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**PROCEEDINGS OF THE  
SOCIETY OF ARCHITECTURAL HISTORIANS  
AUSTRALIA AND NEW ZEALAND  
VOL. 33**

Edited by AnnMarie Brennan and Philip Goad

Published in Melbourne, Australia, by SAHANZ, 2016

ISBN: 978-0-7340-5265-0

The bibliographic citation for this paper is:

**Elizabeth Musgrave** "A Golden Anniversary: 50 years of the split skillion roof in Queensland." In *Proceedings of the Society of Architectural Historians, Australia and New Zealand: 33, Gold*, edited by AnnMarie Brennan and Philip Goad, 528-537. Melbourne: SAHANZ, 2016.

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## A GOLDEN ANNIVERSARY: 50 YEARS OF THE SPLIT SKILLION ROOF IN QUEENSLAND

*The split skillion roof is a distinctive roof-form in Queensland that is strongly associated with climate responsive modern architecture. On the eve of the Golden Anniversary of the project associated with its architectural debut in Queensland, the Graham House (1967) by John Dalton Architect and Associates, this paper will trace the origins and development of this roof form, created when two opposing skillions sandwich a layer of ventilating space. Through an analysis of the work of Dalton and others, this paper posits alternative explanations for the emergence of the split skillion roof, challenging accounts of Queensland mid-century modernism as responding primarily to climate, and revealing the practice of Dalton and his peers as being alert to disciplinary shifts, including Brutalism, and the renewed interest in pre-existing tradition, regionalist thinking and environmental consciousness.*

## Introduction and Background

As an element of form linking practical matters of construction and material expression to the domain of architectural ideas and ideology, the sheltering roof has throughout history, been associated with a range of theoretical constructs; constructs that address issues such as character, probity and context in different ways.<sup>1</sup> Within the lexicon of architectural vocabulary, a flat roof connotes modern precepts whereas skillion roofs, the most materially efficient form of roof, have long been identified with pragmatic buildings, farm sheds and holiday shacks. From the 1960s, skillions increasingly appeared in the work of modern architects; the rethinking of the horizontal roof form was prompted in Queensland by their regular failure in sub-tropical downpours. The split skillion in this context represents a special instance of skillion, involving two opposed skillions both springing from the same plate line but one being shorter than the other, not meeting at a ridge. Depending on orientation, the resultant cross section could potentially maximise cross ventilation and light. In Queensland the split skillion heralded its arrival fifty years ago in the Graham House (1967) by architect John Dalton. Awarded the Royal Australian Architecture's Bronze Medal for residential work, the Graham House was exhibited at the Japan Expo in Osaka in 1970<sup>2</sup> and published in *The Architectural Review* where it was described in the following terms:

John Dalton's prize winning passage-down-the-middle house near Brisbane is much more interesting than the plan suggests. Perched on the edge of a sharp drop, it is brick where it rests on solid ground and timber where it is suspended in the air. The problem of joining one with the other is resolved by a kink in the roof providing essential ventilation.... the silhouette reflects climatic needs [...].<sup>3</sup>

From the late 1960s the split skillion became a distinguishing characteristic of houses by John Dalton, representing his desire to be both climatically appropriate and identifiably modern. The Leitch (1967), Rabaa (1967), Hughes (1967), Dunlop (1970), Musgrave (1972) and Peden (1972) houses all demonstrate variations of this roof form. But Dalton was not alone in adopting the split skillion; he simply was the most persistent and prolific and arguably the first. Nevertheless, the use of the split skillion was not isolated to Queensland.

Analysis of this single element of form enables tracking of shifts in practice responding to new preoccupations, thereby providing an opportunity to challenge the accepted accounts of Queensland architecture, and claim that this shift was a pragmatic response to climate.<sup>4</sup> Graham de Gruchy, Balwant Singh Saini, Haig Beck, Jennifer Taylor and Graham Jahn have contributed to the orthodoxy of a climate driven mid-century modernism in Australia.<sup>5</sup> Yet, the use of the split skillion transcends a literal application of the principles of climate responsive design to include a range of other concerns leading to a range of different expressions. Together with others including Patrick Moroney, Maurice Hurst, John Railton, and Gabriel Poole, Dalton practiced a mode of modernism that engaged a range of social, environmental and contextual issues that anticipated an appreciation of regionalist thinking; thinking that engaged the local and specific including Queensland's variation on the colonial 'bungalow'.<sup>6</sup>

## Determinants of Form

Accounts of climate responsive design link its emergence to the spread of modernism to the colonial territories of European states, which challenged the universality of the orthodox modernist vocabulary and triggering research into climate and principles for climate responsive design.<sup>7</sup> Climate responsive design was guided by a belief that good architectural design was underpinned by empirical knowledge derived from research, primarily understood as relating to the provision of satisfactory indoor conditions.<sup>8</sup> The human body was the 'physiological measure' and design culminated in a process of piecing together defined elements.<sup>9</sup> As Victor Olgay describes it: "[...] the projection of man's (sic) needs should be the shelter with calculated surfaces of transmitting, absorbing, filtering or repelling characteristics of the environmental factors."<sup>10</sup> In their close reading of the writings of Olgay and Olgay, David Leatherbarrow and Richard Wesley note that in practice, this occurs "often to the exclusion of other considerations."<sup>11</sup>

In Australia, research followed British models which, in turn were based on Victor and Alan Olgays' work and was supported through the establishment of research bodies such as the CSIRO Commonwealth Experimental Building Station (CEBS). Increasingly precise definitions and measurements were disseminated in the CEBS *Bulletin* (from 1946-1965) and *Notes on the Science of Building* (from 1949 - 1991). From 1949 *Notes* were published on issues related to design for climate and roof design including "Roofs Ventilation and Insulation" addressing roof design in hot humid and hot dry climates and "Domestic Roofs – Forms and Features" which amongst other roof types, addressed the technical issues surrounding flat roofs.<sup>12</sup> Research centres were also established within Universities<sup>13</sup> where they accumulated sufficient personnel and authority to directly influence the discipline.<sup>14</sup> But in Queensland a resistance to the growing authority of science was already emerging, finding it's voice in forums such as *Cross-Section*, where the question of design for climate as an imperative for comfort or an affectation of style was debated by local architects.<sup>15</sup>

It is against this backdrop of debate about the role of climate science that the split skillion emerged in Queensland as a distinct element of form. A tracking of the development of the split skillion roof over time indicates a resistance to a straightforward categorization – its form being identified with both a scientifically verified climatically responsive modernism and the pre-existing Queensland bungalow – a harbinger of regionalist thinking.

### Design for Climate in Practice

The transition from flat to split skillion roof can be tracked from the moment that the pop-up roof appeared as a solution to increasing light and cross ventilation in a deep plan. Raising a section of roof over the central room in a square plan solved practical problems whilst maintaining the horizontal rooflines associated with modernity. In the Plywood Exhibition House (1957) by John Dalton and Peter Heathwood, a non-ventilating pop-up vault was about achieving light to the centrally placed bathroom in a compact square plan. Heathwood's Speare House (1957) and the Dalton House at Fig Tree Pocket (1960) also adopted an efficient square plan form and both achieved cross-ventilation through the use of a ventilating skylights over an open plan form.



FIGURE 1 Dalton House, Fig Tree Pocket (1960). Photograph by Geoff Dauth.

The next phase in the development of the split-skillion roof is usually accounted for through the failure of flat roofs in Queensland's tropical downpours. Haig Beck, who was an intern in Dalton's practice, recalls that Dalton appeared after one wet weekend in 1963, declaring there would be no more flat roofs.<sup>16</sup> Whether this story is apocryphal or not is immaterial, for at this time pop-ups became skillions that extended to the length of the plan, ventilating not just one room but the entire house. Dalton's Leverington (1961), Wilson (1964), Graham (1966) and Rabaa Houses (1967) all utilised 'corridor-down-the-middle' plan forms which were vented through skillion roofs along one edge thereby enabling the entire house to be cross ventilated.



FIGURE 2 Graham House, Taringa (1967). Photograph reproduced with permission of Sue Dalton.

Experimentation continued in Dalton's office to fine-tune this solution. In the Wilson House the skillion roof sits over bedrooms at the back of the house, opening to the north to catch the prevailing breezes. The design was as much about light as it was about ventilation. Expression of this skillion was subordinated to the horizontal lines of the roof over the living spaces in front. In the Graham and Rabaa houses, a cranked skillion roof was placed over the living spaces in front, becoming the defining element of expression. A gentler pitched skillion was introduced to rooms providing wall surface into which Dalton inserted proprietary "Colt" ventilators to draw and exhaust hot air across major rooms. The most effective roof was achieved by maximising openings in the windward wall through combinations of sliding doors, louvers and pivoting walls and reducing openings in the lee-ward wall to a small opening located high in the space. The Graham and Rabaa Houses were refined through the testing of scaled models in smoke machines at the University of Queensland and this generic solution was presented years later to the general public in an episode of the ABC series *The Inventors*. Reporting on the Rabaa and Graham houses in *Cross-section*, Dalton promoted such instances of cooperation between University architecture schools' science units and practising architects.<sup>17</sup>

The generating section for the split skillion form became known as the 'Dalton section' and was reproduced by Dalton in houses and finely scaled institutional buildings from this point until his retirement from professional life in 1978. Presentation sections for the Wilson, Graham and Dunlop houses included sun angles emanating from a Corb-like sun and an indication of wind flow in a manner that mimicked the swirling patterns of smoke in a smoke tunnel. However, to claim that Dalton adhered to a strict adherence to climate design principles would be an overstatement.

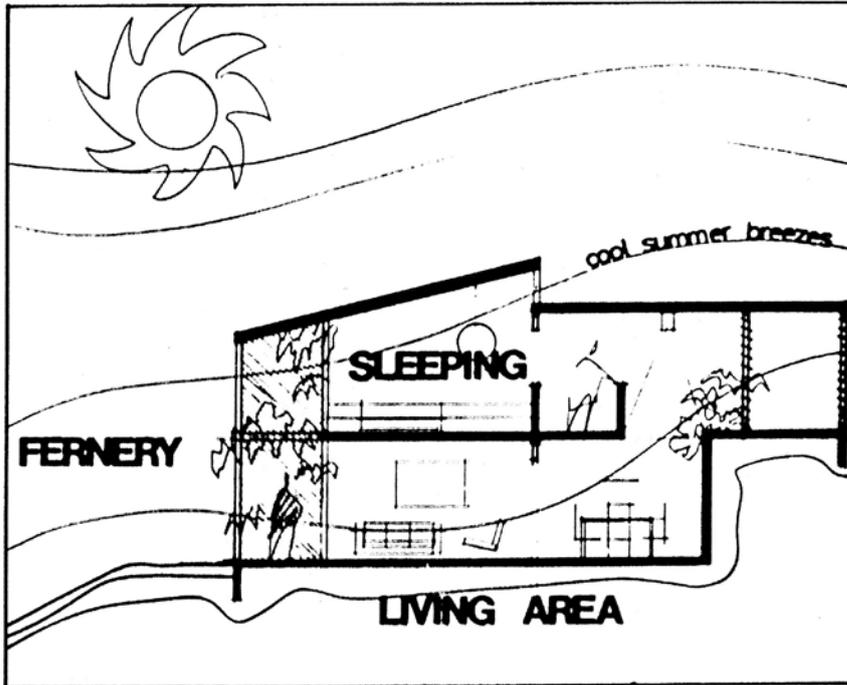


Figure 3: Section, Dunlop House, Indooroopilly (1970). Reproduced with permission of Sue Dalton.

The extension of the roofline beyond the edge of the living spaces, ostensibly to exclude summer sun but admit its warming rays in winter, enabled the reintroduction of a narrow veranda in the Graham and Rabaa houses. In subsequent houses, including the Dunlop, Musgrave and Vice-Chancellor's Residences, this space would become a breezeway, contributing another spatial type to the Dalton oeuvre. It should be noted here that the Graham House, whilst oriented north on its steep site actually favours the less desirable west. The Graham House demonstrates that Dalton's design decisions were as much about soliciting a formal expression capable of iteration, as they were to do with climate.

There is more of interest in the Graham and Rabaa roof form than climate responsiveness. The crank in the primary north facing skillion in both instances resembles the shift in pitch between veranda and main volume of the traditional Queensland house. The dark understory of these two houses was also celebrated in different ways; through the introduction of diagonal cross-braces in the Graham House and in the Rabaa House by tapering white brickwork piers that bracket and support a timber framed box housing the living spaces. The elements of the pre-existing Queensland house – the undercroft, stumps, the veranda, its posts and rails, cross bracing, shifting roof pitches - were recognisably present.

Haig Beck and Jackie Cooper have written of the split skillion in Dalton's work as linking principles of climate design to an interest in the vernacular tradition and as being indicative of regionalist thinking. Beck recalls that when Dalton appeared in the office after that wet weekend in 1963, declaring there would be no more flat roofs, he was also brandishing a photograph of a simple farmhouse building.<sup>18</sup> For Beck these two things, the shift to skillions and the vernacular farmhouse became inseparable. In an account first written in 1985 Beck argues that the emergence of the 'crippled gable' in Dalton's architecture represented a shift towards regionalist preoccupations: "By the early 60s he [Dalton] had identified and begun to use the traditional form of the Australian country house with its deep verandas and crippled hip roof."<sup>19</sup> This did not represent the abandonment of one ideological position in favour of another but rather its transformation.

## Introducing Other Influences

By 1967, skillion roofs were already present in the work of other architects in Australia. In 1961 Woolley and Dysart were commissioned by Lend Lease Corporation Limited to design three exhibition houses for the 1962 Demonstration Village in the suburb of Carlingford, one of which was the Split Level.<sup>20</sup> The 'Split Level' was developed further for Pettit & Sevitt in 1962 to include a characteristic split skillion roof form over the entire plan; not as a response to climate but as a device for accommodating a transferable house solution to a range of site gradients.<sup>21</sup> In 1962 Woolley was awarded the Wilkinson Award for his own house at Mosman, a series of skillion roofs over a split floor plan. This was followed in 1963 by the Johnson House at Chatswood by Peter Johnson, a single skillion. In both these houses, the living platform is stepped down over steep topography, the roofline, "parallel to slope" – a compositional play informed by an intention to be in formally and experientially in harmony with the site.<sup>22</sup>

The Woolley House at Mosman and the Johnson House at Chatswood, together with work by Allan Jack and Cottier, Philip Cox, Don Gazzard and architects in the New South Wales Government Architect's Branch, Graeme Gunn and Daryl Jackson have been identified with the Sydney School and with the emergence of Brutalism in Australia. Recently Philip Goad has identified characteristics of the Brutalist aesthetic such as the use of skillions, clinker bricks, stained timber structure evident in the work of Keith and John Reid in Melbourne, John White in Perth, and John Chappel in Adelaide.<sup>23</sup> Goad argues that the widespread incidence of the Brutalist aesthetic in Australia was due in part to the influence of young Australians returning from working abroad in the 1950s and 1960s; this included English emigres such as Maurice Hurst who emigrated to Brisbane, and the affinity of the younger generation of architects for the humanist tendencies of Scandinavian architects. In transferring Brutalism's principles and ideals to new circumstances these young architects were responding to local conditions resulting in a range of different outcomes.<sup>24</sup>

In Queensland, Brutalism mediated by climate is evident in houses by John Railton (1963) and Maurice Hurst (1965), and Patrick Moroney (1968). These houses were featured in *Cross-section*, and Dalton's editorial commentary indicates that his rhetoric extended from its focus primarily on climate to include the Brutalist aesthetic. Railton's house and studio in Spring Hill (1963), which featured a split skillion tuned to maximising cross-ventilation, was described in *Cross Section* as "an almost Baroque series of interior volumes, airy, spacious and well-suited to the hot humid summers of Q'land."<sup>25</sup> In 1965 skillion roofed houses by Maurice Hurst at Indooroopilly and Kenmore were described as 'Brutalist.'<sup>26</sup> The shift was subtle but was an indication of Dalton's desire to link practice in Queensland to shifts in discourse globally.

Did Ken Woolley and others influence Dalton? Probably. There is a similar use of bricks, albeit bagged, large masonry elements, the use of dark stained timber on exposed structure, veranda elements and stained timber ceilings. Dalton himself cited Danish architect, Arne Jacobson, as a significant influence.<sup>27</sup> Jacobson's Søholm I Row Houses at Klampenborg were completed in 1951, and the split skillion roofs in these widely published houses were a means of drawing sunlight into a deep narrow terrace house plan.

The fact remains that split skillion roof forms were adopted for use in houses across Australia in response to a variety of imperatives including siting, light, program, climate, and expression. Dalton's interest in the split skillion aligned with widespread practice and in Queensland, where the adoption of new forms invariably raises issues of climate, the split skillion proved ideal.

## The 'Ecological Turn'

A slightly different application of the split skillion appears in Queensland in the late 1960s and is evident in Dalton's Hughes, Vice-Chancellor, Musgrave and Peden (1972) Residences. Whereas earlier house forms such as the Dalton, Leverington, Neale (1962) and Wilson houses hover over or sit on their sites, these later ones are carefully situated and oriented in relation to the specifics of site, views, light and prevailing breezes. In these houses the program for living was accommodated in a variety of spatial volumes and ordered into discrete wings orientated to take advantage of climate and the specific circumstances of site, forming a composition of skillion roofed volumes. The appearance of a 'broken profile' of roofs, especially in the case of the Vice-Chancellor and Peden Residences, was not unlike a clustering of farmhouse roofs, denoting territory within a wider landscape.<sup>28</sup>



Figure 4: Peden Residence, Pullenvale (1972). Photograph reproduced with permission of Sue Dalton.

The preoccupations directing the Vice-Chancellor's and Peden houses represent a further shift of focus whereby the ideal of the modern house as a transferable solution, was replaced by an understanding of the house as situated in and constructed on its site.<sup>29</sup> Concurrently the provision of interior spaces providing satisfactory indoor living conditions was no longer the sole priority. Instead the provision of a spatial richness and linked indoor/ outdoor living spaces without loss of comfort became key concerns.<sup>30</sup>

The Vice-Chancellor and Peden residences clearly demonstrate the distinction between a purely scientific approach to understanding environment (in which climate science is one of many overlapping fields of expertise and knowledge) and a more holistic understanding of the role of environment in architectural design. With a purely scientific approach, emphasis in architectural design remains on the environmental performance of enclosing elements – the Olgays' notion of "shelter with calculated surfaces" – whereas decisions defined by a broader contextual approach, where climate is mediated against other constraints and opportunities, the focus of attention expands to include the relational aspects of elements of form and their consequences for space and formal expression.

### **The Split Skillion as Signifier of a 'Style'**

Over the past 50 years the split skillion roof has become a persistent motif in both architect-designed and developer-driven work in Queensland. As signifier of a 'style' it conveys the idea of a lightweight, ventilating roof sheltering open airy spaces beneath.<sup>31</sup> In the hands of architects such as Gabriel Poole, Peter O'Gorman and Kerry and Lindsay Clare it continues to respond to a range of interests beyond climate.

Gabriel Poole has indicated his indebtedness to Dalton and Gibson from whom he gained an understanding of the potential of working the section for light and ventilation.<sup>32</sup> The Poole Frith House (1972) at Buderim is perhaps the clearest use of a split skillion use in Gabriel Poole's architecture, but even the earlier and influential Dobie House (1972) has a pop-up roof section.<sup>33</sup>

Peter O'Gorman and W. H. Carr's winning submission to the 1965 Cluster House Architectural Competition run by the Royal Institute of Australian Architects (RAIA) Queensland Chapter co-sponsored by the Industrial Relations Service

and *Brisbane Telegraph* newspaper features a cranked skillion roof over 16 units organised in a matt layout to achieve 'optimal climate orientation.' Although controversially their wining scheme was not built, the principles of climate control developed in this project were progressed in later houses by O'Gorman, particularly the Becket House (1969-70) and the Redbank Plains House (1972); both of which explore the potential of timber tectonic.<sup>34</sup> In Clare Design's Thrupp and Summers Residence (1987), a skillion intersects with a barrel vault in a fresh interpretation of the split skillion, and ventilating roofs are present in the White Residence (1980-81), Maroochydore South Post Office (1985) and Dedyne Residence additions (1994). Even the Gallery of Modern Art (2006) sports a pop-up roof, contributing to a light suffused mall.

## Conclusion

Analysis of a single distinctive element of form – the roof – possibly the most the highly visible indicator of a response to climate over a period of 50 years has provided a platform for testing accepted accounts of local history. A simple change of focal length between broad-based general historical accounts which tend to privilege the significance of climate and the survey of an individual practice has led to a questioning of the polarity between responsible design for climate and a more sensuous engagement with environment.<sup>35</sup> In Dalton's oeuvre the emergence of the split skillion roof represents the development within his practice of a key element of a distinctive, climate appropriate but consistently modern language; one which also revealed the potential for a spatial richness. The deconstruction of the split skillion enabled forms to respond directly to site and context, corresponding to a broadening of architecture's interest in environment to embrace circumstances beyond climate. Beyond its capacity to respond to climate, the split skillion represents the alignment of the skillion with extant roof forms in the guise of the rural sheds and its resonance with the sheltering space of the veranda. It foreshadows a growing interest in rural buildings and in regionalist thinking.<sup>36</sup> It represents an instance of Dalton, who was always alert to new attitudes and global shifts in disciplinary thinking, identifying opportunities for the implementation of new approaches in his own practice. Climate, while a constant issue, was never the only concern. For Dalton, as for Maurice Hurst, Pat Moroney, Peter O'Gorman and those that followed including Gabriel Poole, Kerry and Lindsay Clare, the skillion was a simple and pragmatic form that can be tuned for the specifics of site, climate and the wider landscape. It also marks the point in Queensland where a modern aesthetic was challenged by an intention to be both regionally appropriate and identifiably modern.

## Endnotes

- 1 Elizabeth Musgrave and Maxwell Horner in "The Detail in Architecture" Comparative Analysis of Built Detail," *Architectural Theory Review* 5. no. 1 (April 2000): 1 – 15. The capacity of architectural elements to reveal architectural ideas has a long history that can be traced backwards through history from Semper to Vitruvius.
- 2 Liz Johnston, "Hint of Japan in a not too dinky-di home," *The Australian*, December 23, 1969, 5; "Brisbane Example for Expo Japan," *Telegraph Home Show Feature*, March 12, 1970, 18-19.
- 3 "Seven Just Square," *The Architectural Review*, vol. 144, no. 858 (August 1966): 142 - 143.
- 4 Jennifer Taylor, *Australian Architecture Since 1960* (Sydney: Law Book Co., 1986), 116-117. Taylor writes 'Climate is always an important factor in Australian design, but in this area [Northern Australia], it a prime consideration.' Stuart King, "A Climate of Confusion: The Significance of Climatic Adaptation in 19th Century Queensland Architecture," *Panorama to Paradise: Proceedings of the 24th Annual Conference of Architectural Historians of Australia and New Zealand*, (Adelaide, S.A.: the Society, 2007), 1. Philip Goad, "Homes in the Sun: Climate and the modern Australian House 1945-1965," *Celebration: Proceedings of the XXII Annual Conference of the Society of Architectural Historians Australia and New Zealand*, Napier New Zealand (Napier, N.Z.: the Society, 2005): 134, 136.
- 5 Balwant Singh Saini. *Architecture in Tropical Australia* (Carlton Vic.: University of Melbourne Press, 1970); Haig Beck, "Detailing, National Identity, and a sense of place in Australian Architecture," *UIA International Architect 4* (1984). Taylor, *Australian Architecture Since 1960*; Graham Jahn, *Contemporary Australian Architecture* (East Roseville, NSW: Gordon and Breach Arts International, 1994).
- 6 Alexander Tzonis , Liane Lefaivre, "Tropical Critical Regionalism: Introductory Comments" in eds. Alexander Tzonis , Liane Lefaivre, Bruno Stagno, *Tropical Architecture : Critical Regionalism in the Age of Globalisation* (Chichester, UK: John Wiley and Sons, 2001), 2-3.

- 7 Rohdri Windsor Liscombe, "Modernism in Late Imperial British West Africa: The work of Maxwell Fry and Jane Drew, 1946-56," *Journal of the Society of Architectural Historians* 65. 2 (June, 2006): 188; Philip Goad, "Homes in the Sun," 134. See also Deborah Van der Platt, Andrew Wilson, Elizabeth Musgrave, "Twentieth-Century (Sub)Tropical Housing: Framing Climate, Culture and Civilisation in Post-War Queensland," in *Hot Modernism: Queensland Architecture 1945-1975* (London: Artifice, 2015), 88-89.
- 8 Van der Platt et al, "Twentieth –Century (Sub)Tropical Housing," 88-89. First articulated by D.S. Littlemore. "Building in the Tropics," *Architectural Science Review* (November, 1958): 33.
- 9 Victor Olgay and Aladiar Olgay, *Application of Climatic data to House Design* (Washington DC: US Housing and Home Finance Agency, 1954), 10 cited in David Leatherbarrow and Richard Wesley, "Performance and style in the work of Olgay and Olgay," *ARQ* 18. 2 (2014): 171.
- 10 Olgay and Olgay, *Application of Climatic Data to House Design*, 10. Cited in David Leatherbarrow and Richard Wesley, "Performance and style in the work of Olgay and Olgay," *ARQ* 18, 170.
- 11 David Leatherbarrow and Richard Wesley, "Performance and style in the work of Olgay and Olgay," 170.
- 12 "Design for Climate," *Notes of the Science of Building* SB1 (August 1949); "Roofs, Ventilation and Insulation," *Notes of the Science of Building* SB3 (undated); "Thermal Considerations in House Design," *NSB* 35 (June 1965); Domestic Roofs – Forms and Features," *NSB* 37 (November 1955); "Natural Ventilation of Buildings," *Notes of the Science of Building [NSB]* 43 (February 1957); "Houses for Hot Climates," *NSB* 63 (January 1961); "Cooling the Home," *NSB* 75 (June 1963).
- 13 For instance, the Department of Architectural Science was established at the University of Sydney and from 1958 published research outcomes in *Architectural Science Review*.
- 14 Richard Blythe, "Science enthusiasts: a threat to Beaux-Arts architectural education in Australia in the 1950s," *Fabrications: The Journal of the Society of Architectural Historians, Australia and New Zealand*, 8. 1 (1997): 117-128.
- 15 *Cross-Section*, 153 (July 1, 1965) and *Cross-Section*, 154 (August 1, 1965).
- 16 *Cross-Section*, 153 (July 1, 1965): unpaginated; *Cross-Section*, 154 (August 1, 1965): unpaginated. Editorial comment in *Cross Section* is supposedly anonymous. The Queensland contributing editor to *Cross-Section* at this time was known to have been John Dalton. Dalton's papers contain copy text and correspondence with editors in Melbourne.
- 17 *Cross-Section*, 174 (April 1, 1967): unpaginated. Dalton, Queensland's anonymous contributing editor writes: "The need for cross section and warm air egress at roof level in Brisbane's Hot Humid Climate prompted the 'section' of these two houses."
- 18 Interview with Haig Beck conducted on January 11, 2013. *Digital Archive of Queensland Architecture*, <http://qldarch.net> (Accessed on March, 1, 2016).
- 19 Haig Beck, "John Dalton: Halls of Residence Brisbane, Qld. (1982)," *UIA International Architect: Detailing, National Identity and Sense of Place in Australian Architecture* 4 (1985): 52.
- 20 Judith O'Callaghan, "The New Suburban Dream: The Marketing of Pettit & Sevitt Project Houses," 1961-1978 ADDITIONS Proceedings to the XIXth conference of the Society of Architectural Historians, Australia and New Zealand, Brisbane: SAHANZ, 2002, 6.
- 21 O'Callaghan, "The New Suburban Dream," 6-7. Also Stephen Batey, "Carlingford Homes Fair 50<sup>th</sup> Anniversary Tour," *Postcards Architecture AU* <http://architectureau.com/articles/carlingford-homes-fair-50th-anniversary-tour/> (Accessed on April 12, 2015).
- 22 Ken Woolley, "Architect's Own House, Mosman (Wilkinson Award 1962)," *Architecture Australia* 52 (December 1965): 75-70; Peter Johnson, "Architect's Own House, Chatswood," *Architecture Australia* 52 (December 1965): 80 -83.
- 23 Philip Goad, "Bringing It All Home: Robin Boyd and Australia's embrace of Brutalism 1955-1971" in *Fabrications* 25, 2 (June 2015): 189. Goad examines arguments previously forwarded by Jennifer Taylor and Robin Boyd.
- 24 Philip Goad, "Bringing it all home," 208.
- 25 *Cross-Section* 133 (November 1963): unpaginated.
- 26 *Cross-Section* 153 (July 1965): unpaginated.
- 27 Noel Robinson, "Dalton Houses 1956-1975: an exemplar for Brisbane's domestic architects?" B. Arch. diss. University of Queensland, 1976. Jacobson's Soholm Row Houses were completed between 1945 and 1955.
- 28 John Dalton referring to roof-scape in, "John Dalton : Halls of residence Brisbane, Qld. (1982)," *UIA International Architect: Detailing, National Identity and Sense of Place in Australian Architecture*: 52.
- 29 Necdet Teymur, *Environmental Discourse: a critical analysis of 'environmentalism' in architecture, planning, design, ecology, social sciences and the media* (London : Question Press, 1982), ix - x. Jens Ivo Engels "Modern Environmentalism," in Uekoetter Frank, *The Turning Points of Environmental History* (Pittsburgh: University of Pittsburgh Press, 2010), 119; Peter Hay, *Main Currents in Western Environmental Thought* (Sydney: UNSW Press, 2002), 1.
- 30 Howard Tanner, *Australian Housing in the Seventies* (Sydney: Ure Smith, 1976). Betty Churcher, *Understanding Art: The use of space, form and structure* (Adelaide: Rigby, 1973).

- 31 Leatherbarrow and Wesley "Performance and style in the work of Olgay and Olgay," 169, citing Joseph Rykwert 'On the High-Tech Style in Heaven and Earth' in *Wolkenkuckucksheim* 12: 1 (August 2007): 3. In this paper Rykwert postulates that 'style' has three key characteristics; that it is comprised of elements that are 'visibly evident', capable of being 'catalogued,' and 'summed up, imitated and even applied.'
- 32 Interview with Gabriel Poole and Lindsay Clare at the office of Tim Benetton, 2.11.2015.
- 33 <http://gabrielpoole.com.au/portfolio-view/dursley-house-1976-1983/> accessed 27.01.2015
- 34 Haig Beck and Jackie Cooper, "Andresen O'Gorman Works 1965-2001" *UME* 22: 2, 4-7.
- 35 Julie Willis and Philip Goad, "A Bigger Picture," *Fabrications: The Journal of the Society of Architectural Historians, Australia and New Zealand* 18: 1 (2008): 7-8.
- 36 This interest is evident in the publication of books including Philip Cox John Freeland, *Rude Timber Buildings in Australia* (London: Thames and Hudson, 1969).