A Rough Trade, how artisan ironworkers mediated architectural modernism: the 1897 Wesleyan Church, Darwin

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In 2001 the former Methodist church at the corner of Knuckey and Mitchell streets in Darwin NT, was dismantled, refurbished and re-erected on a new site in the Darwin Botanic Gardens. As well as being the oldest surviving church building in Darwin, it is a unique example of nineteenth century prefabricated steel framed building. The building was first erected at the Knuckey St. site in 1897. It was manufactured at a time when artisan craftsmen worked new materials of iron and steel with highly evolved handicraft skills, but had begun to make increasing use of machine tools. This continuation of artisan production into the late machine age, places it at odds with the process of modernisation Giedion describes in *Mechanisation Takes Command* and raises questions about the manner in which the application of the steel frame ‘modernised’ architecture.

Introduction

Crossick’s sociological study of artisan metal workers in South London between 1840 and 1880, and Porter and Livesay’s economic history of nineteenth century manufacturing in the United States, both show that ‘craft’ or ‘handiwork’ methods and organization persisted in the metal working trades, until the end of the nineteenth century. This mode of production is in marked contrast with the processes of modernisation described by Giedion in *Mechanization Takes Command*. In addition to bringing into question Giedion’s description of the process of modernization, the maintenance of a guild based, apprentice and master, style of industrial organization by nineteenth century ironworkers raises an argument against the claim that iron was a ‘un-craftsman’-like material, such as Ruskin’s claims in his book *Seven Lamps of Architecture*. 
Indeed, Donald Reynolds\textsuperscript{6} claims that the ‘specialised knowledge’ accumulated by artisans, such as engineers and founders engaged in metal construction in the nineteenth century, ensured their continued involvement in design and manufacture until late in the century. There is at least one documented example of an Australian manufacturing company established in the 1880’s by an English immigrant ironworker, Sidney Williams & Co., that continued producing prefabricated buildings, well into the mid twentieth century.\textsuperscript{7}

The artisan manufacturer played a crucial role in transferring knowledge of design in iron and steel to the architectural profession during the early stages of modernisation and this transfer was necessary if Mechanisation, as described by Giedion, was to occur in construction. In building construction, this process of knowledge transfer was to a large extent assisted by the fluidity of the architectural profession prior to the incorporation of the various state Architect’s Institutes and the consequent formalisation of architectural registration. Watson and Mackay remind us that in the nineteenth century, the term architect was often used only to “distinguish a building designer as distinct to a building contractor” and that entry into the profession could be via a period of articles, during which time the pupil undertook evening classes, or simply “by serving an apprenticeship and / or acquiring practical experience in a building trade”\textsuperscript{9}. The fluid professional environment in a rapidly developing colony, produced such prodigious characters as Martin W. Haenke; who after completing articles with the Architect Lloyd Tayler in Ipswich, Queensland, worked for a while in Melbourne. He then returned to Ipswich where he practiced as an “Architect and Electrician”. His business card also claims “Doctors electrical Instruments made to order”. He is also credited by Watson and Mackay with being a ‘furniture maker...building surveyor, colliery proprietor, and industrial chemist.”\textsuperscript{9}.

According to Reynolds mass production was largely dependent on the development of factory based methods of prefabrication, the standardization and interchangeability of parts and regular wages for factory workers. It was the combination of these which ‘made it possible to build serviceable structures without the direct participation of a trained architect”\textsuperscript{10}.

\textit{The building}

The prefabricated steel-framed Wesleyan church, was erected in 1897 at the corner of Knuckey and Mitchell streets in Darwin, Northern Territory. It was ordered to replace an earlier timber church, which had occupied the site since 1873, but was completely destroyed by a cyclone on the night of the 6\textsuperscript{th} January 1897.
The new church was sent to Darwin by sea and the components arrived in June 1897, only 5 months after the cyclone. Lewis speculates that the decision to replace the building in metal may have been made because of the risk of white ant attack and the perceived resistance of steel against cyclonic winds. The Wesleyans, as members of a missionary church, would have been experienced in establishing missions in remote locations under difficult conditions. This together with the remoteness of the settlement and the short period of time following the cyclone suggests that the church authorities may well have considered the likelihood of ‘post cyclone’ shortages of labour and materials, in making the decision to order a prefabricated steel building.

Robertson demonstrates that the importation of transportable metal buildings was typical Australian response in areas where labour or material shortages were evident, such as in Victoria, during the gold rush years from 1852-1854 or when a new area was opened for colonial development. The Sidney Williams Co., based in Rockhampton, was active in the prefabrication of metal buildings from the late 1890’s and extensive use was made of their locally manufactured prefabricated metal buildings throughout the thinly populated areas of pastoral Queensland and The Northern Territory of Australia.

Lewis tells us that the decision to build in metal was not ‘unusual’ at the time, and some of these prefabricated buildings reached a high level of sophistication. Several British firms are known to have prefabricated buildings that were sent to Australia, and other parts of the world, notably South Africa and South America. Some of these were quite large and complex. This peculiar export industry has been documented by several writers, notably Gilbert Herbert in his book *Pioneers of Prefabrication. The British Contribution in the Nineteenth Century*. Graeme Robertson also records the delivery of three iron churches manufactured by ‘Hemming’s Patent Improved Portable Buildings Manufactory’, at Clift House in Bristol; and Coppin’s *Olympic Theatre* building, erected in Lonsdale St. Melbourne in 1855, which appears to be one of the single largest iron prefabricated buildings imported. Pedro Guedes account of the imposing (but never to be erected) Toowoomba railway station, shows the sophistication of design that could be achieved by the manufacturers of these buildings. Robertson cites contemporary reports to show that huge profits were made on the supply of such pre fabricated buildings, in spite of contemporary accounts of their climatic unsuitability. This would have provided the impetus for artisan manufacturers, to diversify their business and to become importers and merchants of these buildings. Thus the Darwin Wesleyan Church building sits within firmly an established Australian practice of prefabricated metal buildings.

**Materials**

The building frame is fabricated from rolled steel “T” and “Flat” bar framing, with riveted spliced joints where necessary to extend the length of a member. The rolled T sections are
utilized as wall studs, with the flange of the T facing outwards to receive cladding. In places the flanges of the T sections have been skillfully slotted to receive a flat bar bracing member. The rafters ridges and wall braces are made from flat bar. Verandah posts are cast steel pipes with cast steel connectors at each of the post heads. These connectors are slotted to receive the Fascia, and at each corner, an additional slot is provided for the hip rafter. The framing is extremely lightweight and during restoration the contractor reported significant racking until the frame was again braced by the pressed steel cladding. The original cladding was manufactured from sheet steel pressed to resemble weatherboards. The roof is corrugated steel sheeting, though the original material had been replaced, probably during the 1940’s. The hip rafters are extended, and jack rafters are bolted to and extend outward from the top plate of the wall, to provide a continuous verandah on all four sides at the same pitch as the main roof.

From the eaves, at the end of the hip rafters, a ‘tie down’ chain extended to concrete anchor blocks, one at each corner. The roof sheeting was fixed using iron ‘hook bolts’, which hooked under the purlins, passed up through the roof sheet and was fixed by a nut. According to Lewis, while this provided excellent fixing of the roof against cyclonic winds, it was in fact a traditional 19C method of fixing roof sheets.

It is known, from Lewis’s 1989 report, that the building was erected in 1897, at the yards of A. Simpson and Sons in Wakefield Street, Adelaide, disassembled, and shipped to Darwin.

The erection and disassembly of prefabricated buildings was a technique used by building manufacturers to check of the fit and the presence of all members prior to disassembly and packing. It would also enable the packing and the numbering or marking of parts to proceed in reverse order. (Refer to figure 3). Graeme Robertson reports the use of such a technique in the yards of Mr. Hemming, in Bristol and the use of identification marks hammered into the posts and the matching column heads in this building (figure 3) indicates it was followed here. The development of architectural drawing standards was a necessary part of modernisation of construction. Assembly drawings for the early transportable buildings were not provided, and when supplied, the quality of those drawings varied enormously. Guedes, for example, reports that a set of comprehensive set of plans were provided for the Toowoomba station. The building was documented to the extent that the roof plan showed the location of each individually numbered corrugated roofing sheet. In contrast, Corio Villa, a remarkable example of design and foundry work, arrived in Geelong without plans nor delivery documentation. The components lay for some time arranged in a paddock, while the new owner worked out (incorrectly as it turned out) the assembly of the components.
The framing of the Darwin church is steel and not iron, and this places this building within a later period of ‘second stage’ industrialization, following the invention and commercialization of the Bessemer steel conversion process in the mid 1850’s. Thus the building dates from a time when the effects of Giedion’s mechanisation should have forced a move to capital intensive mass production. The conversion of manufacturing from cast iron to Bessemer steel occurred rapidly, but required massive investment in furnace technology. During this period ironworkers, when faced with the prospect of having to find large sums for capital investment, tended to avoid the move to become steel founders but became instead general engineers, or merchants of metal products, “ironmongers”. At the time of erection or the Darwin church, Simpson’s, a company now known for manufacture of appliances and white goods such as fridges and washing machines, was a foundry manufacturing a range of complicated castings, including among other things “…. Metalworker beds, safes, ovens, windows and enamelware” The artisans employed at Simpson’s were undoubtedly skilled in metal fabrication and casting. But although Lewis demonstrates that Simpson’s were known to have “erected prefabricated factory buildings in Wakefield Street in 1890’s” he could not conclude whether Simpson’s had made similar buildings to the Wesleyan church. From running an entrepreneurial environment of the highly skilled artisan shop, Simpson’s were able to become merchants, involved in import of buildings for resale. It is also conceivable that their ironworkers were skilled enough to copy imported buildings, or even design them themselves utilising imported ‘stock’ materials. In a workshop with skilled artisans, such work could be undertaken for small production runs (perhaps even to order), and the design and casting of small numbers of specialised components undertaken, as required.

Lewis states that the cast steel components of the Darwin church, were “very sophisticated” and from this he concludes that they must have been imported from some overseas source. Lewis’ comments were most likely directed toward the complicated column head castings, which incorporate slots to accept the hip and fascia members (figure 3). Such conclusions are understandable. The intense capitalisation required to establish a steel making plant, meant that it was not until 1900 that the first steel furnace commenced operation at Eskbank, in the Lithgow valley, NSW. In 1897, then all steel was imported. Further, the complexity of the casting where the hip meets the verandah post and fascia suggests parts designed for mass production and not a ‘one off’ building. However an alternative explanation is possible. Although no steel was made in Australia at the time, steel waste offcuts would have been readily available in a general engineering shop. The majority of metal workers then in the Australian colonies were immigrant craftsmen; predominantly originating in Northern England Scotland and Wales, where iron founding and steel making were established industries. In much the same way that steel making equipment and managerial expertise was imported, immigrant labour provided the skills capable of manufacturing of quite complicated castings. Robertson has documented cases in all of the Australian colonies where foundries had copied
imported iron lace panels and manufactured them in large numbers. But the local workshops contained highly skilled artisan innovators, capable of much more than producing copies of imported products. Sidney Williams, a young British immigrant ironworker, sometime gold miner, inventor and farmer, established *Williams Brothers* the Rockhampton engineering firm in 1879. The firm was financed using fees and prize money from his successful entrance in the architectural design competition for Rockhampton Boys Grammar School, a substantial masonry building constructed in 1880-1881. In 1880 the firm became Sidney Williams and Company. Williams, an apprentice ironworker when he immigrated, grew wealthy as a general engineer and contractor. Williams was the designer and manufacturer of the iconic Australian ‘Comet windmill’. His work testifies that skilled artisans could successfully design mechanisms and buildings of significant complexity, and with such skill, that in the years prior to various state Architects Acts, they could legitimately appropriate for themselves the title ‘architect’. The Sidney Williams Company he founded, successfully manufactured prefabricated buildings from the early 1890’s up until 1976.30

The castings at the Wesleyan chapel would not have been beyond the technical capacity of Australian artisans, particularly if scrap steel was available for reconversion and imported steel sections modified for the framing. This is a distinct possibility. Examination of column head castings while the building had been dismantled and the components available for close inspection, provides evidence in support of this speculation. The surface of the column head castings themselves is uneven and does not achieve the same level of finish as the other rolled or cast pipe components of the building. This is particularly noticeable with the 4 corner column head castings which were designed to receive the hip rafter. Though the component identification marks that appear on both the columns and the castings (visible in figure 3), indicate that they both emerged as building components, from the same small workshop.

The irregularities in the castings, which are otherwise of significant complexity, is consistent with a limited production run made, to order, by an artisan in a rudimentary or ‘general’ workshop. A more regular finish would be expected of a mass production item emerging from a specialised workshop using automated machine processes and mass production techniques servicing what would have been a world wide market. The remainder of the steel framing consists of manually modified flat bars and T – pieces, certainly not beyond the capacity of local ironworkers to cut to cut to length, shape and pre-drill, even in a small workshop. The hand fabrication of the building studwork and rafters, from rolled stock material cut to length, is evidenced by the connection of the steel T studs and the angled top and bottom plates. At the plates, each flange of the T, which faces outwards and would clash with the vertical leg of angle bottom plate, has been cut and removed and filed flat to the back of the T crossing. In addition the end of each rafter has been shaped at the end to suit the angle of the roof and wall junction. Thus we have
clear evidence of craft methods of manufacture of an industrialised building, in steel, quite late in the nineteenth century.

 Restoration

Over the years prior to its refurbishment, the technical significance of the Darwin church building largely went unrecognized. Changes in use of the building resulted in several substantial alterations and additions, which utilized ad-hoc building techniques such as timber framed ‘fibro’ transepts, (added in 1940), a loading dock and signage hoardings (added in the nineteen-sixties and nineteen seventies respectively). These alterations disguised the original form of the building and the varied palette of contemporary ‘vernacular’ construction materials, masked its age. Further, as the 20th century progressed the method of construction had itself become unremarkable alongside buildings of similar construction, which were much younger. This obscured the significance of the building’s structural framing and consequently the age and the technical significance of the building, were not generally appreciated.

The steel framed construction repositions this otherwise minor building within the narrative of architectural history as a work of ‘early modernism’. As such it becomes an exemplar of early prefabrication the use of industrial techniques and machine production.

Giedion understood that the changes that precipitated modernism in architecture were as much procedural and institutional, as technical or formal. And that an observer would not understand the effects (the forms) of mechanization, without understanding the both evolutions of technology and the underlying concepts which organized its forms and structure. He believed that new methods of production were inextricably “woven into the pattern of thought and custom”. Such issues are raised where ever traditional forms and techniques gave way to emerging processes and new materials, such as in the use of the iron and steel frame during the nineteenth century. Giedion claimed that modernisation required the elimination of complicated handicraft at the beginning of high mechanization and the move towards modern production. But the fact that components of the Darwin Wesleyan church were made and finished by hand, indicates the persistence of artisan methods of fabrication. This demonstrates that production does not progress directly to mechanised mass production, as Giedion supposed. The issues are thoroughly embedded in ‘contested’ definitions of what technology and progress entail and iron workers at the end of the nineteenth century, were at the forefront of this debate. The direct involvement of ironworkers with the new materials gave them technical mastery over an expanding ‘new technology’. When combined with a willingness to take on entrepreneurial role as merchants, this gave them both technical control over their work and access to accumulated capital. This enabled skilled and entrepreneurial artisans, to break through barriers of class and status in nineteenth century society but also to
maintain traditional forms of industrial organisation that preserved the flexibility and skill of artisan manufacture. Thus artisans such as Sidney Williams, M W Haenke and the Simpson’s were able to move in and out of the architectural practice, in days prior to regulation and to effect technology transfer within the fledgling architectural profession.

Giedion specifies that mechanization impacts on our intimate surroundings in three ways, the confusion of the environment, the counterfeit of handicraft methods and a degraded sense of materials. In each, the Darwin Wesleyan church demonstrates how artisan manufacturers resisted and mediated Giedion’s principles of mechanisation. As entrepreneurs and innovators, they were quite at home with increasing mechanisation of their workplace. Industrial reproductions of, say art, confuse our reference frameworks and undermine the traditional value systems that are used make the world intelligible. But in recreating the symbolic ‘church porch’ and in using a pressed steel ‘weatherboard’ profile for the cladding (rather than replicating a ‘high status’ material such as stone), the artisan clarifies the building’s position as a ‘modest’ public building constructed using limited means. The counterfeit or adulteration of handicraft methods, serves to promote consumerism, by degrading the ‘usefulness’ of an artefact, and instead inflates the symbolic associations which attach to it, in lieu. In this case, the interior of the church is unlined and both the industrial nature of its material and the workmanlike ‘handicraft’ process fabrication of the building, are clearly on display. This works against the industrial alienation bought about by mechanisation. And finally, in the Darwin Wesleyan Church, awareness of the properties of the steel framing and its appropriate use is clearly evident in the way that the amount of steel in the structure has been minimised. It is instructive, for instance, to compare the sizes of the original steel sections in the building (which had survived three major cyclones in its lifetime), with the new (and rather more substantial) ‘I beam’ portal frame, that were inserted to bring the steelwork into compliance with the current cyclone code.

Such artisan resistance to Giedion’s principles of mechanisation is not surprising. From the 1840’s onwards there was widespread reaction against the factory system of production and its consequences. Contemporary arguments ranged from calls for the reinstatement of the values of the guild system, such as mounted by Ruskin in The Stones Of Venice, to arguments for a new relationship between people, their goods and production; such as those advocated by William Morris, or Marx, in their critiques of the factory system.

Conclusion

At mid twentieth century, Gideon, in Mechanisation Takes Command accepted industrialization. But he sought to a new relationship with industrial production, one which recognized that production serves social as well as physical, needs. But Giedion
overlooked the type of relationship with production, which was successfully maintained by the ironworkers in Australia, at least until the 1870’s or 1890’s. The Darwin church shows that artisans successfully grasped the benefits of industrial production: high production volumes achieved through the utilisation of standardised materials, increased availability of goods, and low prices, in comparison with the labour cost. But, as shown by Crossick, alongside their increasing use of machine tools, artisans also strove to retain the guild structure of their industry which placed value on a high level of handicraft skill. This served to maintain both flexibility and the ability to solve new technical problems. It retained the skills necessary to produce one off items or prototypes, when necessary. The evidence form the Darwin Wesleyan church building shows that ironworker’s retained entrepreneurial and creative control over their industrial output much later than the move to steel production. It suggests that the development of a modern construction technology, did not follow the process of modernization suggested by Giedion, but was mediated by the artisan metalworker. High levels of production skill and entrepreneurial control over the technology made it possible for artisan craft designers to replicate aspects of traditional form, while simultaneously embracing new technology and production techniques. To trace Gideon’s idea of ‘anonymous design’ we must sometimes follow Walter Benjamin and look for the prehistory of modernism in semi obscure technological curiosities. The banal and ‘everyday’ may not, by themselves, appear to have transformed architecture. But such an approach would lead us to re-appraise more established ‘transformational’ examples canonised in the history of modernism, with insights obtained from the study of minor buildings like the 1897 Wesleyan Church in Darwin.

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Figure 1: The Wesleyan Church. Front view, 1956.
Photo courtesy of the Pearce Collection, Northern Territory Library.

Figure 2: The newly refurbished and relocated Wesleyan Church Darwin, 2002. Side and rear view.
Photo by the author
Figure 3: The column head castings, fitted to their steel pipe columns. On the left, a Corner post showing the casting slotted to accept both the hip rafter and fascia plate (refer to figures 4 and 5 below) and on the right the typical post head casting slotted to accept a typical fascia plate only. Notice the component identification marks clearly visible on the casting and the top of the pipe column of the ‘typical’ post. Photo by the author.

Figure 4 and 5 alternative views column head castings, (corner post). Photos by the author.
The writer thanks *The Architect’s Studio*, the Architects for the refurbishment project for access to their heritage study drawings and other records, and the contractor Mike Gentle, for access to the site during construction.


4 John Ruskin “...perhaps the most fruitful source of corruption which we have to guard against...I mean the use of iron”. Chapter 2, The Lamp of Truth, in *The Seven lamps of Architecture. Peoples Library Edition*, Cassell and Co. Ltd. London and New York, 1909 p. 75


7 Troppo Architects P/Ltd, *The Sidney Williams Hut. An information base on Sidney Williams & Co. & the Comet Building*. Darwin A report prepared for the NT National trust under the National Estate finance Assistance Program. 1992


9 Donald Watson and Judith MaKay 1994. P84


11 Architect’s Studio Pty Ltd *The former Wesleyan Church Building, Knuckey Street, Darwin, Northern Territory*, Report prepared for Heritage Branch, Northern Territory Government, Department of Lands Planning and Environment, September 1996. p16


15 Dr. Miles Lewis, Comments on Objections to Australian Heritage Commission to Proposed inclusion on the Register of the National estate. Darwin, Typescript held in the State Reference Library. Darwin 1989


17 Graeme Robertson, in *Decorative Cast Iron*, 1984 p.19


19 Graeme Robertson, in *Decorative Cast Iron*, 1984,p.20

20 Dr. Miles Lewis, ‘From Cyclones to Dyna Cycles’,1991.

21 Dr. Miles Lewis, ‘From Cyclones to Dyna Cycles’,1991p19, and Architect’s Studio 1996, p18

22 Dr. Miles Lewis, Comments on Objections to Australian Heritage Commission to Proposed inclusion on the Register of the National estate. Darwin 1989


25 for an account of the construction of Corio Villa, see Graeme Robertson , *Decorative Cast Iron*, p20-23

26 Dr. Miles Lewis, ‘From Cyclones to Dyna Cycles’, p. 19.


30 Troppo Architects P/Ltd., The Sidney Williams Hut. An information base on Sidney Williams & Co. & the Comet Building,1992
31 Dr. Miles Lewis, ‘From Cyclones to Dyna Cycles’,1991.
32 Sigfried Giedion, (1928, 95) Introduction by Sokratis Georgiadis (Trans. Duncan Berry), Building in France, Building in Iron, Building in Ferro concrete, Texts and Documents, Getty Centre for the history of Art and the Humanities, Santa Monica, California.
34 Seigfried Giedion Mechanisation Takes Command , 1982, 1948. p. 344