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8 Figs. 5.5, 5.6, 5.7, 5.8 and 5.9 are all taken from B Bridgford, 'Japan: Yokohama. 10 Sheets of Plans, Elevations and Sections of Various Buildings for the Royal Naval Victualling Depot', produced by the UK Admiralty: China Station: Correspondence, (1875-77), (MFQ 1/1114/10-19), held in the National Archives, UK.
Figures 4.7 and 4.8).

4-6 Archival drawing of the floor plan of the Royal Naval Victualling Depot at Yokohama. The size of the timber columns and walls can be measured from this drawing and the different materials can be identified from their different colours.

4-7 Archival drawing of the façade of the Royal Naval Victualling Depot at Yokohama. The difference in the employment of materials can be understood from the distinction in colouring in this façade drawing: the timber columns and stone steps on the right hand side are coloured.

The construction of the walls (yellow) is detailed in Figure 4.9. It appears that five-inch
square sections were used for columns and beams within the wall construction. Tile and stucco were used for the exterior, with shells as cavity infill, and the interior finish being lath and plaster. The finished wall is therefore about eight inch thick and therefore thicker than the timber columns.

No discernible strategies for earthquake-proofing can be found in the above drawings. Timber-framed masonry construction was generally adopted for such projects with exterior cladding of stone or tile and plaster. These were generally considered as fireproofing materials, so fire resistance was still a crucial concern. The fact that timber was employed for earthquake resistance in traditional Japanese buildings was not considered in either of the above examples.  

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4-9 Archival drawing of a detailed section of the walls of the Royal Naval Victualling Depot at Yokohama.
The material employment is clearly redrawn and marked on the right-hand side. (Drawing, Author 2009)

4.2 The Original Mr Hunter’s Residence (Kyuu Hantaashitei) (1889)

Yokohama was considered as the key port in eastern Japan near Tokyo (or Yedo) but Kobe was the equivalent in western Japan by Osaka. Around 1889, as Japan continued to be Westernised, a German businessman asked a British architect to build this two-storey
In 1907, Edward Haslette Hunter bought this, which was to become his future residence. This building illustrates a popular construction system, while it was built, but very few buildings in this construction system survive now. Therefore this has been carefully preserved. It was eventually moved from its original site but maintains its original orientation.

His name in Japanese writing is トราプォフ which is pronounced ‘Ee Gureppi’, although the actual German name has not yet been established.

Hunter, who was born in Londonderry, Northern Ireland, UK and who travelled to Japan around 1864, arrived first in Yokohama but moved to Kobe as soon as Kobe opened to foreigners in 1868. He started several different businesses around the Kansei region, in western Japan, such as the E.H. Hunter & Cooperation, and the Osaka Iron Works. In terms of the social history of Kansei region, Hunter was considered an important figure. See Hyougoken Kyouiku linkai [Hyogo Prefectural Board of Education, 旧ハンター氏邸修築工事報告書] (Kobe: Hyougoken Kyouiku linkai, 1964), pp. 1-6, for more information.
Although the architect was anonymous, Japanese historians associate this building with a British architect, Alexander Nelson Hansell, who designed several private residences in Kobe around that time.\(^\text{12}\) Hansell was well known for his verandah-based colonial architectural style, especially for private residences.\(^\text{13}\) The southern elevation of this project (as shown in Figure 4.10) echoes this style even though the enclosure is slightly different from the typical verandah style. The northern façade (as shown in Figure 4.11), however, did not present an identical elevation but imitated the façade of a masonry structure.


The main entrance is marked on the Western side and the major interior spaces are surrounded by covered verandahs around the south and east. It presents two dramatically different languages in one building – with the enclosure of the verandahs by continuous glazing (mainly on the south facade), and a solid wall with vertically scratched stucco (mainly on the north). The spatial arrangement shown in Figure 4.12 provides clues to explain the variation in external cladding. The major living spaces faced south and east and were surrounded by covered verandahs, and service spaces as well as corridors and stairs were corralled along the northern flank. The plan of the first floor employed similar arrangements except over the main entrance which was a tower on the upper floors.

14 The original graphic of Figs. 4.12, 4.13, 4.14, 4.15, 4.16, 4.17, 4.18 and the left-hand side of Fig. 4.19 refer to drawings and pictures in the appendix in the reconstruction report. See Hyougoken Kyouiku Linkai [Hyogo Prefectural Board of Education [兵庫県教育委員会], ed. Kyuu Hantaashtet Ichiku Kouji Houkokusho [A Report of the Removal and Reconstruction of the Original Residence of Mr E.H. Hunter, 旧ハンター氏邸移築工事報告書].
Although the main entrance on the ground floor (located to the west and facing south) is clad with stucco and set back behind the verandah, it is completely hidden from the southern aspect. Figure 4.13 shows how the surface pattern of the entrance and the tower was very different from the rest of the verandahs and exhibits some discordance. It should be alright to say that the spatial arrangement of the living and service areas is separated and is reflected in the façade claddings. The service zone has the appearance of masonry cladding on the exterior and living spaces has the verandah façade.

Figure 4.14 shows the particular cladding of the eastern flank of the northern elevation which comprises a covered verandah for the ground floor but becomes a solid wall with stucco on the first floor. However, from the interior view (see the right-hand side of Figure 4.15) the wall cladding for both floors appear to contain the same windows, instead of windows for the ground floor and solid walls for the first floor.
4-14 Scale drawing of the northern elevation of the Original Hunter’s residence.
The major tone of the northern elevation is scratched stucco while the eastern edge of the ground floor is expressed differently.

4-15 Scale drawing of an east-west section of the Original Hunter’s residence.
This shows the appearance of the interior walls of the northern wall while the eastern end of the ground floor and the first floor present a similar glass surface.

In fact, the ground floor is fully glazed like the rest of the verandahs. However, for the first floor, there is a door leading to storage space. So externally, the storage space echoes the appearance of the service zones; whilst internally it pretends to be similar to the verandah enclosure, and thus conceals the storage space behind.
The verandahs become an ambiguous threshold between interior and exterior. The enclosure of the verandahs blurred its reading as an interior or an exterior. Given that the solid walls with a plaster cladding (marked in grey in Figure 4.16) are set back about 2.5 metres behind the verandahs, the space between the enclosure and the solid walls was considered as a semi-exterior space.

Detail of the wall and structural construction is illustrated in Figure 4.17 and shows the main structural frame comprising 18x18cm timber pillars encased in tile and bricks. The wall construction incorporates mortar externally and plaster internally, with the cavity in-filled with timber, mud and other materials. This type of wall construction is not implied in the surface cladding, neither the masonry-like stucco finish, nor the verandah

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15 The measurements shown on the floor plan are in Japanese units of length, and one of these units, a *shaku*, is approximately equal to 30.3cm. Therefore, 8.10 *shaku* is about 2.5 metres.
enclosure. The general internal plaster finish and the timber veneers also had little connection with the structural system. It should be noted that the use of timber veneers internally, in this configuration, was alien to traditional Japanese architecture.  

Figure 4.15 clearly presents the internal finishes with white plaster walls for the majority of the internal elevations. However, timber veneers are employed at the lower part of the wall and adopted for several principal spaces, such as the living room on the ground floor. It is fair to assert that the veneer signified the importance of the particular internal space. Variation in internal finishes did not really exist in traditional Japanese architecture but this approach was popular in Westernised architecture.

The relationship between interior and exterior in this project is very complicated. For example, the northern wall (Figure 4.18) shows how the exterior of scratched stucco and the interior of plain plaster have a limited relationship except for the similarity of the timber friezes around their heights. The scratched stucco appears to imitate the texture of stone masonry construction, whilst the interior plaster is collocated by timber veneers in

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some of the lower sections of the wall.

However, the difference between the inside and the outside is difficult to discern in the southern part. Here the solid wall behind the southern elevation has a similar construction to the exterior walls, although both sides are the same as the interior cladding of the northern wall. The solid walls result in the verandahs becoming an inside/outside space, as shown in Figure 4.19. Moreover, the timber structure and
non-load bearing infill of the walls cannot be read in the cladding on either side. As with the previous projects, any concern about earthquake hazards is not evident in this project.

4.3 The Tokyo Station (1914)

The third case study project that I examine in this chapter is the Tokyo Station. This project is considered by Japanese architectural historians to be the most sophisticated performance of the Japanese architectural profession following more than forty years of Westernisation and modernisation. After the 1891 earthquake and the many significant events mentioned in the previous chapter, the Station was completed in 1914. The completion of the station, according to Japanese scholars, boosted the nation’s confidence in various aspects of construction.\(^\text{18}\)

\(^\text{18}\) The key events were establishing new Japanese institutions, connecting the new technology with their traditional ways, speaking to the world about their professional knowledge and discussing their architectural styles. More information about these can be...
station not only enabled a more convenient transport link in Tokyo, but also signified the evolution of a whole society. The station is located in the heart of Tokyo, in front of the Imperial Palace. The ninth Imperial National Assembly (1896) called for a private railway line across Tokyo as part of the urban planning and transport infrastructure.

The cladding for the Tokyo Station not only indicated Japanese self-confidence in architectural practice but also promoted the growth of related industries. Experts on Japanese tiling asserted that the station denoted a great deal about the ambitions of architects and tile manufacturers. Subsequently, architects favoured the use of brick-like tiles made by Japanese companies as surface cladding.

The architect of the station, Kingo Tatsuno, played a significant role in determining the style and materiality of the building. Tatsuno developed his British-affected style in Japan and also influenced many architects in Japan and its colonies. The ‘Tatsuno’ style, as it came to be known, comprises pale stone bands, mostly horizontal, running through


red-brick walls collocating with towers in the corners. The Queen Anne style is usually considered as the basis of the ‘Tatsuno’ style. The historian, David Stewart, called it a ‘loose, if [recognisable], version of the Queen Anne revival’. During the 1910s, the ‘Tatsuno’ style was adopted for many projects in Japan and its colonies. As Stewart suggested, the Tokyo Station and ‘its facade must [sic.] preserved as … a record of Tatsuno’s period style’ and his confidence.

The materiality of the station is more complex than it first appears. We might (correctly) assume that the main construction is brick because of its appearance, but the façade finish is not actually brick. A hidden material (reinforcing steel) was employed because of its earthquake-resisting characteristic and is evident in the archival photographs showing the steel frame in place before the masonry construction.

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23 Ibid. p. 54.
24 See the photograph in the second graphic plate of Tetsudouin Toukyou Kairyou Jimusho [The Office of the Improvement of the Railway Department in Tokyo 鉄道院東京改良事务所], Ttoukyoo Shigai Kooka Tetsudo Kenchiku Gaiyoo [A Brief Introduction to the Flyover Railway in Tokyo, 東京都街高架鉄道建築概要] (Tokyo 東京 1914).
4-20 Archival floor plan of the ground floor of the Tokyo Station. This shows the function from the left/northern side to the right/southern side.

4-21 Archival sketch of the Western elevation of the Tokyo Station. This shows the general form of the Station including the roof shape and special partitions, which are marked, to catch the observer’s eye.

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25 Figs. 4.20 and 4.21 are both taken from Nihon Kenchiku Gakkai [Architectural Institute of Japan], 'Kanmatsu Fuzu: Toukyou Chuuou Teishajou [Illustration: The New Establishment of the Tokyo Central Station, 建築雑誌] 24, no. 286 (1910).
In Figure 4.20, the ground floor plan of the station shows how the spatial arrangement impacts on the elevation design. Figure 4.21 shows the basic layout of the façade design with emphasis on the entrances within the design and the different claddings. For instance, the domes signal the main departure and arrival zones; the central focus also show the royal divisions. Moreover, the external cladding also reinforces this emphasis including the short horizontal lines on the corners of the protruding sections of the façade (as seen in Figures 4.21 and 4.22).

The so-called ‘Tatsuno style’ was exemplified on the surface expression of the Station, while the construction system of the station is reinforced brick. The brick colours and

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26 Although the roofs of the southern and northern entrances were not quite the same as the so-called dome in the western world, the Japanese historians named it ‘dome’ when talking about this. As a result, I have employed the term that the Japanese used to in this discussion in order to respect the Japanese understanding.
white granite (or pebbledash band) are the primary components and Figure 4.22 illustrates the general expression of this collocation. Nonetheless, as briefly mentioned above, the red section of the façade is actually brick-like tiles and not facing brick construction.

The white courses vary between true granite (as in Figure 4.23) and pebbledash stucco finish (as shown in Figure 4.24). It is obvious that the pebbledash stucco finish imitated the stone and is intended to present the image of a solid masonry structure. The original proposal was for reinforced concrete, but the final project employs brick with a steel frame. Although the appearance of a reinforced brick construction could satisfy the ‘Tatsuno’ style, the architect still used about a million red brick-like tiles to cover the

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27 Figure 4.23 is taken from Hikosaburou 彦三郎 Kanai 金井, ‘Toukyou Teishajou Kenchiku Kouji Houkoku [Construction Report of the Tokyo Station, 東京停車場建築工事報告]’, Doboku Gakkai-Shi [Journal of Japan Society of Civil Engineers, 土木学会誌] 1, no. 1 (1915), p. 67.
entire elevation in a combination with granite and pebbledash stucco.

Besides the pebbledash stucco, the detail of the red surface finish should be noted. At that time, the Japanese still called this kind of tile ‘keshou renga’, which can be directly translated as ‘cosmetic brick’. This kind of ‘brick’ has no load-bearing function and in later publications is referred to as a ‘tile’. The ‘brick’ cladding seems rather eccentric and redundant, given that tiles were so expensive, and the finish appears superficial. A comparison between the ordinary brick (shown on the left-hand side of Figure 4.25) and the ‘cosmetic brick’ (shown on the right-hand side) reveals some significant points. The

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29 Figure 4.24 and the original drawings of Figure 4.27 are taken from Rekishi Ishou Zairyou Bunka Kai, [Subcommittee of History, Style and Material, 歴史・意匠・材料分科会] and Kouzou Bunka Kai, [Subcommittee of Construction, 構造分科会], 'Dai Yon Senmon Iinka i Sankou Shiryou [Reference Documents of the Fourth Specialised Committee, 第四種門間間参考資料]', (Marunouchi Ekisha Hozon Fukugen Nikansuru Chousai Purojekuto Suishin Iinkai [Promoting Committee of Investigation and Project Designing of Conservation and Reconstruction about Marunouchi Station Building, 丸ノ内駅舎保存・復元に関する調査・設計プロジェクト推進委員会], 2003).

30 Danto Kabushikigaisha (Danto Corporation 淡陶株式会社), Katou加藤, and Tanaka田中, Nihon No Tairu Bunka [Japanese Tile Culture, 日本のタイル文化], p. 72.

31 According to the historian Kenji Horigome, six of these ordinary red tiles cost the same as one litre of rice, and three of the special tiles used for corners cost more than one litre of rice in Tokyo in 1914. See Kenji惠二 Horigome恵, 'Waiqiang Cizhuan Zhi Gouzao Tese [The Constructive Characteristic of the Tiles on Exterior Walls, 外壁磁磚之構造特色]', in Guoding Gaji Zongtongfu Xiuhu Diaocha Yu Yanjiu [An Investigation and Research for Repairing and Protecting the Nationally Historical Property, Office of the President, 國定古蹟總統府修護調查與研究] (Taipei 台北: Ministry of the Interior [內政部], 2003), pp. 4-35, for details.
cladding material had two thicknesses (either 15mm or 45mm) but the faces of both were around 110 x 60mm. Figure 4.26 shows the constructional variation in the 'cosmetic bricks' and the structural bricks. Superficially, the cladding presented a surface pattern which was similar to the header bond of brick construction. Structurally, the brick layering was similar to the English bond, which made the different thicknesses of the 'cosmetic bricks’ necessary.

4-25 A structural brick and a brick-like tile with a mark of their sizes of the Tokyo Station. From the comparison, the similarity in the sizes of both objects is clear.

4-26 Sketch of the brick construction of the Tokyo station. This illustrates the relationship between bricks and brick-like tiles.

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34 Fig. 4.26 is taken from Oosaka Rekishi Hakubutsukan [Osaka Museum of History 大阪歴史博物館], ed. Renga No Machi Tairu No Machi: Kindai Kenchiku to Toshi No Fuukei [Red Brick and Cosmetically Enhanced Machi: Modern Brickwork and Cityscape] (Osaka: Osaka Museum of History 大阪歴史博物館), 1990, p. 39.
The expressive freedom provided by separating the cladding and the structure (as claimed by Japanese scholars) was not exploited. The adoption of this technique could have the result of various reasons including the architects’ dexterity, sizable budget or other social factors. Nonetheless, the employment of this technique resulted in the popularity of ‘cosmetic brick’ cladding a brick construction during that time.
4-28 Original drawing of the detail of the façade and its wall section of the Tokyo Station.
The drawing shows the relationship between the external façade and the wall masonry system, and the brick layering is shown as well.  

Fig. 4.28 is taken from Hiromi Hanzawa, Seiichi Yoshikawa, and Shintarou Mizuno, eds, Toukyoueki to Tatsuno Kingo: Ekisha No Naruriritsutito Toukyoueki No Dekirumade (The Tokyo Station and Kingo Tatsuno: The Formation of the Station Building and the Station Itself) (Tokyo: Toukyou Suteeshon Gyararii (Tokyo Station Gallery, 東京ステーションギャラリ) and Higashi Nihon Ryokyaku Tetsudou Kabu Shiki Gaisha (East Japan Railway Company, 東日本旅客鉄道株式会社), 1990), p. 59.
The station’s interior was mainly plaster finish with timber or slate veneers as a lower dado. As mentioned above, this kind of combination had not been seen before in traditional Japanese architecture. Although it is understandable that public building’s surface should be robust to resist wear and tear, the employment of this internal cladding exemplified its popularity for other Westernised projects.

Figure 4.27 shows the dramatic difference between the exterior and the interior of the station, whilst Figure 4.28 details the construction of the façade in section. The former presents the external façade and the internal elevation in section. Obviously, any similarity or connection between them is minimal. The interior walls render it impossible to detect the structure or the exterior walls from interior observation. Certainly the shape and height of the interior dome is very different from the exterior scale, and decorative elements and plaster cladding embellish the interior. Moreover, Figure 4.28 shows that windows are framed with granite from the exterior, but employ timber facings on the interior. In addition, the position of the keystone of the entrance opening had granite cladding, although the actual construction is brick.

After the completion of the Tokyo Station, the Kanto earthquake in 1923 shocked Japan physically and psychologically. Although the confidence of professional seismologists grew stronger, the architectural implications and scholarly interpretations were different.

4.4 The Imperial Hotel (1923)

This chapter has explored the changes of stylistic and tectonic effects of Western architecture and construction techniques as they were implemented and adapted in Japan.
The fourth case in this sequence of five is the famous Tokyo Imperial Hotel by Frank Lloyd Wright. Completed in 1923, this project became even more significant after the 1923 ‘quake. The establishment of the hotel (partly shown in Figure 4.31) was significant and this is reflected in its central location in the discussion on architecture and seismicity more generally. The hotel was located in the centre of Tokyo, near the Tokyo Station, facing the Hibiya Park to the north of the Imperial Palace (see Figure 4.29).

![Image](Image)

This project signified another kind of Western influence. The Japanese influence on the project architect, Frank Lloyd Wright, is well known, the Western logic in his approach was sublimated and the Japanese influences were definitely as a result of his own

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38 The cooperation was founded in 1890 with its first generation of the hotel building; it was the first Japanese western-style hotel built under Home Ministry supervision from the Japanese Meiji government. See Kathryn Smith, 'Frank Lloyd Wright and the Imperial Hotel: A Postscript', *The Art Bulletin* 67, no. 2 (1985), p. 296, for details.

39 Figure 4.29 is taken from Nobumichi Akashi 明石 信 and Osamu Murai 村井 晃, *Franke Roido Raito No Tei Koku Hoteru* (Frank Lloyd Wright: Imperial Hotel) (Tokyo: 建築資料研究社, 2004), p. 34.

40 Figure 4.30 is taken from Kevin Nute, *Frank Lloyd Wright and Japan: The Role of Traditional Japanese Art and Architecture in the Work of Frank Lloyd Wright* (London: Chapman & Hall, 1993), p. 52.
interest. For the Japanese, Wright’s interest in the exotic east was crucial in their discussions. It appears that the Japanese considered that Japan and Wright influenced each other and helped cross-fertilize ideas.

41 Nute, Frank Lloyd Wright and Japan: The Role of Traditional Japanese Art and Architecture in the Work of Frank Lloyd Wright, p. 2.
43 Ibid. p. 36.
44 It seems likely that Wright would have been aware of the publication by one of his colleagues, Edward Morse, of Japanese Homes and Their Surroundings published in 1886. Ibid. p. 36.

Frank Lloyd Wright’s special interest in Japanese culture can be confirmed from the fact that he prioritised Japan on his first overseas trip in 1905. Although Wright’s contact with Japanese culture began before 1893, the International World’s Columbian
Exposition in Chicago provided the first opportunity for him to directly experience traditional Japanese architecture. The Exposition presented the Ho-o-den temple (known in English as the Phoenix Hall) (Figure 4.30). The pavilion was constructed using traditional Japanese techniques, and included landscaping around and between the buildings. Although Wright did not write specifically about the Japanese pavilion, the general influence of Chicago at that time (as well as his later projects) have led scholars to argue that he was deeply affected this experience. Certainly the continuity between interior and exterior was one of the most inspirational aspects of Japanese architecture for Wright.

In 1911, on the recommendation of Gookin, Wright got involved in the proposals for a new Imperial Hotel, given that the capacity of the first hotel was deemed insufficient. Wright’s friend, Frederick W. Gookin, heard about the plan to build a new Imperial Hotel and wrote to Aisaku Hayashi, the general manager, to propose Wright as the ideal architect for the new building.

Gookin appreciated Wright’s strong interest in Japanese culture and his proposal that Wright be offered the commission was readily accepted by Hayashi. For the Japanese, however, the hotel had not only immense architectural significance: it also had political

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45 Ibid. p. 49.
48 Smith, 'Frank Lloyd Wright and the Imperial Hotel: A Postscript', p. 297.
significance. Wright’s interest in Japanese culture augured well for his design.\textsuperscript{49} Although it took about ten years to complete the project, Wright and most Japanese were extremely satisfied with the final result. Certainly the building had a tremendous effect on the Japanese profession.\textsuperscript{50}

The hotel’s construction system combined masonry construction with concrete structure. Archival records indicate that the structural system was reinforced concrete with some ‘brick concrete’ variants.\textsuperscript{51} However, the naming of the surface material ignored the agreement made in 1922. During the Tokyo Peace Exhibition in 1922, experts and manufacturers agree to adopt the term ‘tile’ in preference to other names such as ‘cosmetic brick’ or ‘surface-layered brick’ to name this kind of surface cladding material. Nonetheless, this agreement did not affect the preference for this cladding material of the Imperial Hotel.\textsuperscript{52}


\textsuperscript{50} Regarding Wright’s effect on the Japanese profession, many publications, such as Tanigawa谷川, \textit{Raito No Isan [Inheritance of Wright, ライトの遺産]}, had referred to this significance.


\textsuperscript{52} Hino日野, ‘Nihon No Tairu No Tanjou: Sen, Shikigawara, Toyhan Tara Tairu He [The Origins of Japanese Tiles, ‘日本のタイルの誕生: 塊,数瓦,陶板からタイルへ]’, p. 117.
The ‘brick concrete’ system referred to the cladding material but still used the word ‘brick’.\(^{53}\) However, other publications also referred to the same material as ‘tile’.\(^{54}\) Nonetheless, the horizontal section from a demolished block (shown in Figure 4.32) can offer evidence that the ‘scratched brick’ (or rustic brick) and the Oya stone were only used for the cladding, and the main structure is reinforced concrete. The archival photograph taken during the construction (as shown as Figure 4.33) also confirms the structure, which had rebar within concrete columns as reinforcement. In addition, the cladding materials, the Oya stone and ‘scratched brick’, were not simply stuck onto the concrete structure, but they were load-bearing as per masonry construction.

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\(^{54}\) Danto Kabushikigaiisha (Danto Corporation 淡陶株式会社), Katou 加藤, and Tanaka 田中, Nihon No Tairu Bunka [Japanese Tile Culture, 日本のタイル文化], p.90, and Tanigawa 谷川, Raito No Isan [Inheritance of Wright, ライトの遺産], pp. 126-7.
The illustration of the wall sections made by Wright after the earthquake confirmed the tectonic form. After the 1923 ‘quake, he attempted to bolster his construction methods and demonstrate their earthquake-resisting capabilities, but down-played the surface ornament and cladding. He provided two sketches to illustrate the method of construction and these are presented below. Figure 4.34 shows that ‘scratched brick’ forms the shape of the double shells and the gap between the shells is filled with concrete, although this is not totally new invented by Wright but could be seen in ancient Roman architecture. Figure 4.35 clarifies the employment of concrete piles or ‘fingers’. Since the site was drained marshland, Wright used about 2.5 metre deep concrete piles which extend deep into the mud and stitch the building into the earth.

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56 Frank Lloyd Wright, 'In the Cause of Architecture: In the Wake of the Quake Concerning the Imperial Hotel, Tokio', Western Architect 32, no. 11 (1923); ———, 'In the Cause of Architecture: In the Wake of the Quake Concerning the Imperial Hotel, Tokio', Western Architect 33, no. 2 (1924); and ———, 'Why the Japanese Earthquake Did Not Destroy the Hotel Imperial', Liberty 4 (1927).
Wright believed that these construction methods were crucial for the earthquake-proofing.

The scale drawings of wall vertical sections (initiated during the demolition of the hotel around 1967) indicate several kinds of constructional systems for the walls. As shown in Figure 4.37, Section D indicates a cladding of ‘scratched bricks’ for both sides of the guest room balconies. This is similar to Figure 4.36, where both sides of the openings employ the same cladding. However, when looking at the lobby wall section (see Section B in Figure 4.37) the exterior and interior surfaces employ layered ‘scratched bricks’ whereas the concealed structure is a concrete infill.

The interior section may change from the ‘bricks’ to hollow blocks (as presented in Section C) but the structural system remains the same. Figure 4.38 also shows that the claddings of the interior and exterior wall section of the lounges were ‘scratched bricks’ with a hidden concrete support behind. However, there is a cavity space in between the two sides of the concrete structure. From observation, spatial continuity is maintained by

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57 Figures. 4-34 and 4-35 are both taken from Wright, ‘Why the Japanese Earthquake Did Not Destroy the Hotel Imperial’, pp. 64-5.
using the same cladding materials. However, the section reveals an actual discontinuity in the structural design.

The external façade was generally composed of three kinds of surface materials, namely: scratched ‘brick’, Oya stone and terracotta tiles. Scratched ‘brick’ was the most widely discussed material of these three and, subsequently, was also one of the most influential choices in terms of cladding for Japanese architecture. The resistance of this structure to the Kanto Earthquake resulted in widespread imitation of the materials employed in it.

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58 Figures 4-37 and 4-38 are taken from Akashi明石, Kyuu Teikoku Hoteru No Jisshouteki Kenkyuu[Physical Research into the Old Imperial Hotel, 旧帝国ホテルの実証的研究], p. 376 and p. 401 respectively.
The imitation extended beyond the structural system and included the surface finish. Particularly, the scratched ‘brick’ was the most popular element to be copied.  

4-39 Attachment of ‘scratched bricks’ of the Imperial Hotel imitating the stretcher bond of brickwork. The collocation of ‘bricks’ and Oya stone is emphasised with lines for the layering order. (Photographs, Author 2008; Drawing, Author 2009.)

4-40 Photograph of the terra-cotta tiles of the Imperial Hotel employed as border finishing. (Photographs, Author 2008; Drawing, Author 2009.)

However, this particular ‘brick’ could not be ordered from any of the existing factories; so Wright established a factory in Aichi. The manufacturer was well known for producing architectural ceramics and undertook the production of the ‘bricks’ and terracotta tiles for the hotel. The pattern of attaching ‘bricks’ still employed the pattern of the stretcher bond for elevations in general (as shown in Figure 4.39). The main

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function of these ‘bricks’ (as we can see in Figures 4.37 and 4.38) was as cladding as they did not have any load bearing functions - although they form the walls and bear their own weight.

Oya stone had both structural and ornamental functions. It came from a quarry in the Tochigi Prefecture, not far from Tokyo. It is an igneous rock but relatively soft, so it is easy to carve. Essentially, the Oya stone served a structural function as evident in the drawings of internal elevations and plans of the lobby (see Figure 4.41). However, Wright also employed this stone in various ornamental ways: it could ornament the horizontal cornice of a façade or frieze (as shown in Figures 4.31 and 4.43).

Figure 4.42 also shows Oya stone used as a decorative element combined with terracotta tiles (on the left-hand side) or used to ornament the upper section of the wall (on the right-hand side). This arrangement was eccentric, as, conventionally, stone was usually located in the lower portion of a wall to provide a solid impression of masonry construction. Sometimes the decorative Oya stone required additional rebars to secure it to the concrete construction (as illustrated in Figure 4.44).

Terracotta tiles were specially produced in two types: one had a similar shape to that of the scratched ‘brick’, and the other was partly hollow. The former (marked in grey in Figure 4.40) had a different surface texture pattern from scratched ‘brick’. The tiles were abutted next to one another to form a horizontal band showing a graphic pattern-like border. The second type of tile was generally collocated with Oya stone as ornamentation. For example, terracotta and Oya stone were arranged together to form built-in lighting features (as shown in Figure 4.42).
4.41 Photograph and scale drawings of the Oya stone columns around the lobby area of the Imperial Hotel. These are marked with hidden lines and simple texts on the format of photograph, elevation and plans. (Photograph, Author 2008)

61 The scale drawings employed in Figure 5.41 are taken from Akashi 明石, Kyuu Teikoku Hoteru No Jisshouteki Kenkyuu [Physical Research into the Old Imperial Hotel, 旧帝国ホテルの実証的研究], p. 374.
Photograph of a part of the first floor of the Imperial Hotel. The column on the left hand side is framed with ‘bricks’ and Oya stone, while the light was hidden in the frame made by hollow terra-cotta. The Oya column at the back and the Oya ornament on the right-hand side should also be noted. (Photographs, Author 2008)

Photograph of the lobby of the Imperial Hotel. This shows the Oya stone employed for the surface finish and the terra-cotta tiles employed for the light baskets. (Photographs, Author 2008)

Detailed drawing of a section of Oya sculpture and reinforced concrete of the Imperial Hotel. This indicates the fixing method of the huge sculpture of Oya stone and its surrounding rebar.

The fact that the internal finish for the public spaces of the building was almost the same as the external finish is a significant point. Apart from the sections of the wall and floor construction delineated in grey blocks (see Figure 4.45) the appearance of the interior elevation was similar to the expression of the exterior façade. Indeed, except for the private spaces (such as guest rooms and service areas) the public internal spaces including lobby, banqueting hall and auditorium were all finished in this manner.

The Figure refers to *Ibid.* p. 365.
4-45 Section of the entrance partition of the Imperial Hotel.
This shows the identical appearance of the interior and exterior surface finish if we neglect the grey block, i.e. the construction section.

As shown in Figure 4.46 and Figure 4.45, the visual continuity of interior and exterior can be readily appreciated in this project. Nute claimed that Wright learnt about this continuity between exterior and interior from his travels in Japan. However, this principle has been adopted superficially in this project, although internal and external finishes seem to have no gaps in the cladding of the public spaces. However, the actual discontinuity is hidden between the internal and external finishes, i.e. structural walls.

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63 Figure 5.45 refers to Akashi 明石 and Murai 村井, Furanku Roido Raito No Tei Koku Hoteru [Frank Lloyd Wright: Imperial Hotel, フランク・ロイド・ライトの帝国ホテル], p. 80.
64 Nute, Frank Lloyd Wright and Japan: The Role of Traditional Japanese Art and Architecture in the Work of Frank Lloyd Wright, pp. 124-5.
4-46 Scale drawing of the relationship between the external façade and the section of the Imperial Hotel.

Although the interior elevation is absent, Figure 4.45 shows the similar appearance of the supplementary of the interior elevation.

The surface cladding was not intended to imply any structural logic. For example,

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65 Figure 4.45 refers to Akashi 明石 and Murai 村井, Furanku Roido Raito No Tei Koku Hoteru [Frank Lloyd Wright: Imperial Hotel, フランク・ロイド・ライトの帝国ホテル], p. 80.
Figures 4.34, 4.35, 4.37, 4.38 and 4.44 reveal that the structural arrangement was diverse. Some of wall construction had isolating cavities while others had hidden rebar to reinforce the ornamental attachments. This kind of discontinuity was not reflected in the surface cladding, which appeared continuous from the inside to the outside.

Essentially, a disjunction between inside and outside physically existed but was masked. Moreover, some (usually load-bearing) materials employed in this project, acted only as decorative finishes – Wright’s use of Oya stone illustrate this point. Although many refer to the scratched ‘brick’ as a brick because of its thickness, its non-load bearing employment was contrary to people’s conventional assumptions regarding ‘bricks’, and is an essential criterion in distinguishing between brick and tile.\(^{66}\)

### 4.5 The Katakurakan (1928)

Finally we come to the last case study in this short survey of changing construction processes in westernising Japan: the Katakurakan, a large bathing complex often described in stylistic terms as ‘Japanese Gothic’. This is located near Suwa Lake, which is in the middle of Chubu region of Japan’s main island, around 150 kilometres from Tokyo. The Katakura Enterprise funded this building for their employees exploiting the hot spring for their leisure. Japanese scholars believe that both the structural and cladding materials of the earthquake-resisting Imperial Hotel had a significant impact on

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Japanese architecture. Subsequent influences can be found in related discussions and many projects finished after 1923. For example, when the Japanese architectural profession undertook a major ten volume historical over-view from the beginning of the Meiji Restoration to the end of Showa period (covering some 112 years), Wright’s hotel and its influence occupied one-tenth of the entire publication. Indeed, the entire ninth volume focuses on Frank Lloyd Wright’s influence.

4.47 Model of the Katakuran.
The general style of the Katakuran can be understood from this bird’s eye view from the east: the collocation of colours is very obvious while its style is difficult to be categorised. (Photograph, Author 2008)

Another publication (relating to Japanese tiles) asserts that Wright’s choice of surfaces for the Imperial Hotel led Japanese architects to adopt the new trend of using tiles on architectural surfaces. Projects by Matsunosuke Moriyama, who had followed the Tatsuno Style very rigidly in the 1910s before switching to Wright and the Katakuran

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68 Tanigawa Raito No Isan [Inheritance of Wright, ライトの遺産].
69 Danto Kabushikigaisha (Danto Corporation 淡陶株式会社), Katou Raito, and Tanaka Tatsuno, Nihon No Tairu Bunka [Japanese Tile Culture, 日本のタイル文化], p. 104.
is one such noteworthy project.

Matsunosuke Moriyama’s projects in Taiwan were strongly influenced by the Tatsuno Style but his approach changed dramatically after 1923. With Tatsuno’s recommendation, Moriyama practised in Taiwan from 1907 to 1921. His Taiwanese projects reflect the expression of the Tasuno Style and will be detailed in the following chapter. After returning to Japan in 1921, Moriyama started his own practice in Tokyo, shortly before the Kanto earthquake. He designed several private residences (which often represent the clients’ ideas rather than the architect’s) but the Katakurakan was Moriyama’s first project in Japan and was completed in October 1928. Certainly his treatment of the façade surfaces is reminiscent of Wright’s approach at the Imperial Hotel.

In order to understand the internal cladding as well as its relationship to the wall construction, we need to consider the spatial arrangement of the Katakurakan. As shown in Figure 4.47, the Katakurakan consisted of two separate two-storey buildings both facing east and close to the Suwa Lake to the west. Figure 4.48 shows the entrances to both structures with explanatory arrows.

The connection between the two buildings was a single-storey corridor, with the bathing facilities located on the ground floor of the northern block. The ground floor of the southern block provided individual rooms with traditional tatami matting for rest purposes. As shown in Figure 4.48, the grey blocks indicate the extent of traditional

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Japanese tatami flooring on both floors.

4-48 Floor plans of Katakurakan: the ground floor is the lower plan and the first floor is the upper plan. The arrows mark the main entrances while the spaces with Japanese traditional styles are shadowed.  

However, the construction systems for both buildings were different and the cladding proved very complicated. The system adopted for the northern building was a reinforced concrete frame with concrete walls, while the structural frame of the southern building

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71 These original drawings, which I have further edited, were published in Furuta 吉田, 'Kenchikuka Moriyama Matsunosuke No Kenkyuwu [A Study of the Architect Matsunosuke Moriyama], 建築家森山松之助の研究]', p. 74.
was timber. As shown in Figure 4.49, the concrete walls of the northern building were about 50cm thick, while the exterior and interior walls of the timber-framed southern building were around 30cm and 20cm thick respectively. The thickest wall of the southern building was the entrance, which was about 40cm thick.

![Ground floor plan of Katakurakan.](image)

The thickness of the walls of the two buildings was different. Apart from the entrance, the southern (left-hand side) building generally had thinner walls while the northern (right-hand side) building had thicker walls.

Nevertheless, the different construction systems could not be discerned externally, for the exterior claddings of both buildings employed a similar vocabulary. The principal façade (shown in Figure 4.50) conveys similar graphic imagery and similar cladding

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72 Ibid, pp. 50-51.
73 Acknowledgements are given to the staff of the Ei-zen department of the Katakurakan, who provided the original images shown in Figures 4.49, 4.50, 4.51 and 4.52.
materials. The primary surface cladding material was brown scratched tiles, sized as per the stretcher face of a brick. The tiles were set in a pattern similar to that of stretcher bond brickwork (as shown in Figure 4.53).

The Japanese scholar Agi observes that scratched tiles were already a popular material for surface finishes during this period. Although Heiya has commented on an alternative colour (yellow) being frequently employed in the Western world, it was not often used before the 1920s.

Some additional materials were also employed for the external façade. In contrast to the rustic brown surface attached horizontally, Moriyama employed ivory stucco as a brighter vertical accent which emphasizes the openings. This technique is clearly

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illustrated in Figures 4.50 and 4.52, whilst in Figure 4.51 it is presented horizontally in the window surrounds. Terracotta was also used sparingly to frame openings (as can be seen in Figure 4.54) along with some vertical ivory stucco panels. The overall expression led the historian Tomohisa Furuta to claim that the *Katakurakan* was in the ‘Gothic’ style because of the verticality of the terracotta.

Stone slabs were also incorporated in the façades of both buildings. Figures 4.52 and 4.55 shows granite cladding attached in a similar pattern to masonry and acting as a foundation for the façade. In contrast, Figures 4.51 and 4.56 show a band of terracotta suggesting the foundation on the façade of the southern block, whereas the cladding material was identical to that of the rest of the façade.

Marble was also used on the exterior but only for cladding of the columns on the

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southern building’s porch (as shown in Figure 4.57). It should be noted that the marble differed from the other cladding materials and did not replicate any conventional masonry pattern or brickwork bond. Although it is clear that the exterior cladding materials were very diverse, the reason for employing so many appears unclear. Furthermore, the connection between the external cladding and the construction was even more ambiguous.

4-53 Attached tiles and the pattern of attachment of the Katakurakan.
The pattern of attachment was sketched in order to clarify the arrangement. (Photograph, Author 2009)

4-54 Stucco finish of the northern partition of the Katakurakan.
The collocation of the surface materials is shown. (Photograph, Author 2008)
4-55 Foundation of the northern partition of the Katakurakan. The pattern of attachment, which is outlined, was staggered like a masonry construction. (Photograph, Author 2008)

4-56 Foundation of the southern partition of the Katakurakan. The cladding materials of the foundations of the northern and southern partitions can be compared between Figure 4.55 and this figure. (Photograph, Author 2009)

4-57 Marble cladding of the southern porch of the Katakurakan. The marble indicates an imitation of the stone construction, but the outline of the attached pattern does not show the staggered pattern. (Photograph, Author 2008)

In contrast to the diverse claddings of the exterior, the interior finishes were relatively simple. Figure 4.48 shows more than half of the interior with traditional Japanese flooring. The interior was primarily finished in plain white plaster, sometimes with paper sliding doors. For example, Figure 4.58 shows how the ‘tatami’ flooring and ‘fusuma’ sliding doors were employed internally.
However, Figure 4.59 shows another approach to the interior, with glazed tiles and mosaics for the hot spring bath on the ground floor of the northern block. The function of this space required a water-resistant finish, and was so specific that neither the conventional Westernised timber veneers combined with plaster, nor traditional Japanese interior cladding, were suitable.

4-58 Interior of the southern partition of the Katakurakan.
The traditional style is employed regardless of the exterior.
(Photograph, Author 2009)

4-59 Interior of the northern partition of the Katakurakan.
The ceramic cladding of the bath area has no connection with the exterior or with the rest of the building.

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Here the relationship between interior and exterior was very minimal. The external claddings of both blocks attempted to achieve a harmonious, regardless of the differing structural systems. The internal finishes was dictated by specific room functions. Given these different considerations, the external façade and the internal elevations operate independently and eschew any dialogue between inside/outside.

It is clear that the choice of materials for the wall construction and cladding of the above five Japanese projects reflects the gradual changes in building culture over time, but they also interact with a changing understanding of social, political and geographical contexts. Although some interiors require specific cladding due to particular functions, the general covering can still be sensed. If we focus on the development of materials, without taking into account the social and political backgrounds mentioned in the previous chapter (and highlighted in Chart 2) it appears to be very random. In contrast, when viewed together (as shown in Chart 3) the influences between them and the attendant changes begin to set out a pattern of material and cultural change. The next part of the thesis will consider Taiwanese architectural expressions around the same time. It does so in order to reveal
the different attitudes towards Western and Taiwanese circumstances. Therefore, in the following chapter, we will review the tectonic form of projects in colonial Taiwan in conjunction with Japanese influences, before returning to discuss the Japanese and Taiwanese case studies more comparatively, and in terms of the wider themes of this thesis.
Chapter 5

Studies of Taiwanese architectural projects

As we have seen in the discussion of historical contexts in Chapter 3, it appears that Western influences did not really affect architecture in Taiwan until the Japanese colonial occupation began. This chapter will now turn to look at a series of architectural case studies that help explain the way in which Western building technologies and techniques arrived in Taiwan, and how they were adapted to the seismic terrain of that place. As much as possible, the case studies have been selected to ‘mirror’ the Japanese situation. This doubled structure is set out diagrammatically in Chart 2. The lower part of this chart maps the Taiwanese case studies against the key earthquake events, and other stylistic periodisations.

The first two architectural case studies that I will examine in this chapter are the Tai-Chung Station (built in 1917) and the Governor General Building (completed in 1919). These projects had a similar appearance but their hidden structures were different. Both of them embodied the influence of the Tatsuno Style, but the station project was of brick construction, while the latter project was framed in reinforced concrete. The similarity of their appearance and their respective architectonic expression has generated some important interpretations.
The third project to be examined, the *Taihoku* University, was founded at the end of the third decade of the twentieth century, and its main library (the focus of the case study) was part of the initial infrastructure for Taiwan’s first university. From visual observation only, the surface materials of this project differed from those of the previous two Taiwanese projects: not only in colour but also in texture. This was the first finished work to be discussed after the constructional and structural lessons of the Kanto earthquake.

earthquake of 1923 in Japan had been absorbed into the colonial building industry and applied in Taiwan. Changes to building approaches and systems as a result of the Kanto quake were significant, even though they were applied to this project, sited in Taiwan, not Japan.

The fourth case study project, the Chia-Yi Station (completed in 1933), signified a fusion of the ‘modern’ influences introduced by Japan and seismic considerations represented by the reinforced concrete construction. Although the physical repercussions of the ‘quake often depended on physical proximity, the fact that the entire construction, including its structural frame and wall construction, was built in reinforced concrete was related to a desire for seismic resistance. Nonetheless, the material of the wall construction and cladding system was still relatively conventional compared with the final project that I will examine, the Taipei Public Hall.

Materials employed for the Taipei Public Hall (our fifth case study in Taiwan) signified an attempt to abandon conventional patterns for surface cladding. Choice in cladding design was not limited to the imitation of masonry construction only. Nonetheless, the political after-effects of the Taiwan Exhibition of the Fortieth Anniversary of (colonial) Governance also added complications.

5.1 The Tai-Chung Station (1917)

As outlined in Chapter 3, the Japanese colonial period officially started in Taiwan in 1895. However, appropriate government structures and the establishment of the colonial construction industry almost did not take place until the 1910s. Ide’s and Fu’s
classifications according to technical and stylistic criteria (as shown in the Chart 2) confirm this situation. In addition, termite problems for timber construction and the colonial push for modernisation led to masonry construction becoming the primary construction system in the second decade of the twentieth century. The Tai-Chung Station, built in 1917, is therefore the first project that can be properly considered as being constructed under the colonial regime.

5-2 Photograph of the Tai-Chung Station now.
The photograph shows the original elevation of the station excluding the later extension to the north. The general colour collocation of red and grey is clear (Photograph, Author 2007).

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The city of Tai-Chung had geographical and political significance for the colonial government. In terms of geography, the city lies in the middle of Taiwan’s western coast, which was considered an advantage by the government. It was not overly developed when the Japanese arrived, a positive factor in their consideration. The geographical value of the city turned into political significance, and the new station was a significant factor in this transformation.

It is evident that the government chose this city to facilitate a connection between the northern and the southern railway systems in 1908. Moreover, the fact that members of the Japanese imperial family frequently visited both the city and the station also confirmed its crucial role. The colonial government prioritised the station and replaced the original building to bolster an increasing demand on the railway network. Thus, the new station building (Figure 5.2) was established in this context.

Unfortunately the architect of the Tai-Chung Station cannot be confirmed from official records. However, the genealogy of Japan-educated architects allows us to assume that the architect would have been one of Kingo Tatsuno’s pupils, or perhaps a pupil of one of his students. The unknown architect adopted a conventional design for the station, adhered to the Tatsuno Style and offered few surprises.

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Most architects and designers favour an architectural style which is familiar and several scholars have affirmed that the station is indeed Tatsuno style, while some have even claimed similarities with the Tokyo Station project. The fact that ornamentation on the

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4 The archival drawings of Figures 5.3, 5.4, 5.5 and 5.6 are archived in Dr Shuenn-Ren Liou’s office.
façade imitated some ‘modern’ iconic elements was interpreted as ‘free-classic’ style. The definition of ‘classic’ might remain in doubt, but the conventional Western interpretation was unavoidable.

The spatial arrangement (shown in Figure 5.3) will help to explain the composition of the façade (shown in Figure 5.4). The façade of the Main Hall had a gable end and steeple to emphasise its significance. Whereas the Waiting Rooms had less ornamentation than the central section. The ‘classic’ decoration and mock-structural elements with pebbledash finish provided the modernised appearance that the Japanese had introduced. Moreover,

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5-4 Original drawing of the main façade and modern detail photographs of the Tai-Chung Station. This shows the decorations of a steeple, a gable, mock-keystones, functionless voussoirs and medallion-like ornamentation, as well as the height of the ceiling of the main hall. (Photograph, Author 2007)

6 Lin 林, ‘Taichung Huoche Jhan Jhih Benti Jianjhu Han Yuetai Yanjiou [Research into the Main Building and Platforms of the Taichung Station], 台中火車站之本體建築（含月台）研究’, p. 44.
this kind of ornamentation was deliberately used to decorate not only the main façade but also the side elevations (as shown in Figure 5.5).

The station was built in brick construction without rebar or steel reinforcement. Only the lintels over openings (windows and doors) employed reinforced concrete, but this did very little to enhance its earthquake resistance. The architectural surface was a cladding, rather than a structural element (Figure 5.6). The two detail photographs in Figure 5.6 show the layers of masonry construction and the separating line of stone as well as the bond of brickwork. It would have been too eccentric, however, to construct some layered bricks within the stone construction.
Modern detail photographs marked on the original drawing of the main façade of the Tai-Chung Station. The different finishes of the lower exterior walls are presented, although the construction behind the cladding was the same. (Photograph, Author 2008)

In fact, the external façade was covered with brick-like tiles and a pebbledash stucco finish. The pebbledash is employed to imitate the stone construction, and the separating line of ‘blocks’ allows us to identify the mock-keystones and function-less voussoirs (see Figures 5.4 and 5.5). Moreover, the brick-like tiles and their surface joints appear to be

7 The exact term that people used to name this kind of material in the archival files of this project cannot be found yet. However, since the documents of the Tokyo Station by 1914 and those of the Governor-General Building at the end of 1915 both referred to it as ‘brick’ (in the Tokyo Station as ‘cosmetic brick’ and in the Governor-General Building as ‘attached brick’), it was probably named ‘brick’ with a specifying adjective. According to Eyiyiti Hino, there were more than twenty names for this kind of material, including exterior attached cosmetic brick, cosmetic brick, attached brick, attached (roof) tiles,
a header bond of brickwork. Figure 5.7 confirms the assertion made at the end of the previous paragraph.

An incoherence between the cladding and the structure was obvious. The eight English bonds of brickwork employed in the structure were clothed by five header bonds and some stucco finish. Unlike Tokyo Station, the cladding of the Tai-Chung Station did not have tongue-and-groove joints in the structure. There was only one thickness of the ‘brick-like’ tile cladding here and the cladding was attached to the relatively plain surface of the structure. A common tile was employed for the majority of the façades, and its dimensions are similar to the header face of ordinary brick, namely 108 x 57mm (Figure 5.8).

5-8 Ordinary tile for the façade of the Tai-Chung Station.
The photograph at the top left presents the pattern of attachment; the top right illustration is a scale drawing of this kind of tile, while its individual front and back are shown below. The sizes of the material are shown by the ruler at the bottom but the surface is clothed with red paint. (Top left-hand photograph, Author 2008; Other photographs, author 2002; Drawing, Author 2002)

5-9 Corner tile for the corner of the façade of the Tai-Chung Station.
The photograph on the top left shows the attaching pattern on the walls; at the top right is a scale drawing of this kind of tile, while its front and back are shown separately below. The surface of the tile at the bottom left hand side is painted, and the size of the tile is shown by the ruler. (Top left-hand photograph, Author 2008; Other photographs, Author 2002; Drawing, Author 2002)

Figure 5.9 presents the special tile employed at right-angled corners. This detail clearly
reveals that the tiles provided the perfect substitute in order that the imitation brickwork effect can be maintained without any mortar joints at the corner edge. They also demonstrate that, because of the material’s thickness, the characteristic of this ‘cosmetic brick’ or ‘attached brick’ was that it was only cladding, rather than load bearing.

With regard to the internal walls, two principal materials are evident. The majority of the interior was covered in plaster. Although the central tall windows in the Main Hall were higher than the ceiling, for the walls of the main hall, the plaster finish covered the top 960cm or so below the ceiling (as can be seen in the exterior view of Figure 5.4).  

The second principal material employed was polished pebbledash stucco which presented a mock stone appearance. As shown on the left-hand side of Figure 5.10, the interior column constructed in brick and the imitation of ‘classical’ decorative elements were concealed. The horizontal band emphasised its imitation of stonework, whilst the

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8 According to their investigation, the position of the ceiling is the same as the original. Teoh and Lee, ‘Gouzao Siankuang Diaocha Yu Siousu Jianyi [An Investigation of the Construction and Suggestions for Repairs]’, pp. 155-156.
polished pebbledash stucco also veiled the lower part of the walls to a height of around 150cm (as shown on the right-hand side of Figure 5.10).

The exterior of the wall was covered by tiles and pebbledash; the interior was covered with plaster and polished pebbledash. The surface of the opening in the section was covered partly following the rule of the exterior and partly following the rule of the interior. (Photograph, Author 2008)
The lack of any connection between the elements forming the enclosure, namely its external façade, structure and internal elevation, is highlighted in Figure 5.11 and 5.12. In regard to the central section, Figure 5.11 shows that the external expression of the collocation of brick-like tiles and pebbledash stucco cannot be found in the interior. Similarly, the interior’s white plastered planes are barely noticed through the windows. Although they reveal the ceiling of the interior, it was difficult to see much from the exterior. The differences in the finishes to exterior and interior were only clearly presented in the openings. For example, part of Figure 5.11 shows that the wall of the entrance was clothed in two ways. The outer half was clad in tiles and a pebbledash stucco finish; whereas the inner half was masked by plaster and polished pebbledash. This lack of connection between exterior and interior finishes was obvious.

Figure 5.12 illustrates a similar approach used on both sides of the walls to the Waiting Rooms. The combination of brick-like tiles and pebbledash stucco conveys the image of masonry construction on the exterior, while the interior was clothed in plaster and polished pebbledash. The lack of continuity shown in Figure 5.11 is echoed in Figure 5.12.

Even so, some Japanese scholars claim that the cladding of brick structures with brick-like tiles provided some freedom in the design of both structure and façade.\(^\text{10}\) This was not entirely true for the cladding of the Tokyo Station, but it proved successful for the Tai-Chung Station.

Diagram of the walls of the waiting rooms from the exterior, structural section to the interior of the Tai-Chung Station.

The wall on the exterior was covered by tiles and pebbledash, and that on the interior was covered by polished pebbledash stucco and plaster. (Photograph, Author 2008)

The tiles adopted for the façade of the Tai-Chung Station were specially produced by a Japanese company (the Shinagawa Refractories) which also produced the cladding materials for the Tokyo Station as well as the Governor General Building. The implication and the signified meaning of this approach will be discussed in later chapters, but the architectonic form of the Governor General Building, the second case study, will be introduced next.
5.2 The Governor General Building (1919)

Soon after the opening of the Tai-Chung Station, the Governor General Building was completed. The importance of the Governor General Building to Japanese colonialism was obvious. For the Japanese, it represented their colonial power and their empire. There was no disagreement about erecting a significant building in Taipei, the capital of colonial Taiwan, to replace the former temporary office.¹¹


¹² Figure 5.13 refers to Shun'ichi 俊一 Kuriyama 林山, 'Taiwan Sotokufu Kyuusha No Hozon [The Preservation of Old Government-General Building, 臺灣總督府舊廳舍的保存]’, Taiwan Kenchiku Kaishi [Journal of the Architectural Institute of Taiwan, 台灣建築會誌] 2, no. 5 (1930).

¹³ This is taken from Chin 琴 Hsueh薛, ed. Guoding Guji Zongtongfu Siouhu Diaocha Yu Yanjion [An Investigation and Research into Repairing and Protecting the Nationally Historical Property, Office of the President, 國定古蹟總督府修護調查與研究] (Taipei [台北], Taiwan: Ministry of the Interior [內政部], 2003), p. 3-9.
The temporary office, which had been in use since the Japanese occupation began in 1895, was originally the government office of the Ch’ing Dynasty, called the Taiwan Pu-Cheng-Shi-Shi Ya-Men (see Figure 5.13). However, this was a temporary arrangement and using the offices of a previous regime reflected badly on Japanese status and their promotion of ‘modernisation’- a new edifice of appropriate standing was therefore essential.

The subsequent design competition not only emphasised its significance but also confirmed the influence of the Japanese architectural profession. It was actually the first architectural competition to be held anywhere by the Japanese government and, of course, attracted a great deal of Japanese architects’ interest (and arguments).  

The panel of competition judges included civil servants of the colonial government and Japanese professional architects such as Kingo Tatsuno and Chuta Ito. The result was announced in 1909 but only identified the second and third prize-winners, with no overall winner being named. Therefore, the winner of the second prize, Uheiji Nagano, did not have the right to put his proposal into practice (see Figure 5.14). Instead, on Tatsuno’s recommendation, the colonial government commissioned Matsunosuke Moriyama, one of Tatsuno’s pupils, to amend Nagano’s design and make it suitable for

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14 Huang, Zongdufu Wuyu: Taiwan Zondufu Ji Guandi De Gushih [The Story of the Taiwanese Governor-General Prefecture and the Residence of the Governor, 總督府語：台灣總督府暨官邸的故事], p. 83. Participation in the competition was limited to architects of the Japanese Empire.

15 Taiwan Soutoku Fu [Taiwanese Governor-General Prefecture 台湾総督府], ’Fu-Chousha Shinchiku Ni Seku Suru Ketsugi-an [Decision About the New Establishment of the Building of the Taiwanese Governor-General Prefecture,府廳舍新築二関スル決議案], Doboku [Department of Engineering 土木] ed., 1050, no. 2 (1906); and ———, ’Taiwan Soutoku Fu Chou-Sha Shin-Ei Sekkei Dai-Ichi-Ji Shinsa Kitei [The First Plan of the Competition for the Building of the Taiwanese Governor-General Prefecture ,臺灣總督府廳舍新營設計第一次審査議案], Doboku [Department of Engineering 土木] ed., 1329, no. 13 (1907).
By the end of 1909, Moriyama, whose own proposal had been included on the shortlist for the competition, took Nagano’s proposal back to Tokyo in order to discuss with other architects how proposed changes should be handled. He returned to Taiwan in 1912 to start construction. The main structure was completed in 1915 and the whole project finished in 1919. Consequently, most architectural historians regard Moriyama as the architect of the Governor General Building, rather than Nagano.

Moriyama had a close apprenticeship with Kingo Tatsuno and practised Tatsuno’s distinctive style in Taiwan. He graduated from Tokyo University in 1897, while Tatsuno was principal of the department. Before his work in Taiwan, he had made a detailed examination of timber-framed masonry building and had carried out some projects. Moriyama had also written some publications on architectural history and construction methodology.

At the end of 1906, when the competition for the Governor General Building was decided, he received a contract from the colonial government in Taiwan, which launched his career as a practising architect in Taiwan. Although he participated in many important projects over the next seventeen years, historians recognise that the Governor General Building was absolutely critical to his standing in Taiwan. In fact, soon after its

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16 According to another employer of the colonial government, the commissioning of the architect for the Building resulted from Tatsuno’s recommendation. Huang, Zongdufu Wuyu: Taiwan Zondufu Ji Guandi De Gushih [The Story of the Taiwanese Governor-General Prefecture and the Residence of the Governor, 總督府語：台灣總督府暨官邸的故事], pp. 104-105.

17 Hsueh, ed. Guoding Guji Zongtongfu Siouhu Diaocha Yu Yanjiou [An Investigation and Research into Repairing and Protecting the Nationally Historical Property, Office of the President, 國定古蹟總統府修護調查與研究], pp. 3-8, 3-9.
completion, he left Taiwan and returned to Japan.  

Given Moriyama’s career path, it might be appropriate to claim that Tatsuno and his influential style played a crucial role in the style of the Governor General Building. Another factor in its evolution of the design might be colonialism itself.

Initially Moriyama practised the Tatsuno Style in such a sophisticated manner that Tatsuno himself directly expressed an appreciation of his pupil’s design flair. He directly employed materials similar to Tatsuno’s project for the Tokyo Station. The façade of the Governor General Building is clad in ‘attached bricks’, similar to the red ‘cosmetic bricks’ of the Tokyo Station. He also uses verandahs on three floors of the eastern, southern and western façades. As mentioned in the previous chapter, verandahs were a well-known emblem of colonial architecture due to the prevailing climatic conditions.

Certainly the Japanese viewed Taiwan as a much warmer region, similar in climate to Southern Asian countries for European colonialists. On the other hand, because of the

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18 In Japan, he undertook responsibility for the scale drawings of the 1872 First Mitsui Bank headquarters, so he had opportunities to understand the construction system in detail; he also published his writings in monthly-published architectural textbooks (or kenchiku gaku kou hon, in Japanese). In Taiwan, besides the Government-General Building, he was the architect of Taichung Prefectural Office, the Taipei Prefectural Office and the Tainan Prefectural Office. Tomohisa智久 Furuta古田, 'Kenchikuka Moriyama Matsunosuke No Kenkyuwu [A Study of the Architect Matsunosuke Moriyama, 建築家森山松之助の研究]' (Nihon University [日本大学], 1987), pp. 7-9.

19 Ibid. p. 13.

20 This material in archival documents in December 1915 was referred to as ‘attached brick’ with a size of 107mm by 61mm and a thickness of 12mm. Kenji憲二 Horigome堀込, "Waiqiang Cizhuan Zhi Gouzao Tese [The Constructive Characteristic of the Tiles on Exterior Walls, 外牆磁磚之構造特色]", in Guoding Guji Zongtongfu Xiuhu Diaocha Yu Yanjiu [An Investigation and Research into Repairing and Protecting the Nationally Historical Property, Office of the President, 國定古蹟總統府修護調查與研究] (Taipei [台北]: Ministry of the Interior [內政部], 2003), pp. 4-31, 4-35.
Westerners and their works in Japan, it would be fair to believe that Nagano and Moriyama were aware of the significant connection between verandahs and colonial power.

The main entrance to the east and the Western alternative entrance are marked. This plan also shows that the site of this project is actually as big as a block.

It is necessary to understand the spatial arrangement of the building before embarking on a detailed interpretation of the façade design. The major entrance was in the middle of

5-15 Scale drawing of the site plan of the Governor General Building today. The main entrance to the east and the Western alternative entrance are marked. This plan also shows that the site of this project is actually as big as a block.

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21 For the European colonialists, Sir Banister Fletcher and John Musgrove, Sir Banister Fletcher's A History of Architecture, 19th edn. (Butterworths, 1987), p. 1193, explains details. For the Japanese, this requirement was confirmed by the request by civil servants that the warm climate condition should be taken into consideration and also from their complaints that some of the proposals in the first round of the competition did not react to this requirement. Huang, Zongdufu Wuyu: Taizhan Zondufu Ji Guandi De Gushih [The Story of the Taiwanese Governor-General Prefecture and the Residence of the Governor, 總督府物語：台灣總督府暨官邸的故事], pp. 93-4.

22 Acknowledgements are given to Chin Hsueh, who was the director of the repair and protection research of the Building and who provided the scale drawings shown in Figures 6.15, 6.16, 6-20 and 6-21.
the eastern approach with a secondary entrance for officials located in the opposite western wing (Figure 5.15). This could explain the location of the tower (some 60 metres higher than the rest of the building) on the eastern façade. As seen in Figure 5.16, it not only marked the entrance but was literally a towering symbol of colonial authority. The verandahs mentioned above (see Figure 5.16) provided valuable shade for the other portions of the main elevation in contrast the importance of the tower.

The material selected for the structure and the claddings were crucial in understanding the architectonic expression. The main structural frame was of reinforced concrete, with walls of brick. However, neither of these two construction materials was exposed on the external façade or the internal elevations, and were concealed behind various applied cladding on either side.

The primary material of the external cladding was ‘attached brick’, i.e. 12mm thick tiles.
The majority of the red portion of the façade was clad in ‘attached bricks’ aping a header bond brickwork pattern, and shown in Figure 5.18. Bespoke tiles were made to suit different angles of the building’s corners. Tiles with a simple right angle were relatively widely used, as per the previous project. The specific angle of the corner also required custom tiles (perhaps with an angle of 135 degrees, as shown in Figure 5.17).

This finesse ensured that the imitation brick construction appeared more real. The collocating materials for the cladding are horizontal bands of pebbledash stucco finish and granite for the façades. The majority of so-called ‘modern’-style embellishments, such as a superficial (and non-structural) keystone and banded Tuscan columns, were clothed in pebbledash bands (see Figure 5.19).

In addition, a portion of the base course (as highlighted in Figure 5.20) was also clad in pebbledash stucco with horizontal concave bands to imitate stone. Granite was used for the porch of the main entrance, as illustrated in Figure 5.19.
Photographs of the eastern elevation of the Governor General Building.
The main picture shows the general collocation of ‘attached bricks’ and pebbledash stucco. For a clearer view, A section of the arched verandah on the second floor is enlarged on the right-hand side, and the superficial imitation of structural elements is pointed out. An enlarged view of the porch of the main entrance is shown on the left-hand side. (Photograph, Author 2007)

The majority of the interior walls was finished in plaster. Nonetheless, for the purposes of collocation, some slate is used on the lower wall in the Lobby, and timber veneers are used for the dado panelling in the offices. These finishes can be seen on the right-hand side of Figure 5.21.

The cladding of the exterior or the interior did not reflect the structural frame (see Figure 5.21). The reinforced concrete frame remained invisible, but the brick-like tile did not really imply the wall construction either. This assertion derives from the fact that the
external cladding accorded with Tatsuno Style, and structure was not usually embodied or implied on the surface plane of the architectural style.

![Part of an archival drawing of the eastern elevation. This shows the arrangement of the materials of the cladding for the stone-imitated pebbledash stucco of the base course.](image)

Nonetheless, the relationship between interior and exterior was complicated because of the arched verandahs. Certainly the verandahs compounded the boundary condition between inside and outside, principally because the verandahs were not enclosed or glazed and could not be counted as interior spaces. Even so, the cladding of the verandahs was generally similar to the other internal finishes. Therefore, the identification of the verandahs became ambiguous and created a discontinuity of enclosures. So much so that the cladding of the external façade, the structure and the cladding of the internal elevation became even more disconnected.
5-21 Archival drawing and modern photographs of the Governor General Building.
This shows the diagram of the central part of the eastern elevation and its section as well as photographs of the exterior, interior and verandahs. (Photograph, Author 2002)
5.3 The Main Library of the Taihoku Imperial University (1929)

After the completion of the Governor General Building and the disaster of the Kanto earthquake, the next popular stage of architectural development in the late 1920s is well represented by a group of buildings at the Taihoku Imperial University (Taihoku Teiko Kudaigaku in Japanese). The previous two projects highlighted the popularity of brick-like tiles in the 1910s. However, the choice of material for architectural structures and surfaces in Japan and Taiwan changed dramatically in the second half of the third decade of the twentieth century.

Chapter 3 discussed how the 1922 Taiwanese earthquake was completely overlooked, whereas the 1923 Japanese earthquake and the burgeoning seismic resistance movement impacted on projects in Taiwan. Therefore, the popular employment of yellow scratched (rustic) surface material for façade cladding (as embodied in the Katakurakan in Japan) was also employed at the Taihoku Imperial University in Taiwan.

Kaoru Ide was the chief architect of the university project, and Kingo Tatsuno’s influential ideas remained prevalent, especially in the early years of his career in Taiwan. Ide’s education and professional experience in Japan also had a close...

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23 Horigome asserted that the period of the popular employment of the red brick-like tiles was between 1912 and 1926. Horigome輝雄, ‘Waiqiang Cizhuan Zhi Gouzao Tese [The Constructive Characteristic of the Tiles on Exterior Walls, 外牆磁磚之構造特色]’, pp. 4-31, 4-32.

24 The establishment of the Taihoku Imperial University in Taipei symbolised another stage of the colonialism. The infrastructure of the colony had been reached a mature stage when it began to consider the importance of higher education after experiencing the railway construction, the governmental representation and the administrative rearrangement in the first quarter of the twentieth century. The Taihoku Imperial University was converted to the National Taiwan University after the end of the Japanese colonial period.

25 During the founding period of the University, Kaoru Ide was the chief architect while Shunichi Kuriyama, Noboru Sakamoto, Souichi Kuriyama, Yoshio Shirakura and
connection with Tatsuno. His transfer to Taiwan in 1911 was endorsed by Tatsuno’s reference and triggered by an invitation to assist Matsunosuke Moriyama’s with the Governor General Building. After its completion, Ide continued his career in Taiwan until his death.

Ide’s design for Taihoku University display some similarity with these and other Japanese buildings. In fact, Japanese influences were ubiquitous: not only in his personal connections and experiences but also across Taiwan. For instance, reports on new projects in Japan were frequently published in Japanese newspapers in Taiwan. Coverage included the latest proposals in the area around Tokyo Station (as noted in Chapter 3).

Given such circumstances, it was obvious that Ide and other architects in Taiwan were aware of the latest architectural trends in Japan. Moreover, the similarity in the choice of materials for projects in both Japan and Taiwan also reflects the influence from Japan. The surface claddings of some buildings (completed between 1923 and 1929) at the Tokyo Imperial University resembled that of the Taihoku Imperial University (completed around 1929). Figures 5.26 and 5.25 illustrate how the colour and surface texture of [Shigasuke Yasaka were assistant architects. Taiwan Soutoku Fu [Taiwanese Governor-General Prefecture 台湾總督府] ed., Kyuu Shokuminchi Jinji Sooran Taiwan Hen Go [General Reviews of the Previous Colonial Personnel, 旧殖民地人事總覧 台湾編 5], 16 vols., vol. 13 (Tokyo: Nihon Tosho Sentaa 日本国書センター, 1997).

He graduated from the Tokyo Imperial University in 1906 and practised in Tatsuno’s office for two years. Taiwan Kenchiku Kai [Architectural Institute of Taiwan 台灣建築會]，'Ryaku Reki [Brief History of Kaoru Ide's Career, 略歴]', Taiwan Kenchiku Kaishi [Journal of the Architectural Institute of Taiwan, 台灣建築會誌] 16, no. 2.3 (1944).

Sutejirou Umezawa, 'Ide San No Nakunara Re Ta Zengo [Front and Back Where Ide Died, 井手さんの亡くなられた前後]', Taiwan Kenchiku Kaishi [Journal of the Architectural Institute of Taiwan, 台灣建築會誌] 16, no. 2.3 (1944), p. 58.

Zaiyou Ichi Kisha [A reporter in the capital 在京一記者], 'Marunouchi No Konjaku to Sorekenchiku [The Marunouchi Area and Architecture around the Area Now and in Former Times, 丸の内の今昔と其建築]', Taiwan Nichi Nichi Shimbun, 20 September, 21 September, 24 September, 28 September, 30 September and 3 October 1922.
cladding materials from the Tokyo Imperial University were similar to the library at the Taihoku Imperial University, although the fixing patterns was differed.

From the end of the 1920s, the university campus had developed gradually and several buildings were shown on the plan published at the end of 1931 (see Figure 5.22). The main library at Taihoku can be seen as representative of this new group of buildings. The

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Figures 5.22 and 5.24 refer to Taiwan Kenchiku Kai [Architectural Institute of Taiwan], 'Fuzu Setsumei: Taihoku Teikoku Daigaku Yoshokan Jibutsu Shitsu Sonota Shinchiku Kouji Gaiyou [Statement of Illustration: The New Establishment of the Library of the Taihoku Imperial University, 附圖說明: 臺北帝國大學圖書館事物室其他新築工事概要]', Taiwan Kenchiku Kaishi [Journal of the Architectural Institute of Taiwan, 台灣建築會誌] 3, no. 6 (1931).
first part of the library was finished in 1929, and the northern extension of the library was completed by 1931. The importance of a university library was undoubted, and the two elements of this substantial library provided significant expression in terms of their architectonic form.

30 King Shih Architects [金光裕建築事務所], ed. Guoli Taiwan Dasyue Siaoshihguan Kongjian Jhengsiou Gongcheng Shihgong Jilu Baogaoshu [A Record and Report of the Repair and Reorganisation of the Gallery of University History of the National Taiwan University, 國立臺灣大學校史館空間整修工程施工記錄報告書] (Taipei台北: Taiwan Daxue (National Taiwan University, 臺灣大學), 2005), p. 7.

31 Figure 5-23 and drawings in Figures 5-29, 5-30 and 5-31 refer to King Shih Architects [金光裕建築事務所], ed. Guoli Taiwan Dasyue Siaoshihguan Kongjian Jhengsiou Gongcheng Shihgong Jilu Baogaoshu [A Record and Report of the Repair and
The façade design of the central block can be discerned from the planar spatial arrangement. As shown in Figure 5.23, the entrance and the main vertical circulation were in the middle of the original building, thus emphasising the centrality evident in Figure 5.24. Once the northern extension was completed, the bookshelves and reading room were all relocated to the new part of the library, with the interior spaces of the southern section converted for office use. Indeed, the functions of the different spaces have continued to change over time and the library has experienced numerous extensions over the last eighty years.

The structural materials of the two building was different. The main construction system for this project shifted from brick construction (in 1929) to reinforced concrete (in 1931) and still co-exist in this project. However, both systems were covered in the same way.  

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5-24 Archival drawing of the southern elevation of the original library of the Taihoku Imperial University.
This shows the central part as the main focus with the emphasis of the gable.

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Reorganisation of the Gallery of University History of the National Taiwan University, 阿立台灣大學校史館空間整修工程施工記録報告書, p. 7.
32 Taiwan Kenchiku Kai [Architectural Institute of Taiwan 台灣建築會], 'Fuzu Setsumei: Taihoku Teikoku Daigaku Yosho Kan Jibutsu Shitsu Sonota Shinchiku Kouji Gaiyou [Statement of Illustration: The New Establishment of the Library of the Taihoku Imperial University, 附圖說明：臺北帝國大學圖書館事物室其他新築工事概要]; and King Shih Architects [金光裕建築師事務所], ed. Guoli Taiwan Dasyue Siaooshihguan Kongjian Jhengsiou Gongcheng Shihjong Jilu Baogaoshu [A Record and Report of the Repair and Reorganisation of the Gallery of University History of the National Taiwan University, 國立臺灣大學校史館空間整修工程施工記錄報告書], pp. 6-10.
cladding material, namely; a vertical machine-cut tile with a pebbledash stucco finish for the exterior and plaster with timber veneers for the interior.

The left-hand side of Figure 5.29 and Figure 5.30 show the external claddings of the original buildings, while Figure 5.31 presents that of the northern extension. The wall thickness in the original partition was slightly greater than that of the northern wing. However, the columns of the northern building were thicker than the southern wall. The wall construction of the northern extension was also in brick.

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33 The note for the illustration in the archival documents indicates the surfacing material as ‘tiles’ directly without other descriptions or adjectives, unlike previously described projects, where it is referred to as ‘attached brick’ or ‘cosmetic brick’.

Materials for the exterior claddings were selected to express some simplified icons of conventional architectural appearance. The primary component of the external cladding of this project was the yellow/brown machine-cut tile. This material imitated a surface-scratched tile but was more economic, requiring less labour in its production. Instead of imported tiles from Japan as noted in previous projects, the tiles specified here
were produced in Taiwan. The principal size of tile employed was very close to that of the header face of ordinary bricks, but the colour was no longer red, as had been the popular during the 1910s in Japan and Taiwan. Also, unlike brick, the surface of the tile was not plain.

5-28 The cladding of the entrance to the original library of the Taihoku Imperial University. This shows the arrangement of different materials clothing different parts of the elevation: from the top to the bottom are plaster, the border tiles, the bigger tiles and polished pebbledash stucco finishes. (Photograph, Author 2008)

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35 Taiwan Kenchiku Kai [Architectural Institute of Taiwan 台灣建築會], 'Fuzu Setsumei: Taihoku Teikoku Daigaku Yoshokan Jibutsu Shitsu Sonota Shinchiku Kouji Gaiyou [Statement of Illustration: The New Establishment of the Library of the Taihoku Imperial University, 附圖說明: 臺北帝國大學圖書館事物室新築工事概要]', p. 60.

36 In Japan and Taiwan, the colour of bricks is usually red; yellow/brown bricks are not popularly employed. The surface-scratched brick is unusual as well.
Diagram of the surface finishing from the exterior to the interior of the main entrance to the original library of the Taihoku Imperial University.

The exact pattern of the layered brick of the structure is unknown, but the claddings of the interior, transitional zone and the exterior are shown. (Photograph, Author 2008)
This tile cladding completely covered the façades of both buildings, regardless of the variation in construction systems. The pattern of tile attachment still followed a pattern similar to the header bond of brickwork, and is shown in Figure 5.25. However, as shown in Figure 5.26, some buildings built in the 1920s in the Tokyo Imperial University had already adopted different patterns.

The other important exterior cladding material of this project was pebbledash stucco. The pebbledash finish was employed at the head and base of both buildings, and is framed in Figure 5.27 by the white dotted lines. The ornamental elements which the pebbledash covered were simplified symbols of ‘modern’ ornaments, such as the gable and the Lombardy frieze (as indicated in Figure 5.27 by black arrows). Another example was the tile attachment around the original position of the springers for the arched windows. This arrangement differed from the ordinary and represented simplified springers (as highlighted in Figure 5.27 by a black arrow). The attempts to imitate masonry materials and ‘modern’ ornaments are ubiquitous. It would be fair to say that even though construction systems had changed, people’s aesthetic predelictions remained conventional.

Before reviewing the other section of the wall, the internal cladding of the entrance porch should be discussed. Its characteristics confirm its role as a transitional space between interior and the exterior. As shown in Figure 5.28, brown border tiles define the edge of the tile veneers, while plain tiles (twice as big as the stretcher face of ordinary bricks) were attached in the form of staggered stone courses. As per other internal finishes, exchange.

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plaster covered the upper section with polished stucco as a dado. Similar claddings were also adopted for the entrance lobby of the ground floor, and can be seen in the middle picture of Figure 5.29.

5-30 Diagram of the surface finishing of the exterior; the section from the interior to the exterior walls of the southern partition of the library; and the internal elevation of the original library of the Taihoku Imperial University. (Photograph, Author 2008)

Finishes for the remaining interior spaces were relatively conventional. Except for the transitional zone, timber veneers were employed for the lower section of almost all the
internal walls combined with a plaster finish for the upper sections. This can be seen in the right-hand side of the diagrams of Figure 5.29, Figure 5.30 and Figure 5.31.

Figure 5.29 shows the transition from exterior to interior. As well as the wall construction, the stair can be considered a division between internal and external cladding. The transitional zone extends to the stair steps as shown in the middle of Figure
5.29. The colour of the exterior cladding extends to the veneer of the transitional zone, while the plaster finish of the interior cladding extends to the upper part of the cladding of the transitional zone.

The relationship between exterior, structure and interior can be seen in Figures 5.29, 5.30 and 5.31. Figure 5.23 shows the different positions in relation to these three diagrams and clarifies their different tectonic treatment. It is evident that the cladding of the exterior could not be discerned from that of the interior and *vice versa*.

Moreover, to identify the structural differences between the two buildings is even more difficult. The identical cladding of both exterior and interior make the differences in their construction impossible to identify by observation only. Although the reason for the variation in structural systems remains unclear, it should be noted that, given their institutional standing, this was not a casual choice or budgetary requirement. Nevertheless, the development in the library’s architectural expression from the previous project is obviously significant. However, the next project in this discussion expresses an even greater shift.

### 5.4 The Chia-Yi Station (1933)

It is important to consider projects in Chia-Yi, which suffered 1904 and 1906 earthquakes and is only about sixty kilometres away from the epicentre of the 1930 earthquake. The conclusion of investigations into the damage done by the 1930
earthquake was that brick buildings and architectural ornamentation should be avoided.\(^\text{38}\)

The Chia-Yi Station, completed in 1933 (see Figure 5.33) is a suitable project through which to examine these recommendations.

![Image](image.png)

**Figure 5-32** Lamination of historic maps of the area around the Chia-Yi Station showing the industrial rail connections.\(^\text{39}\)

The importance of the Chia-Yi Station can be understood in relation to both colonial power and architectural development. With respect to colonial power, the timber and sugar industries around this area were essential to meet growing demands. A vast

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\(^{39}\) Figure 5-32 refers to Chun-Ming Huang, ed. *Jia-Yi Shih Shihding Guji Jia-Yi Huocejihan Diaocha Yanjiou [Investigation and Research into the Chia-Yi Station as a Municipal Historical Property of the Chia-Yi City]*, 嘉義市市定古蹟嘉義火車站調查研究 (Chia-Yi嘉義: Cultural Affairs Bureau, Chiayi City 嘉義市文化局, 2003), p. 36.
quantity of timber was exported from Taiwan to Japan and the sugar industry also boosted Japan’s economic growth. The Chia-Yi Station could facilitate both industries and the station provided a crucial transport link because of its convenient location. Figure 5.32 indicates the railway network around the Chia-Yi Station: the solid line represents the main north/south rail line. Rail connections from different sugar plantations are marked on the left-hand side, and the railway from the Ali Mountain relating to the timber industry is shown by the green line towards the right-hand edge. The importance of the railway lines of the Chia-Yi Station could signify the role of the Chia-Yi Station from the colonial aspect.

5-33 Contemporary photograph of the Chia-Yi Station.
(Photograph, Author 2000)

Because the Japanese had identified timber architecture as their tradition, the demand for timber was always obviously high and continuous. As their colony, it was inevitable that the Japanese would export as much timber from Taiwan back to Japan as possible. For instance, the huge pair of traditional timber gates, the torii, in front of the Meiji Shrine (or Meiji Jingu), were sourced from the Ali Mountain in Taiwan. See http://www.meijijingu.or.jp/qa/jingu/12.html accessed on 14 May 2008.

The vast area of plain around the region of Chia-Yi was mostly planted with sugar cane, and rail links were built to connect the sugar-producing places with the Chia-Yi Station for transportation.
In terms of architectural development, the concern about earthquakes was crucial for this station. By the end of the 1920s, the need to improve the old railway station was paramount. In 1928, therefore, the ‘Section of Improvement’ of the Department of Railways (supervised by the Bureau of Traffic) was devolved from the ‘Section of Work’.

The original Chia-Yi Station (1903) was built using timber-framed masonry construction but suffered damage from the earthquakes in 1904 and 1906. In fact, the station barely survived: part of the dry adobe walls collapsed and some of the brick columns cracked. Despite this damage, the old building continued in operation until the new station (constructed in reinforced concrete) was finished in 1933. This building was not only the first station in Taiwan to be entirely constructed in reinforced concrete but also (among similar sized stations) the first to be rebuilt by the newly established ‘Section of Improvement’ in the Department of Railways.

Takeo Ushiki is considered to be the station architect. He had no direct connection with Kingo Tatsuno. Instead he graduated in 1916 from a school in Nagoya in Japan and travelled to Taiwan to work for the colonial government from 1917. Between 1929 and 1940, he worked in the ‘Section of Improvement’ in the Department of Railways. Having left Japan shortly after his graduation, he did not have many opportunities to engage with Tatsuno. Although he was particularly interested in factors which influenced

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43 Niitaka Shinpou Sha, [新新新报社], ed. Taiwan Shinshi Meikan [Directory of Important People in Taiwan, 臺灣紳士名鑑] (Taipei: Niitaka Shinpou Sha [新新新報社],1937), p. 171.
the choice of materials, this was not strongly reflected in his design of this station.

5-34 Floor plan of the Chia-Yi Station.

Its spatial arrangement is clearly presented: while the central part was the main entrance and the side blocks were waiting rooms. Additionally, the location of the vertical section made for Figure 5.43 is marked.

5-35 Eastern elevation of the Chia-Yi Station.

This presents the classical notion of the centre and the modern concept of the wings.

The simple spatial arrangement of the station produced its centralized façade.

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45 This design is considered as eclectic or as the transitional from ‘Classicism’ to Modernism. Huang, ed. Jia-Yi Shih Shihding Guji Jia-Yi Huochejhan Daocha Yanjiou [Investigation and Research into the Chia-Yi Station as a Municipal Historical Property of the Chia-Yi City , 嘉義市市定古蹟嘉義火車站調查研究], p. 41.

46 The archival drawings of Figures 5.34, 5.36, 5.40 and 5.43 are archived in Dr Shuenn-Ren Liou’s office.

47 Figure 5-35 and archival photographs of Figures 5-37 and 5-38 refer to Taiwan Kenchiku Kai [Architectural Institute of Taiwan 台灣建築會], 'Fuzu Setsumei: Ka-Gi Eki Sonota Shinchiku Kouji Gaiyou [Statement of Illustration: The New Establishment of the Ka-Gi Railway Station, 附圖說明:嘉義驛其他新築工事概要]', Taiwan Kenchiku Kaishi [Journal of the Architectural Institute of Taiwan, 台灣建築會誌] 5, no. 5 (1933).
arrangement. Figure 5.34 shows that the central space was the main hall, and the elevation of this part (as shown in Figure 5.35) were higher than the side wings, and its gable form emphasised its importance. Most of the ornaments and relatively ‘modern’ elements, such as arch openings and simplified brackets, on exterior façades were concentrated in this section. Two other primary spaces (either side) served as waiting rooms, and their elevations included flat roofs which were considered as signs of Modernism.

5-36 Archival drawing showing the arrangement of rebar (reinforcing steel) of the Chia-Yi Station.
This confirms that the construction of the walls was reinforced concrete and the location of the rebar is clearly marked for the structural frame, walls and openings as well as the base course.

It is crucial to understand structure in any discussion on tectonics and here the material form of the structure was relatively simple. Unlike many other buildings which might combine a number of structural materials, the construction of the Chia-Yi Station, including its structural columns and roof beams and walls, was reinforced concrete. The rebar arrangement shown in Figure 5.36 provides evidence of this approach.
Cladding of the external façade, however, was unavoidable. So although the overall construction was reinforced concrete, it seems that people still had difficulties in accepting unadorned concrete. Therefore, the majority of the façade was covered with plain brown tiles. The standard size of the tiles was 227 x 57mm i.e. similar to the stretcher face of a brick. The cladding was arranged in a pattern similar to stretcher bond in brickwork. This tile is shown in Figure 5.37 marked ‘1’ and its original colour without ivory paint is also shown in Figure 5.37 marked ‘3’.

The other kind of scratched-surface tile was adopted only for decorating the main gate facing the city. This was attached in a pattern imitating the basket bond of brickwork, and can be seen in Figure 5.37 marked ‘2’. Special border tiles were employed for surrounding the gate opening, and their arrangement and collocation on the façade is

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48 The demand for tiles was increased along with the demand for the construction in reinforced concrete. Moreover, people were very used to seeing the pattern of brickwork or layered masonry construction on the surface of a construction. Danto Kabushikigaisha (Danto Corporation 豊陶株式会社), Katou加藤, and Tanaka田中, Nihon No Tairu Bunka [Japanese Tile Culture, 日本のタイル文化], pp. 90, 96.
shown in Figure 5.37 marked ‘2’, while the photograph marked ‘4’ highlights their shape and colour in detail. The reason for the application of paint will be clarified later.

5-38 Detail photographs showing pebbledash employment of the Chia-Yi Station.
Detail of the pebbledash embellishments is marked on this archival elevation photograph from the southern view. The first detail photograph (‘1’) shows the head edge lining, and the second (‘2’) shows the sculptural stucco object which acts as a simplified bracket on the façade. The base course and the original colour of the pebbledash without its painted covering are indicated in photographs ‘3’ and ‘4’ respectively. In addition, the original colour contrast of brown tiles and pebbledash stucco finish can be seen from the archival photograph. (Photographs, Author 2003)

Pebbledash stucco finish was an alternative material on the exterior walls to give an impression of stone construction. This cladding was employed for the base of the elevations, and can be seen in Figure 5.38 marked ‘3’, while the photograph marked ‘4’ is an example of un-painted pebbledash stucco. The staggered division lines can be considered as imitating a coursed stone construction.
Comparison between the classical egg-and-dart frieze and the head edge lining on the elevations of the Chia-Yi Station.

The classical egg-and-dart decoration on the left-hand side is borrowed from Fletcher’s publication; the lining ornament on the right-hand side is located at the head edge of the elevations. This comparison attempts to indicate the similarity between these two forms of decoration and the nature of the imitation. (Photographs, Author 2003)

The pebbledash stucco at the head of the exterior façade adopts oval forms. This decoration of the façade can be seen in Figure 5.38 marked ‘1’, whereas Figure 5.39 offers a comparison with a classical egg-and-dart motif. The decorative objects around the big arched windows (as shown in the photograph marked ‘2’ in Figure 5.38) could be considered simplified brackets and were also covered in stucco finish.

In respect of the interior finishes, the lower portion was relatively diverse but plain plaster for the upper section. As shown in Figure 5.40, three different types of veneer panels were adopted. One type consisted of tiled panels (shown at the left-hand picture on Figure 5.40) with slightly bigger horizontal joints than vertical joints in order to stress

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49 The drawing is taken from Fletcher and Musgrove, *Sir Banister Fletcher's A History of Architecture*, p. 118.

50 The link between this ornament and the classical egg-and-dart ornament can be seen in Huang, ed. *Jia-Yi Shih Shihding Guji Jia-Yi Huochejhan Diaocha Yanjiou* [Investigation and Research into the Chia-Yi Station as a Municipal Historical Property of the Chia-Yi City].
the horizontality. Polished stucco was also employed as a edging to this kind of veneer.

The second variant (as shown in the centre of Figure 5.40) comprised stone slabs, with the marble texture naturally expressed. It should be stressed that the marble was imported from Yamaguchi, Japan. The final type (according to archival records) was the arrangement of square tiles of about 12 x 12cm, which nowadays is concealed by a timber veneer (as shown in the right-hand picture on Figure 5.40) while the central panels have a printed marble-like texture.

![Photographs, Author 2003](image)

5-40 Employment of different kinds of veneer of the Chia-Yi Station.
Three frames are marked on an archival section indicating different veneer materials: tile, marble and timber (from the left/south to the right/north). (Photographs, Author 2003)

The upper walls were generally covered in plaster; but upper sections of the pilasters in the main hall were embellished with tiles. To clarify the ornament of the pilasters, two unfolded elevations of the main hall are shown in Figure 5.41 and the positions of the capitals are framed and shown in detail photographs below. The collocation of square tiles and floral ornament for each capital varied dependent on its location. It should be noted that these ornaments on the internal northern and southern walls (equivalent to the
height of the ceiling in the waiting rooms) were higher (as shown at the left hand side of Figure 5.41). Whereas on the internal eastern and western walls, where the pilasters were shorter (as marked on the right-hand side of Figure 5.41). The capitals were even below the large windows facing the city and the station platforms.

5-41 Scale drawings of internal elevations and detail photographs of the main hall of the Chia-Yi Station.
This figure shows archival drawings of the sections and modern photographs of the main hall: the attached tile and floral ornaments are decorated around the position of the capital.  
(Photographs, Author 2009)

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[51] Drawings of Figures 5-41, 5-42 and 5-43 refer to Huang黃, ed. Jia-Yi Shih Shihding Gaji Jia-Yi Huochejhan Diaocha Yanjiou [Investigation and Research into the Chia-Yi Station as a Municipal Historical Property of the Chia-Yi City], p. 41.
Carving of fake attachment pattern on the elevations of the Chia-Yi Station.
The positions of the photographs are marked on the ground plan. The walls are not covered with tiles but carved with fake joints on the surface of the concrete. (Photographs, Author 2003)

It is important to explain the over-painting of the façades and the repercussions of rebuilding the Chia-Yi Station after the Second World War. Part of the eastern facade was destroyed during the war and, for some reason, its re-construction did not include the tile embellishments. The walls of the rebuilt portion, therefore, were devoid of tiles. So, a pattern of staggered joints was inscribed into the concrete surface (both inside and outside) and can be seen in the top and bottom of Figure 5.42 respectively. The method adopted to unify this new section with the original walls was to paint both internal and exterior facades in order to conceal the variation.
5-43 Diagram of the surface finish from the exterior, and the section to the interior of the exterior walls of the Chia-Yi Station, with modern photographs of the external façade and the interior elevation of the Chia-Yi Station.

An archival drawing of the elevation and section of the main entrance and a scale drawing of the internal elevation on modern photographs show the relationship between the exterior and the interior. The location of the vertical section is marked on Figure 5.34. (Photographs, Author 2009)
Despite this action, the connection between architectonic expression of the cladding and the actual structure is still vague. As shown in Figure 5.43, the cladding of the external façade still conveys an impression of masonry construction. Disregarding the external cladding and the concealed structure, the cladding of the internal elevations was generally separated into lower veneered sections combined with plaster above. Both sides present relatively conventional images, but the true significance of the reinforced concrete structure is concealed.

The choice of materials in this project differs from previous projects, but essentially follows the conventional notion of masonry construction. Given when this project was built, Ide’s technical classification is coherent, i.e. the reinforced concrete period. Also Fu’s stylistic definition of this era as Transformational seems appropriate. However, preparations for the Taiwan Exhibition of the Fortieth Anniversary of (colonial) Governance introduced new (political) factors and can be seen most clearly in the next project.

5.5 The Taipei Public Hall (1936)

The Taipei Public Hall, our final Taiwanese case study, has considerable importance in terms of its political and architectural repercussions. In terms of politics, it was located on the site of the original Taiwan Pu-Cheng-Shi-Shi Ya-Men (as mentioned earlier), but the official justification for this project was to celebrate the enthronement of the Emperor
However, two years before its official inauguration in 1934, the organizing committee of the Taiwan Exhibition of the Fortieth Anniversary of Governance had already nominated it as the principal venue for the exhibition of 1935. The map for one of the exhibition sites (shown in Figure 5.44) illustrates the key role of this major building in the exhibition.

Kaoru Ide confirmed its architectural importance by valuing this project as equal to the public halls in Tokyo, Osaka and Nagoya, which were very important in the colonial motherland, Japan.

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52 Taipei Shiyakusho [台北市役所], *Taipeishi Koukaidou Kenchiku Kouji Gaiyou [Summary of Construction Work of the Taipei Public Hall, 臺北市公會堂建築工事概要]* (Taipei: Taipei Shiyakusho, 1936).

53 Yanagiwaza 柳枝, 'Hajime Seiyon Juushuunen Kinen Taipei Hakurankai Mitefuruki [Visiting Description of the Taiwan Exhibition of the Fortieth Anniversary of Governance, 始政四十年記念臺灣博覽會觀歩記]', *Taiwan Kenchiku Kaishi [Journal of the Architectural Institute of Taiwan, 臺灣建築會誌]* 7, no. 5-6 (1935), p. 294; and Mitsuo 光雄 Kanomata 麗又, ed. *Hajime Seiyon Juushuunen Kinen Taipei Hakurankaishi [Summary of the Taiwan Exhibition of the Fortieth Anniversary of Governance, 始政四十年記念臺灣博覽會誌]* (Taipei: Hajime Seiyon juushuunen Kinen Taipei Hakurankai 始政四十年記念臺灣博覽會, 1939), pp. 72-3.

54 Ibid.

proofing) and the surface cladding confirmed its status and significance. However, any consideration of its seismic resistance was the result of reinforced concrete’s inherent reliability rather than local advice gleaned from the damage investigations into the 1930 or 1935 earthquakes in Taiwan.

5-45 Modern photograph of the Taipei Public Hall.
The general appearance of the Hall is shown: light green is the general colour for the façade and the central gable centralises the focus. (Photograph, Author 2008)

The Taipei Public Hall (as shown in Figure 5.45) was a typical example of Fu’s Transformational Style. The simplified ‘modern’ language, such as the central gable of the main façade, is recognisable but has been influenced by the strategy of simplification. As in previous projects, the strategy of locating the main entrance (marked by an arrow at the left-hand side of Figure 5.46) in the centre of the main façade as a focus was repeatedly employed. The significance of the main façade is discernable from diverse

56 Chao-Ching 朝卿  Fu, Rihjih Shihci Taiwan Jianjhu [Taiwanese Architecture in the Japanese Colonial Period, 日治時期台灣建築], vol. 5, 大地別冊 (Taipei 台北: 大地地理, 1999), p. 76.
ornaments (framed and detailed in Figure 5.47) - some of which are discussed below.

5-46 Ground floor plan of the Taipei Public Hall. The main entrance of the Hall is marked at the left-hand side, and the vertical sections for Figure 5.55 and Figure 5.56 are also indicated here.

The structural system of this project was reinforced concrete with a steel framework for the main assembly space. As with the other projects, the cladding materials have no link to the concealed structure. Although the steel framework can be viewed in archival drawing (shown in Figure 5.48), the reinforced concrete construction can only be confirmed in written records.

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57 Figures 5-46, 5-47 and 5-54 refer to 井手, 'Taipeishi Koukaidou Rakuseishiki Ni Oke Ru Kouji Houkoku [The Construction Report in the Ceremony of the Completion of the Taipei Public Hall, 臺北市公會堂落成式於記工事報告]'.
5-47 Eastern elevation along with details framed of the Taipei Public Hall.
The original service wing is marked in grey blocking, and the locations of two vertical circulations are framed with dotted lines to indicate the different heights of the windows there from the rest of the windows. Other ornaments on the façade are framed to show the location of the detail photographs shown below. (Photograph, Author 2003)

5-48 Archival drawing of the steel beam over the performance hall of the Taipei Public Hall.
This confirms the construction system of the building.

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58 Figures 5-48, 5-55 and 5-56 refer to Hsu Yu-Chien Architects & Associates [徐裕健建築事務所], ed. Taipei Shishijiji Taipei Gonghuitang Yanjiu Diaocha Yu Zhihu Jianyi [Research Investigation and Repair and Protection Suggestions for the Taipei Public Hall,
The range of cladding materials was diverse and included tiles, border tiles, terracotta, pebbledash stucco and granite. The general layout of the elevations (as shown in Figure 5.50) comprised green glazed tiles (similar in size to stretcher bonded bricks) with dark brown glazed border tiles. The base of the facade was covered with Japanese granite (as shown as ‘c’ in Figure 5.47). Pebbledash stucco was used relatively sparingly, formed only in small parts of the elevations. As shown in Figure 5.49, pebbledash stucco was employed for the base (as per the granite). However, the pebbledash was used only for the external emergency steps, whereas the granite was retained for the principal elevations. The cladding materials echo masonry conventions, and imitate coursed stone and brickwork.

The choice of construction provided relative freedom in façade design and acted like a blank canvas for the architect. He employed a number of compositional devices including vertical ornamental panels (composed of diverse ceramics) between the windows. Such panels decorated the main façade as well as the side elevations (as can be seen in Figure 5.54, pictures ‘1’ and ‘3’) and connected windows at different floors. The

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(Photograph, Author 2008)
dark green border tiles helped to frame the panels and windows, so that the vertical emphasis of the façade became more evident. The top edge of the facade was also clad in a band of orange, brown and green tiles set in a zigzag pattern (as shown in picture ‘2’ in Figure 5.54).

<table>
<thead>
<tr>
<th>5-50 Detail of the general cladding of the elevations of the Taipei Public Hall.</th>
<th>5-51 Overall cladding of the interior of the main entrance of the Taipei Public Hall.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The position of the detail photograph was framed in Figure 5.47. (Photograph, Author 2003)</td>
<td>The collocation of materials from the top to the bottom is plaster, border tiles, mosaics and polished stucco. (Photograph, Author 2003)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5-52 Internal shape of the rhombus-shaped window of the Taipei Public Hall.</th>
<th>5-53 External shape of the rhombus-shaped window of the Taipei Public Hall.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The comparison between Figures 5.52 and 5.53 provides another evidence of discontinuous expression. Not only the shape of the windows but also the surrounding claddings on both sides presented this expression. (Photograph, Author 2003)</td>
<td></td>
</tr>
</tbody>
</table>

The interior finishes within the Public Hall displayed a similar approach to the
previously discussed projects. The interior employed timber veneers and plain plaster for lower and upper walls respectively, and can be seen in the internal elevations of Figures 5.55 and 5.56. However, the veneers for the internal wall around the main entrance were designed slightly differently. Figure 5.51 shows the collocation of finishes in this area. The glazed mosaics form a dado panel with dark coloured tiles used as a border between the lower mosaic panels and the upper plaster walls, and polished stucco as a skirting board.

It should also be noted that some windows with particular shapes externally do not match internally. Figure 5.47 shows several such windows with different shapes. For example, the rhombus-shaped windows (with the external form shown in Figure 5.53) differ in appearance internally (see Figure 5.52).

Figures 5.55 and 5.56 present the relationship between different layers of enclosure. The expression of the enclosure at the main entrance and façade was similar to that of the Taihoku Imperial University library (as shown in Figure 5.29). The cladding of the transitional zone of the entrance lobby (shown in the section part of Figure 5.55) combines external materials and internal finishes.

However, the veneer materials of the transitional zone (as shown on the right-hand side of Figure 5.55) were also different from those of the interior. The material forming the veneer panels changed from granite (for the semi-exterior part) to mosaic (for the semi-interior space) and is shown in Figure 5.55. This palette shifted again to wood for the internal elevations, as shown in Figure 5.56.
5-54 Archival southern elevation and detail photographs of the Taipei Public Hall.

This provides clear images of the head edge of the zigzag pattern, the tile-framed windows with compositions of tiles and terra-cotta, and the arched windows. (Photograph, Author 2003)
This presents the main façade and the section of the entrance buffer area as well as the internal elevation of the main façade. Apart from the cladding of the porch, the internal cladding has very few connections with the external clothing; even the shape of the windows is not quite the same. (Photograph, Author 2003)
5-56 Diagram of the claddings of the partly southern elevation, the section with horizontal circulations and the opposite internal elevation of the Taipei Public Hall. The vertical graphic panels and regular collocation of green tiles and dark brown borders on the external façade cannot be sensed from the interior, which is generally timber veneers and plaster finish. (Photograph, Author 2003)

Compared with Figure 5.55, Figure 5.56 expresses a diminished connection between the external façade and the internal elevation. The vertical emphasis of the façade has disappeared internally and is replaced by a disconnection between floor levels. It is clear
that the exterior cladding allowed considerable freedom in façade design (a benefit of the construction system), whereas the choice of interior finishes followed a more conventional logic.

The five selected projects (described above) reflect Japanese influence and colonial power in Taiwan. The architectonic form and expression (as illustrated in Chart 3) were affected by Japanese fashions and significant events in Japan, rather than local seismological problems and experience. Western influences on Japan spanning almost a century (since 1853) had brought dramatic change to Japanese mainland and colonial societies, as well as seismological and architectural developments. Moreover, the changes promulgated by the Japanese offered an opportunity to change Taiwan, even if only after Japan’s victory over China in 1895. During this period, changes in Taiwan’s architectural evolution were at the initiative of the colonial regime. The Taiwanese earthquakes, which should have been a significant factor, did not really affect architectural development at all.

However, the choice of building materials before and after the Westernisation of Japan and the modernisation of Taiwan changed dramatically. Most buildings could be divided into four elements: structural frames, walls, external cladding and internal finishes. The choice of structure shifted from natural materials, such as timber or adobe, to brick and reinforced concrete.

In traditional Japanese architecture, structural frames were usually made from timber, whereas, in Taiwan, adobe and timber were widely adopted materials for construction.
Under Western influences, timber was replaced as the main structural material by brick in Japan, and later by reinforced concrete in colonised Taiwan. The main structural material also shifted to brick and reinforced concrete as a direct result of Japanese precedents. In certain cases, the structural frame and wall construction may have been the same material (as per conventional masonry construction) but most projects employed different materials and construction methods for structural frames and walls.

The range of materials for walls evolved from timber (or boards) to more industrialised products in both Japan and Taiwan. At the beginning of the Western-influenced period in Japan, walls in Westernised architecture was usually different from the structural frame. For instance, in the timber-framed masonry system the walls’ materiality could vary. They could be hollow, or filled with cavity boards, or loaded with dead shells.

In the twentieth century, walls adopted other techniques including the combination of reinforced brick or reinforced concrete (as a structural frame) and the use of ‘brick’ cladding infilled with concrete. Before the imposition of Japanese rule, adobe collocated with bamboo poles was popular as a wall construction in Taiwan. In colonial Taiwan, however, wall materials for official architecture were generally similar to those in contemporary Japan. When Japan adopted either brick or reinforced concrete (as a structural frame), Taiwan followed suit. When Japan had brick walls with either timber or reinforced concrete (as a structural frame), architects in Taiwan adopted a similar method.

In most projects, the exterior cladding changed to suit the various different kinds of frames and walls. Before being influenced by the West, ‘namako-kabe’ was one of the most widely used finishes in Japan. At the beginning of Japan’s Westernisation, brick
and stone were used as materials for enclosing timber frames, with stucco sometimes employed as an alternative.

In the twentieth century, the surface finish often echoed the frame and walls, although different materials were still employed to create additional layers. For example, cosmetic ‘brick’ or bonded ‘brick’ were adopted by the Japanese in reference to masonry veneer panels or brick-like tiles. In the 1920s, Frank Lloyd Wright employed layered ‘bricks’, which were thicker than tiles, to form walls and rooms but they were still treated as a surface material. He employed concrete to fill the cavity between the two layers of layered ‘bricks’, and reinforced concrete columns as the primary structural elements to support the building.

Thereafter, other projects still had an additional layer of scratched ‘brick’ which was actually (non load-bearing) tiles but similar in appearance to Wright’s seminal project. Prior to 1895, specialised surface finishes largely did not exist in Taiwan. A few Taiwanese projects did attach extra layers of ‘bricks’ or tiles as a surface finish, but the choice of tile was dependent on the structural frame and wall construction. Certainly the range of internal finishes remained relatively similar in the above projects. Plaster was probably the most popular material for interior walls in both Japan and Taiwan. However, in the twentieth century, plaster was often combined with tiles and timber or stone.

We cannot consider wall construction in isolation especially as Western influence has played such a meaningful part in its evolution and helped created a particular approach in the Far East. We need to engage with ornament and structure (as outlined in Chapter 2) in examining the architectural form of the above projects. This should reveal the issues appropriate to a wider discussion.
Chapter 6

Discussion: Architectonic responses to seismological impact and cultural change in Japan and Taiwan

In Chapter 2 we discussed the relationship between structure and ornamentation in architecture. It is useful to begin here by rehearsing some of the main positions in this long-running debate, before examining how they do or do not inform the discussion of the Japanese and Taiwanese architectural case studies that have been outlined in the previous two chapters.

According to Robert Venturi, the connection between inside and outside of a building was implicitly acknowledged as a theoretical question during Marc Antoine Laugier’s time. He argued that the connection between inside and outside in Renaissance architecture was relatively clear, suggesting that the interior ‘vocabulary’ of Renaissance buildings was ‘almost identical in scale and sometimes in material’ with that of the exterior. However, Venturi identifies a shift during the Baroque era when ‘the inside
[became] different from the outside.\textsuperscript{1} Although the difference between the inside and outside also existed before Baroque period, it should be acceptable to suggest the difference became more obvious in some projects since then. In the late Baroque phase, when ornamentation on architecture had become very complex, Laugier responded by attempting to reform architecture’s classical orders and promoted a new architectural rationalism.\textsuperscript{2}

Laugier’s intention was to return to the authentic use of the elements of architecture, and the concept of the ‘rustic hut’ was central to this point. Until the pre-Modern period, the architectural surface still expressed complex decorations. However, several \textit{avant-garde} architects provoked a re-consideration of architectural elements and the connection between, what Karl Bötticher called, art-form and core-form.

The tension between surface decoration and the surface of architecture, and the distinction between interior and exterior volumes in architecture was played out through the twentieth century. Various modernist and postmodernist positions in the debate are examined by later scholars such as Mark Wigley.\textsuperscript{3}

Although the development of the debate seems measured in its historical context, two vital problems can be identified from these discussions. Firstly, the architectural debate


on structural expression - ornament and tectonics - was not well connected to parallel debates in structural engineering and material studies. Practical architectural design and material selection did not engage with arguments concerning tectonics, and *vice versa*.

Wigley put forward his understanding of Modern architecture’s surface finish as ‘white coats’, instead of a conventional skin to represent the cladding. Most scholars, however, were uninterested in a balanced dialogue or connection between theory and architectural practice. Technical studies of actual projects together with an understanding of debates on ornament/structure were scant. Moreover, among these few significant considerations regarding the choice of material, such as exposure to seismic hazards, were not included in these discussions. This has limited any meaningful response to this kind of practical concern. In fact, this omission could lead us to neglect the second concern, namely a review of non-Western countries, which have had more cause to consider real technical worries, such as earthquakes (as discussed in previous chapters).

Unfortunately, the bulk of critical discussion was largely focused on the stable Western world (without seismic threats) which meant that other factors in the East (such as seismic shifts and cultural legacies) were rarely taken into account. It is difficult to understand why another part of Western world, such as the west coast of the USA and the Mediterranean region, did not contribute to the series of discussion of structure-ornament debates. Certainly such influences could well have lead to specifically different arguments.

Certain aspects of Japanese culture had been studied in the Western world, and had contributed to architectural practice and art at certain levels. However, some serious concerns raised by Japanese, such as seismicity and modernism, did not really impact on
Western approaches. For example, it was generally believed that Charles Rennie Mackintosh and his colleagues were interested in Japanese art and absorbed some of its effects to put into practice in their own work at the turn of the century.⁴ However, their understanding and interpretation of Japan was limited, and Mackintosh himself did not openly admit Japanese influences in his oeuvre.

By the 1930s, when the Japanese had gained some confidence in earthquake resistant construction, Bruno Taut also addressed seismic issues (if briefly).⁵ Even so, serious consideration of earthquakes was largely absent from western architectural discourse. Any tectonic consideration of Japanese conventions or the country’s Westernisation was rarely taken into account.

For most Westerners, of course, the Far East played an insignificant role in shaping their world. The existence of the Far East was seen as remote and exotic and registered little more than a few random thoughts (as mentioned above). Nonetheless, the Japanese were obliged to join the rest of the world (when it emerged from its self-imposed isolation after 1853) and then they actively participated (for their own reasons) in the process of their Westernisation after 1868.

However, Japan did not entirely follow the Western approach to tectonic theory. The Japanese practised their version of Westernisation in a manner very different from that of the Westerners. They followed their chosen ‘West’ instead of the orthodox Western world, because the purpose of this strategy was not merely to be identical to the West.

⁵ Bruno Taut, Fundamentals of Japanese Architecture (Tokyo, Japan: Kokusai Bunka Shinkokai, 1936); p. 12.
Indigenous cultural identity and seismic issues sparked some hesitation and diluted any wholesale adoption of Western values.

Based on this deeper understanding, this chapter will returns to a number of significant features of buildings in Japan and Taiwan in the pre-war period. We have already explored their tectonic details (in Chapters 4 and 5) but this chapter will pay particular attention to the issue of tectonic expression. In doing so, it will also draw upon the structure/ornament debate and key theoretical vocabularies, such as tectonic, prevalent in the West. This will include reviewing the ideas of such figures as Semper, Venturi, and Kahn.

The intention is not merely to apply that vocabulary, but to test its capacity to support an analysis of these buildings in Japan and Taiwan. This chapter will explore some of the benefits and ambiguities in this theoretical vocabulary employed in non-Western contexts such as Japan and Taiwan. Moreover, it will clarify two principal aspects, namely; seismological and cultural issues, including Westernised and colonised. It will also examine changes in the importation and production of building materials, construction knowledge and technology, as well as changes in people’s attitudes to built form.

Although tectonic form is essentially physical, not communicative or cultural, architecture (unavoidably) is a cultural phenomenon. To interpret this particular phenomenon, the nature of semiotics (‘a science studying all cultural phenomena’) could

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reveal some hidden implications.\textsuperscript{7} There is almost nothing free of implicated meaning and an extrinsic explanation for intrinsic meaning.\textsuperscript{8} Based on this supposition, a semiotic approach could help reveal the interaction of material and representational aspects of architecture in the context of the various cultural and seismic influences for each project.

\textbf{6.1 Japan’s Western symbols and yatoi’s ignorance of seismic hazard}

The first project to be examined is the British Consulate in Yokohama designed by Bridgens in 1869. Its construction system was timber-framed masonry. Its exterior material seemed to be stone, but the construction materials of the walls and internal cladding remained unknown. To supplement this unavailable tectonic detail, we will examine another British-built project in Japan, the Royal Naval buildings in Yokohama. Both were close chronologically and share common construction techniques. The latter’s Storemans Quarters, finished in 1877, was also timber-framed construction. Its exterior surface was covered in tiles and plaster, while the wall cavity was filled with dead shell, and the interior surfaces employed plaster and lath (as shown in Figure 4.9).

The use of materials in both projects is far away from the orthodox concept of architectonics and the authenticity of materials. The choice of surface claddings showed little understanding regarding their structural systems. The exterior surface of the British Consulate might suggest that its structural system should be a load-bearing masonry

\textsuperscript{7} \textit{ibid.} pp. 11-12.

construction. However, its structural system was actually timber frame, although the surface cladding was so heavy that it was able to carry its own weight. In respect of the Storemans Quarters, from its appearance its exterior surface also suggested masonry, although its structural system was different again.

The architects of both projects showed little concern for any connection between inside and outside. The Consulate building’s structure was not exposed; instead, an additional layer of construction was used as an architectural surface. If we seek specific theoretical debates on structure and ornament to support the disconnection between inside and outside of this building, Venturi’s writings might prove suitable. He argues that the contradiction between inside and outside of eighteenth century architecture is the same for modern architecture.  

An indifferent relationship between the two sides of wall construction of Yokohama’s British Consulate building supports Venturi’s thesis. Although the cladding would have been secured to the structure, the relationship between the external stone façade and the concealed timber structure was alienated. The contradiction between the two was clear and, therefore, they were metaphorically ‘unattached’.  

Similar phenomena can be found in the tectonics of the Storemans Quarters. Here the structural system (also timber frame) was visible but cladding on both sides veiled the construction of the wall. The surface and construction of the Royal Naval buildings did not relate to one another in terms of their choice of material. Venturi’s theory expressed

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10 *ibid.*, p. 74.
alienation between structure and cladding but could not clarify the reasons for the material selection.

Developing an interpretation from the ornament/structure debates alone, however, would exclude some important considerations. For example, the exploration of an architectural style and any fireproofing measures would be overlooked. The expectations of both Westerners and Japanese were often ignored, even though this would affect the tectonic form. As mentioned in Chapter 3, the Japanese viewed Bridgens (the architect of the British Consulate) as representative of Western practice, and his projects and comprising timber-framed masonry construction certainly embodied Western knowledge.

Bridgens’s system reflected Western ideology at least for the Japanese. Although it was developed from ‘namako-kabe’. It should be noted that San Francisco used timber frames with brick walls for several years after the 1868 earthquake (as mentioned in Chapter 1). 11 Although it might be arbitrary to suggest any direct connection between circumstances in San Francisco and those in Japan, it implies that (for American architects) this structural system would not be seen as exceptional. Since the sequence usually resulted from conditions: in this case, the seismic conditions of two locations are similar, so that the similar reflections should not be too surprising.

Nonetheless, for some British commentators the British Consulate should act as a standard model. James Anglin, for example, stated that:

If the English government had it in contemplation to give the Japanese a specimen of the utter want of taste with which foreigners can put up, in the matter of

architecture, they could not have succeeded better than they have done in accepting the plans of Major Crossman of the Royal Engineers, for the British Consulate in Yokohama. We used to think that the Shanghai Club was the ugliest building in the East, but our Consulate surpasses it out and out. We do not think we do the architect justice in presenting a side and back view instead of the front, but our excuse is that the view we give is a little less bare as a picture. We have one satisfaction, however, in contemplating the building; and that is, that everyone, Japanese and foreigner alike, knows that it is a hall of justice, and that appeals to either Judge or Consul within its walls [obtain] an honest decision. Now-a-days we think this is so with all the foreign courts of justice here; but not long ago, it was very much the reverse at some of these tribunals.  

Although the aesthetic approach was not favoured, the role of justice and the communicative aspects were appreciated, even though the criteria of justice in Anglin’s mind remained unknown. The building represented an ideological image of British architecture’s reliability. Tectonically, the superficial cladding played a key role, although Anglin criticised this on aesthetic grounds. Ideologically, the building at least communicated the idea of justice, or more specifically, a Western notion of justice. Although the representation of British taste and the communication of justice were both arbitrarily linked to the Consulate building, the material fabric effectively symbolised both aspects.

At that time, the Japanese desire to study, or imitate, Western-built architecture was more important than any distinction between architecture and building. It might be argued that the Royal Naval building was a building, rather than real architecture. Nonetheless, for the Japanese at that time, the new term ‘architecture’ was close to ‘construction’ and the subtleties between architecture and building were still too vague. For them, Westerners built the project, and that meant that it was a symbol of their Westernisation. So, although the British Navy did not adopt academically accepted principles, for the Japanese, it was representative enough of ‘the West’.  

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Certainly, the fireproofing was a key factor in the architectonic form. Having experienced the 1866 fire in Japan and also fires in their home countries, fire was considered more threatening for Westerners. The Great Fire of London (1666) and frequent fires in San Francisco (around 1850) reminded the British and Americans of the devastating effects of conflagration. Therefore, the masonry cladding of this construction was ideal for fireproofing. The masonry surface protected both structural frame and interior from external fire hazard. Architects often ignored the danger of combining different materials during seismic tremors, which could be problematic.

The 1880 earthquake near Tokyo and Yokoyama led John Milne to begin to think about how to measure and record earthquakes. However, their effects were not taken very seriously and did not change people’s thinking or construction methods. Therefore, the construction of the Original Mr Hunter’s Residence employed a method similar to the earlier projects.

The Original Mr Hunter’s Residence was completed in 1889, and was also categorised as timber-framed masonry construction. As shown in Figures 4.16 and 4.18, its structure was timber frame, but was hidden in the depth of the walls. The space between the interior finish and the exterior finish was lined with timber board and filled with brick, tile and mud. The exterior finish (for the north façade) comprised a scratched stucco finish which alluded to masonry construction. By contrast, the south facade suggested a framed construction, comprising verandahs, which, at the time, were considered to be an important aspect of colonial architectural style. The timber frame (which was largely covered with stucco and plaster) was partly revealed on the southern elevation. For the northern walls, the surface finish was scratched stucco with an interior usually of plaster,
but some timber veneers.

The finish of the wall behind the southern verandahs was plaster and (again) some walls had timber veneers. The finish for the surface facing the verandahs was also plaster. As shown in Figure 4.13, the doors were also integrated into the façade with the verandahs and rendered the southern façade more ambiguous.

Semper and Loos’ notion of *Bekleidung* (dressing/cladding) might help explain the design logic of the claddings. When Semper suggested that ‘hanging carpets remained the true walls, the visible boundaries of space [and the] often solid walls behind them were necessary for reasons that had nothing to do with the creation of space’; and when Loos observed that the ‘architect’s general task is to provide a warm and livable space,’ both architects were promoting the importance of cladding and the enclosure of space. The ambiguous cladding of the wall behind the southern verandahs reflected this approach. Both sides of the wall served the purpose of living spaces, so they are similar to the internal cladding of the northern wall. However, the idea of *Bekleidung* could not fully explain this tectonic device and the arrangement of the wall beyond the verandahs and the material employed for the external cladding of the northern wall.

Nonetheless, Semper and Loos’s idea of *Bekleidung* could still support the reason for the concealed structural frame. According to Semper, ‘[even] where building solid walls

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became necessary, [they] were only the inner, invisible structure hidden behind the true and legitimate representatives of the wall’.\textsuperscript{15} Loos echoed this claim and stated that ‘[to] invent this frame is the architect’s second task’.\textsuperscript{16}

Although neither represented mainstream opinion at that time, their ideas supported the invisibility of the structure and diverged from accepted notions of authenticity in materials. The same theoretical approach extended to visible spatial boundaries and the consideration of surface cladding, including stucco and plaster. Nonetheless, while it was generally accepted that stucco imitated the appearance of stone masonry construction, the reason for this could not be explained by this concept.

Furthermore, Koolhaas’s concept of ‘lobotomy’ is discernible in the tectonic expression of the Original Mr Hunter’s Residence. He employed the term ‘break’ to illustrate the discrepancy between interior and exterior of a building, and endorsed the separation of these two aspects.\textsuperscript{17} Koolhaas’s idea supports the disconnection between external surface, structure and interior cladding of this project, so the ‘break’ and lobotomy can be accepted.

Neither the northern, nor southern, facades had similar spatial arrangements. The northern wall acted as a straightforward boundary between exterior and interior, while the southern wall was more ambiguous. It was neither exclusively internal, nor entirely external. It functioned as a spatial break but its treatment did not indicate a systematic approach. However, the rather disordered and ambiguous character of the southern wall

\begin{flushleft}
\textsuperscript{15} Semper, \textit{The Four Elements of Architecture}; p. 104.
\textsuperscript{16} Loos, \textit{The Principle of Cladding}; p. 66.
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cannot be fully explained by this lobotomy idea.

Although this phenomenon could not be explained by the theoretical debate on structure and ornament, some clues can be discerned, if we include cultural considerations. Even after the 1880 earthquake, the threat of earthquake damage was of little concern in Japan. Instead, Western iconography was the priority. The symbolism of a masonry façade was set out in the discussion of the previous project, and the inclusion of colonial-style elements (such as verandahs) were widely practised.

Certainly the temperature difference between Japan and European countries was not significant, so the design of verandahs did not relate to climate conditions. In other words, it primarily reflected people’s conventional understanding of imported architecture as a symbol of colonial style, although the link between verandahs and colonial architecture was still arbitrary. Although the verandah might have come from the Indian bungalow, the weather conditions of India and of Japan are so different that to use the same style would not reflect on varied condition.

For the Japanese, timber-framed masonry construction was a symbol of the West. According to this project, stucco’s imitation of masonry construction was wholly reasonable for the Japanese. The Western influence was primarily in the concealed structural frame, but the wall construction had become so insignificant that its disjunction became strangely acceptable.

The West demonstrated its superior construction and culture by diverse means and the Japanese (during this period) fully accepted Western pre-eminence. Although some Japanese were cautious about Western technology and culture, the overwhelming
Westernisation was endorsed by an authoritarian government who eschewed any criticism.\(^{18}\)

While most of the Westerners in Japan were ‘yatoi’, they adjusted their construction methods to suit the situation in Japan, and prioritised fire resistance (as a consequence of the fire of 1866). They still insisted on the impression of a reliable construction and masonry satisfied this need. Both Bridgens and Conder promoted masonry and this encouraged the Japanese to accept the timber-framed masonry system due to its symbolic appearance. Before the 1891 Nobi earthquake, the hazard of earthquakes and its attendant impact on construction were not taken seriously by ‘yatoi’.

### 6.2 Western and modern icons for Japan and Taiwan

The 1891 earthquake in Japan was an important watershed for Japanese Westernisation. Thereafter the influence of ‘yatoi’ decreased significantly. The Japanese gradually achieved their goal in absorbing Western values without any implicit confession of cultural inferiority. Their colonisation of Taiwan seemed to prove this, and the brick façade (although a Western import) played a significant role in architectural expression in Japan. The same was true in the colony of Taiwan, where it was successfully transformed into its own style.

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The Tokyo Station, the third project examined in this research, was one of the most significant projects designed after the Nobi earthquake and put an end to the ongoing debate concerning a supposedly ‘Japanese’ style. As we have seen (in chapter 4), Kingo Tatsuno’s best-known project, the Tokyo Station built with a reinforced brick construction system was completed in 1914.

As shown in Figure 4.24, the main construction materials for this project were brick and steel. Although brick was not an ideal material in resisting earthquakes, steel enabled the structure to perform better in an earthquake situation. As shown in Figures 4.27 and 4.28, the majority of its surface cladding was ‘cosmetic brick’.

The collocating material of the surface layer was a granite and pebbledash stucco finish. Granite (as shown in Figure 4.23) was fixed to the lower section of the elevation, and was used to give an impression of a ‘base’. Pebbledash was adopted to clothe some elements which did not have structural functions but mimicked structural elements, such as pilasters and keystones. The interior elevations generally employed plain plaster.

Various debates on structure and ornament were initiated to address the tectonic issues in this project. Relevant precedents include Wagner’s Post Office Savings Bank which epitomises a coherent relationship between architectural surface and architectural construction. However, the external cladding of Wagner’s building (as shown in Figure 2.3) was very structured. Although a stone masonry construction existed behind, the surface cladding was distinct from the structure.

The Tokyo Station’s ‘cosmetic brick’ façade was actually a ‘thin’ brick veneer. The impression given was of an architectural load-bearing surface which represented the
construction itself. In fact, the construction was hidden behind the surface. The confusion of literal functional elements and superficial ornamental (structure-like) elements was deliberate, even though it seemed somewhat redundant.

The architect planned to employ the same kind of material, i.e. brick, but adopting different approaches. The ‘cosmetic brick’ ignored non-mechanical expression, and structural bricks disregarded its aesthetic conventions. Nonetheless the construction method for the ‘cosmetic brick’ (as shown in Figure 4.26) still followed the coursing modules of structural brick. Therefore, the design was more restrained not as convenience and freedom as some Japanese scholars claimed.\(^{19}\)

We know that Wagner’s Post Office Savings Bank included fake bolt heads, attached to the surface of the building, which could be easily removed without leaving any traces on the surface of stone tiles and did not contribute to the actual structure of the building. The white bands of pebbledash at the Tokyo Station extend throughout the façade on the ground floor, but the bands only appear on one corner of the façade on the first floor. We can visually correlate these discontinuous bands with quoins, even though the width of the bands was relatively thin compared with quoins that functioned structurally. This imitation of quoins, therefore, was another example of how surface cladding could imitate architectural elements and allude to the structure.

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This is very similar to the role of the fake bolts on Wagner’s façade. The employment of the ‘cosmetic brick’ and pebbledash was to confuse observers into believing that what they saw was brick and stone. However, the purpose of such confusion cannot be gleaned from Wagner’s writings.

Moreover, Koolhaas’s notion of lobotomy and Semper’s idea of *Bekleidung* might be represented in the tectonic use of the internal finish. Plaster was essentially irrelevant to both structure and exterior cladding. The relationship between the inside and the rest of the building was loose and discontinuous. The external impression of the station gives few clues and suggests that the architect had no intention to present the structure to the interior. The disconnection (‘lobotomy’) was evident in the discrepancy between the claddings of both sides of the wall. Nonetheless, the internal cladding (given the various interior uses) could still be linked to Semper’s idea of prioritising the cladding and disregarding the concealed structure.

It is noteworthy that Karl Bötticher’s art-form and core-form was also reflected in the choice of materials. Bötticher suggested that art-form should derive from core-form, and that the art-form should be the representational language of the core-form.\(^{20}\) If we consider that the surface cladding of the Tokyo Station was the art-form and its structural construction the core-form, then it might make sense of Bötticher’s concept.

The ‘cosmetic brick’ indeed represented the concealed brick structure, although its reinforcement did not represent it. However, the pebbledash stucco did not represent hidden construction, but implied the conventional understanding of a solid foundation.

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and corner quoins. This construction method was not employed for this project, but it existed in typical Westernised architecture. In other words, its use implied the idea of skeuomorphy.

This skeuomorphic implication here generates a semiotic interpretation of materiality. The relationships between the architectonic elements of the Tokyo Station were different from the two earlier projects (discussed above). The semiotic connections in the first two projects focused on the symbolic expression of stereotypical Western architecture. By contrast, the Tokyo Station shifted to a physical relationship between different materials. The façade expression provided an iconic relationship to the concealed construction. The brick construction did not show a real façade, but the ‘cosmetic bricks’ (thinner than ordinary bricks) in effect imitated its construction.

This multiple layering of material was similar to previous projects built by Westerners, but the architectonic form and expression were changed. In addition, if the design employed a semiotic approach, the materiality of the ‘cosmetic brick’ would be ignored, just as the materiality of ink would be ignored in the presentation of a publication. Given that the tile pattern was the primary message that the architect chose to deliver, then the materiality of the ‘cosmetic brick’ or pebbledash stucco would not warrant any attention. The image of masonry layering had overtaken everything and, as a result, the icon of the masonry construction still dominated discussion of the design.

Nonetheless, to omit the influence of seismological and cultural considerations would be regrettable. As I have suggested throughout this thesis, it is important to explore why the

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choice of materials could not be explained by the ornament/structure debates discussed above. In regard to seismological concerns, a number of experts revealed (after 1891) the inappropriateness of brick construction in terms of its earthquake-resistant characteristics. Some architects such as Kingo Tatsuno, however, still insisted on a masonry construction system and his Tatsuno Style.

Tatsuno’s adaptation of brick construction to the earthquake zone was to reinforce the brick construction in an invisible way, using a steel frame to solve any seismic shortfall. This adjustment of the construction system could not be traced back to any educational or overseas experiences. It could be surmised that he took advice from an expert in seismic issues. Certainly, the additional reinforcement enhanced its earthquake resistance considerably, with the result that the Tokyo Station largely survived the 1923 Kanto earthquake.

Complicated cultural concepts affected the tectonic elements as well. A relatively suitable earthquake-resistant material, such as reinforced concrete, was not employed. Given that reinforced concrete was not uncommon at that time, and the Station’s status meant no lack of financial support, it is curious that reinforced concrete was not employed. By contrast, the great number of ‘cosmetic bricks’ used in the project was extremely expensive. Based on Tatsuno’s personal background of Conder’s teaching and his British experiences, the use of brick construction as well as the image of red brick seemed essential for his Tokyo Station. Red brick used to be a Western symbol, but it evolved into the Tatsuno Style and became a modern icon.

One of Tatsuno’s pupils merged his most famous projects into a painting as a memorial after his death. Some 45 projects were depicted in this painting and only seven of these
did not employ his eponymous style with its red and white collocation. The façade expression for which Tatsuno became known was obviously affected by Western considerations, but the Japanese also elevated this to become an icon of Japanese modernisation in Taiwan.

A similar tectonic strategy was introduced three years later into colonial Taiwan. The first project to be discussed is the Tai-Chung Station (as shown in Figures 5.11 and 5.12). It was completed in 1917 and was built in brick without the benefit of a steel frame. Reinforced concrete lintels were placed above the openings as a kind of reinforcement. The exterior walls were covered with brick-like tiles, which were secured in a brick header bond pattern, with the collocation of a pebbledash stucco finish. The internal finish was primarily plain plaster, while some lower sections are in polished pebbledash stucco. Superficially, the external and internal claddings of the Tai-Chung Station were similar to those of the Tokyo Station, and expressed a similar attitude by imitating materials and construction. The attachment of the red tiles to the exterior was intended to imitate the appearance of brick construction. The pebbledash stucco on both external and internal walls copied the effect of stone masonry construction, while the separating bands on the pebbledash imitated the coursing of stone construction.

As a result, some theories explaining the materiality of the Tokyo Station are also suitable for the Tai-Chung Station. Bötticher's art-form and core-form as well as

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skeuomorphic expression, were both practised (in part) at the Tai-Chung Station. The external cladding (the brick-like tiles) can be considered as representative of the core-form (the brick construction). Although the literal connection between the surface cladding and the structure was relatively simple, the metaphorical link was apparent. Moreover, the pebbledash stucco also skeuomorphically implied in the anticipated reliability of masonry construction. Nonetheless, the superficial similarity of the two projects did not imply that their cultural considerations were the same, as can be read in the variation in structural forms, for instance.

As mentioned above regarding the Tokyo Station, some Japanese authorities believed that the surface layer was a convenient method for designating structure as well as surface treatment. As a result, architects could defer any strategy informing the architectural façade to the structural construction. The well-designed surface layer therefore would provide suitable expression and conceal the visually poor performance of the structure beneath. This strategy was practised in the cladding of the Tai-Chung Station. The connection between surface and structure is only discernable in the mortar joints without any shaping elements, such as tenons or tooothing-stones. This disengagement between the internal and external cladding could be referred to as ‘lobotomy’ as well. However, the reasons for this choice of materials remain unclear.

If the cultural and seismological concerns are included in this discussion, the complex semiotic implications become clear. In terms of cultural, the entire construction still acted as an index of colonial modernisation. The Tatsuno Style could be a index of Japanese colonialism in Taiwan, although they claimed it to be icon of modernisation. It should be noted that when Westernisation transferred to colonial Taiwan, the Japanese
began to refer to it as modernisation. Politically, the fact that the members of the Japanese royal family visited the Station many times signified the Station’s status.

At the inauguration of the railway system its indexical role was clear, and the choice of materials and their appearance had to satisfy this criterion. The materiality also indexed the close connection between Japan and Taiwan, since both the Tai-Chung Station façade tiles and the ‘cosmetic bricks’ of the Tokyo Station were produced by the same company. Although it might be argued that such trade links were not tied to the colonial relationship, this notion could only be confirmed if said status ceased to exist. The Japanese employed these materials precisely to demonstrate a colonial connection. Based on prevailing political circumstances, such bias by the ruling power was unavoidable.

 Compared to Tokyo Station, the design of the Tai-Chung Station displayed very limited consideration of seismological concerns. The reinforced concrete lintels over the openings of the Tai-Chung Station could be seen as the most significant reinforcing elements. However, this did not provide sufficient resistance to seismic shocks, and its structural inadequacies were gradually revealed after successive earthquakes had shaken the building. The difference in structural reinforcement between the two stations was substantial.

The second project in Taiwan to revisit is the Governor General Building designed by Matsunosuke Moriyama. As we have seen, this project was completed in 1919, only two years after the Tai-Chung Station, although its construction began before the station. The main structure was a reinforced concrete frame, with walls of brick construction. Its exterior facade was composed using ‘attached bricks’ (red brick-like tiles) and pebbledash stucco bands, while part of its exterior was clad in granite. Its interior finish
was primarily plain plaster, combined with timber veneers and slate (for principal spaces). Brick-like tiles were employed to imitate brick construction, since they were attached on the wall in the pattern of brickwork header bond. In addition, the pebbledash stucco finish imitated stone construction. These material variations are presented in Figure 5.21.

Any theoretical concepts in the structure/ornament debate concerning the materiality of the Tai-Chung Station could also apply to the Governor General Building. For instance, if the structure is considered as the inside and the claddings as the outside, Venturi’s contradiction between the inside and the outside is self-evident. Moreover, the skeuomorphic masonry implication of the pebbledash is identical.

However, the differences in the structural system of the Tai-Chung Station and the Governor General Building signified distinct architectonic approaches. For example, the structural technology and the building scale required a reinforced concrete frame, although reinforced concrete was not used for spatial enclosure. This necessitated a different infill material combined with external cladding. The surface cladding offered convenience and freedom in the façade’s design, and also concealed the different construction materials.

As mentioned before, the bare surface of concrete and the co-existence of brick and concrete were considered too eccentric at that time for people to accept. People were

23 The addresses about the increase of the employment of the reinforced concrete system evoking the increase of the employment of the surface tiles can be seen in Danto Kabushikigaisha (Danto Corporation 淡陶株式会社), Katou加藤, and Tanaka田中, Nihon No Tairu Bunka [Japanese Tile Culture, 日本のタイル文化]; p. 90, in Eyiyiti永一 Hino日野, “Nihon No Tairu No Tanjou: Sen, Shikigawara, Toyhan Tara Tairu He [the Beginning of Japanese Tiles, “日本のタイル”の誕生: 埼,敷瓦,陶板からタイルへ].” in
familiar with the appearance of masonry but not the hybrid nature of this construction which can be described as a skeuomorphic presentation. However, the brick-like cladding still signified part of the wall construction, and an iconic connection still existed. So the main structural material (the brick-like exterior cladding) was skeuomorphic, whereas the wall infill and the internal enclosure were iconic.

Various semiotic scholars have commented on the role of cultural expression. They include Geoffrey Broadbent who employed the skeuomorphic phenomenon to explain the mental structure of architectural meanings and transformed ornament.\(^\text{24}\) Also, Umberto Eco asserted that it is relatively easy to use well-known functional items and architectural denotation to introduce new functions or forms and thus avoid people’s rejection of new ones.\(^\text{25}\) Both approaches provide useful explanations for the exterior cladding of this project.

Moreover, the ambiguous character of the verandahs and the cladding of the interior also presented their own particular considerations. The second difference was in the verandahs on the eastern façade, which evoked a more nuanced relationship between exterior and interior. The finish of the verandahs was in plaster, as per the interior.

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\(^\text{25}\) Eco, 'Function and Sign: The Semiotics of Architecture'.
Plaster was usually an internal finish and yet could be seen in the exterior view. The ambivalence of this exterior/interior aspect was ignored.

The multiple floors of the interior also embodied the ‘lobotomised’ concept of alienation. It appeared that the internal claddings of individual floors were similar, but they actually differed from one another because of their different functions. The identical external cladding, i.e. the brick-like and stone-like cladding for the façade, was also ‘lobotomised’.

None of the above theories can fully explain the materiality and its implications, but perhaps cultural and seismological concerns could be responsible for this shortfall. Certainly, modern and colonial cultural considerations still dominated the choice of surface expression. According to the historian Kenji Horigome,\textsuperscript{26} the popularity of this kind of ‘attached brick’ in Japan was mainly from 1912 - 1926. The proliferation of this technique was almost simultaneous with the development of reinforced concrete. Moreover, Horigome suggested that this surface finish was seen as very fashionable and modern at that time. This project provides evidence that Japanese ideas really flourished in Taiwan. The incompleteness of the concrete surface and the ‘fashionable and modern’ approach of ‘attached tiles’ evoke a sense of cladding akin to the dressing idea and art-form, although the connection with core-form was not considered.

An obvious index of the colonial regime (like the Tai-Chung Station), the Governor

\textsuperscript{26} Kenji 恵二 Horigome 希恩, "Waiqiang Cizhuan Zhi Gouzao Tese [the Constructive Characteristic of the Tiles on Exterior Walls]" in Guoding Guji Zongtongfu Xiuwu Diaocha Yu Yanjiu [an Investigation and Research for Repairing and Protecting the Nationally Historical Property, Office of the President, 國定古蹟總統府修護調查與研究] (Taipei [台北]: Ministry of the Interior [內政部], 2003); pp. 4-31, 4-32.
General Building was probably the colonial government’s most important building. Cultural significance could be found in the type of structure and the addressing of seismological considerations (so neglected at the Tai-Chung Station). The reinforced concrete frame signalled a substantive seismological concern, as brick construction was not suitable for buildings in seismic high-risk areas.

In this project, however, the construction system was relatively reliable in terms of seismic resistance. Even though the attachment of surface cladding might cause problems when earthquakes occurred, it would not be too troublesome for two reasons. Firstly, any collapse would be limited to surfaces only instead of structural problems, and secondly, the relatively small size of the cladding unit (unlike huge heavy stucco sculptures) would mitigate damage caused by falling cladding. The surface cladding did not reflect the concealed structure in this project, but instead represented cultural and colonial concerns.

These three projects embodied the Western symbols that the Japanese recognised in regard to cladding. Indeed, for the Japanese they were literally Western icons. The exterior iconically represented what Conder (or Tatsuno) and the Ginza housing scheme evoked: a brick façade collocating with a stone (or white) trim. In effect it skeuomorphically signified the preference or reliability of masonry construction. The interior reflected the Original Mr Hunter’s Residence’s legacy: the collocation of plaster and timber dressing. In Japan, these symbols were arbitrarily linked with Westernisation. However, in Taiwan they linked to the modernisation introduced by the Japanese. Their iconic similarity demonstrated the intentions of the Japanese, but can be seen as an index to the ubiquity of Westernisation in Japan and its colonial grip over Taiwan. Chronologically, these three projects were completed before the 1923 Kanto earthquake.
6.3 Indexical combination and balance of Western symbols, modern icons and seismic concerns

Colonial influence had a crucial effect on Taiwanese architecture during that period; so it is important to outline the circumstances in Taiwan in light of the significant 1923 ‘quake in Japan. Its impact resulted in important shifts in the tectonic strategies of Japanese architecture, and latterly in Taiwan as well. The detail of the 1923 ‘quake has been clarified in previous chapters, so, to avoid repetition, I shall proceed with an examination of the Imperial Hotel designed by Frank Lloyd Wright. Certainly, its earthquake-resistant characteristics generated considerable influence, but I shall focus on the building itself for now.

The importance of the Imperial Hotel has already been discussed. As shown in Figure 4.32, its main structural system was a reinforced concrete frame. However, the wall construction differed from the other projects discussed here. The scratched bricks, which were attached in stretcher bond arrangement as shown in Figure 4.39, not only acted as a surface finish but also played the role of shuttering for the concrete. As well as the scratched bricks, the palate of materials included Oya stone and terracotta. Interior finishes in most areas were similar to the exterior (as can be seen in Figure 4.36), but some private spaces, such as guest rooms, had hollow blocks as their internal cladding, which was different from the outside.

Some theoretical arguments on ornament and structure were reflected in different parts of the material employment of the Hotel. For instance, first of all, the scratched bricks bore their own loads as so-called brick veneers and the internal concrete construction was also
load-bearing. This was very similar to some of Kahn’s projects, as shown in the second section of Chapter 2. Although brick was not the only material employed at Kahn’s Exeter Library, it had a twelve-inch concrete wall with a cavity and brick ‘veneer’ claddings on both sides (as shown in Figure 2.11). It therefore followed the basic logic of tectonics in terms of load-bearing structures.

Looking again at Wright’s hotel, it seems that the load-bearing brick ‘veneers’ echo Kahn’s approach in his library project. However, this expression could not conceal the fact that the ‘veneers’ were not really the primary structure but the enclosure of structural reinforced concrete, and this suggests that the tectonic approach in this project did not achieve an ‘honest’ expression of structure, as promulgated by Modernist dogma.

Secondly, if we consider that the ‘veneers’ were not the primary structure, then some understanding of the multiple construction layers is required. If we focus on the sections shown in Figure 4.37 and Figure 4.38, the different construction types show where the reinforced concrete structure as either revealed or concealed. It seems that the theory of Bekleidung could be useful again for this cladding expression. Although Wright deliberately employed a concrete structural system within the surface veneers to stress his earthquake-proofing strategy (as shown in Figures 4.34 and 4.35), his strategy for elsewhere in the hotel adopts ‘scratched bricks’ and Oya stone. The surface materials not only received more of Wright’s attention in general than other parts of the construction, but also attracted the attention of spectators, acolytes and other professionals. Wright’s interest in the role of the claddings (particularly primary cladding) is strongly reflected in the Bekleidung theory. The invisible reinforced concrete structure also became less important in the overall discussion.
Nevertheless, employing only theoretical arguments cannot fully explain the consequences and implications of the selected materials. In respect of the cultural approach, it is important to note that this commission came about (in part) because of Wright’s interest in Japan, which led the client to believe that he would respect Japanese culture. However, not only did his colleague disagree with his design, which did not contain explicit Japanese elements, but Wright actually employed countless Western elements (alien to traditional Japanese architecture) in this design. Indeed the material, brick, had been a Western symbol for the Japanese since their Westernisation, and was not recognised as a local material. Moreover, Japanese traditional architectural spaces were divided by thin material, usually supported by timber frames. However, the walls of the Imperial Hotel were much thicker than traditional Japanese architecture. Certainly the combination of a double skin of brick with reinforced concrete structure was much thicker than a timber frame structure. The structural system adopted at the hotel was also very Western and employed a masonry load-bearing system together with a concrete frame.

Moreover, the section drawings reveal a discontinuity across the enclosing structure of the building, which objected the continuity that Wright and various scholars (such as Nute) claimed as one of the typically Japanese aspects of this design. The wall construction was not a single material of shown brick. Therefore, the continuity is only superficial.

Additionally, Antonin Raymond, who worked for Wright (but left during the construction of the hotel), attested that Wright’s design ‘had nothing in common with Japan, its climate, its traditions, its people and its culture’ but only its ‘organic decorative
forms’. In light of this, the subsequent influence of the Imperial Hotel should be categorised as a Western bias, although Wright and many Japanese people have assumed that this was a Japanese consideration.

In terms of seismic matters, the importance of the Imperial Hotel was celebrated internationally because of its earthquake-resistance. As coursed brick was not considered an ideal material for earthquake-proofing, the provision of the hidden reinforced concrete was necessary. The survival of Wright’s hotel from the Kanto ‘quake proved the seismic-resisting capability of reinforced concrete again after the 1906 San Francisco ‘quake. Wright himself proclaimed the effectiveness of the construction system he had employed on the hotel to the Western world, and to the Japanese. Certainly, its earthquake resistance credentials of its structure and its surface cladding resulted in that the invisible concrete structure system and the visible cladding quickly began to be imitated.

However, Wright’s consideration of the materiality of seismic conditions was not thoughtful enough. For example, the fact that the Oya stone was treated as an ornament and was hung at elevated positions could confirm this in some parts of the façade. Although the hotel did not suffer immediate damage after the 1923 earthquake, it eventually (after some 40 years) deteriorated and witnessed cracks and leaks.

Despite this, the hotel had a significant influence on the Japanese architectural profession. This can be seen in later projects in Japan and Taiwan, not only in their structural system but also in the surface texture and colours of surface cladding materials. As evidence of

this, another Japanese project built after 1923 should be examined in terms of its tectonic strategy.

The Katatkuran, as we saw in Chapter 4, was designed by Matsunosuke Moriyama and was completed in 1928. This project most immediately illustrated Wright’s subsequent influence in Japan. The main structure of its two sections varies: the structural frame of the northern block was reinforced concrete, while southern block was timber (as can be seen in Figure 4.49). The majority of the exterior is clad in scratched tiles with a collocation of ivory stucco, brown terracotta and stone slabs. Its internal walls were generally plastered with the occasional addition of tiles and mosaics.

Several positions in the structure/ornament debate could help interpret the materiality of this project. According to the arguments set out in Chapter 2, the relationship between construction and surface claddings of these two blocks was rather loose, because two different structural systems employ similar façade treatment. In other words, the cladding did not imply or metaphorically connect to the structural systems. Any relationship between exterior, structure and interior seemed to be entirely over-looked. In particular, if the internal spaces and their finishes are also taken into account, Koolhaas’ ‘lobotomy’ theory could provide a suitable references for this aspect. The discontinuity between inside and outside, structure and claddings (on both sides) was self-evident. They served individual purposes in a lobotomised way without linking implications and concerns, although they were fixed (literally) to each other.

Furthermore, we can also consider that Moriyama treated the surface cladding as a layer of Bekleidung. No matter what the construction was, the surface claddings for the exterior adopted the same approach, and the finishes in the interior followed their spatial
arrangements. The functions of the interior spaces can be divided into several types, and the interior finishes echoed their spatial requirements (see Figure 4.48). Since the framed structural systems provided considerable design freedom (unlike masonry construction), surface cladding could be understood in terms of a graphical composition.

Additionally, even though the structural support of the Katakurakan was not of brick, the external surface of the building still had a conventional masonry appearance, primarily in cours ed brick patterns. This indicated that the internal claddings followed the interior spatial arrangement, and the exterior claddings followed the spectators’ expectations. The structural frame was invisible and unimportant, and this concept directly embodied Semper’s notion of Bekleidung.

However, the external cladding presented the expression of a skeuomorph. The external cladding which the Japanese considered Western (such as the Imperial Hotel) remained largely superficial. Monolithic masonry construction was not used in this project, but the brick patterns and solid image of the foundation had been maintained. In fact, the skeuomorphic expression could connect cultural and seismic concerns to an interpretation of the surfaces. Architects and ordinary people were impressed that the construction of the Imperial Hotel was reliable and its surface cladding also promoted a confident ideology. In terms of structural approaches, Japanese concerns and Western influences were entwined together.

On the one hand, Japanese tradition provided evidence that the timber frame was very reliable in resisting seismic impact. Even during the surge in Westernisation, timber-framed masonry construction still retained a timber frame. On the other hand, after the Kanto earthquake, the Imperial Hotel proved the earthquake-proofing properties
of a reinforced concrete frame. Moriyama employed two structural frames for the two separate sections of this project, but adopted similar cladding, which was usually associated with Wright’s Imperial Hotel by the Japanese architectural profession. The dual structural system could be seen an index of the cultural and seismic influences, but its technical approach made the skeuomorphic concerns even more vivid.

In terms of design style and façade expression, Moriyama changed his approach dramatically compared to his other Taiwanese projects. The Tatsuno Style, which he practised thoroughly, in Taiwan was abandoned. Instead, he employed a collocation which was similar to Wright’s project, disregarding the earthquake proofing of the Tokyo Station.

As shown in Figure 4.53, it is difficult to avoid associating the use of scratched tiles with the Imperial Hotel façade. Instead of their actual structural materials (timber or concrete), the façade claddings of both sections implied skeuomorphic ideas which could be indexed to the brick construction and the cladding of the Imperial Hotel.

It should, however, be noted that Moriyama did not slavishly copy Wright’s design in this project. Wright claimed that the (rather superficial) continuity between inside and outside was a Japanese influence and that this characteristic could not be found in Moriyama’s project.²⁸ Besides the structural systems observed above, the functions of the interior spaces were different, and the interior finishes were designed accordingly. In other words, Wright’s influence was limited to the interior of the Katakurakan, although

²⁸ Wright’s claim could be found in Kevin Nute, Frank Lloyd Wright and Japan: The Role of Traditional Japanese Art and Architecture in the Work of Frank Lloyd Wright (London: Chapman & Hall, 1993).
the exterior was strongly affected. The so-called continuity did not carry over.

Nonetheless, the apparent similarity of this project to Wright’s Imperial Hotel was not co-incidental. Another project by Moriyama, the Tokyo Dental College, completed only a year after the Katakurakan, had a similar appearance. Wright’s influence therefore was apparent, although the Japanese made their own adjustments. Moreover, for other Japanese architects, Wright’s influence also affected subsequent new design projects in both Japan and Taiwan. Having examined these Japanese projects, it seems appropriate now to assess some of the Taiwanese case studies.

Despite the fact that another earthquake occurred in Taiwan in 1922, the influence of the Kanto Earthquake in Japan and Wright’s influence migrated to Taiwan. The Library of the Taihoku University, built soon after the completion of the ‘Katakurakan’, took a similar approach to its façade design. The library also comprised two separate buildings. The southern section (shown in Figures 5.28 and 5.29) was built in 1929 using brick construction, and the northern section (presented in Figure 5.30) was finished by 1931 using a reinforced concrete system, but both sections employed brick for the wall construction.

Also both sections share the same cladding materials (see Figures 5.25 and 5.27), primarily a yellow/brown machine-carved tile, with a pebbledash stucco finish for the base and topmost edge. The tiles were attached in header bond pattern and the pebbledash finish of the base was delineated as per stone coursing. The majority of the interior was finished in plain plaster, and then combined with timber veneers or tile veneers in specific spaces.
Some theoretical debates on ornament and structure are applicable for this project. Firstly, Semper’s idea of *Bekleidung* was relevant to exterior claddings. Before the 1923 earthquake, the general approach to façades in Japan (and in Taiwan) was usually a red tone (a typical brick colour). After the seismic resistance of the Imperial Hotel had been confirmed, however, the general façade tone had become similar to the façade of the Wright’s hotel. Not only in colour but also the surface texture of the ‘scratched bricks’ was imitated for the façade of the *Katakurakan* and for that of the Library of the *Taihoku* University.

The two different structural systems of the library were clad in the same type of surface material. So although the structural variation was ignored, the identical claddings unified the expression of both sections of claddings. This tectonic expression echoes Semper’s attention to claddings, but his idea of the primary role of cladding relies on cultural influences.

Secondly, although the colour and plain surface of red brick was abandoned for the external cladding, the pattern of brick construction still remained for the tile attachment. Indeed, the size of the tiles is similar to a brick header and was attached in a pattern similar to the header bond of brickwork. Although the earlier section employs a brick structure, the exterior cladding did not represent a structural icon because the colour and texture of the tiles related back to Wright’s ‘scratched brick’ instead of ordinary red bricks. Additionally, the imitation of masonry construction for the base was faux. As a result the façade cladding skeuomorphically expressed a link with the Kanto earthquake (as did the later section).

Thirdly, these tectonic expressions present a rather loose discourse on the relationship
between the different layers of wall construction and cladding. Venturi’s contradiction between inside and outside was partly echoed in this project. If the structure is the inside and both sides of the claddings are the outsides, the connection between them is limited. If the internal cladding is the inside and the external cladding is the outside, they do not convey any similarities either. Even the heights of the base course and the internal dado in the ground floor were different (see Figures 5.29 and 5.30). The proportion and the division of claddings on both sides did not have many collocations, which confirms Venturi’s argument concerning the contradiction.

Nonetheless, such links with theoretical debates appear vague, and it is relatively difficult to identify a specific project that directly illustrates or supports the terms of the ornament/structure debate in the West. Moreover, some important aspects of Taiwanese architecture cannot be properly understood if cultural and seismological concerns are excluded. With respect to cultural and colonial considerations, Japanese influences were still significant in this project. The influences of Wright’s Imperial Hotel on Moriyama’s Katakurakan are evident in the cladding of the library’s external surface. The colour of the tiles of the Taihoku University Library resembled the palate in these two Japanese projects. It appears that, in the 1910s, Ide’s design style followed popular notions of Japanese style in architectural expression, and by the late 1920s, his ideology was still affected by contemporary Japanese influences.

Moreover, the ‘classical’ ornamental elements on this project’s façades echoed the ‘modern’ ideas of Japanese Westernisation. As in the previous two projects in Taiwan, the Japanese designed ornamental elements for the façade to signify the desired ‘modern’ idiom, regardless of the fact that in the West they might be seen as ‘classical’ and
decidedly un-modern. The Japanese arbitrarily regarded these elements as a Western symbol and introduced them to their Taiwanese colony. They did not refer to them as Western, however, as the Japanese Style was to be the standard for the Taiwanese, with the result that the terms ‘classical’ or ‘Western’ in the West or in Japan ironically came to mean ‘modern’ in Taiwan.

In seismological terms, the co-existence of two kinds of structural systems was complicated. Research suggested that brick construction was not recommended for seismic resistance, so the use of brick for the southern section of the Library of the Taihoku University was curious. Comparing it with other buildings on the campus, a three-storey building (completed before the southern block) was built in concrete, but other single storey buildings were built in brick. It might be reasonable to assume, therefore, that Ide believed in the reliability of brick construction for one and/or two storey structures.

The northern block (a three-storey building), however, was built with a reinforced concrete frame. The change in Ide’s approach must be the result of specific considerations. It might be argued that the height of the northern building, although it had three storeys, was similar to that of the southern building. However, Tadashi Taniguchi’s report about the seismic resistance of buildings in Taiwan could be determining factor. In the report published in September 1930, he warned of the danger.

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29 Kaoru Ide, ‘Kantou Chihou No Daishinsai to Shourai No Kenchiku [Great Earthquake in Kanto Region and Architecture in the Future, 関東地方の大震災と将来の建築]’, *Taiwan Jihou (The Taiwan Times, 台灣時報)* 1924; p. 37.

of brick construction in Taipei. Ide might have read it before working on the structural design of the northern block. However, both wall constructions were built in brick. In other words, no matter which structural system was adopted, the wall construction material was the same: red brick.

In terms of the treatment of the façades, Moriyama and Ide aspired to other goals in unifying the cladding for two sections of buildings rather than worrying about the inconsistency of tectonic strategies. The surface ornament and cladding patterns were continuous from the southern building to the northern one. Lombardic friezes and arches were decorated, although neither of them represented red brick construction, concrete frame or brick wall. The seismological concern (based on Japanese experience) was partly considered but was veiled by cultural issues.

The next project in Taiwan to be revisited is the Chia-Yi Station (completed in 1933). This was built entirely in concrete including its frame, its foundations and its wall construction (as shown in Figure 5.36). The majority of its exterior surface cladding was tiles (similar in size to the stretcher face of brickwork) which were attached as per brickwork stretcher bond. The base course and topmost edge of the façades were finished in pebbledash stucco. The base course was striated as per staggered coursed stonework. The topmost edge imitated classical decorative elements. The interior veneers were off diverse materials, such as tiles, marble and timber panels, with the upper section of the interior walls finished in plain plaster.

Examination of the Chia-Yi Station with regard to theoretical debates on ornament and structure again reveals the alienated nature of its surface expression. That is, the pattern of the masonry construction on the surface of the reinforced concrete construction had an
alienated or loose relationship to the construction behind. Certainly, the design logic of the brickwork pattern for the exterior and the diverse panels of the interior echoed Semper’s idea of *Bekleidung*. The brick construction retained its significance on the surface, while for spectators the construction was hardly relevant, even though it structurally supported both external and internal claddings.

Based on this point, a second theoretical connection can be gleaned. Skeuomorphy again was reflected in the external cladding. The image of masonry construction remained despite the fact that in practical terms it had been replaced. It appears that a raw concrete surface, without the application of different finishes, was still not readily acceptable to the public. However, the perceived reliability of ‘modern’ Western architecture had resolved this problem. It was not a simple tectonic issue but was strongly associated with cultural and ideological concerns. Nonetheless, although reinforced concrete construction offered greater freedom in façade design, the surface cladding was still limited to the appearance of masonry construction. The potential freedom was not fully embraced and may have been the result of cultural and seismological concerns.

The use of reinforced concrete construction, to replace the previous timber-framed masonry construction, echoed the seismological concerns, but the surface claddings reflected colonial and Japanese ‘modern’ considerations. In fact, the consideration of seismological and cultural approaches had become increasingly entangled and difficult to separate. Indeed, the significance of this influence should be stressed. The replaced construction system was introduced into Japan and later promoted in Taiwan under Japanese rule, after the 1906 earthquake in Chia-Yi, despite the fact that the original Chia-Yi Station employing this structural system was partly damaged during that ‘quake.
Its restoration using reinforced concrete construction signified abandoning not only the construction system but also Western influence from the nineteenth century.

Moreover, the popularity of materials in Japan still guided the choice of cladding in Taiwan. Although the abandonment of ornament was suggested in the report following the 1930 Taiwanese earthquake, surface cladding and ornament still remained on the façades of the Chia-Yi Station. The size and colour of the cladding tiles as well as the pebbledash stucco finish all support the fact that the image of the seismically resistant Imperial Hotel has been continuously employed. Certainly the tiles could be derived from the ‘scratched bricks’ and the pebbledash stucco could stem from the Oya stone. Other Western symbolic ornamentation, i.e. the images of egg-and-dart friezes, simplified brackets and arch openings (as well as the gable), on the façades of the Chia-Yi Station still indexed the ‘modern’ influence introduced by the colonial power, as employed at the Library of the Taihoku University.

Concrete construction basically provided an almost blank canvas for architects to design their ‘ideal’ cladding, but cultural considerations prevented complete freedom in the choice of cladding materials. It appears that the advice of seismologists was only partly taken into account: the recommendation to employ concrete construction was adopted in this project but it was still not possible to abstain from ornamentation. The reliability and the ‘modern’ associations of masonry construction could not be abandoned.

The final project that we are going to revisit in this comparative analysis of the tectonics of key Japanese and Taiwanese pre-war buildings is the Taipei Public Hall. Its structural system was reinforced concrete with a steel frame to span across the performance spaces (as shown in Figure 5.48). The construction of the walls was concrete as well.
The general appearance of the exterior cladding was light green tiles (similar in size to the stretcher face of brick), collocating with dark brown border tiles. The green tiles repeated the typical pattern of stretcher bond, but the overall pattern was regularly interrupted by the dark brown border tiles every five courses. The vertical panels were ornamented the façade cladding between the windows. These panels comprised five to eight kinds of ceramics and stressed the vertical emphasis of the façades. The topmost edge of the façade was also tiled (more akin to the header face of a brick) and formed a zigzag pattern. In respect of the interior, apart from the main entrance lobby, where mosaics replaced the veneers, the general internal finish was timber veneer collocating with a plaster finish.

Such debates on ornament and structure could help interpret this project’s expression, although it can be approached in different ways. On the one hand, the claddings of both interior and exterior provide few clues in understanding the structure. The exterior dressing stressed the diverse possibilities of composition, while the interior cladding was focused on the comfort of the users. Nonetheless Semper’s idea of Bekleidung still suits this approach to its expression. The general external claddings still skeuomorphically presented a masonry pattern, as dictated by its cultural impact.

On the other hand, however, freedom inherent in concrete as a material. So whilst the graphic possibilities might be irrelevant to both structure and interior, it was a perfect example of freedom in façade design. In this respect, the claddings of exterior and interior illustrated the special properties of concrete construction. Koolhaas’ lobotomy and Kahn’s ideas could be found (simultaneously) in the claddings of this project. The freedom that concrete provided led to negligible association between either side of the
cladding, and thus the discontinuity was confirmed.

Kahn uses the example of a brick arch as the means to construct an opening, whereby the properties of the material have to be explored.\textsuperscript{31} Looking again at the Taipei Public Hall, the ideal expression of a concrete wall could well be free graphic form, given that the properties of concrete offer the freedom of surface claddings for both sides. Concrete does not impose any restrictions on the façade design and allows free form shapes. In Koolhaas’ example, different sides and floors served their own purposes and were not restricted by the construction or other technical factors. Unlike the façade of the Chia-Yi Station, the exterior cladding of the Taipei Public Hall expressed greater freedom in the façade design and overall composition. The loose relationship of ‘lobotomy’ had been practised, but this cannot fully explain the concealed structure and the reasons for the cladding’s composition.

Cultural factors had been semiotically expressed in the surface of this project, along with seismological considerations evident in the selection of the primary structural system. ‘Modern’ influences could still be found in the design forms and other general surface finishes. The gable of the main façade could be one prime example. Like the Chia-Yi Station, conventional tiling was still employed on reinforced concrete surface. With the collocation of the horizontal bands of granite as a base course for the façade, the masonry image could still be recognised. Although the colourful panels between the windows indicated some freedom in the façade, the lofty significance of the building meant that this was understated.

The use of reinforced concrete as the construction system appeared to be a response to seismic concern, although some traditional masonry tropes were still deployed. The pattern of masonry coursing and mortar joints were still imitated in the tiling. Nevertheless, the reinforced concrete and steel frame ensured vast spans were achievable in safety. The choice of construction system was reflected in the Japanese response to seismic hazard. Ornamentation on the façades, although generally not recommended in such circumstances, was still employed, and in places embodied the freedom of the concrete.

Since the 1923 earthquake and the inauguration of the Imperial Hotel, the above five projects adopt a similar architectural vocabulary. The overwhelmingly red façade and the Tatsuno Style were abandoned after 1923. Instead, the colour of the Imperial Hotel façade was repeatedly employed and further developed (to an almost ubiquitous degree). Given the seismic reliability of a reinforced concrete structure, more and more projects were built using this structural system. Occasionally, some hybrid brick construction and/or timber frame might be adopted. The Western symbolism that had been internalised by the Japanese, was elevated to the status of symbols of modernisation in Taiwan. Here seismic concerns had become hidden, resulting from the choices of structural system (in both Japan and Taiwan). The indexical connection can only be realised within the cultural and seismic milieu of the period.

Nonetheless, the comparative discussions above and the theoretical debates reviewed in Chapter 2 make it difficult to fully interpret the architeconics of the above ten projects. Some theoretical approaches, such as Semper’s idea of *Bekleidung* or Venturi’s contradiction, were frequently considered, but the projects sometimes contained
completely opposing expressions. For instance, Louis Kahn’s approach to tectonic expression might suit to explain part of a project, alongside another part echoing Koolhaas’ ‘lobotomy’ idea.

Even though some circumstances could be examined by skeuomorphic concepts, cultural concerns had already been paramount. Many phenomena in the expression of these projects cannot be understood only through developed theoretical ornament/structure debates. The principal problem is the inadequacy of employing ‘Western’ theories in discussing architecture from across the globe, including the Far East. Westernised Japan and its colony Taiwan (examples of the non-Western world) did not become involved in this current debate even though Western colonial power had reached their territory.

However, some of the ambiguous tectonics in the above projects appears reasonable when cultural and seismological issues are taken into account. To be more specific, Western influences, seismic considerations and Japanese concerns seem to lead to these entwined expressions. Western influences dominated and monopolised pole position at the beginning of architectural development in Westernised Japan. Although the effects decreased gradually, it did not entirely disappear.

Seismic concerns were not taken into account during the prioritisation of Western influences, but they became more and more significant after the 1891 ‘quake. It even became part of Japanese ideology as the nation confronted Western influence in the twentieth century. The Japanese approach can be seen in various strategies regarding seismic issues which gradually developed after 1891. In Taiwan, it was dominant because of Japanese colonialism, so what was considered as Western influence in Japan became part of the ‘modernisation’ drive introduced by Japan. The following chapter,
therefore, will explore the architectural expression of completed projects to reveal their inherent approaches.
Chapter 7

Alternative architectonics in the Far East

The discussion in the previous chapter makes it clear that exclusively employing the conventional terms of the ornament/structure debate to discuss built projects in the Far East is not wholly satisfactory. Although it may illustrate the cultural gap between the Western world and Westernised Japan, the use of Western theoretical terms does not appropriately inform discussion of the architectonics of the Japanese and Taiwanese architectural projects I have been examining. In this chapter, therefore, I shall attempt to pose alternative approaches to the discussion of architectonics, bearing in mind the themes of seismicity and cultural difference that have informed this thesis.

The external cultural and geographical influences on the conceptualisation and making of architecture (as discussed in the previous chapter) can generally be understood in various Western, seismological and Japanese terms. For projects in Japan, Western considerations seriously affected earlier projects in that country, and continued throughout the twentieth century (although, as we will see, the means of their influence varied). The seismological concerns were generally ignored in the early period of the process of Westernisation in Japan, but became increasingly significant for later projects. Nonetheless, the seismic concerns as they emerged were not understood merely as a
technical matter, but were also deeply implicated in the formation of Japanese identity and Japanese colonial ambitions which, in this thesis, becomes evident in Taiwan. Although seismological problems also existed in Taiwan, the architectonics and material expression of Taiwanese buildings were more typically developed out of Japanese architectural models, rather than from an engagement with local seismological conditions.

This chapter offers a more detailed reflection on this general account. It does so under three headings. First, it reflects on Western concepts of architectonic expression as they were adopted and internalised in Japan (Section 7.1). Second, it reflects on the specifically seismological considerations as they affected architectonic expression (Section 7.2). And third, it examines Japanese considerations of identity and colonialism through architectural expression (Section 7.3).

### 7.1 Western considerations regarding architectonic expression

The arrival of the ‘Black Ships’ in 1853 marked the beginning of the West’s impact upon Japanese society. This much-discussed historical moment initiated a cultural hybridisation process and was, as we have seen, also reflected in the material expression of Japanese architecture, beginning with the British Consulate in Yokohama (completed in 1869). This building carried the rather uneven expectations that both Westerners and Japanese had for the wider cross-cultural relationship that this first contact carried. The discussion of the material minutiae of wall construction in key architectural projects reflects upon and takes part in this wider this cross-cultural milieu.
Western builders and architects were familiar with the dangers of fire but less concerned about seismic problems. The timber-framed masonry construction of the British Consulate (as well as the British Naval building) reinforces this assertion. It seems that the 1855 Ansei earthquake near Tokyo was less terrifying (for Westerners) than the 1866 fire that destroyed Yokohama. Western architects believed that masonry construction would satisfy the need for fireproofing (as had been demonstrated after the Great Fire of London) and also, as a matter of course, resist earthquakes.  

The Japanese still considered timber-framed masonry construction to be a Western construction method, although some British architects despised it. As mentioned earlier, some Japanese practised what they learned from foreigners to establish Western-style government buildings. The Japanese believed that the masonry façade of this construction system symbolised the essence of Western architecture. This construction system was so efficient that they even recommended it to Taiwan.

The Original Mr Hunter’s Residence represents a thoroughly Western model and was commissioned by the Meiji Restoration to encourage foreign businessmen and architects to stay in Japan. The controversial timber-framed masonry system was still employed for this project and it is notable that the 1880 ‘quake had very little influence on this project. The symbols of Western architecture, such as verandahs and stucco, were used with complete disregard for their appropriateness.

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In Chapter 3 we discussed the completion of the Ginza brick housing scheme (built in the 1870s), which represented the ‘orthodox’ appearance of Western-style architecture. Brick building techniques, therefore, were available when the Original Mr Hunter’s Residence was planned, but the British architect still employed timber-framed masonry construction. Cawley’s advice regarding the durability of masonry construction (instead of timber-framed masonry or wooden construction) and its ability to protect a building from fire and seismic hazard was not taken into account in this project. Nevertheless, the completion of the Ginza housing scheme provided the Japanese with identifiably Western iconic images, and Josiah Conder also promoted this approach in his teaching.

The architectonic expression of the Original Mr Hunter’s Residence was primarily intended to symbolise colonial style rather than worrying about fire hazards. As suggested in the previous chapter, the verandahs for European people were not strictly necessary in terms of Japan’s climate, so they were employed as a symbol of colonial style architecture. Nonetheless, the timber-framed masonry construction for the northern part of the building would not protect it from fire because of the timber verandahs on the southern flank leaving it vulnerable to fire. Western ideology, as symbolised by architecture style, prevailed over other more technical considerations in selecting the materials for this project.

Internally, the combination of plaster and timber veneer also revealed a prevailing Western influence and did not evidently reflect Japanese traditions – according to Kinjirou Saitou, traditional Japanese walls have no divided partitions for upper and lower

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4 The condemnation of the western scholars can be seen in Cawley, 'Some Remarks on Constructions in Brick and Wood and Their Relative Suitability for Japan'.

346
sections. In other words, the distinction between the upper wall (in plaster) and the lower (in veneer) was not generally employed in Japan. This approach to interior finishes was reasonable from a Western point of view and popular for Western-designed and Western-occupied properties. This particular approach was not restricted to this residence but was extensively employed in many projects aspiring towards the Western style. This interior treatment heavily influenced architecture in Japan and also in colonised Taiwan.

The construction methods outlined in the above two projects also had ambiguous semiotic consequences that were transmitted to Japan having a lasting effect. The architects of these buildings were Western. They newly arrived and practising in Japan deployed masonry façades that concealed a timber structure. This demonstrated ambivalence in the way the architecture was conceived and made. On the one hand the timber-framed masonry construction was, in a theoretical sense, to be condemned. British experts disagreed with this structural system in relatively robust terms.

Nonetheless, on the other hand Western architects still employed this construction system in their work. The widespread use of this construction system by other Western architects in Japan, the acceptability of multiple construction layers and claddings was established. That is, the ambivalence regarding expressed structure and surface cladding, had the effect of authorising another kind of architectonics in Japan that was characterised by a relative lack of interest in expressing structure and an interest in

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articulating architectural surfaces, often in multiple layers.

Moreover, Conder also taught his students to appreciate the beauty of architecture, so by concealing the (generally unbeautiful) structure with cladding should have been welcomed by the Japanese. For the Japanese, such projects were seen as exemplars of the West, and implied that timber-framed masonry construction was acceptable even for Western architects. The external façade came to be considered as paramount, while the construction system was regarded as being far less important. What we can call an ‘architectonic ambivalence’ that Western architects (and experts) displayed in their buildings had a lasting effect on the Japanese architectural profession.

According to Clancey, Western influence began to diminish after the 1891 earthquake, but endured (in part) through the succeeding decade. However, there are signs that the influence of Western architecture went beyond this date. Tamekichi Ito, for example, still stressed his Western affiliation to attract attention (and work) in Japan after 1891. This influence extended beyond the field of buildings per se, and included the very definition of architecture. Chuta Ito, for example, also attempted to import the Western understanding of ‘architecture’ to Japan by emphasising that a major aspect of Western architecture involved aesthetic judgement and the distinction between architecture and building was fundamental to this.
In fact, relatively simple Western ideas had already begun to change Japanese society. And later, selected aspects of this change came to be internalised to Japanese culture and identity. No longer merely external influences, they came to be internal to a kind of Japanese cultural expression. Importantly, while this shift – in which Western architectural characteristics came to assimilate as authentically Japanese – was often evident in Japan itself, it came to be expressed in a heightened and nationalistic way in Taiwan as an expression of Japanese colonial and cultural authority. The Western origin of many of Japanese colonial buildings in Taiwan was concealed or ‘rebadged’ as an authentic expression of Japanese modern architecture.

A clear piece of evidence of this shift was the emergence of the Tatsuno Style, which embodied Western-style taste as it was employed in Japanese architecture in the twentieth century. The Western symbolic image of the brick construction for the Japanese had been evidenced above. Moreover, the ‘Tatsuno Style’ stands as a clear example of the internalisation of Western architectural influence in Japanese architecture. This typical style was popular even after the 1891 earthquake, when the Japanese began to re-examine their Westernisation.

Nonetheless, the major 1923 Kanto Earthquake again posed a challenge to Western styles (modes) of building in brick. The fact that this ‘quake created a bad reputation for brick construction can be evidenced by the out-of-fashion Tatsuno Style, although buildings using the reinforced brick method (such as Tokyo Station) remained undamaged. However, this did not mean that Western influence ceased. On the contrary, it reasserted

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itself due to the strong performance of Frank Lloyd Wright’s Imperial Hotel.

The architectonics of the Imperial Hotel certainly amplified Western considerations, and its subsequent influence in Japan and beyond was significant. Wright did not choose any existing materials in Japan but instead introduced his own preference of brick cladding. His design was supposedly based on the concept of Japanese culture, but it could be argued that it not only reflected his client’s preferences but also the fact his projects in the US also employed similar architectural expression.  

Nonetheless, the issue of seismic resistance brought Japan even more pervasive Western architectural influences in projects built after 1923. The scratched surface and colour of Wright’s scratched brick facade came to be regarded as an icon for seismic safety. Japanese architects mimicked the surface of the material and transformed to be the ‘scratched tile’.

Moreover, the seismic resistance of the Imperial Hotel also led to the popularity of the reinforced concrete frame. Although reinforced concrete construction was introduced into Japan in the first decade of the twentieth century, the Japanese did not employ it widely until 1923. Nonetheless, the Japanese quickly categorised both scratched tile

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coverings and reinforced concrete construction as native ideas, and introduced them to Taiwan as ‘modern’ techniques emanating from Japan.

The particular kind of architectural modernity embodied in the Imperial Hotel was also evident in the architectonics of the Katakurakan, and this project also had an important effect in the colonial Japanese architecture constructed in Taiwan. Wright’s influence can be found in the reinforced concrete frame and the exterior surface cladding of the Katakurakan. In addition, the interior finishes in the reinforced concrete section of the Katakurakan included the Western-style stucco and mosaic panels.

It should be noted that part of the exterior cladding of the ‘Katakurakan’ not only presented an iconic imitation but also a skeuomorph of the hotel’s cladding. At the Imperial Hotel, the construction comprised a reinforced concrete structure with brick veneers. For the Katakurakan, part of the construction adopts a reinforced concrete structure with tile and stucco cladding. While Wright’s Imperial Hotel had used load-bearing veneers, the Katakurakan allowed the frame to carry the load and the façade to be merely expressive in its own terms. But the architects of the Katakurakan chose to repeat the appearance of the veneers of Wright’s Hotel in the tiles which clad their building. So the tiles on the Katakurkan carry a kind of translation in material form, or skeuomorph, of the actual patterns that appeared in the Imperial Hotel. The tiles also communicated, in a more iconic sense, the positive associations from the Imperial Hotel’s reliability and seismic resistance. The cladding of Katakurakan, then, not only demonstrated the skeuomorph of the self-load-bearing veneers of the Hotel, but also operated as an icon which communicated the sense of reliability of the that building.

The subtle difference between iconic imitation and skeuomorphic translation is an
important aspect of the wider process of Japan’s engagement and internalisation of Western approaches to architectonics. This wider process can be divided into three periods, separated by two significant earthquakes. From 1853 – 1891, when Western ideas surged into Japan, the culture shock was so powerful that the Japanese actually decided to embark on wholesale Westernisation in order to achieve equality with the West. During this period, some Japanese were cautious about Westernisation, but such was the enthusiasm for Western culture and technology that this concern was not widespread. Westerners, however, as we have seen, were not entirely consistent in the way they conceived and built architecture, preaching an architectonic rigour, but practicing a more ad-hoc façadism when it suited. This inconsistency is what I have called an architectonic ambivalence.

The second period was from 1891 – 1923, when a loose version of the Queen Anne Revival style was popular. This style stemmed from the Western-style architectural education provided by Conder (and by his pupil Tatsuno). Although this was not a coherent Japanese style, the Japanese internalised it and then introduced it to Taiwan in the guise of a ‘genuine’ Japanese style.

All of this changed again after the 1923 Kanto earthquake, when brick construction was abandoned and Wright’s Imperial Hotel induced the Japanese to adopt another kind of Western influence. This affected subsequent projects not only in Japan but also in Taiwan. Here, the Japanese colonial authorities promoted the style as truly Japanese and modern.

Since the Japanese only admitted to Western influence in Japan itself, they usually considered strategic decisions for the colonies to be based on Japanese thinking and
techniques or what they claimed as Japanese-identified local factors. Western influence could not be extended to any colony, as Japan had to be seen to be more influential than the West. They also incorporated seismological factors to distinguish themselves from the Western world, but did not have the same attitude in considering seismological problems in the colonies, and this will be explored in detail later in the discussion of the Japanese colonial policy.

7.2 Seismological considerations for architectonic expression

Western architectonic concepts were introduced in the above discussion in order to clarify the detail of Japanese and Taiwanese Westernised/modernised projects in the pre-war period. So the discussion will now focus on seismological factors. Earthquakes have been a particular problem for architects working in any region where there is a seismic threat, such as Japan and Taiwan. And this concern is legible in the structure of a building and its expression. However, this important consideration was ignored during the period when Westerners began to have such a disproportionate influence in Japan, up until the terrifying 1891 earthquake. Before this ‘quake Western influence generally dominated architectural and tectonic development in Westernised Japan. The 1891 earthquake obliged the Japanese to refocus their attention and identify new constructional, structural and architectonic strategies. This process required them to reassess their standing in the world but also their role as a colonial power. I shall return to this aspect after the discussion about developments in seismology.

Westerners first introduced the notion of an architectural profession to Japan in 1880,
and although Japan had a historical understanding of seismology, only a few Japanese were in a position to become involved in the new science. Western attitudes towards the seismological threat, however, were challenged by the 1891 quake and the Japanese gradually began to assert their own authority on this important issue.

The 1855 and 1880 earthquakes did not significantly impact on architectural expression in Japan. Before 1891 the cautions of a ‘daiku’ on the earthquake resistant properties of Western construction was largely overlooked.\(^\text{10}\) John Milne, however, realised the potential danger of seismic occurrences from his experience of the 1880 earthquake; but he did not appreciate the fact that earthquakes did not substantially damage timber buildings indicating the excellent seismic resistant properties of timber buildings.

The 1891 Nobi earthquake had a dramatic impact on Westernising Japan. In the surveys of the damage wrought by the earthquake, the investigations (carried out by Westerners) did not satisfy the Japanese, because they could not properly explain the causes of the collapse of many Westernised buildings. On the Westerners’ side, John Milne and Josiah Conder continued to be concerned about how best to improve Western construction techniques in Japan. Although they significantly changed their standpoint from initially promoting the superiority of the West, to being willing to accommodate to Japan’s local factors. As Gregory Clancey suggests, this earthquake saw ‘the collapse of the “foreign” structures that began to bring the “natural” disaster into techno-cultural focus’.\(^\text{11}\)


Japanese, the struggle between Westernisation and Japan’s own cultural identity had begun in terms of building and architecture, at any rate.

So when Japanese architects (educated according to Western doctrine) addressed the devastation of the 1891 earthquake, they were inclined to improve on Western-style models as promulgated by their tutors, instead of critiquing or overthrowing Western influences. For example, having surveyed damage caused by the Nobi earthquake, Chuta Ito discussed the relationship between earthquakes and brick housing in order to find a solution to enable masonry construction to withstand the seismic threat.\(^{12}\)

In 1892, however, the Japanese established a new seismological institute (IEIC) to replace Milne’s original Seismological Society of Japan (SSoJ), which was founded in 1880. This was important not only for seismological study but also significant in wresting control of the seismological profession from Westerners. The IEIC fuelled a surge in Japanese confidence and the demise of the SSoJ signalled a decline in Western influence in the seismological field. Japanese scientists wanted to distinguish Japan from Western countries and used this shift to help shape Japanese identity and set Japan apart from other countries.

Taiwan became a Japanese colony only four years after the 1891 ‘quake. Taiwan, like Japan, was located on the circum-Pacific seismic zone. Before Taiwan’s colonisation, Japan had secretly sent an advanced party of researchers to investigate diverse aspects of Taiwan, including military capabilities and issues of governance. However, the seismic

threat in Taiwan was not included on their agenda.\textsuperscript{13}

Two serious earthquakes in 1904 and 1906 around the Chia-Yi region did not result in any significant adjustments to conventional building practices. In the aftermath of the earthquakes, timber-framed masonry construction was recommended for reconstruction projects, despite the fact that the old Chia-Yi Station (built earlier using a timber-framed masonry construction) had been partly damaged by the earthquakes. Even so, this did not affect the materials used for Taiwanese projects built in the 1910s, which were affected more by developments in Japan.

In Japan, seismic considerations started to affect the architectural expression of completed projects. Among the ten architectural case studies discussed in this thesis, the Tokyo Station was the first project to take the seismological problem most seriously. The 1923 earthquake tested its construction reinforced with steel, revealing that the hybrid structure performed well compared to a swath of other buildings, (including the Ginza housing scheme and others constructed with brick cladding and structure) which collapsed. However, the achievement of the Tokyo Station did not halt the declining popularity of brick. Before clarifying the reasons for this fact, we should review the seismological issues for two Taiwanese projects built before 1923.

Explicit earthquake-proofing measures were not evident in the architectural expression of

\textsuperscript{13} Cheng-Chen 政誠 Cheng Zheng, Taiwan Da-Diaocha: Linshi Jiu-Guan Diaocha Wei-Yuan-Hui Zhi Yan-Jiu [Overall Investigation of Taiwan: A Research of the Temporary Committee of Old Customs in Taiwan (Rinji Taiwan Kyuukan Chousa Inkai), 臺灣大調查：臨時臺灣舊慣調查委員會之研究] (Taipei 台北: BoyYoung博揚文化, 2005), p. 12. In 1873, this survey took place in Taiwan and lasted three and a half months; it was carried out Sukenori Kabayama and his colleagues. He served in the Japanese army with the rank of major at that time and later was also the first Governor-General of Taiwan in 1895 and 1896.
the Tai-Chung Station, although the Governor General Building in colonial Taiwan reflected some considerations in the design of its structural frame. The Tai-Chung Station project displayed little concern about this issue and employed a simple brick structure with no reinforcement – and was therefore liable to collapse during a seismic shake. The Governor General Building had a reinforced concrete frame. The reason for the variation (in terms of seismic issues) in these two projects is unknown. However, the previous damage report on the Taiwanese earthquake did not recommend the use of reinforced concrete frames. It would seem that the benefits of a reinforced concrete frame had to be imported from Japan following the research on seismic resistant construction in that country.

The 1923 Kanto earthquake in Japan had serious implications in both Japan and Taiwan, whereas the 1922 Taiwanese ‘quake had limited impact. For the Taiwanese, the local seismic threat was taken less seriously than the earthquake problem in Japan, and seismological considerations in Taiwan were evidently a low priority for the colonial regime. In Japan, however, the effort of the 1923 earthquake (in terms of construction materials) coalesced around the earthquake-proofing properties of Wright’s Imperial Hotel. In the West, Wright published his structural design to demonstrate the construction methods after the earthquake. In Japan, the structure of the Imperial Hotel (i.e. a reinforced concrete frame) became popular. So, despite Wright’s supposed interest in indigenous culture, the Japanese again internalised Western and seismological considerations into their own practices.

The structural system of the Katakurakan signified both Western and Japanese considerations. Seismological concerns were evident in its structural frame. The
reinforced concrete frame was obviously influenced by the West, whereas the timber-framed section could be linked to Japanese tradition. Despite the fact that combining different materials could increase the seismic danger, the different structures signified Moriyama’s seismological concerns.

The iconic cladding of this section of the timber-framed building, just the same as the reinforced concrete section, was only tiling and stucco finish without masonry construction. So, the ambivalence of this tectonic approach echoed the architectural ambiguity of the Original Mr Hunter’s Residence. The combination of two structural systems, reinforced concrete frame for the northern and timber frame for the southern, was ambiguous but also reflected Japanese concerns, and will be discussed later in detail.

As mentioned in Chapter 3, investigations in Taiwan in 1930 were initiated into the seismic resistance of buildings after the 1923 earthquake in Japan. Because of the seismic damage in 1923 in Japan, the Japanese experts, Tadashi Taniguchi and his colleagues attempted to reveal the constructive danger of buildings in Taiwan. However, the fact that they only published their reports in Japan was significant. It is clear that the principal audience for the report on Taiwan were assumed to be the Japanese in Japan, and not the citizens of Taiwan. In Taiwan itself, only a few Japanese in the colonial government were able to access the reports published in Japan. So, although the Taiwanese people were taught Japanese, it was still not easy to access these specialist publications and therefore tied seismic concerns to Japanese thinking.

However, Taniguchi’s report might offer a clue as to the enigmatic deployments of structural materials of the two sections of the Library of the Taihoku Imperial University. Although he did not directly write on buildings in Taihoku University, his report was
likely to have been seriously considered by the colonial government. The employment of separate structures in the two sections of the Library of the Taihoku Imperial University signified different concerns. If Taniguchi’s report is taken into account, then the brick construction of the earlier southern building did not incorporate any seismic measures but reflected Japanese thinking on ‘modern’ architecture. Whereas the reinforced concrete frame of the later northern building explicitly signalled seismological considerations. It should be noted that Ide himself recommended reinforced concrete for public buildings in 1922, but he did not follow his own recommendations for the southern building. Given that his own recommendations had not been incorporated in the earlier building, other clues, such as Taniguchi’s report, should be considered to have brought about the change of structural system.

Moreover, the constructions of the Chia-Yi Station and the Taipei Public Hall evidenced the valid impact of the seismic resistance of the Imperial Hotel’s structure, while the Japanese further developed the system of reinforced concrete into the wall construction as well. Even so, the consequences of the Taiwanese earthquakes had little impact on the materiality of these two projects.

As noted, the reports documenting the Taiwanese earthquakes of 1922 and 1930 repeatedly suggested that surface ornamentation should be avoided, and that reinforced concrete was recommended. However, it remains unclear whether reinforced concrete construction in Taiwan derived simply from such considerations or from a combination

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14 Kaoru 関 伊東三, ‘Jishin to Kaoku No Kenchiku [Earthquakes and Dwelling Buildings, 地震と家屋の建築]’, *Taiwan Nichi Nichi Shimbun [台灣日日新報]*, 26 September, 27 September, 28 September, 29 September, 30 September, 1 October, 3 October, 4 October and 5 October 1922.
of seismic and Japanese colonial influences. Nonetheless, the assistance from Japanese experts in the 1935 earthquake in Taiwan was somewhat skewed because of the forthcoming Exhibition rather than genuine seismological concerns.

For the Japanese, seismological considerations encompassed more than just simple technical approaches. After 1891, they gradually used this seismological expertise to project their identity to the world. They actively participated in international conferences on seismology and published their research achievements in both Japanese and English to communicate with the wider world. However, they asserted that architecture should be essentially technological (not artistic), even though Conder had introduced the concept of architecture as a sophisticated art.

It is notable that the Taiwanese earthquakes did not really affect the architectural expression of the Taiwanese projects discussed in this thesis. Despite the fact that Taiwan lies in a region of seismic hazard, and the Japanese had published reports following several Taiwanese earthquakes during their colonial regime, the seismological considerations practised in Taiwan usually derived from Japanese practice. The reports relating to Taiwanese earthquakes were mainly used to regulate the construction of residential accommodation but were not incorporated into the construction of government buildings. This leads our discussion in the next section on Japanese architectonics in the colonial era.
7.3 Japanese considerations of identity and colonialism for architectural expression

This chapter has focused on alternative considerations regarding architectonics in Japan and its colony Taiwan during the pre-war period, and has included considerations of Western cultural and architectural influences and seismological issues as important contexts. I would now like to further develop these themes by discussing Japanese considerations. As indicated in previous chapters, Western influences dominated the development of Japanese society during this period as the Japanese chose this route in order ‘to enrich the nation and to strengthen the military’.¹⁵ This policy proved beneficial for Japan, but architectural influences were often covertly subsumed into Japanese projects. Given the West’s ambiguity on architectonic matters, the Japanese developed their own preferred construction methods.

Timber-framed masonry construction was a perfect illustration of this preference. As said before, this construction system has dual characteristics: one was Western origin due to Bridgens’s introduction, which bolstered its association with Western values; the other is the transformation from a traditional Japanese construction method. For the Japanese, this was popular not only because it was allied to an American architect’s design, but also achieved a Western appearance using conventional methods. It therefore, for the Japanese consideration, provided some acceptability of the architectural ambiguity in the combination of cladding and structure.

Despite Japan’s fulsome embrace of Western ideas, the traditional Japanese carpenter

(the ‘daiku’) still reminded the Japanese about the reliability of timber construction in resisting seismic shocks. In addition, the introduction of traditional Japanese architecture to the profession’s educational curriculum was another consideration. After Tatsuno replaced Conder as head of department zouka of at the Imperial College of Engineering, he employed Kiyoyoshi Kigo to teach traditional Japanese architecture. These changes were not immediately evident in buildings’ materiality at that time, but they establish a framework for later developments in Japanese identity.

In the last decade of the nineteenth century, Japanese identity had been progressively established, but set within a context derived from the Western world. Before the twentieth century, Chuta Ito used his thesis to assert that Japan had real architecture, not just buildings.

At the turn of the century, Japan began to assimilate Western influences to become Japanese consideration. Besides the Tatsuno Style, it is clear that the Japanese assimilated these interior cladding techniques as their own modern style, although (according to the discussion on the Residence’s interior) this was not the traditional Japanese interior. The Japanese took it for granted that this was their style of interior design, and they practised it widely in Japan (and in Taiwan). Moreover, the 1910 debate on the appropriateness of Japanese architectural style also emphasised Japanese consideration.

Japanese architects, borrowing Western concepts of architectural style

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16 Tachikawa立川, ‘Koubushou Yongtou Gishu Tachikawa Tomokata Shoshin [工部省四等技手立川知方上申]’.
18 Kingo金吾 Tatsuno辰野, ‘Warekuni Shourai No Kenchiku Youshiki Oikaganisubekiya [What Architectural Style Should We Adopt for the Future, 我國將來的建築様式を如何}
from powerful countries, proposed that they should have their own indigenous architectural style. The assimilation was not only on architectural style but also material use and future expectation.

Historians have claimed that the completion of the Tokyo Station also brought greater success to related Japanese manufacturers. The station’s surface cladding material became very popular throughout Japan and also in its colony, Taiwan. This affirmation provided an image of Japan’s industrial success, and shaped its development. Related industries were founded after 1853 under Western influence but, in the second decade of the twentieth century, this industrial development proved a significant factor.

It should be noted that before Japan’s colonial period, Taiwan had very limited contact with the West. After the Japanese arrived in their new colony, they introduced the process of Westernisation as practised during the Meiji period. In Taiwan, however, they reframed Westernisation as a process of modernisation. In other words, the Japanese recast the differences between themselves and the West in Taiwan.

For the Taiwanese, however, Japan’s imported innovations were readily accepted as a form of modernisation. This was evident not only in documentation but also in changing

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attitudes towards earthquake research in Taiwan. As mentioned above, Omori visited Taiwan twice to research seismic damage in the first decade of the twentieth century. After this, he also visited the USA and Italy to conduct similar investigations, although the earthquakes in San Francisco and Messina occurred later. Nonetheless, his attitude towards the situation in Taiwan and that in the West was different. Using his Japanese experience, he attempted to teach Taiwan relevant Japanese techniques. In contrast, he attempted to look for differences and learn how Japan could benefit from his visits to Western sites. This scientific interest in seismology also embodied a Japanese colonial attitude to Taiwan.

Japanese concerns were clearly represented in the architectonics of the Tai-Chung Station. As discussed above, Japanese architects considered that its style (brick with stone trim) counted as being a Japanese architectural style. The expression of this project reflected the requirements of this style and the cladding material echoed this thinking. The iconic connections between structure and cladding were also evident, even though they were not entirely consistent. In the previous project, we saw that the cladding and structural brick at the Tokyo Station (as shown in Figure 4.26) were inter-connected, so that the thickness of the cladding was directly related to the construction of the brickwork, although the reinforcing steel was not expressed on the surface. In contrast, as the Tai-Chung Station (as shown in Figures 5.8 and 5.9) the thickness of the cladding materials were identical, and the inter-connection between structure and cladding was not exploited (as seen in Figure 5.7).

Superficially, the tectonic expression of the Tai-Chung Station was very similar to that of the Tokyo Station; however, the means of construction was not quite the same. It seems
fair to assert that the cladding of the Tai-Chung Station (both exterior and interior) had an iconic similarity to the Tokyo Station, but the difference in their construction signified the distinction between the original country (Japan) and the colony (Taiwan). In other words, the surface expression of the Tai-Chung Station iconically represented Japan’s interpretation of their architectural style. The entire construction of the Tai-Chung Station indexically showed the colonial distinction, compared to the Tokyo Station which was more deliberate and also incorporated seismic resistance measures.

For the Tai-Chung Station, the red surface implied concealed brick construction but the pebbledash stucco did not signify the stone construction employed beneath this cladding material. The imitation of stone construction was not represented in the material used anywhere for this project, but only represented a visual impression of solidity and reliability. It could be said that the stone construction was skeuomorphically imitated by the pebbledash stucco finish. In addition, when the structural system changed again from brick construction to reinforced concrete, the skeuomorphic expression would be extended, which was exactly as illustrated in the architectonics of the Governor General Building.

In terms of surface cladding, the materiality of the Governor General Building was generally similar to that of the Tai-Chung Station. The iconic similarity could be linked to the ‘modern icon’ introduced by the Japanese to Taiwan. However, the structural strategy for the Governor General Building differed from the Tai-Chung Station, and naturally signalled this difference. The semiotic difference was more than a mere interpretation of a tectonic discussion but represented the entire colonial politics. The structural system revealed the difference and the incorporation of seismic resistance
measures signalled the importance on this building for the colonial power.

Referring to contemporary studies on seismic resistance, it is fair to assert that the Japanese colonial government had already understood that brick construction was more dangerous than reinforced concrete frame in a region vulnerable to the threat of earthquakes. The Tokyo Station was constructed in reinforced brick, and the Governor General Building was constructed with a reinforced concrete frame. Although the latter project was finished after the completion date of the Tai-Chung Station, the construction process commenced before that of the station. In other words, the colonial government had decided to construct the Tai-Chung Station with the knowledge that a simple brick construction was not suitable in a region of seismic hazard. The reason for this decision cannot be confirmed, but it is reasonable to suggest that the choice of the reinforced concrete frame for the Governor General Building was made because of its role as a colonial powerbase.

In the matter of the materiality and surface expression of architecture, the Japanese employed their internalised Western methods not only for the exterior but also for the verandahs and the interior. The cladding of the verandahs of this project (according to archival photographs) was similar to that of the Original Mr Hunter’s Residence and the British Consulate. The interior cladding also resembled the Tokyo Station as well as the Tai-Chung Station. This again echoed Japan’s internalisation of Western techniques into their approach to construction, especially as it was practised in Taiwan. So although it was similar to ‘Western’ methods, the Japanese claimed that it was in fact the ‘modern’ method.

Additionally, the skeuomorphic expression of the Governor General Building should be
emphasised. As mentioned above, the pebbledash stucco finish skeuomorphically signified the solid image of a stone structure. Also, the brick-like tile cladding was a skeuomorph of actual brick construction. Since people were used to seeing this surface cladding, and the reinforced concrete frame did not offer the conventional surface for spectators, the skeuomorphic expression appeared to be the appropriate exterior cladding. The skeuomorphic presentations, including red brick-like tiles and the pebbledash stucco finish, not only indexed to people’s conventional aesthetic taste but also signified the ‘modern’ image which the Japanese wanted to import to Taiwan.

After the 1923 ‘quake, again, the Japanese transformed Western sources, i.e. Wright’s earthquake proofing hotel, into Japanese consideration, according to Wright’s interest in Japanese culture. He claimed that he wanted the hotel to marry with its immediate environment especially in view of its close proximity to the Royal Palace, but was also concerned about validating its connection to Japanese traditions.  

However, the choice of material did not wholly match his ambitions. This might be excused on the grounds that Wright stressed that his concrete structure was deployed as a seismic resistance technology, and some might argue that this showed specific local considerations, especially as the Japanese had become more concerned about seismicity in modern architecture. Nonetheless, the subsequent influence of the Imperial Hotel was internalised by the Japanese, and then symbolically appropriated to represent Japanese factors.

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The similarity between the façade and structure of the Imperial Hotel and part of those of the *Katakurakan* made the Japanese appreciate the more complex and hybrid architectonic possibilities of these buildings. On the one hand, it expressed the assimilated Western influences; on the other hand, it expressed Japanese conventional timber construction. Japanese influence as expressed in the *Katakurakan* complex was concentrated in the southern building, whereas the northern building represented Wright's influence. Both the exterior cladding and its structural frame suggest this direct imitation. The use of scratched tiles was skeuomorphically inspired by the scratched brick of the Imperial Hotel, and the stone slabs and pebbledash stucco were linked to the Oya stone adopted by the Hotel. The interior finishes, however, presented little connection with the whole ensemble. This disconnection belied the residual effect of Western influence but internalised by Japan’s own interpretation.

However, not only the structural frame, interior cladding of the southern section of the *Katakurakan* complex displayed obviously different concerns compared to the northern section. However, these concerns did not extend to the exterior cladding which replicated the northern building’s façade treatment, namely; Wright’s use of scratched tiles and stone slabs. Nonetheless, despite the external cladding which repeated the skeuomorph of the Imperial Hotel, the hidden structure and the interior cladding were even more different from those in the Imperial Hotel.

Due to its internal spatial arrangement, the Japanese influence was particularly explicit in the *Katakurakan*. Unlike other case studies discussed in this thesis, the materiality of the interior (and spatial organisation) of the *Katakurakan* did not follow the Western approaches I have been discussing. Instead, a more traditional Japanese treatment of the
internal surfaces was evident. Perhaps the project’s function (the exploitation of natural hot springs) was considered to be such a traditional Japanese activity that the interior of the Katakurakan could reflect traditional Japanese qualities, even though the exterior was significantly affected by Wright’s ideas.

Western notions filtered through a Japanese sensibility were extended to the colonial outpost of Taiwan. This process of symbolic appropriation of external (Western) architectural influences was developed most clearly in the projection of Japan’s own cultural authority in their colonial project. As we have seen, this is precisely the case in Taiwan, a site where Japan’s cultural identity (through architecture) was affirmed and consolidated. In Japan in the 1910s, the distinction between Japanese and Western architectonic approaches was not very clear. However, by the 1920s, the Japanese began to actively assimilate Western influences into their own building culture, so the distinction came to be blurred deliberately and the architectural results more complex. For example, the newspaper in Taiwan in 1922 which published Ide’s articles about the 1922 Taiwanese earthquake and reports about the Marunouchi area in Tokyo confirmed the fact that the Imperial Hotel represented Japanese modernisation (their internalised ‘Westernisation’).

This combination of factors was an inspirational goal for the Japanese in Taiwan and became much more obvious after the 1923 earthquake. Thereafter concern about seismological threats was closely linked to a Japanese architectural sensibility. The connection between seismic concern and Japanese consideration eventually became apparent in both Japan and Taiwan. The seismic resistance of the Imperial Hotel supported this idea and was directly applicable for Taiwanese projects.
Therefore, projects in Taiwan after the 1923 Kanto Earthquake of Japan should be considered again in terms of its architectonic expressions of emerging Japanese building culture, and the Library of the Tahoku University was the first one in the chronology of this process. In fact, Japan’s influence was again expressed in the materiality of the Library of the Taihoku Imperial University. It is likely that the co-existence of two different structural systems for the library and the Katakurakan shared a similar attitude towards material expression.

The early section of the library was built in brick construction, whereas the northern building was constructed using a reinforced concrete structure and duly enhanced its seismic performance. This shows that, at a certain level, Ide still trusted the seismicity of brick construction when designing the first building in 1929. Ide’s trust in brick construction resulted from the assumed reliability of the ‘modern’ aspect but, ironically, reinforced concrete construction also derived from the ‘modern’ approach.

Compared with brick construction, reinforced concrete construction demonstrated Japan’s increasing confidence. Looking back, the popularity of brick construction mainly derived from Conder’s and Tastuno’s continuing advocacy during the period of intense Westernisation. By contrast, the seismological knowledge and related technological concerns were widely developed in Japan during the twentieth century. Although the knowledge of reinforced concrete construction was imported from abroad at the beginning of the twentieth century, Japanese seismologists rapidly adopted this construction technique as an integral element of their own profession, after the confirmation of reinforced concrete’s seismic resistance.

Moreover, if the change in the structural system for the northern section of the Taihoku
University Library could be linked to the 1930 report, the involvement made it difficult to elide the Japanese colonial influence. It is therefore fair to assert that the replacement of reinforced concrete as the major structural material was a combination of seismological concerns and the emergence of a heightened Japanese architectonic sensibility.

The exterior surface cladding the library indexically presented the ‘modern’ image that the Japanese introduced to Taiwan. The ‘modern’ image of architectonics had previously been red brick, but, due to Japan’s 1923 earthquake, it had shifted to yellow/brown with a machine carved surface but still in the size of the header face of brick. It did not iconically represent the red brick construction, but it could be considered as an index of the cultural convention of ‘modern’ construction, i.e. the conventional preference of the pattern of brick construction and the size of the material. Additionally, the pebbledash stucco finish of the façade still skeuomorphically presented the image of a masonry construction. However, the interior cladding also signified the assimilation of the overwhelming Japanese ‘modernisation’.

The architectural ambivalence that resulted from combining two structural systems, as we have seen in the Ktakurakan building in Japan or the Library of the Tahoku University of Taiwan was resolved, and this could be evident in the materiality of the Chia-Yi Station. However, this ambivalence of co-existing different structural system still existed in skeuomorphic form, namely reinforced concrete construction with masonry-like cladding. In terms of the exterior cladding of the Chia-Yi Station, the pattern of the stretcher bond and the size of the stretcher face of brick still represented the ‘modern’ image of colonial notion, and the pebbledash stucco finish was also linked
to the same origin. A simplified ‘Classical Western’ ornamentation did not have any connection with other Western sources in Taiwanese history.

Instead, Japan’s introduction of these aspects to Taiwan still played a significant role. Neither brick construction, nor stone construction, was employed in this project but the entire façade was full of their skeuomorphically constructed imitations. This mimicry was explored in the general cladding of the façade and presented in the diverse ornamentation on the façade. Essentially the ‘modern’ image was still skeuomorphic.

This ‘modern’ expression was also adopted for the interior cladding of the Chia-Yi Station. The treatment of the walls with a plaster finish (upper section) and veneers of various materials (lower section) confirmed this aspect. This type of interior finish was so sophisticated that almost all the Westernised architecture (built during the colonial period) had a similar architectural expression. It should be noted that although the interior veneers comprised different materials, generally they imitated the pattern of masonry construction or employed thin slabs of masonry materials. In other words, the reliable conventions of masonry construction were still ubiquitous.

As mentioned, the decision to replace the original 1903 station reflected a Japanese sensibility. This not only abandoned its ineffectual seismic resistance but also promoted confidence in reinforced concrete. The switch should be seen not only in seismic concerns but also in Japan’s increasing ability to tackle earthquake-proofing issues.

A Japanese sensibility was strongly embodied in its colonial regime and was demonstrated in the Taiwan Exhibition of the Fortieth Anniversary of Governance. The colonial government planned to display the benefits of their rule over a long period.
Therefore, the Governor General asked for help from mainland Japan to avoid the interruption of the smooth running of the event by the 1935 earthquake.

Colonial considerations behind the construction of the Taipei Public Hall were even more remarkable. The official purpose of its erection was to celebrate the enthronement of Emperor Hirohito and mark the beginning of the Shōwa period. Moreover, as mentioned above, being the assembly venue of the Exhibition also signified its role in Japanese colonialism. The fact that the architect, Ide, associated this building with similar public venues in other large Japanese cities, while explaining the importance of the hall architecturally implied that the judgement was set at Japanese standards. The surface cladding style and the majority of the suppliers of materials and facilities obviouslyshowed the connection between Taiwan and Japan. Japanese colonialism could not be ignored or erased since the link with Japan was intertwined in every aspect of the building.

The ‘modern’ image was very clear in material use. Reinforced concrete was used not only because of seismic concern but also the significant role of colonial power. The majority of the façade was the image of masonry construction, although the reinforced concrete did not limit the scope of cladding. Also, the ‘modern’ cladding continued in the interior.

Although the delicate ornamentation of the vertical panels between the windows attempted to exploit some design freedom, the results were relatively subdued. Additionally, although the majority of the interior cladding still had the internalised ‘modern’ cladding, the veneers of the entrance section were different.
Japanese considerations existed throughout the entire period of this research, even though they were not as explicit as the Western impact in the nineteenth century. However, from their first embracing of Westernisation to the launch of their colonial empire, from the timber-framed masonry construction through brick construction to reinforced concrete construction, Japanese considerations were really omnipresent. They can be divided into two (very entwined) categories. Firstly, the Japanese attempted to advance their own agenda to ensure that related concerns were practised. Secondly, they assimilated Western influences into their own ways, and especially so when they operated in Taiwan.

Japanese considerations in the nineteenth century were mainly in the first category. Even the surge in Westernisation was established on this foundation. The seismic concerns (which were later injected into this approach) were also (at least partly) due to this reason. This approach can be found mainly in the indexical phenomena, such as Ito’s thesis about the comparison between the traditional Japanese and ancient Greek temples, rather than in its architectural identity.

By contrast, the internalisation of Western influences can be seen from the architectonics of projects in Japan and Taiwan. The seismological profession was introduced to Japan by Milne but they had wrestled with this problem (as had Taiwan) long before the establishment of this academic body. Based on this concern, Japan adopted seismology their specialisation to communicate with the rest of the world. Seismology was also employed to teach Taiwan about its successful strategies, despite the fact that Taiwan also had a long history of similar suffering. This transformed the seismic issue (beyond the technical) into a particularly Japanese concern. Moreover, the internalisation was also
employed for the selection of a structural system and the style of exterior and interior claddings. For projects in Japan this might not be so obvious, but for Taiwanese projects it was dominant. Western influences had shaped the modern ideas introduced by the Japanese. However, the West should not have a presence in a subjugated Taiwan as Japan should be the superior power.

The concept of skeuomorph played a significant role in architectonics with a Japanese sensibility. In terms of cladding styles and materials, so-called Western classical ornaments would be transformed into ‘modern’ signs for projects in Taiwan. The pattern of the ‘modern’ masonry construction could be used for cladding brick construction as well as with reinforced concrete construction. This can be evidenced in the Tatsuno Style as well as the impact of Wright’s Imperial Hotel.

7.4 Architectural ambivalence and skeuomorph in alternative architectonics

If we review the overall discussion again, two essential concepts are identifiable in the three considerations – Western, seismological and Japanese. Architectonic ambivalence can be seen throughout, and skeuomorphs can be found on many exterior cladding employments.

Architectonic ambivalence can be found in projects from the very early phase of Western influence. Westerners introduced incoherence in the materiality of projects, while their scholars condemned the Japanese for this ‘mongrel’ adoption. This duplicitous attitude was presented to the Japanese, and naturally created a dilemma, or a convenient
opportunity, for the Japanese to imitate. The Japanese could either imitate the authentic brick construction that Waters built or copy the timber-framed masonry construction that Bridgens introduced (as used for the Original Mr Hunter’s Residence). Given Western considerations, architectonic ambivalence provided this ambiguity or freedom for the Japanese.

This ambivalence was maintained when the two sections of the Katakurakan were built. In terms of seismological considerations, the framed structures provided sufficient flexibility to withstand a seismic shake. However, the attachment of different material claddings might also result in seismic danger due to the different vibration frequencies of different materials. Moreover, the two sections were built using different framing materials (reinforced concrete and timber) but they were clothed externally in very similar ways. The complex combination of materials for the two buildings provided a very ambivalent situation in terms of the seismic concerns. The southern section with its timber frame was similar to the timber-framed masonry construction but not quite, since the cladding of tile, slate and pebbledash stucco was much lighter than masonry cladding. The northern section with its reinforced concrete frame was similar to the construction of Wright’s Imperial Hotel but not quite identical. Here the external cladding was (again) much lighter than that of Wright’s building. The exterior claddings of both buildings seemed to unify them, but the architectonics behind them was very different. It is difficult to differentiate their ability to sustain seismic shock.

The two structural systems used for the Library of the Taihoku University also generated ambiguous circumstances. Built within two years, the two sections employ different structural systems: the early one was brick construction without reinforcement, whilst the
later one was a reinforced concrete frame. Both sections were clothed by the same means. Despite the seismic concerns, as both structural systems in Taiwan signified ‘modern’ images, the shift in the structural system probably arose due Japanese concerns. Although a clue in this variation is suggested by Japan’s growing confidence, the architectonic ambivalence remained.

Architectonic ambivalence had been developing for an extended period and rendered the architectonics somewhat eccentric. To assert its dishonesty or condemn its discontinuity does not help to understand it. On the contrary, to understand the ambivalent consideration hidden behind this aspect is an alternative solution to this circumstance.

Skeuomorphic imitation of the cladding of the Imperial Hotel was first explored in the cladding of the Katakurakan. The Japanese did not directly use the same material to imitate, they used a thinner material to iconically represent the exterior cladding, which gave spectators an image of reliability and seismic resistance. However, the brick veneers were not deployed, as the construction was entirely a reinforced concrete body. In other words, the imitation was only a visual memory of a no longer extant project by a Western architect. Therefore, skeuomorph should really be the title of this imitation.

Besides the fact that the Tatsuno Style had copied the Queen Anne style, its characteristic brick with stone trim mode actually imitated materials: red brick and a band of stone. This could have been an iconic imitation, if the materials had been carried through to the construction behind. If not, then the cladding became a skeuomorphic expression. Within the Japanese context, the red brick-like tiles attached in a pattern similar to the header bond of brickwork were also a skeuomorph of brick construction. Similarly, the pebbledash stucco used for cladding part of the façade with a stone trim
band was a skeuomorph of stone construction.

This can be shown in buildings in Taiwan which display the Tatsuno Style. Again the pebbledash cladding of the base course and topmost edge of some later projects also indicated a skeuomorphic expression, and the brown/yellow tiles attached in the pattern of brickwork was also a skeuomorphic presentation. The cladding of the Katakurakan building, the Library of the Taihoku University and the Chia-Yi Station all confirmed this expression.

Skeuomorphic expressions signified clear cultural clues about the material employed for cladding and ornamentation. It was clear in the case of the timber origin of key elements of the Greek temples, and has also become clear for the projects discussed in this thesis. The origin of the architectonic expressions in the projects I have examined was either brick construction or stone construction. Neither of these origins could be considered as traditional Japanese construction. The Western symbols of masonry construction came to be embedded in the culture of Japanese building so deeply that even though the structural materials changed, architects and the public who used and appreciated the buildings still desired to see the patterns of these masonry constructions. This kind of expression might seem to be redundant for a new structural system, but it was actually a very natural progress for people to gradually become used to new materials and new structural systems. More technically, this process also reveals through an indexical semiotic how thoroughly the Westernisation process affected Japan’s symbolic understanding of construction and materiality.

It is clear that an understanding of the architectonic ambivalence and skeuomorph in these three considerations, Westernised projects in Japan and Taiwan should not be
regarded as being too eccentric to approach. Nonetheless, the ornament/structure debates established in the Western world should not be abandoned altogether either. On the contrary, the conceptual legacy of this debate helps our understanding of different approaches and potential problems. The aim of this research is to explore conceptual alternatives such that the ornament/structure debates do not serve as the sole criterion by which to criticise and understand architectonics. In this respect, the cultural and seismological contexts in which buildings are conceived and made have been a crucial aspect of that project.
Chapter 8

Conclusion: the interplay of architectonics, geography and culture

As ornament is no longer organically related to our culture, it is no longer the expression of our culture.¹

When Adolf Loos articulated his objection to ornament, he asserted that ornament has no connection with contemporary culture and, as a consequence, need not be a primary concern for contemporary (modern) architecture. According to Andrew Benjamin, Loos considered ornament to be irrelevant as a generative motive for architecture.²

However, from the twin perspectives of the skeuomorphic transformations of materials and the particular colonial and geographical context that I have been examining, Loos’s approach is less convincing. As we have seen, the concept of the skeuomorph asks us to pay attention to the morphology of materials as they are employed in cultural artefacts through time. This focus draws out the significance of materials and how they are employed through time in specific cultural contexts. Moreover, the projects and the contexts that I have discussed in previous chapters provide evidence which complicates the tendency to dismiss ornament as being insignificant in architecture. Indeed, ornament

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and cladding systems can reveal complex cultural and geographical implications. The structural systems, constructional processes and cladding materials of a given building can hold complex semiotic implications that are grounded in specific considerations of culture and geography, and these should not be simply taken for granted.

Architecture in the contexts that I have been examining was not only influenced by conventional architectonic theoretical principles, but also by particular geographical conditions as well as different cultural considerations. As we have seen, the architectural case studies discussed above were constructed under Western influence in a non-Western world; so conventional (Western) architectonic principles and associated debates on the relationship between structure and ornament were partly, but not wholly, insignificant.

Western principles such as these should not be the only frame of reference when approaching the architecture of Taiwan, Japan and other non-Western countries. On the contrary, specific cultural and geographical conditions demand new ways of thinking about architectural form. The cultural considerations, such as Westernisation, colonialism, modernism and local traditions, should be considered since they complicate any consideration of architecture and materiality. For instance, the imitation of Western architecture might look eccentric. However, if the struggling between Westernisation and local tradition has been understood, the eccentric architectural format can be acceptable.

Moreover, geographical conditions, including the threat of earthquakes (a particular focus of this thesis) provide even more variables in such an undertaking, and these can also explain some enigmatic constructive methods. From this Eastern-focused study, as clarified, to include imported influences, such as Westernisation and colonialism, and local approaches, such as traditional and seismic concerns, would help spectators to
understand the difference between their convention and these Eastern projects. The interplay between architectonics, geography and culture determined the deployment and configuration of materials in the architectural examples in Japan and colonial Taiwan.

At the beginning of this thesis, we examined the instability and complexity of architecture in seismic contexts, or what could be called ‘building on shaky ground’. Earthquakes in San Francisco, Messina, Santa Barbara and Napier seriously affected the expression and deployment of materials in architecture in these places. Initially architectural construction was not influenced by seismic concerns in any simple or direct way. Rather, seismology set in train various diverse considerations including issues of fireproofing, the inadequacy of conventional construction techniques, and even the place of architectural ornamentation. These examples, however, were all located in Western contexts, and were somewhat remote from conventional debates regarding ornament and structure. To simplify the matter of architectonics, whether they echo the ornament/structure debates or not, would be unsatisfactory, since the use of architectonics implies a deeper, more complicated meaning.

Therefore, in the second chapter, I elaborated some of the principal positions in structure/ornament debates and associated theory. The aim of that chapter was to better understand the key debates as a means of interpreting the architectural projects in seismic topographies. Based on this analysis, projects by Kahn and Venturi were discussed not only in terms of their material and constructional logic, but also through an examination of the theoretical ideas that guided many of their architectural projects. This more specifically architectural reflection on architectonics, materiality and expression was framed within a wider discussion of semiotics. This part of the thesis also broached some
basic correlations between architecture and semiotics.

A third strain of theoretical literature was also introduced here, namely the work in archaeology and related disciplines on the concept of the skeuomorph. This concept added an additional sensitivity to the traces of pattern, ornament and meaning in material culture more generally. The range of examples (spanning both Eastern and Western contexts) and the manner by which the concept emphasised development and change through time, was helpful in the discussion of the architectonics of shaky ground.

The aim of reviewing these theoretical positions was motivated by my interest in the deployment of materials in architecture in the specific colonial and seismic contexts of Japan and Taiwan during the period from 1853 - 1945. The Westernisation of Japan provided an important historical foundation for the engagement of conventional debates on structure and ornament. It is notable that Japan at this time provided a direct link with Western culture and its architectonic values.

Therefore, my initial motivation was that the history of architectural and construction development in the Far East still offered a sufficiently different milieu in which to rethink conventional (Western) theoretical arguments (once assumed to be more-or-less universal). Secondly, the underlying topographical conditions of the circum-Pacific seismic zone (which demanded distinctive approaches to the deployment of building materials and architectural construction) contributed a further, and powerfully determining factor when thinking about building and material culture.

The above factors allowed projects in Westernised Japan and colonial Taiwan to serve as the empirical grounding for this study. Underlying this project was the fact that, while
the circumstances of Taiwan’s colonial history are not well known and are often glossed over in the West, it remains an important issue in Taiwan. More generally, it is an important episode in the history of modern and colonial architecture and deserving of attention for that reason alone.

Based on these circumstances, the historical background of architecture and seismology in Westernised Japan and Taiwan was introduced. As was evident in Chart 1, earthquakes have occurred throughout this period. In respect of Japanese earthquakes, the most serious was the 1854 ‘quake which was too early to be fully registered in Western records. The 1880 earthquake, however, attracted foreign attention and was actually the most insignificant in terms of its magnitude (on the Richter scale) and its impact on the ground.

While Gregory Clancey’s study has argued that Western influences on geological research decreased after 1891 and even became insignificant after 1923, this was not entirely the case in the architectural profession. Nonetheless, local seismic factors impacted on the architectonics of Japanese buildings in more explicit ways over time. The earthquakes in Taiwan were no less threatening than those in Japan. In fact, the five main earthquakes which occurred in Taiwan during this period were all more serious than the 1880 earthquake in Japan. Despite this, earthquakes which occurred in Taiwan appear to have been less influential on the development of architecture in Taiwan during that period, whereas Japanese quakes had considerably more influence on the development of Taiwanese architecture. This reveals that the impact of colonialism had was of greater significance than the local seismic occurrences on architectural development in colonial Taiwan.
I have shown that the role of colonialism in Taiwan is a significant factor in understanding this issue. Colonial authority in Taiwan was strong and Japan largely dominated cultural and economic life throughout this period. In the field of architecture, this would lead us to imagine that buildings constructed in this era were essentially ‘Japanese’ in both conception and construction. While it is true that Japanese approaches to architecture, building and construction were dominant in Taiwan, the influence of Japan was more nuanced than might be assumed. It involved complex hybridities and mixed cultural traits, which were not usually revealed at the formal level, but come into view in the detail of constructional and cladding systems.

In some respects, it might be correct to assert that the Japanese attempted to hide the West, or render Western influence invisible to the Taiwanese, so that Japan would be clearly seen as the superior nation. Moreover, the Japanese also attempted to hide their true thinking from the West; but this was only explicitly so in Taiwan. This can be evidenced from the experiments of new constructive materials in Taiwan and their superior attitude towards Taiwanese earthquakes. Only after Japan had become as strong as competing Western countries did they begin to develop their imperial ambition. They were determined that such ambition should be masked from the West but was nevertheless clearly shown in their colonial policy. The architectonics of projects in Taiwan at that time did not address the local situation. On the contrary, it could be seen as an index of concurrent cultural and topographical concerns in Japan. To analyse this field of evidence, we rely upon (but must extend) the existing structure/ornament debates which developed in Western architectural discourse.

This entwined connection between architectonic, cultural and topographical phenomena
in Japan and Taiwan during this period is best understood by examining the semiotic consequences of the deployments of materials in the selected projects. This approach is demonstrated in the planimetric wall sections shown in Chart 3. This graphical format facilitated a comparison between the deployment of materials for structure, construction and cladding in each case. It appears that, in Japan, the material deployments of construction could be divided into three periods with clear watershed moments between each period, i.e. the occurrences of the 1891 and the 1923 earthquakes. Even more interestingly - and ironically - the deployment of materials in Taiwanese architectural projects did not change because of local seismic events but seemed to respond, instead, to the seismological and cultural context in Japan.

For instance, the change from the Governor General Building to the Library of the Taihoku University was dramatic, but the upper part of Chart 3 offers a clue to the change. In fact, the deployment of materials in the projects represented in the lower part of Chart 3 were continuously affected by those in the upper part. The nature of this influence is complex, however, and the chart tries to show the subtlety and irregularity of these influences. The line of influence is clear to see and, although their surface cladding did not indicate the hidden structure, the subsequent influence in materiality between different material fabrics is discernable.

This empirical data clearly reveals the inadequacy conventional terms of reference, vocabularies and debates on ornament and structure when examining the use of materials in these projects. Certainly some aspects of these debates do partly help in explaining the material and architectural logic of the projects and provides a basis for thinking about an architectural dialogue between Japan and Taiwan. For example, Semper’s frequently
cited idea of *Bekleidung*, and Venturi’s distinction between inside and outside, are useful in considering architecture regardless of location. Their conceptual frameworks (and built work) provide a more fluid connection between structure and cladding, and enable projects in different contexts to somehow echo these points of view.

Nonetheless, these concepts are not wholly satisfactory for the milieu of the projects under discussion in this thesis. Semper’s and Venturi’s ideas have been so frequently cited that they tend to be used indiscriminately and applied to many different architectural situations and conditions. However, the arguments set out in Chapter 2 convey dramatically different approaches and are useful for understanding the materiality of individual projects. The Imperial Hotel, for example, reflects this duplication and its surface veneers seem to echo Kahn’s idea in his ‘conversation’ with brick. However, the coherence of both interior and exterior veneers also reminds us of Semper’s idea of *Bekleidung*, despite the fact that Kahn’s and Semper’s concepts were very different. In other words, this approach could not provide observers with clarity in the connection between projects and theoretical arguments, since many significant considerations are ignored.

Such significant considerations, therefore, should be taken into account in any interpretation of the more ambiguous and complex projects discussed in this thesis. In my research, cultural and seismological approaches have been identified as crucial. These considerations were semiotically expressed in the choice of materials for significant architectural projects. To be more specific, the early impact of Western thinking (and later Japanese responses) in terms of seismological threats affected the architectonics of Japanese buildings. These foreign influences and local responses were
clearly legible (in a semiotic sense) through the cladding materials used in certain Japanese buildings. Seismological concerns and internalised Western influences were more semiotically explicit in later projects in Japan. Diverse factors, including the passage of time, enhanced technological developments, increased knowledge of architecture and seismology and availability of materials, strengthened the semiotic consequences of seismological concerns and Western internalisation.

From the skeuomorphic perspective, geographical and cultural factors are more evident semiotically through the choice of materials in buildings. The concept of the skeuomorph provides an alternative framework for interpretation, especially for projects built in the later period when the relationship between surface expression and structure was relatively complex. This framework can expose hidden phenomena informing cultural and conventional thinking on materiality. It can evoke materials employed in the past, as well as people’s conventional perspective on the façade expression.

Although the skeuomorph idea is not central to the ornament/structure debates in architecture, it still derives from a broader Western theoretical understanding and therefore relates to those debates. This approach offers an ideal foundation for a dialogue between theoretical discussions and contextual influences. Some cultural aspects could be represented in the skeuomorphic format, dependent on the materiality of each project.

Whilst the representation of cultural – whether Western, Japanese, or colonial – contexts and seismological factors can be usefully examined through the lens of skeuomorphy as supported by semiotics, it should be noted that selected materials and expressions did not simply signify singular and straightforward ideas. The adoption of masonry construction, for example, was employed by Western architects in Japan as a Western icon, but was
used by Japanese architects as a Western symbol. Moreover, the brick-like tile cladding was not only a Western icon in Japan, but also a symbol of Japanese modernity in Taiwan. This dual semiotic characteristic existed frequently in the range of architectural materials under review, and different perspectives often resulted in different semiotic implications and meanings.

With the perspective that this thesis has attempted to raise, the well-known theories should be reconsidered. For instance, Kahn’s idea of material use would also be based on certain conventional understanding. Comparing SOM’s library project to Kahn’s interpretation of materials, we might realise that the properties of material can be unique but it can also be diverse if the different format might be used. Also, as said, Loos’s idea of ornament is less convincing, as ornaments have usually contained cultural expression. Moreover, it should be acceptable to consider that Venturi’s distinguishing between the inside and the outside indeed offered the freedom of the architectonic deployment. However, the cultural reflection can express not only on the ornament but also constructional material choices. Additionally, when Koolhaas’s lobotomy has given a reasonable excuse for the horizontal and vertical break for modern architecture, it also provides the elasticity of the cultural differences and adjustment. These theoretical debates should be slightly ament to consider architecture in different cultural and geographical milieu.

Considering geographical and cultural factors alongside the architectural-theoretical arguments is an important supplementary approach to understanding the architectonic expression of projects under seismological and certain cultural influences. Intentions and implications are discernable in the relationship between architectural claddings and
structure and, although this supplementary approach does not suit all projects (accommodating seismological and Westernised influences), it still provides a significant additional layer to our conventional (often simplified) understanding of a universal idea of tectonic expression. This supplementary consideration could offer clues for the adaptation of conventional debates on structure and ornament for projects shaped by different backgrounds.

In other words, as noted above, from this supplementary consideration in architecture, shaky grounds have physically affected the choice and employment of materials to resist the seismic danger. Structural and façade design were both influenced. Extendedly, in architectural theory, the physically shaky ground offers this series of the architectonic theory a theoretically shaky ground to review the lack of said differences. This has led this study to find the alternative of the conventional theoretical ideas.

Although the body of the thesis did not include postcolonial theory, nonetheless, the projects were located in colonial grounds. Therefore, the dominance of Western theories for Japanese architecture as well as the colonial dominance of the Japanese for Taiwanese architecture were re-considered. This thesis was motivated in the postcolonial position. This kind of postcolonial position, which is vital to penetrate into the whole thesis, is the place where I heavily rely on.

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3 It should be noted that the assumption of the universal idea resulted from conventionally arbitrary simplification. However, Kenneth Frampton referred to Gottfried Semper’s words to clarify the cultural difference in architectonic expressions. For instance, Semper narrowed tectonics only to the carpentry approach but added stereotomy to the masonry construction to point out the different tectonic natures in different cultures. See Kenneth Frampton, John Cava and the Graham Foundation for Advanced Studies in the Fine Arts., *Studies in Tectonic Culture: The Poetics of Construction in Nineteenth and Twentieth Century Architecture* (Cambridge, Mass.: MIT Press, 1995), pp. 16, 336. Nonetheless, the importance of the ornament of the cultural expression is downplayed.
What should be reminded is that the hybridity revealing in this research includes the approach of materiality as well as of culture. As said, masonry construction, which Westerners were used to, was relatively simple: elastic structural elements were not usually mixed with masonry construction. As mentioned before, in seismic Italy, seismologists had difficulties to suggest the elastic timber construction, which had better performance in seismic threat, for the reconstruction. To shift from masonry construction to timber framed construction was not easy. However, the reinforced concrete construction not only contains concrete but also elastic rebar, which were welcome by not only the Japanese but also Westerners, like the Italian. When architectonic materials are hybridised due to complex conditions, architectural hybrid not only happens in material use but also in cultural and geographical reflections. Architecture has been understood as cultural reflection and now the hybrid expression of cultural and geographical milieu and material should also been included.

As suggested above, this supplementary approach cannot be employed to discuss all non-Western projects, since this would fall into the very Universalist interpretation that I want to contest. In addition, this also reveals that conventional architectonic discussions have ignored many diverse concerns, and cannot really be used to discuss Western projects either. Therefore, different concerns should be adopted for different projects. Certainly, some common factors can affect projects located in similar geographical or cultural milieus, but a general universal standard should not be set. Instead, the different factors should be clarified and understood before they are theorised. Moreover, traditional architecture within the non-Western world cannot be simply understood within conventional architectural theories. It needs to be seen in the context of an architectural dialogue (with potentially dramatic repercussions) since the projects were
not affected by Western technological and architectural ideas. Different approaches should be introduced for vernacular projects of this kind. Additionally, to suggest that Japanese or East Asian architecture be understood within its own exclusive geographical and cultural frame of reference is also inappropriate. Rather, it is more a matter of building and sustaining a cross-cultural relationship that can cross-fertilize the debates informing architecture and building.

My research has endeavoured to provide sound evidence in support of a wider principle which stresses the importance of understanding different milieus and influences in order to interpret diverse material aspects of architecture. Without such a broad and cross-cultural approach, any in-depth assessment of architecture is open to misunderstanding and misinterpretation. I have argued that in the context of East Asia the interplay between architectural, geographical and cultural considerations cannot be ignored. After all, ornament and materiality in architecture are related to our culture, and are indeed a significant aspect of cultural expression.
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406
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415


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423