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Engrained Modernity: Robin Gibson's Pinkenba Grain Elevator

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Abstract

In 1966, four concrete wheat silos and one grain elevator were erected by the Queensland State Wheat Board in Pinkenba, an industrial suburb near the mouth of the Brisbane River. The distinctive complex (known collectively as a grain elevator) was designed by consulting architect Robin Gibson (1930-2014). Although primarily a machine of industry, the static monumentality of the grain elevator has lent them particular building-like qualities which has historically attracted architectural interest. In the early 20th century, European protagonists of the modern architectural movement including Walter Gropius and Le Corbusier circulated images of North American grain elevators in key publications. Their understanding of the type was derived solely from a reading of these images, and consequently the functional aspects of the grain elevator are not considered in their texts. This has since been regarded as a betrayal of modern architectural values by architects such as Melvin Charney and Reyner Banham, who argue a pragmatic understanding of the type was of greater value to architectural theory. While the discourse has struggled to reach a consensus on the correct interpretation of the type, Gibson carefully responded to both formal and functional considerations in the design of the Pinkenba grain elevator. This resulted in a unique variation of the type which is both functional and distinctly architectural. However, as the main publication of the project was heavily image based, it is at risk of being considered for its form alone. This paper will thus explore the functional aspects of the complex critical to an understanding of the scheme. The Pinkenba grain elevator is not a project typically associated with Gibson's work but marks a turning point in his career as the practice moved to larger, more complex commissions. This paper will also discuss the influence of the scheme on Gibson's later works.

Introduction

In 1966, a bulk grain handling facility consisting of four concrete wheat silos and one grain elevator, was erected by the Queensland State Wheat Board in Pinkenba, an industrial suburb of east Brisbane.[1] These facilities are known collectively as grain elevators in international discourse and although typically understood as the domain of structural engineers, the design of the Pinkenba complex was subcontracted to consulting architect, Robin Gibson (1930-2014). This was one of the first major projects for Gibson's practice, whose best known work is the Queensland Cultural Centre (1974-1998), located in South Brisbane. Prior to the Pinkenba grain elevator, Gibson had mainly worked on smaller commissions such as retail fit outs and residential works. A high degree of carefully detailed resolution was required for these projects, and as a result, Gibson refined a particular skill set of design versatility using a limited material palette and simple structural expression. By applying these attributes to the Pinkenba facility, Gibson endowed what was essentially a machine, with striking architectonic form.

Figure 1. Pinkenba grain elevator.
(Photograph by Lloyd Jones, 2017).

The Pinkenba grain elevator is part of a lineage of architectural curiosity with the type. In the early 20th century, several protagonists of the European modern movement used images of North American grain elevators in their publications as built examples of pure form. Walter Gropius is credited with the initial dissemination of these images which were later reused by the likes of Walter Behrendt, Eric Mendelsohn and most notably Le Corbusier in his seminal publication, *Vers une Architecture.*[2] Collectively, they embraced the unadorned, geometric forms of the grain elevator, which they upheld as visual primers for the modern architecture of the 20th century. However, as very few of the European modernists had actually visited a grain elevator, their interpretations were limited to descriptions of monumentality, rhythm and

form, for which they offer no functional explanation.[3] From the 1960s, architects such as Reyner Banham, Melvin Charney and William J. Brown criticised the modern architects' appraisals as one-dimensional. In their texts, they argue an understanding of the functional characteristics of the grain elevator is the correct interpretation of the type and provide an explanation of the internal mechanics and construction techniques of the grain elevator. Consequently, architects and critics have struggled to unanimously define the significance of the grain elevator in architectural theory.

Figure 2. A typical grain elevator, Biloela Queensland.
(Photograph by Lloyd Jones, 2017).

As the only known example of a grain elevator designed with direct architectural involvement, the complex at Pinkenba is a unique variation of the type. In the design for the Pinkenba complex, Gibson carefully responded to both formal and functional considerations. However, as the major publication for the project was a photographic book, the scheme is at risk of being interpreted through form alone, much like the modernists' reading of the grain elevator four decades previously. In reality, there were deliberate pragmatic objectives to the design that this paper will discuss. By positioning the Pinkenba complex as a balance between the theoretical positions of the European modernists and the later writers, this paper will offer a fresh perspective of the type in architectural discourse. It is not a project typically associated with Gibson's work but marks a turning point in his career as the practice moved from the domestic scale to larger more complex commissions. As a result, many of the architectural solutions first explored in the project reemerge in Gibson's later works.

Robin Gibson and the Pinkenba Grain Elevator

Robin Gibson studied architecture at the Brisbane Central Technical College and the University of Queensland where he graduated with a diploma in 1954.[4] He then travelled overseas and worked in London practices, James Cubitt & Partners and Casson Conder before returning to Brisbane in 1956 to establish an office under his own name. Initial projects for the firm were retail fit outs, including shops for Miss Shirley's Shoes, in the Brisbane CBD (1961) and Surfers Paradise (1964) as well as residential projects such as the Mocatta Residence located in Yeronga, Brisbane (1966). These projects demonstrated an interest in simple, but beautifully detailed architectural design for which Gibson received institute awards and local recognition. One of the first major projects for the fledgling practice was an administration building for C.I.G. (Commonwealth Industrial Gases) in Rocklea, Brisbane, opened in 1965. Built at a larger scale than his previous works, the C.I.G. Building is the first to expand Gibson's interest in formal architectural composition. On the project, Melbourne University publication *Cross-Section* writes, "The ordering of functions to effect architectural expression reinforced with apt detailing in an apparently effortless and simple manner is, of course, the result of tremendous care and attention."[5]

Prior to the Pinkenba grain elevator, Gibson had also undertaken a number of purely industrial projects for C.I.G. including an oxygen and acetylene manufacturing facility in Rockhampton (1965).[6] The ability to meet the quick construction cycles of industrial projects, as well as the interpersonal skills necessary to foster good client relationships were required to compete in this arena. These were both qualities Gibson had and as a result, it is not surprising that his office was engaged by the engineering firm, R.J. McWilliam and Partners as consulting architects for the Pinkenba project. R.J. McWilliam and Partners had been independently commissioned by the Wheat Board to design the facility and as Gibson used their firm exclusively as their structural engineers, former staff members of Gibson's office believed their commissioning as sub-consultant was simply a case of reciprocal business.[7]

At first glance, the grain elevator at Pinkenba resembles virtually every other example of the type built locally and internationally. It is comprised of the conventional elements in familiar forms - cylindrical concrete storage silos, a rectilinear conveyer gallery above and vertical elevator shaft at one end. Typical of Gibson's design process, the silos and elevator are not a radical departure from existing technologies and materials. The silos were constructed using the same slip form concrete construction technique used to erect grain elevators in North America since the 1900s and previously used in Queensland during the 1920s to erect a maize storage facility in Atherton.[8] Rather, Gibson's architectural contributions to the

Pinkenba facility were a series of subtle gestures that when combined resulted in an unusually sculptural solution.

In a typical grain elevator, the elements of the grain handling process are often clumsily stacked on top of one another. In some instances, other functions are even built within the concrete cylinders making it difficult to determine whether the silos contain grain, men or machinery.[9] Gibson's formal solution was to delineate each of the components of the grain handling process, giving them distinct significance within the overall composition. The shapes chosen to represent these processes were not arbitrary, and domestic forms previously used in the design of grain elevators such as pitched roofs and individual windows were abandoned in favour of strict geometries in line with the modern idiom. This was assisted by a fanatical approach to detailing typical of the office, which ensured each of the components were crisp in their resolution. In a particularly dramatic gesture, the waffle slab of the conveyer gallery is perched above the silos on four delicate conical supports giving the illusion that it is floating. The rigidity of this element contrasts with the sinuous forms of the concrete silos below adding to the visual interest of the complex. On the project, Australian architect Jennifer Taylor writes, "With this strictly practical exercise Gibson gave the buildings a raw strength that relates to the best of the industrial vernacular."[10]

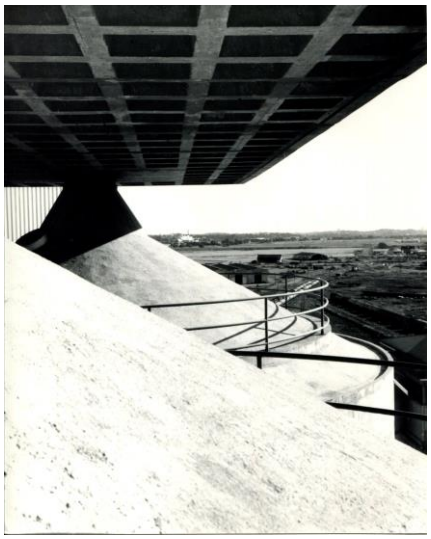

Figure 3. Under the Conveyer house of the Pinkenba grain elevator.
(Robin Gibson Collection, Fryer Library, University of Queensland Library).

The Pinkenba grain elevator was not well published when constructed.[11] The one major publication of the project was in English photographer, Harry Sowden's book *Towards an Australian Architecture* (1968), two years after Stage I of the complex was completed.[12] As a photographer new to the country, Sowden used the book as an exercise to meet architects

in a professional capacity and ultimately establish his business.[13] He selected projects from across the country of varying scales and types to include in the book, and the Pinkenba grain elevator was one of only two strictly industrial projects.[14] Photographed in black and white, and in the purest form of the original four grain silos with square conveyer gallery, Sowden's images are mesmerizing and celebrate the complex as a composition of pure, unadorned form. While a short blurb is included in the book, outlining some of the functional systems of the complex, it is the photographs that are most captivating. As a result the Pinkenba grain elevator has been considered in Australian architectural discourse almost exclusively for its exterior form alone. This interpretation of the grain elevator experienced through images with particular focus on monumental geometric composition, has historical precedence dating back to the origins of the modern movement.

Grain elevators as modernist rhetoric

Five decades prior to the construction of the complex at Pinkenba, images of grain elevators emerged in the publications of European protagonists of the modern architectural movement. Walter Gropius first used grain elevator images during a 1911 lecture and slide show, *Monumentale Kunst und Industriebau Lichtbildervortrag* [Slideshow Lecture on Monumental Art and Industrial building].[15] The use of photographs were a major component of this presentation and the grain elevator images were featured alongside photographs of other industrial buildings. Unfortunately, as senior architectural lecturer at the University of Brighton, Catalina Mejia Moreno, laments whatever spoken criticisms Gropius offered during the lecture, have been lost to the ephemeral space of the theatre.[16] However, Gropius' original lecture notes still exist, and translations are provided in Mejia Moreno's piece, such as the following,

> Corn silo of the Rolands Mill in Bremen by Hilderbrandt & Günthel. The ratio of height to width seems a little unfortunate. The drums are here out of sheet metal, while the latter out of concrete or brick. This should be mentioned precisely because also here the material is indifferent has little to say for the great monumental main form and the artistic rhythm.[17]

The aforementioned caption is one of the more detailed from the presentation which along with other quotes from the lecture, indicate that Gropius' experience of the type was restricted to an appreciation of the qualities of monumentality and rhythm – essentially what could be derived from a reading of the images. Function and even materiality are given supporting roles in the photographic composition of the grain elevator, much like Sowden would do with the Pinkenba facility five decades later.

Gropius' grain elevator images were later disseminated to a wider audience in his 1913 article, "Die Entwicklung Moderner Industriebaukunst" for the *Jahrbuch des Deutschen Werkbundes*.[18] Following this article, Le Corbusier 'borrowed' several of Gropius' images and republished them in the inaugural issue of *L'Esprit Nouveau* before introducing them to an international audience in the 1923 book, *Vers Une Architecture.*[19] Here, they are used exclusively to illustrate a chapter titled, "Mass" within a larger section, "Three Reminders to Architects".[20] Despite being mechanical objects, Le Corbusier, like Gropius, found architectural qualities of geometry and monumentality in the primitive forms of the grain elevator. The unadorned cylindrical towers of the storage bins along with the blocky shapes of the elevators and conveyer galleries were to Le Corbusier, the "correct and magnificent play of masses brought together in light" suggesting that the uncontrived beauty of these primary forms used by engineers to store grain, was proof that these same forms could be applied to any functional purpose to create beautiful architecture.[21] To reinforce this further, Le Corbusier deliberately manipulated the grain elevator images used in the book, using a gouache paint to remove entire roof forms and auxiliary structures when they were deemed at odds to the unadorned geometries he was promoting.[22]

While Le Corbusier must have understood that the purpose of the grain elevator is to store grain, the relationship between the functional characteristics of the type and the composition of form are not explored in *Vers une Architecture.* As the authors of seminal post-modernist book, *Learning from Las Vegas* observe, Le Corbusier "claimed the steamship and the grain elevator for their forms rather than their industrial image."[23] In *Vers une Architecture*, the captions accompanying the images label them as simply American or Canadian grain elevators and in some instances even these basic attributions have been found to be inaccurate.[24] The body of text is no more descriptive, and refers to them almost as an afterthought in self-assured uppercase as the "FIRST-FRUITS *of the new age.*"[25] Rather than provide pages of descriptive text, Reyner Banham suggests in his book *A Concrete Atlantis* that Le Corbusier believed, "the ultimate conviction, credibility, or reassurance lay in the pictures, not the words".[26] This reliance on photographic evidence has itself been considered a form of rhetoric as photographs were considered an impartial medium, which expressed the literalness of the industrial buildings being upheld.[27] However, later writers have used Le Corbusier's deliberate manipulation of the images to discredit the arguments of the modern movement and thus their formal interpretation of the grain elevator. As critic William J. Brown writes, "Here form was *made* to follow function, even if it was not the original intention of the engineer."[28] A shift in the discourse from the 1960s sought to explain these functional characteristics and reposition the grain elevator in architectural history.

Critique of the modernist architects

From the 1960s grain elevator writers have argued the one-dimensional appraisal by the European modernists was insufficient to accurately represent the grain elevator in architectural history. As cultural geographer George O. Carney argues, the farmers and grain elevator operators he met while working on the grain fields of North America as youth had, "never heard of Corbu or Gropius nor were euphoric that elevators were 'touchstones of modernity.'"[29] Texts such as Banham's *A Concrete Atlantis* explore the history of the grain elevator and explain how factors such as the liquid like qualities of grain and explosive characteristics of grain dust informed the development of the materials and forms used in their construction.[30] Banham argues these aspects were crucial to an architectural understanding of the type and is disappointed by the lack of acknowledgement of the importance of these qualities by the modernist architects writing, "I was struck by the cultural width of the Atlantic, by the sheer gulf of space and missed understandings that separates these structures… …from those who had never stood as close to them as I did and who admired their images under quite different lights.[31] While Banham's book encourages a more complete explanation of the type, his objectives were primarily to draw interest to the historical and architectural significance of the grain elevators in Buffalo, which by the 1970s and 1980s were now long abandoned monuments of industry and threatened by development. As such, he does not explain how the functional processes which he upholds as fundamental to the reading of the grain elevator could then be applied by architects in future designs.

One of the few architectural critics to address how a greater knowledge of the grain elevator could influence built architecture was Canadian artist and architect Melvin Charney. His 1967 paper titled, "The Grain Elevators Revisited" is also critical of the modernists' interpretation of the type and upholds the grain elevator as an exploration of technological process. Throughout the text, he questions whether the images supplied in the modernist publications when accompanied by such rudimentary explanations were actually capable of influencing physical structures writing, "Virtually none of the architects who admired them knew how they worked, and they were therefore unable either to appreciate their systems of organization or to draw conclusions that might have served them in their own designs."[32] He argues for a reappraisal of the grain elevator, not as a design image but as an understanding of the complex interaction between the components of the technological systems used to handle grain. This, he believed, was a far more valuable interpretation of the type, and had the potential to influence architecture in other areas writing, "but we must opt for them not as formal images. It is the process of which they are an image that is

important. In this way, the grain elevators may yet again suggest to architects a way out of their self-imposed limitations."[33]

Figure 4. Connections of the Pinkenba grain elevator.
(Robin Gibson Collection, Fryer Library, University of Queensland Library).

The grain elevator as industrial process

This understanding of process was fundamental to Robin Gibson's design for the Pinkenba grain elevator. While the grain silos are the major visual component of the scheme, they were perhaps the simplest element of the complex to realise.[34] The complexity came from positioning the critical components and designing the network of conveyers necessary to link the various mechanisms of the complex. Gibson's architectural role was to give form to the engineering diagrams and planning requirements for the facility which included infrastructure to unload wheat delivered by rail which had to then be stored and loaded onto ships at a later date.[35] To achieve this, Gibson rotated the elevator shaft 45 degrees to the main axis of the silos. This enabled simple right-angled connections with existing and planned components of the site such as weighbridges, dust collection facilities and additional grain storage without compromising the conveyers running above the storage silos. Gibson also understood that the design of the facility was not static and would evolve over time with the introduction of new grain handling technologies. Strategies were thus built into the initial programme that have allowed expansion to take place as the requirements of the complex changed. Between 1966 and 1972 the initial four silos were joined by a further eight and the grain conveyers extended from predetermined cut-outs in the rear of the conveyer gallery to service these silos.

As the only known grain elevator with direct architectural involvement, this project provides an opportunity to test Charney's arguments, that understanding the functional processes of the grain elevator has the potential to influence architecture in other areas. The Pinkenba facility was the first of Gibson's projects which was built at a scale large enough to experiment with the interlinking of a number of complex components. As Gibson's reputation grew, so did the scale and complexity of his commissions. As a result, the movement of people through these projects became a major theme in the institutional and cultural works dominating Gibson's career over the next thirty years. This is most evident in the Queensland Cultural Centre where large numbers of people were required to navigate the different cultural institutions with the added complexity of keeping them separate from heavy vehicle traffic on a busy urban site. To achieve this, Gibson designed a network of viaducts and passageways at various levels of the scheme, to ensure pedestrians were able to move between the major buildings of the complex with ease and safety. These viaducts are not hidden within the buildings but are instead expressive components of the design, such as the staircases of the Queensland Performing Arts Complex (QPAC) which are articulated on the building façade and add to the visual spectacle of visiting the theatre and the major pedestrian artery spanning the width of Melbourne Street linking the Queensland Art Gallery and Museum with QPAC. The expressiveness of these forms are not dissimilar to the network of conveyers used to articulate the movement of grain throughout the Pinkenba facility.

Figure 5. Staircase, Queensland Performing Arts Complex.
(Robin Gibson Collection, Fryer Library, University of Queensland Library).

Conclusion

Although primarily a tool of industry, the static monumentality and geometric form of the grain elevator lend them particular building-like qualities which for over 100 years has drawn

architectural curiosity. This curiosity has resulted in a discourse of conflicting opinions regarding the correct place the grain elevator should occupy in architectural theory. Fundamentally, the discourse focuses on balancing the value of the functional and formal characteristics of the grain elevator. Although the modernists' failure to grapple with the functional aspects of the forms appeared as a betrayal of the overarching values of the movement, their interest is not misguided. Grain elevators continue to be featured in architectural publications as objects of unadorned form including architect Phillip Cox and photographer David Moore's 1988 photographic book, *The Australian Functionalist Tradition* where grain elevators are referred to as an "unconscious aesthetic" that become objects of "strange beauty and awe" when placed in the Australian landscape.[36] However, as interest in the machine age waned in the post-war period, the orthodoxies and symbols upheld by the modernist architects were challenged in international dialogues. The grain elevator was one such casualty and several writers have argued that the grain elevator should be advocated as more than an object of formal curiosity. As David Tell muses, had Le Corbusier "not placed the painted photographs into the central chapter of his 1923 manifesto, grain elevators would never have become iconic."[37]

While the literature has struggled to reach a consensus between the formal and functional qualities of the grain elevator, the significance of Gibson's Pinkenba complex is the successful integration of these two characteristics. The compositional contributions of Gibson's input, combined with a rigorous attention to detailing using strong primary forms has ensured the Pinkenba grain elevator remains distinctively architectural within the industrial landscape at the mouth of the Brisbane River. Here the unadorned geometric forms advocated for by Le Corbusier are used consciously to reflect the streamlined efficiency of the grain handling process. These forms are beautifully captured in Sowden's book *Towards an Australian Architecture* and it is arguably for this reason that the project has been featured in later architectural publications such as Jennifer Taylor's *Australian Architecture Since 1960*.[38] However, it is equally important to consider the complex pragmatically. For Gibson's office, the project was primarily an exercise in functionalist planning, and the success of the scheme was wholly dependent on simplifying the movement and storage of wheat around the complex. This was achieved by deliberate strategies in Gibson's design and allowances in the program for expansion have ensured the project remains a key piece of infrastructure for its current owners.[39]

More than any other Queensland architect of the period, Gibson remained committed to the unadorned forms of the modern movement. From the late 1960s, these were increasingly realised using a béton brut aesthetic, first explored at the monumental scale in the Pinkenba

grain elevator. As the only known grain elevator with clear architectural input, the project offers an insight into how an understanding of industrial process can subsequently influence the design of architectural works in more traditional areas. Projects that followed in Gibson's oeuvre demonstrate an interest in expressing the circulation requirements of complex projects. His projects also reflect an interest in pragmatics and efficiency that have prompted contemporary architectural writers such as Robert Riddel to consider Gibson's work as exhibiting a "restrained modernism of functional quality without complexity."[40] Undoubtedly the Pinkenba grain elevator contributed to this legacy. For these reasons, the Pinkenba grain elevator occupies an important, yet overlooked place in Gibson's catalogue and marks a significant moment in the critical history of the grain elevator.

Endnotes

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[1] University of Melbourne Dept. of Architecture, "Wheat silos for State Wheat Board – Pinkenba", *Cross-Section*,169 (November 1966), 1.

[2] William J. Brown, "How Not to Read Pictures: The History of Grain Elevators in Buffalo, Photography, and European Modernist Architecture 1900 to 1930", *Communications,* 18, (1993), 223-233.

[3] Eric Mendelsohn is the only European modernist known to have made the pilgrimage to North America with the intention to visit the grain elevators. See - Mendelsohn, Eric, *Amerika: Biderbuch eins Architeckten,* (Berlin: R. Mosse, 1926).

[4] Michael Keniger, "Gibson, Robin", in Julie Willis, Phillip Goad (eds.), *The Encyclopaedia of Australian Architecture*, (Port Melbourne: Cambridge University Press, 2012), 271-72.

[5] University of Melbourne Dept. of Architecture, "CIG Building Rocklea", *Cross Section,* 155 (September 1965), 3.

[6] Unidentified, "Oxygen Compression Station at the Commonwealth Industrial Gases Limited Acetylene Works in Rockhampton, Queensland, 1965", State Library of Queensland Collection Reference: 6523 Royal Australian Institute of Architects Photographs and Plans.

[7] Personal communication with Bill Heather (August 2017); Personal communication with Allan Kirkwood (September 2017).

[8] "The Storage of Maize: Silos in Queensland", *Weekly Times,* (Saturday 2 August 1924), 27.

[9] Reyner Banham, *A Concrete Atlantis: US Industrial Building and European Modern Architecture 1900-1925,* (Cambridge Massachusetts, London England: The MIT Press, 1986), 153.

[10] Jennifer Taylor, *Australian Architecture since 1960*, (Sydney: Law Book, 1986), 124.

[11] The only known publication was in Melbourne University journal, *Cross-Section* ("Wheat Silos for Queensland State Wheat Board - Pinkenba." *Cross Section*, no. 169 (1966)).

[12] Harry Sowden, *Towards an Australian Architecture,* (Sydney, London: Ure Smith, 1968).

[13] Glen Murcutt interview with Adrian Boddy, in Adrian Boddy, *Max Dupain and the photography of Australian architecture,* Volume 2, Masters by research thesis, (Queensland University of Technology, 1996), 82.

[14] The other being a car factory in South Australia by Caradoc, Ashton, Fisher, Woodhead & Beaumont Smith.

[15] Catalina Mejía Moreno, "The "Corporeality" of the Image in Walter Gropiu Monumentale Kunst und Industriebau Lecture", *Intermédialités,* (2014), 24-25. doi:10.7202/1034165ar.

[16] Mejia Moreno, “Corporeality”.

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[18] Walter Gropius, “Die Entwicklung Moderner Industriebaukunst”, in *Jahrbuch des Deutschen Werkbunes,* (Jena: E. Diederichs, 1913).

[19] Le Corbusier, *Vers une architecture,* 1st ed. (Paris: G. Crès et Cie, 1924).

[20] Le Cobusier, *Towards a New Architecture*, Trans. Frederick Etchells, (London: The Architectural Press, 1946), 25-33.

[21] Le Cobusier, *Towards a New Architecture*, 31.

[22] Dave Tell, “The Rise and Fall of a Mechanical Rhetoric, or, What Grain Elevators Teach us About Postmodernism”, *Quarterly Journal of Speech,* 100, 2, (2014), 163-185.

[23] Robert Venturi, Denise Scott Brown, and Steven Izenour, *Learning from Las Vegas,* (Cambridge, Mass.: MIT Press, 1972), 136.

[24] William J. Brown, *American Colossus: The Grain Elevator, 1843 to 1943,* (Brooklyn, NY: Colossal Books, 2015).

[25] Le Cobusier, *Towards a New Architecture*, 33.

[26] Banham, *A Concrete Atlantis,* 230

[27] Brown, “How Not to Read Pictures”, 230.

[28] Brown, “How Not to Read Pictures”, 230.

[29] George O. Carney, “Grain Elevators Reply to Keith E. Roe”, *Material Culture,* 27, 3 (1995), 34.

[30] Banham, *A Concrete Atlantis,* 113.

[31] Banham, *A Concrete Atlantis*, 168.

[32] Melvin Charney, “The grain elevators revisited”, *Architectural Design*, (July 1967), 331.

[33] Charney, “The Grain Elevators Revisited”, 331.

[34] Personal communication with Bill Heather August 2017.

[35] Personal communication with Bill Heather August 2017.

[36] Phillip Cox, David Moore, *The Australian functional tradition,* (Victoria: Five Mile Press, 1988), 118.

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[38] Taylor, *Australian Architecture since 1960*, 124.

[39] GrainCorp, “GrainCorp, Pinkenba (Brisbane)”, www.graincorp.com.au/LiteratureRetrieve.aspx?ID=89217

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