

PORTABLE BUILDINGS NEWS

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PORTABLE BUILDINGS WORLD HERITAGE NOMINATION TASK FORCE



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News

Broome Cable Station - our visit

John Walker

Robertson & Lister



Broome Cable Station, now Court House, roof space, November 2022: Tony Isaacson.

We are keen to engage and share with supporters , and researchers

<https://portablebuildingsaustralia.org>

portablebuildingsaustralia@gmail.com

Tony Isaacson, Convenor

OUR NEWS

Meeting with the Australian Heritage Commission chair

In mid-September Tony Isaacson and Miles Lewis, on behalf of the Task Force, met with the Hon Ted Baillieu, chair of the Australian Heritage Commission.

The chair undertook to promulgate the PBWHNTF Proposal amongst councillors at the Australian Heritage Council's October meeting in and assess interest and support for the proposal for World Heritage recognition of Australia's imported nineteenth century portable buildings and structures, and come back to the PBWHNTF. We await his response.



Taskforce inspect Broome Cable Station samples: Mary Lewis

Our visit to Broome and Derby

As a result of the sustained efforts of Rosemary Rosario, the Task Force's Janet Beeston, Tony Isaacson, Miles Lewis and Andrew Muir were finally able to make their long-planned trip to Broome from 28 September to 2 October. The main purpose was to inspect the former Cable Repeater Station, now Courthouse. We found much of interest, including that the building is framed in steel rather than iron making it a very early example for Australia. We report in detail in this issue.

We made a day trip to Derby to see the Singapore-built Emanuel house, which we have included in previous newsletters. We are only able to inspect exterior, as the owners are opposed to any heritage measures. We did, however, have a constructive conversation with one of them, Rick Hardy. The house has been extensively renovated, even 'rebuilt', but retains its original form, and the inspection supported that it is most likely a Singapore-sourced portable from the nineteenth century.

Writing to the Victorian minister

At the suggestion of the Chair of the Victorian Heritage Council, we wrote, in late October, to the Hon Lizzie Blandthorn MP, Minister for Planning, who is the minister responsible for World Heritage matters at a state level, to seek support and recognition.

Our letter coincided with the Victorian state election, and we look forward to the ministers reply now that the election has occurred, and her party returned to government.

New evidence on two iron buildings

Our Prof Miles Lewis presented the keynote address at the Park Life Symposium at the University of Melbourne on 4 November.

The very well received presentation included evidence that the ranger's house in Parkville, commonly known as the Walmsley House, was made by John Walker rather than by Benjamin Walmsley.

From further research subsequent to the symposium he has concluded that the building in the Depot of the Royal Botanic Gardens, which carries two Walmsey plates, is not a prefabricated building at all, but was a store building originally built at the Richmond Police depot. All this is explained in the article on Walker which appears in this issue.

Royal Botanical Gardens value this new understanding of their significant, albeit not portable building, and are currently sharing information on demolished and likely portable Royal Botanic Gardens glasshouses.



Walmsley Cottage, Royal Botanic Gardens Melbourne, March 2021: Tony Isaacson

Meeting with historical societies delivers new knowledge

With the Royal Historical Society of Victoria, we held a successful meeting with local Victorian historical societies on 24 August, in person and via zoom, and nineteen societies having one or more attendees.

We received a lot of new information from the societies in the follow-up, including:

- Vicky Sapkin of the Mornington & District Historical Society has informed us of a Japanese Tea House formerly at 'Wolfdene', Mornington, which seems likely to be the one now at 'Marina', which is on our list.
- Sylvia Black, Secretary of the East Melbourne Historical Society, has produced our first and only illustration of the Singapore cottage in Hoddle Street on its original site. Sylvia then personally researched the Singapore cottage once occupied by the McCrae family in Little Lonsdale St (long since demolished).
- Andrew Linden, a volunteer researcher, has established beyond reasonable doubt that the squatter Robert Patterson was the investor who imported and built about twenty iron houses in South Melbourne, including one that which survives at 399 Coventry Street and that which was moved to the Swan Hill Pioneer Settlement.
- Dr Rob Pilgrim has supplied photographs and information on the Swan Hill building, About it and the the South Melbourne houses, see the article on Robertson & Lister in this issue.
- Denise Raggatt, Secretary of the Balmoral Historical Society, has provided information on the iron shed at 'Indi', and is researching it further.

A number of the societies continue to investigate and research portables in their area.



'Wellington Parade, West Side and Hoddle Street, East Melbourne, 1870s', anonymous lithograph, State Library of Victoria H25131. The Singapore cottage at right.

Fyfe House, 8 Swanston Street, Geelong

Members of the PBWHNTF spent two days investigating 8 Swanston St, Geelong, after being contacted by the new owner and his project manager.

Alexander Fyfe imported building materials to Geelong in 1853 & 1854, including portable houses. He constructed Singapore Terrace on the waterfront in Geelong, consisting of nine attached two-story houses, and his own house was around the corner. The terrace burnt down in 1862, but the house survived. The two-story east building is constructed mainly from Singapore timbers, probably locally constructed, not a portable. The west single-story section is probably in part of the same period, but contains a mixture of Singapore and Australian hardwoods and European softwood. Our investigation findings align with Dr David Rowe's research documentation.

The house is, in our opinion, of State heritage significance, and warrants further protection and registration.

The Pine Creek Repeater Station is not a portable

In the last issue we reported on the National Trust owned Pine Creek Repeater Station. The National Trust had lost its files, and no research material could be located to substantiate the claims made for the building. Our research has now established that the published information is incorrect as to:

- the date of the building: not nineteenth century
- its being prefabricated
- its being of iron, as opposed to steel
- its original function
- the date of its removal to Pine Creek from Burrundie
- its functions when at Pine Creek
- its cultural significance

We will remove it from our list.

BROOME CABLE STATION INSPECTION



Broome Cable Station (now Courthouse), east face: Alan McLean.

By courtesy of the Department of Justice, and with the assistance of the Department of Planning, Lands and Heritage, and staff of the Broome Courthouse, the Task Force was able to make an inspection of most areas of the Broome Cable Station (now courthouse) on 29 September 2022. The inspection was possible due to extensive preparatory negotiations by Rosemary Rosario, the Task Force's Western Australia representative, whose efforts are most gratefully acknowledged. The four members who took part were Janet Beeston, Tony Isaacson, Miles Lewis and Andrew Muir.

HISTORY

For the history of the cable we rely upon John Phillips, 'History of the Broome to Java Submarine Telegraph Cable'. [1]

Broome was made the terminus of a new cable link from Europe to Western Australia which was constructed through Java, because the submarine cables to Darwin had been regularly broken by volcanic activity. The cable was laid from Banjoewangie, Dutch East Indies [Indonesia] early in 1889 by the Eastern Extension, Australasia and China Telegraph Company [EET Co]. The Cable Ship *Seine* left the Thames on 31 December 1888, carrying the ironwork for the building, and between 7 and 10 February 1889 took on a load of 'teak' at Singapore to complete it, and apparently a team of Chinese artisans to do the work. The cable was laid from the Banjoewangie end, and the ship reached Roebuck Bay, Broome, on 23 February 1889.

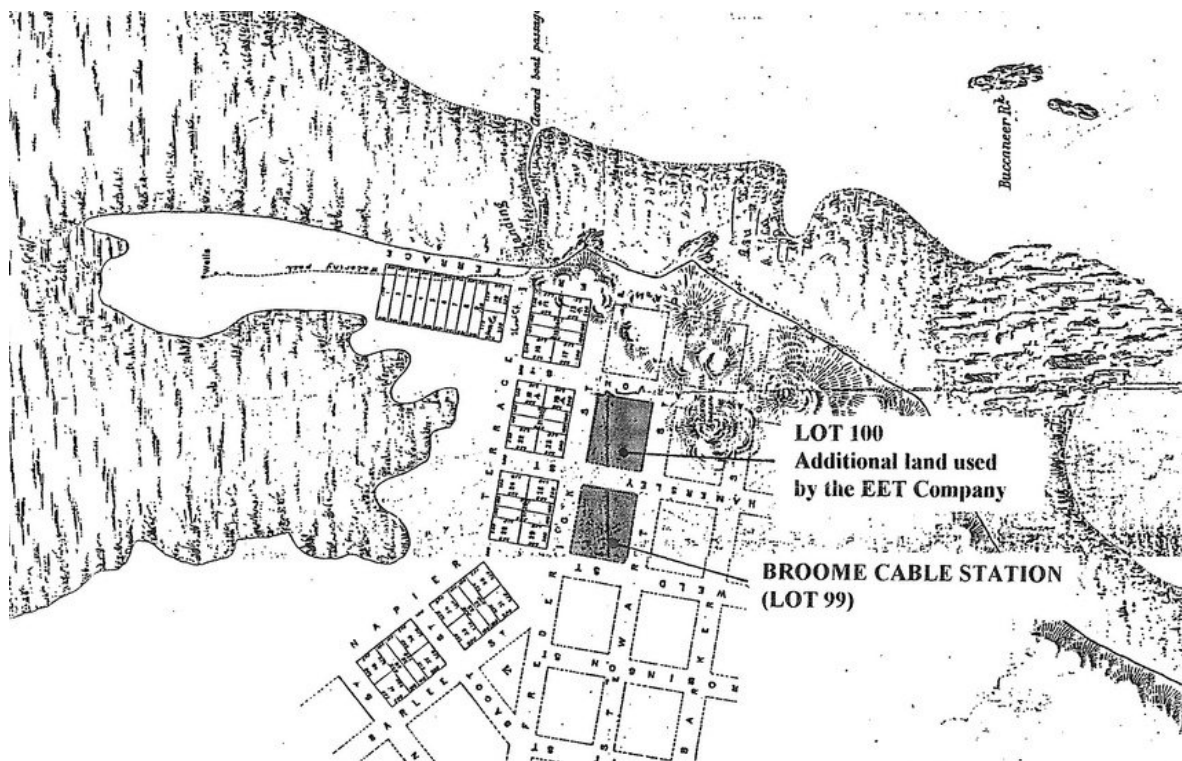
[1] John Phillips, 'History of the Broome to Java Submarine Telegraph Cable and Unveiling of the Commemorative Plaques', in a brochure, *Broome to Java Submarine Telegraph Cable Historic Engineering Marker Commemorative Plaque Unveiling Ceremony* (Engineers Australia, Perth 2006), p 3-7.

BROOME CABLE STATION INSPECTION

The cable was spliced on 26 February, but in the absence of wharfage the unloading of the building components was more of a problem. The *Seine* moored in Dampier Creek, on the eastern side of the Broome peninsula. A local pearling schooner, the *Sagitta* was engaged because of its much shallower draft, and the materials were transferred to it in stages. It then moved inshore at high tide and lowered the components overboard, to rest on the sandy bed until they were collected manually at the next low tide. The engineer reported that it was a pity to treat polished teak in this way, and that its appearance suffered, but no real harm was done. The *Seine* departed on 9 March, leaving Superintendent H W McPherson and a number of staff and tradesmen to complete the building and equipping of the Cable House and Cable Station.

The cable link from Europe to Western Australia through Java and Broome operated between 1889 and 1914.

For the history of the building we rely upon Rosario & Clement, 'Conservation Plan Broome Court House'. [2]

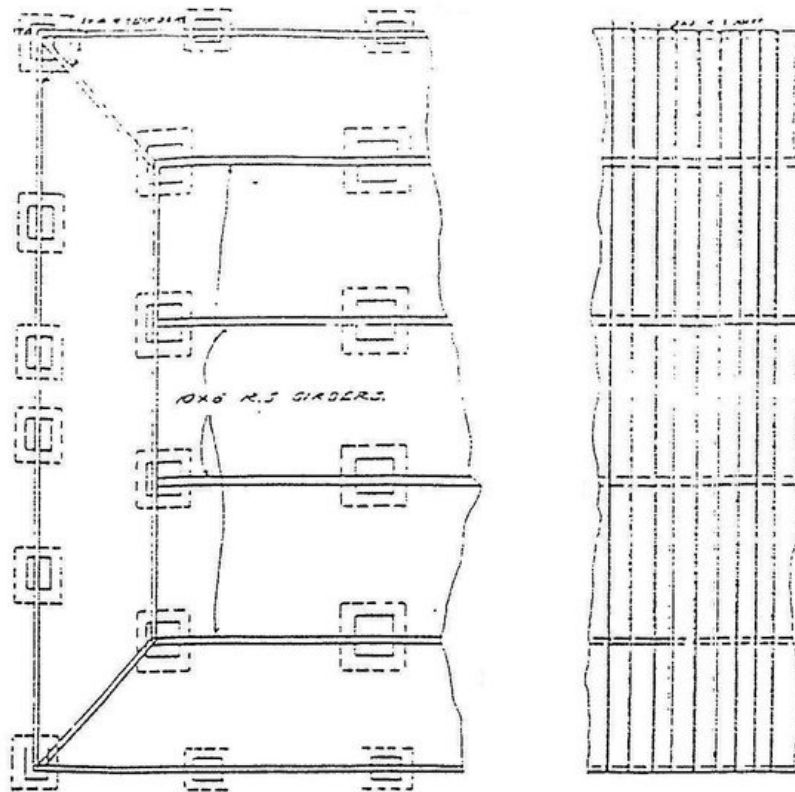


Town Map of Broome circa 1886 (Battye Library Collection), annotated: Rosario & Clement, 'Conservation Plan Broome Court House', p 6 [detail]

The *Seine* sailed from England carrying the new cable and the iron framework and fittings of the house designed for the Broome Cable Station. The ship anchored at Singapore for three days early in February, to take on coal, building labour and the woodwork for the cable station. The EET Co recruited at least 22 Chinese workers in Singapore, including a foreman builder, 11 carpenters, one stonemason and four masons, one general labourer and one cook, all engaged for eight months. A second cook and two 'boys' had contracts for three years. They all arrived in February 1889, ready to commence work. By November 1889, the staff had moved into the almost complete Cable Station.

[2] Rosemary Rosario & Cathie Clement, 'Conservation Plan Broome Court House (Former Cable Station)' [prepared for the Building Management Authority] (Heritage and Conservation Professionals, Perth 1995).

BROOME CABLE STATION INSPECTION



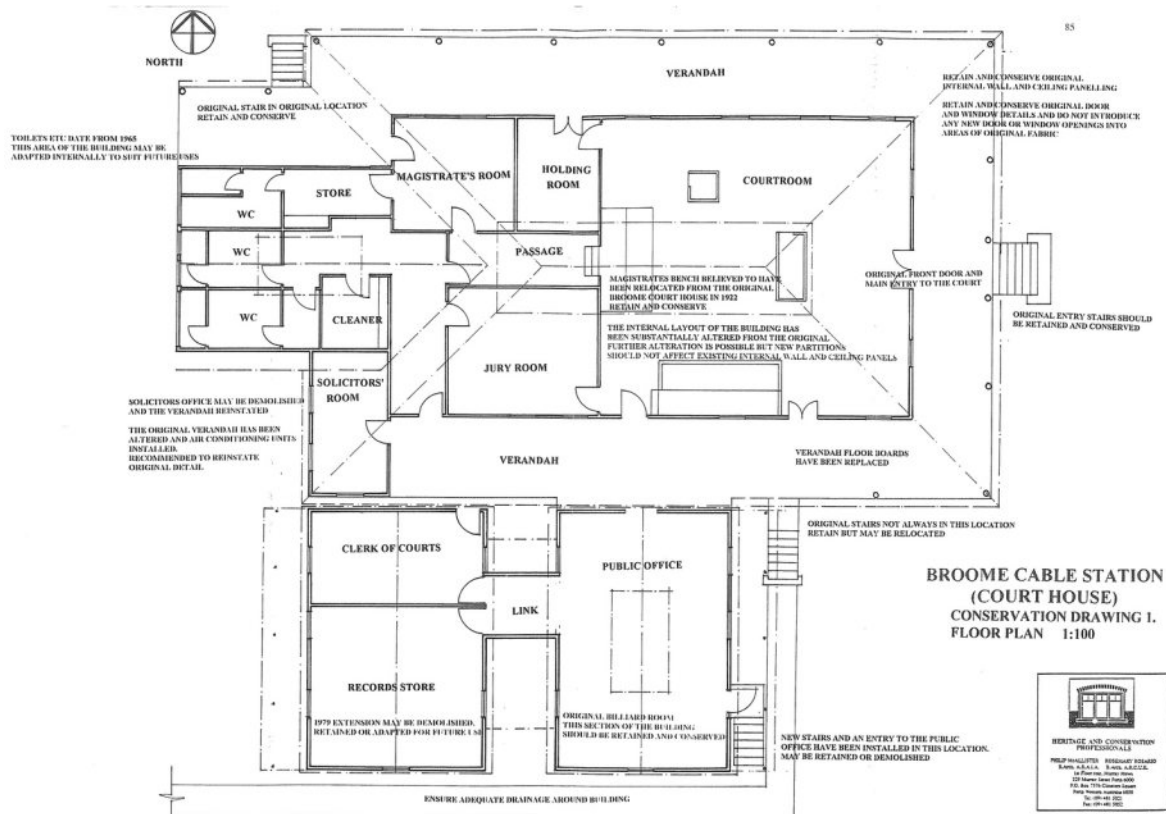
Sub-floor and floor structure from: 'Plan showing conversion of the Cable Station 1922' (Department of the North West WA drg no 108, PWD WA drg no 21441 [detail]).

The building was a rectangular structure under a hipped roof which extended over wide verandahs, with a block of living quarters at the west end, under a separate gabled roof structure. The verandah at the west end was not part of the original structure but an addition made some time before 1920. The main structure was on a grid of stone piers and supported on 10 x 6 inch [260 x 150 mm] beams. The roof structure consisted of trusses spaced at 13 ft (3.96 m) centres. Each roof section had a raised lantern in the centre for ventilation with louvered sides. The roofing consisted of two layers of corrugated iron supported on 2.5 inch (62 mm) iron angles. The building included a billiards room on the southern side, with a roof lantern which was shown in 1920 as a glazed skylight. There was a detached kitchen, with verandah, between the billiards room and the tennis grounds on the Stewart and Weld streets corner. [In this account we follow Rosario & Clement, but have omitted references to 'iron' which we believe should refer to steel, as discussed below, and have interpreted the word 'principals' as referring to the roof frame, not to columns].

In February 1921, seven years after the cable had ceased to function, the Western Australian government bought the Cable Station for £3000 and set aside £1100 for the conversion work. This included cleaning and repainting the exterior, repositioning internal walls and installing the Court fittings from the old Broome Court House. A new kitchen was constructed on the western end of the building. The new Court House opened on 6 September 1921.

In 1965 alterations were made, including the construction of solicitors' room on the southern side of the building, enlarging the jury room, and alterations to the courtroom, including the removal of the balustrade to the public area and the restoration of the magistrate's bench. The western section of the building was altered by the removal of the transit room which was under the extended south-western verandah of the building, and the construction of toilets. This entailed the removal of a section of the original floor and construction of a concrete suspended slab supported on the existing framing.

BROOME CABLE STATION INSPECTION



Conservation plan drawing 1: Rosario & Clement, 'Conservation Plan Broome Court House', p 85.

Further alterations to the building were undertaken in 1979, including an extension to the building on the south side and the installation of new plumbing. The extension was designed as a second structure located parallel and to the west of the original billiards room, now the clerk of court's office. It was designed to incorporate a new clerk's office and a records store, and the original billiards room was altered to create a general office, including the removal of a partition wall constructed in 1922. The new records store and clerk of court's office was constructed to match the detail of the earlier structure. The building has a steel structural frame clad externally with custom orb sheets. Internally it is lined with plasterboard, rather than the timber panelling used elsewhere. The detailing was as close as possible to the original, although the roof did not include a lantern skylight. A linking structure was constructed between the general office (former billiards room) and the new structure for the purpose of access. This was constructed with a flat metal deck roof. The construction of the new extension required only minor alteration to the original building, mainly the relocation of the steps to the solicitors' office from the south-west to the south-east.

INSPECTION

The evidence of the roof space is consistent with the documentary history. The roof of the west wing is continuous with that of the main building, and what is visible within it, as well the external materials and detailing, are similar. The materials of the original south wing (or billiards room) are also similar, and it appears that it was supplied as part of the same package, though not necessarily intended for this exact location.

BROOME CABLE STATION INSPECTION



Junction of the main roof and the west roof: Tony Isaacson.



Phoenix rolling mark on a steel rafter: Tony Isaacson

BROOME CABLE STATION INSPECTION



The floor structure: Miles Lewis.

The basic structure is substantially or wholly of steel, probably by more than one manufacturer. An angle iron rafter bears a rolling mark 'Phoenix', for the Phoenix Foundry, Derby UK. The subfloor members are universal I sections of up to 200 x 150 mm in size. A combination of sources was normal at the time. In the case of the Western Goods Shed of the Great Northern Railway, London, in 1897, the steel of the upper level columns, plate girders and openwork girders was from the Phoenix Foundry, and the steel for the flooring and the joists under the cart roads was from Dorman, Long & Co of Middlesborough.[3]

This raises the question of whether this is a steel building to which timber has been added, or a building designed from the outset in both materials.

The latter appears to be the case. The top plates of the wall, which can be seen from the roof space, are of timber. This suggests that all the framing between the columns is of timber, and without this timber there would be nothing to which the corrugated iron sheets could be attached. The interposition of timber into the steel structure at the corner of the verandah roof, discussed below, supports the same conclusion. The steel components alone do not constitute a self-sufficient building.



A window, interior face: Miles Lewis.

[3] Eileen Chanin, *Capital Designs: Australia House and Visions of an Imperial London* (Australian Scholarly, North Melbourne 2018), p 209.

BROOME CABLE STATION INSPECTION

This is confirmed by the fact that the door and window joinery, which was presumably made in Scotland, is designed to fit over the timber lining, and by the timber plates in the verandah roof structure, discussed below.

The three inch [75 mm] lining boards of the floor and ceiling, the floorboards, and most of the other wooden elements are meranti or similar Malay timber.

We know that the Cable Ship *Seine* left the Thames on 31 December 1888, carrying the ‘ironwork’ [steelwork] for the building, and between 7 and 10 February 1889 took on a load of ‘teak’ at Singapore to complete it, and a team of Chinese artisans to do the work. Given the time frame there can be little doubt that this timber had been ordered in advance and was an integral part of the design.



The court room, showing the cover strap which divides the ceiling in a north-south direction, not on the line of any known partition: Miles Lewis.

Within the main building the most significant plan change has been the removal of the partition walls defining five rooms and a passage, so as to create the present almost square courtroom. However it seems likely that these were lightweight partitions which did not reach full height. On plan, one of the former partitions appears to have finished on the centre of a window opening, which seems unlikely to have been envisaged in the original design. The ceiling shows no evidence of any partitions, and consists of 75 mm boards running longitudinally in two lengths, with a transverse cover strap. The strap appears to be placed to suit the length of the boards and does not correspond to the line of a partition.

The building is carried on 1.2 metre stumps or piers built of local stone, consistent with the fact that a stonemason and four other masons were amongst the artisans who were brought from Singapore.

The substructure of the floor is of universal steel sections, as referred to above, and no rolling marks are visible.



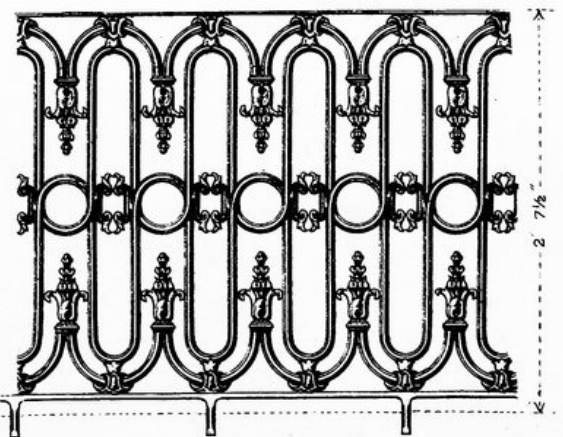
The main stair and the former south-west stair, now at the south-east: Miles Lewis.

BROOME CABLE STATION INSPECTION



Detail of the main stair: Miles Lewis.

There are three stairs, the main one being of double width with the same tread components, but supported by a beam at the centre. They were probably from Macfarlane's Saracen Foundry like the balustrade, below. One stair has been relocated.

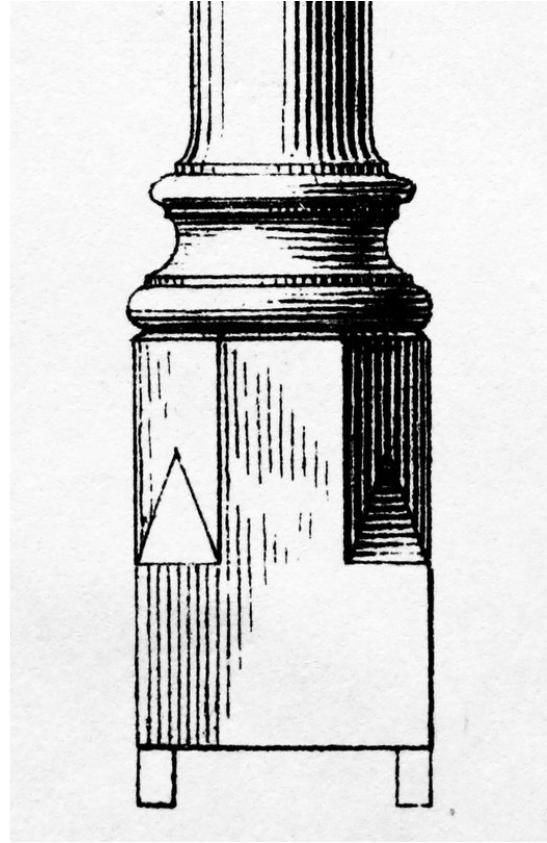


Balustrade of the Cable Station: Miles Lewis.

Walter Macfarlane & Co, *Illustrated Catalogue of Macfarlane's Castings* (6th ed, 2 vols, Glasgow, no date [1882]), 1, p 231, no 299

The cast iron verandah balustrade was probably made by Walter Macfarlane's Saracen Foundry, Glasgow, and is a slightly simplified version of a pattern found in their catalogue.

BROOME CABLE STATION INSPECTION



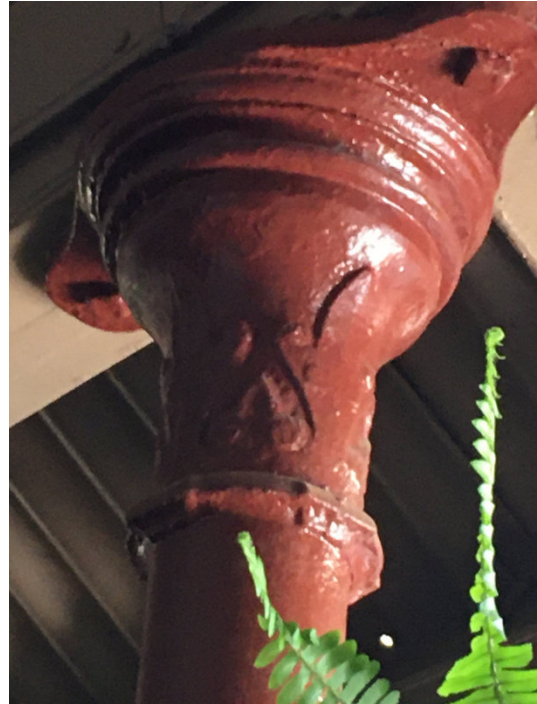
Column base at the Cable Station: Miles Lewis.

A Macfarlane column base: Walter Macfarlane & Co, *Illustrated Catalogue of Macfarlane's Castings* (6th ed, 2 vols, Glasgow, no date [1882]), 2, p 578, no 114.



Brady's plaque on a column base at the Cable Station: Miles Lewis.

BROOME CABLE STATION INSPECTION



Verandah column capitals: Brian Kidd, Mary Lewis.

The verandah columns are also of cast iron, and the broached form of the base bears some resemblance to a pattern by Macfarlane, though this is not sufficient to base any conclusion upon it. There are two patterns of column, one for general use and one for corner positions. A number of them carry the maker's mark, which has been recently cleaned to make it legible:

FRED BRABY
& Co LD
CONTRACTORS
GLASGOW

At the capital of the column is a fleur-de-lys ornament.



Detail at the corners of the verandah roof: Brian Kidd, Miles Lewis.

BROOME CABLE STATION INSPECTION



Roof space: Tony Isaacson.



Market building roof, Georgetown Penang, by Andrew Handyside & Co of Derby, undated,: Peter Romey.

BROOME CABLE STATION INSPECTION

The top chords are T sections. The struts on either side are angles and ties are rods. The ridge junction is a gusset plate carrying eight bolts; the connection of the four bars on either side is made with an oblong plate with three bolts. Below the end roof peak semicircular horizontal plates at the upper and lower level connect the multiple members.



Upper and lower junctions below the roof peak: Tony Isaacson.



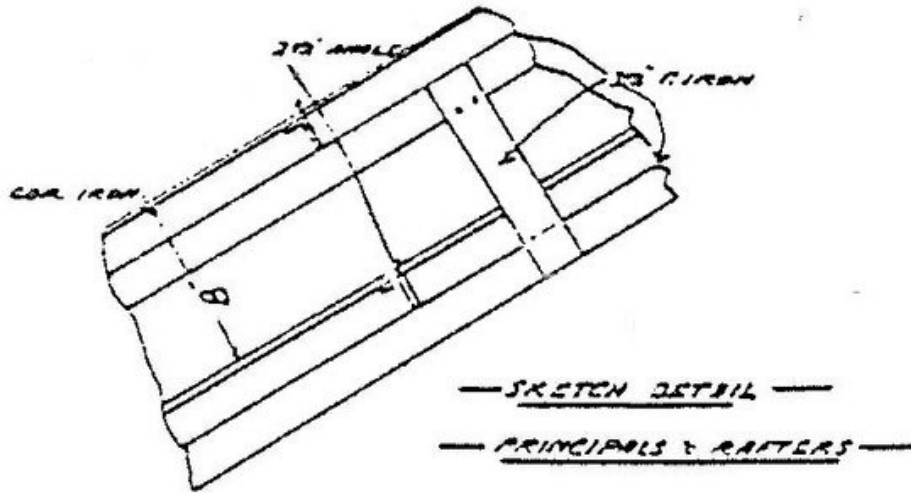
Truss bottom chord panel point: Tony Isaacson.



Hanger beam: Tony Isaacson.

BROOME CABLE STATION INSPECTION

A timber hanger beam carries painted lettering 'KBC/BME No 7'. The lettering is upside-down, indicating that it was applied prior to the use of the beam in its current location. This may represent Kimberley Broome Court/Broome, and the number identifying a bundle within the consignment. The beam is not original as (a) it is of jarrah, and (b) it supports a ceiling of fibrous plaster, a material not in use in 1889. It probably dates from 1922.



Section of roofing: 'Plan showing conversion of the Cable Station 1922' (Department of the North West WA drg no 108, PWD WA drg no 21441 [detail]).



Interstitial roof space: Tony Isaacson.

The roof is double, as indicated on the 1922 drawing.



Empress brand on the lower layer of corrugated iron: Janet Beeston.



Braby's Empress brand as used on his patent steel baths: *Frederick Braby & Co.* 1883 [spine title] (no publication details), p 108.:

Although the upper layer of corrugated iron has been replaced, the lower layer is original, and is marked

[annulus with upward arc]

EMPRESS

[and downward arc]

BRAND

inside the annulus a face in profile looking left (presumably Queen Victoria)

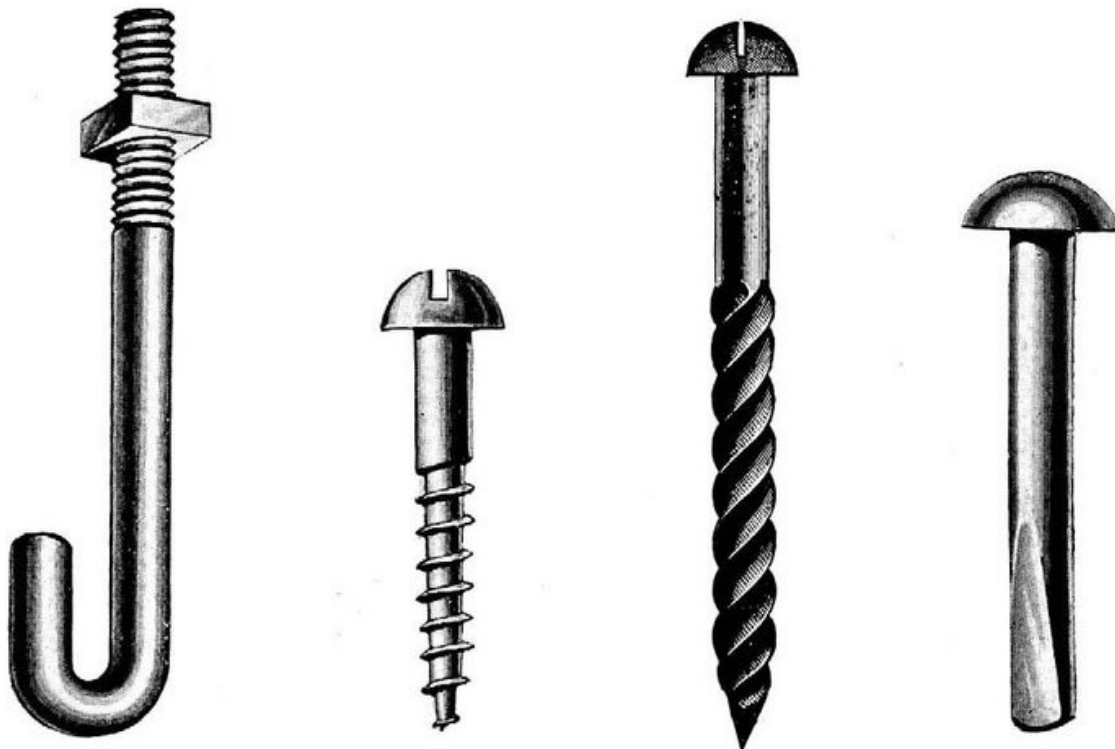
This brand has not previously been reported, but as Braby was a corrugated iron manufacturer it is presumably his. Indeed he used an Empress brand on his patent steel baths, though the image within the corrugated iron brand was not the same one. Braby's usual corrugated iron brand, Sun, is found fairly widely in Australia. Others were Castle, found only once, and Cedar, not so far found at all. The Empress brand was probably introduced in about 1876 when Queen Victoria took the title 'Empress of India.'



Hook bolt roof fixing: Miles Lewis.



Hook bolts from the roof: Miles Lewis



Braby's hook bolts and other roof fixings: Fredk. Braby & Co. Ltd., Braby's *Handbook for Engineers and Architects* (2nd ed, Fredk. Braby & Co. Ltd, London, no date [c 1913])

The corrugated sheeting is fixed to the steel framing with hook bolts. As Braby advertised and possibly manufactured hook bolts, these seem certain to be his product.

A number of flat sheets of zinc showing evidence of contact with spaced apart boards were found in the roof space. These possibly formed drip trass beneath one or more header water tanks within the roof, since removed.

BROOME CABLE STATION INSPECTION



Cable equipment found below the floor: Tony Isaacson.

Below the floor are three devices, apparently for winding or straining cables. These presumably relate to the original function of the building, and one carries lettering which possibly reads.

B
..TH&Co..

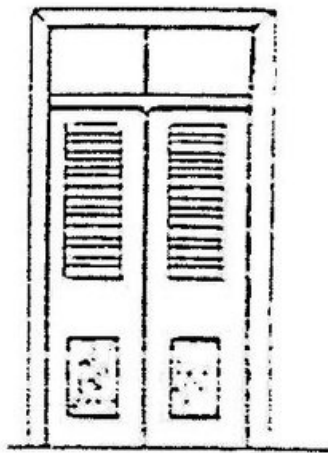
This probably means British Thomson-Houston, pioneering electrical engineers. They traded under that name only from 1894, which would indicate that this equipment is not from the original installation, but should be preserved.

CLIMATIC DESIGN



The ventilating lanterns: Miles Lewis.

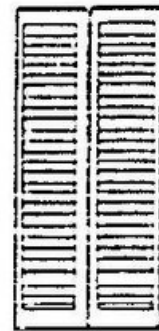
Both the EET Co and Frederick Braby had previous experience in building for hot and tropical climates, and there is no doubt that careful consideration was given to this aspect. The building has a wide verandah, double roofing and ventilating lanterns. Its elevation on stumps, about 1.2 metres high, was also relatively unusual at the time, and seems to have been always envisaged in the design, as flights of steps appropriate for this height were provided.



elevation of front doors



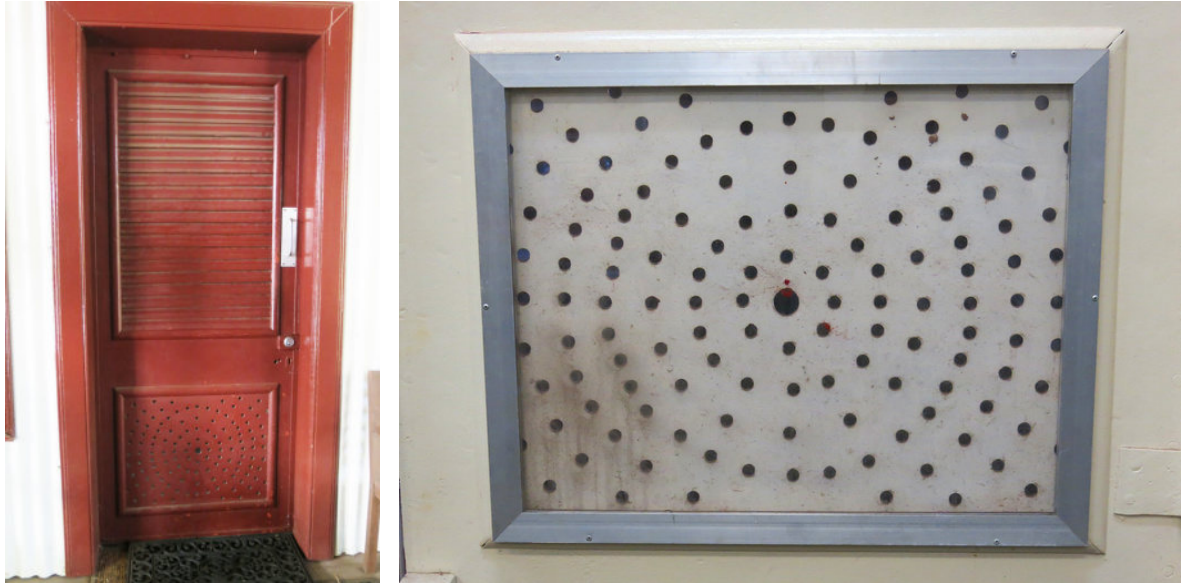
elevation of 'casements'



elevation of steel shutters

Cable Repeater Station, Broome, doors and roof structure: 'Plan showing conversion of the Cable Station 1922' (Department of the North West WA drg no 108, PWD WA drg no 21441 [reformatted details].

BROOME CABLE STATION INSPECTION



Doors with perforated panels: Miles Lewis.



Metal window shutters: Janet Beeston.

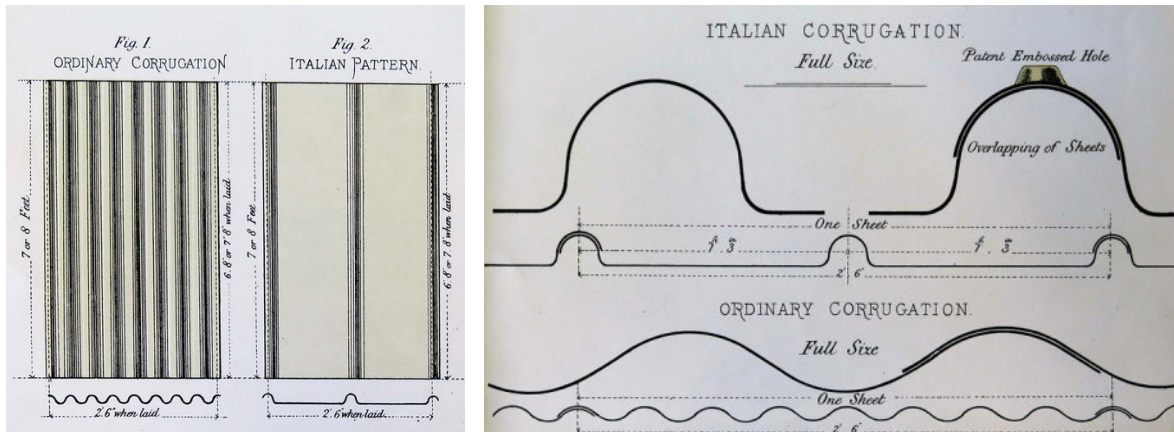
A number of the doors are louvred and/or have bottom panels with a circular pattern of perforations to allow through ventilation, and the windows mostly have louvred metal shutters.

The use of hook bolts to fasten the roofing iron onto the purlins, which is sometimes seen as an anti-cyclone measure, was in reality a fairly standard way of dealing with problem of fixing to a wrought iron, or later a steel member.

A newspaper report in 1890 praised the buildings of the Cable Telegraph Company ‘as a pattern and example to this Colony, being built expressly in such a manner as to suit the climate and allow as much comfort to their inmates as is possible, in these trying tropical regions.’[4]

[4] Inquirer and Commercial News [Perth], 18 April 1890, p 4.

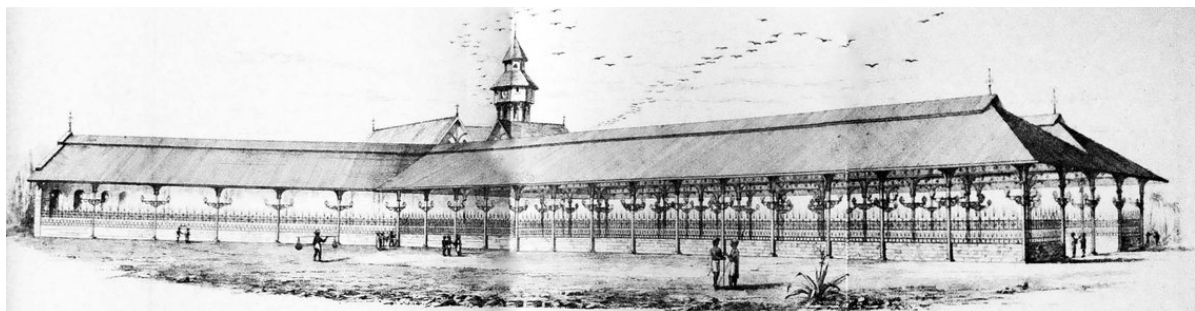
APPENDIX: FREDERICK BRABY



Corrugated zinc compared with 'Italian-formed' or Italian pattern zinc roof sheeting Frederick Braby & Co., *Instructions for, and Examples of, the Application of Zinc, &c* (Braby, London 1869) details of plates A and C.

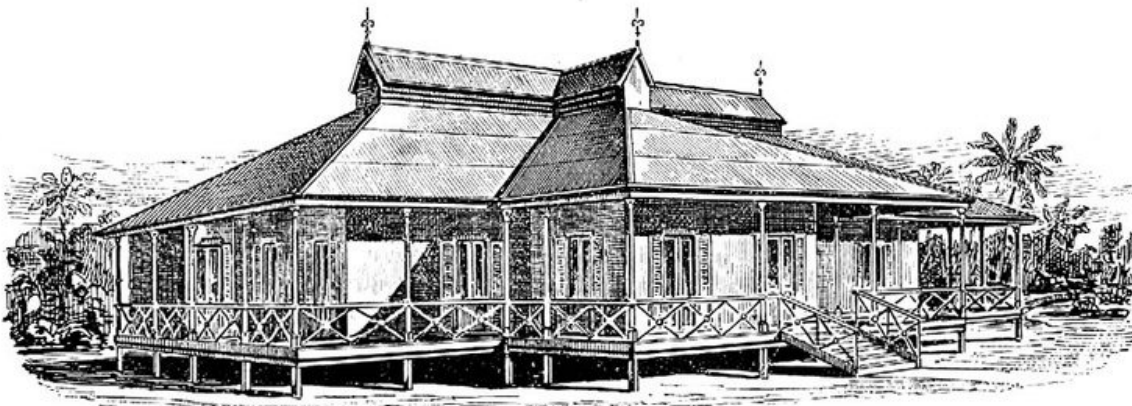


Terminal Station, Ipswich, Queensland, designed by Sir Charles Fox & Son, commissioned by J & R Fisher of Westminster, and possibly fabricated by Frederick Braby & Co, 1868. *Illustrated London News*, 10 October 1868, p 364.

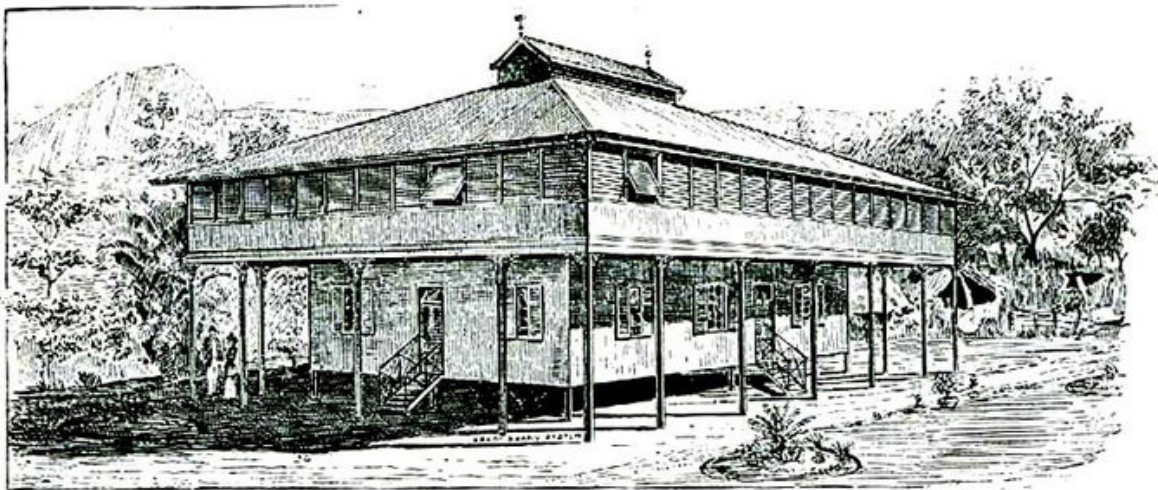


The Bombay Market, roof by Frederick Braby & Co: Fredk. Braby & Company, Ltd. Engineers and Contractors, *Designs of Iron Buildings, Roofs, &c. of Various Descriptions, Suitable for Private and Public Purposes* (Braby, London 1873), plate 41.

BROOME CABLE STATION INSPECTION



'Telegraph station building': Fredk. Braby & Co. Ltd., *Braby's Handbook for Engineers and Architects* (2nd ed, Fredk. Braby & Co. Ltd, London, no date [?c1913], p 95.



'Tea house': Fredk. Braby & Co. Ltd., *Braby's Handbook for Engineers and Architects* (2nd ed, Fredk. Braby & Co. Ltd, London, no date [?c1913], p 94.

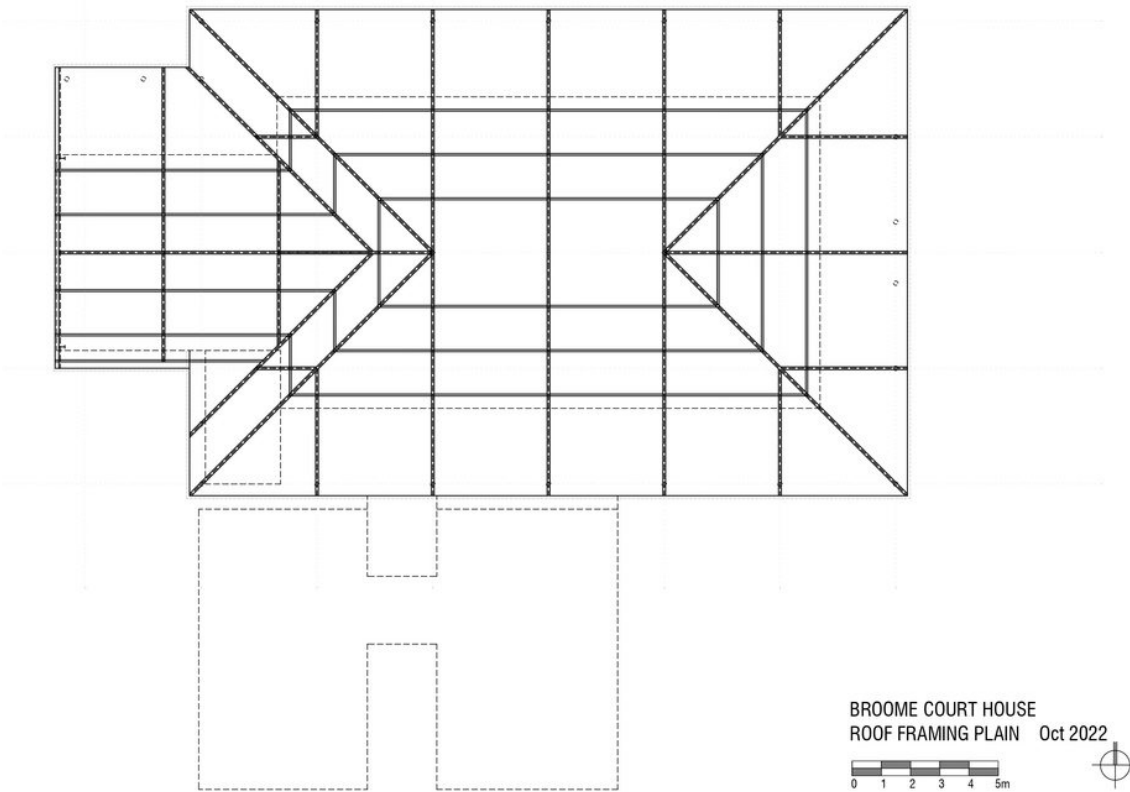
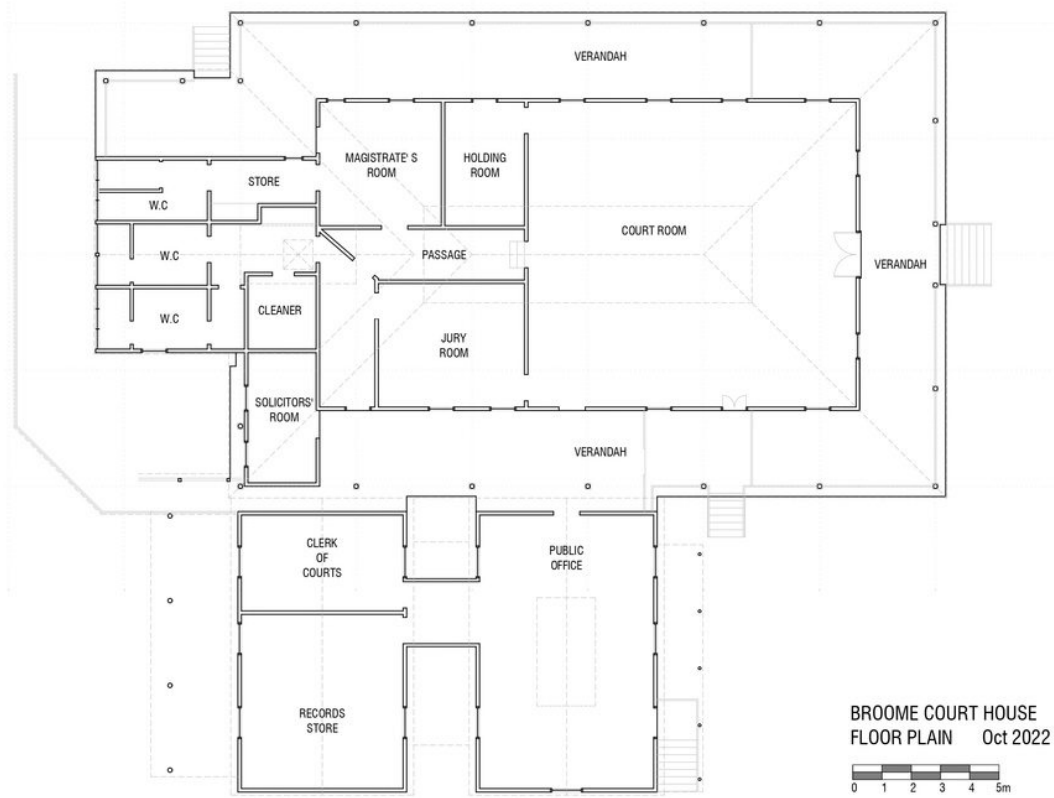
For some time from the 1850s onwards Frederick Braby & Co of London were 'sole manufacturing agents' for the Vieille Montagne company for Great Britain, India and the colonies.[5] By 1883 the company was one of the largest British manufacturers of zinc products, and advertised a wide range of perforated patterns, including a number of ornamental designs intended to be used for blinds.[6] Braby is first listed as a maker of portable houses in the London Post Office Directory of 1863, and within the next five years he had manufactured one or more prefabricated railway stations for Queensland, using both iron and zinc. These station buildings were carried out to the order of Sir Charles Fox & Son,[7] who had been retained by the Queensland Government as consulting engineers for the new railways. At what date Braby's Glasgow works were opened is not known, but these seem to have become Braby's main location during the 1880s. By now he was selling a wide range of iron products, and manufacturing at least some of them. In the early twentieth century Brabys specifically advertised as makers of cable stations, and of other rather similar buildings, in iron and timber. A cable station illustrated in Braby's catalogue bears some resemblance to that at Broome, but rather than a hipped roof with a single central roof lantern it has intersecting roofs with continuous ventilating monitors along the ridges.

[5] They are so described in Frederick Braby & Co., *Instructions for, and Examples of, the Application of Zinc. &c* (Braby, London 1869), title page. According to their 1883 catalogue, *infra*, they have been manufacturing agents for thirty years.

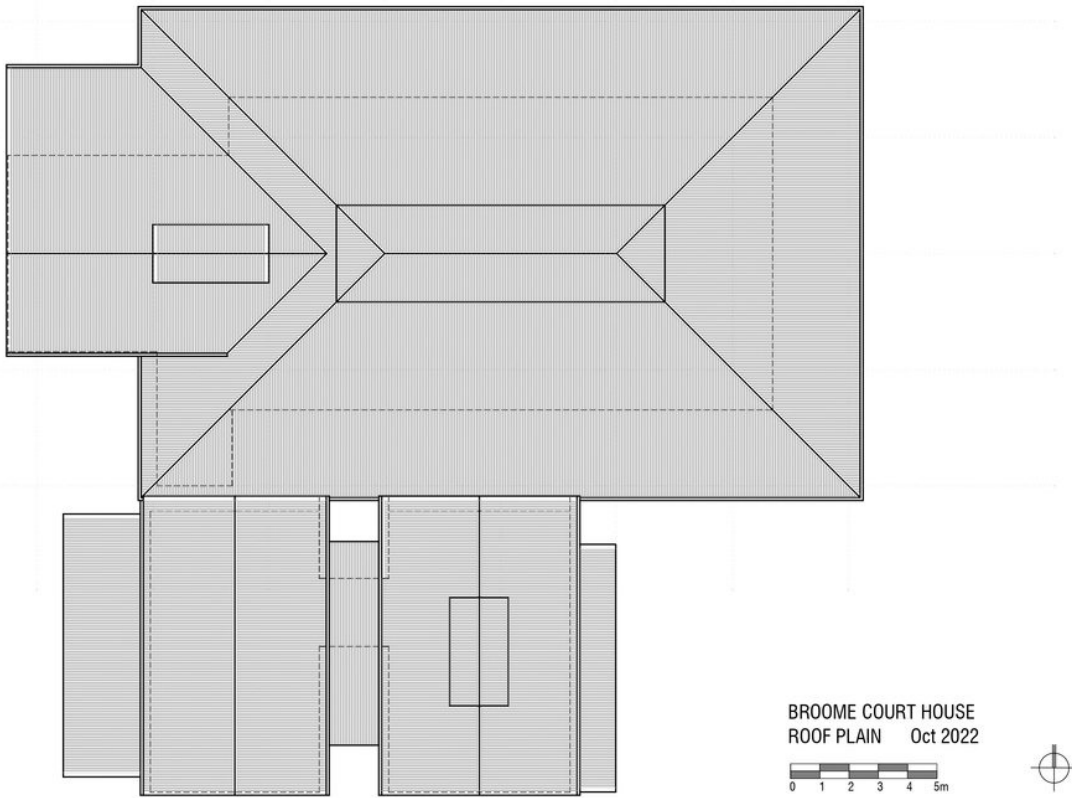
[6] *Frederick Braby & Co. No 9* [catalogue] (London 1883), pp 5-19.

[7] 'Queensland Railway Stations', *Illustrated London News*, 10 October 1868, p 364; 'My First Visit to Queensland', *Town and Country Journal*, 2 August 1873, p 145. Both articles illustrate the station at Ipswich.

APPENDIX: PLANS



Reconstructed plans: Janet Beeston.



Reconstructed plans: Janet Beeston.

JOHN WALKER

MILES LEWIS

015 Mint Coining Works, Macquarie St, Sydney

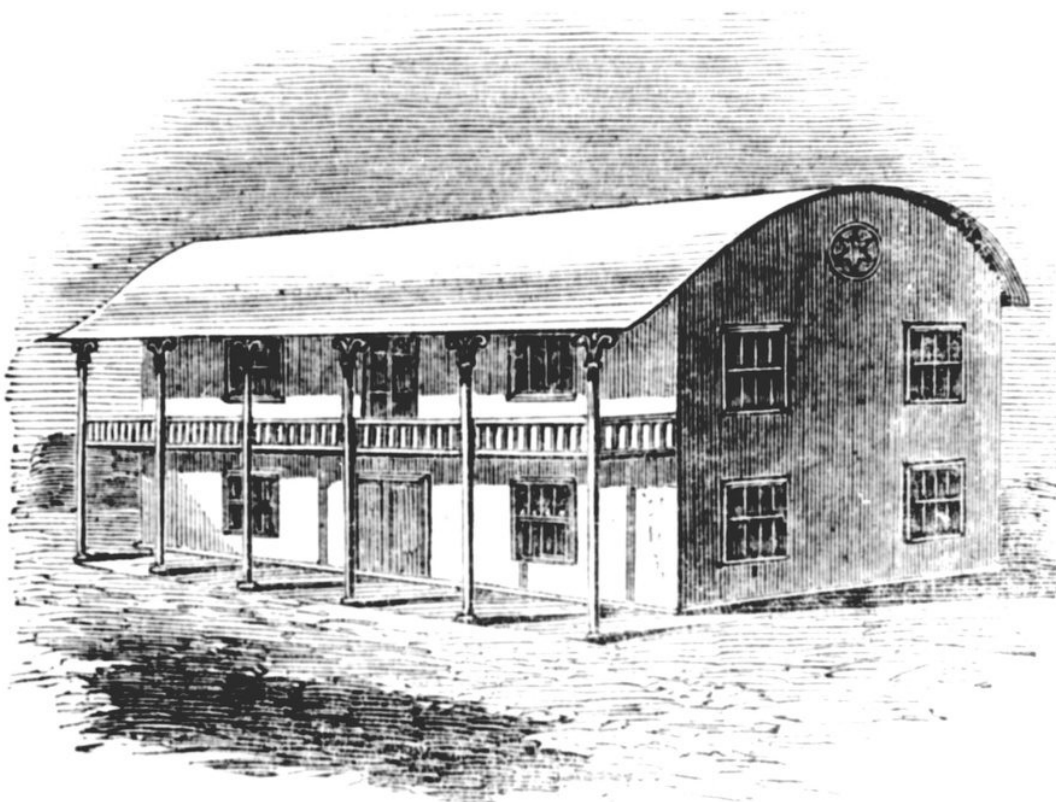
077 iron cottage shell 'The Weatherboard', 24 Weatherboard Rd, Inverleigh, Victoria

079 Walmsley labelled building, Depot, Royal Botanic Gardens, South Yarra

080 Ranger's house, 161-168 Gatehouse St, Parkville

085 Eudoxus, 34 Fenwick St, Geelong

The original British patent for the use of corrugated iron in building was taken out in 1829 by Samuel Robinson Palmer.[1] Richard Walker, a builder who worked for Palmer at the London Docks, almost immediately acquired the rights and became the first to manufacture corrugated iron for building purposes. It appears that two sons, Richard junior and John, joined his firm, but that they later started their own business. Richard junior may have subsequently acquired the original family firm, while John continued with the new one.



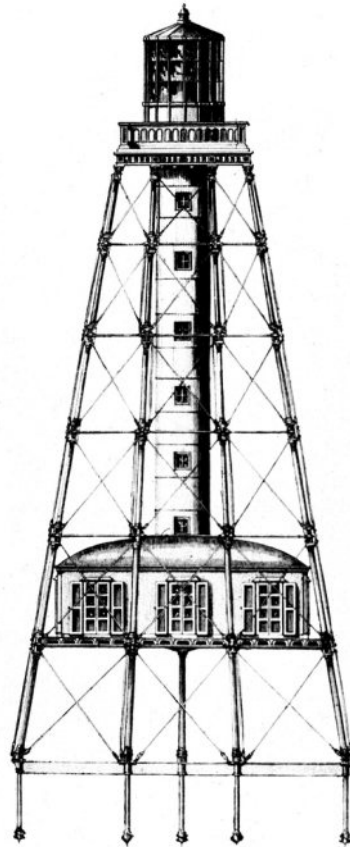
One of nine iron 'houses' for California, made by John Walker, July 1849: *Illustrated London News*, 14 July 1849, p 20.

By 1849 John Walker was advertising improved corrugated sheets measuring 8 ft 0 in by 3 ft 2 in [2.44 x 0.97 m] and an improved method of making 'elliptical' roofs. He was to be an important prefabricator, and his first recorded essay in the field appears to have been the manufacture of nine two-storeyed corrugated iron houses which were sent to California in July 1849.[2] In 1850 Walker manufactured a hotel for Natal, South Africa.[3]

[1] Great Britain, patent no 5786, to Henry Robinson Palmer, 28 April 1829. For the technical history of corrugating and galvanizing, see also H W Dickinson, 'A Study of Galvanised and Corrugated Sheet Metal', *Transactions of the Newcomen Society*, XXIV, 1943-1944 & 1944-1945 [London 1949], pp 27 ff.

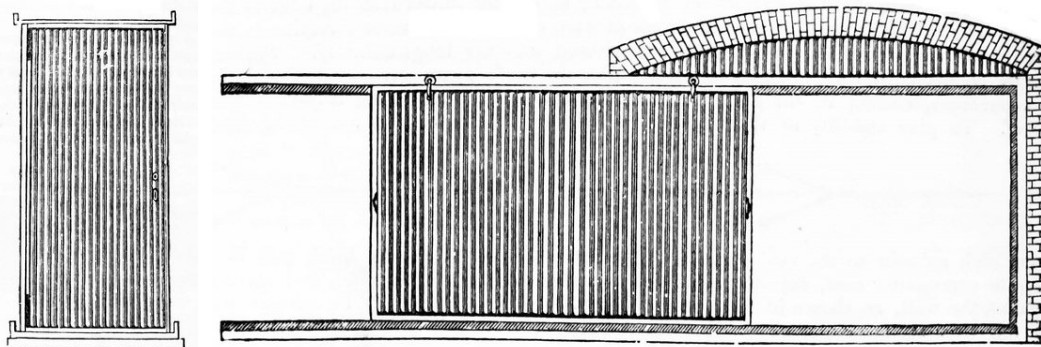
[2] *Illustrated London News*, XV, 380 (14 July 1849), p 20.

[3] *Illustrated London News*, April 1850, p 274; A F Hattersley, *The British Settlement of Natal* (1950), p 203; Brian Kearney, *Architecture in Natal* (Cape Town 1973), p 13.



Lighthouse at Sand Key, Key West, Florida, by I W P Lewis, 1851. *Expositor*, 8 February 1851, p 233.

John Walker's next important work was a lighthouse, or part of one, for Sand Key, south of Florida. [4] Here the dwelling and the central shaft (though not the lantern itself) were made for the United States Government by Walker. A 13.5 m square platform was raised on piles to a height of 4.5 m above the bedrock, and on this was built an 11.4 m square dwelling, and above it a 2.1 m diameter tower continuing to a height of about 27.3 m, braced and supported by an openwork frame extending from the outer edges of the platform to the top of the tower, on which was to be placed the lantern. The house was 3.3 m high and contained nine rooms, the internal and external walls alike being of two layers of corrugated iron sheets, 813 mm wide by 10 mm [3/8"] thick, with a 130 mm air space between them. The roof was of the arched type, and the tower was double-walled like the house, and built in semi-circular sections in 1.8 m rises. All the wall junctions and corners, doors and windows, were fitted with angle iron. The system was analagous to half-timbering: 'In a wooden house the angle iron is represented by the timbers, and the corrugated plates by the boarding.'



Corrugated iron doors manufactured by Richard Walker J C Loudon, *An Encyclopædia of Cottage, Farm, and Villa Architecture* (Longmans, London 1846 [1833]), pp 358, 359.

[4] We know that Walker's lighthouse was in Florida, and the date and description of it coincide very closely with that at Sand Key, illustrated in the *Expositor*, 8 February 1851, p 233, reproduced in Giovanni Brino, *Crystal Palace* (Genoa 1995), p 178.

This approach, of using an angle iron frame within which the corrugated iron is an infill, seems to be unique to Walker and to originate in doors first made by his father.

In 1853 Walker supplied a two-storeyed house to the Royal Mail Steam Packet Company to house their superintendent and other officers at the port of Chagres, Panama. Walker had assembled the lighthouse at Shepherd and Shepherdess Fields, New North Road, Hoxton, but the Chagres buildings were at what was described as his factory, Mill Wall, Poplar. This seems already to have been a very substantial establishment, for it covered 1.2 hectares and employed over 400 men at a weekly cost of £800. Of particular interest is the fact that he was also in the course of constructing thirty-six iron houses 'for the residences of emigrants sent out by Government to Australia.'^[5] These were in fact imported by the Victorian government for its own employees, and it is possible to trace their history in reasonable detail from official records.

As early as August 1851 the Colonial Architect, Henry Ginn, had recommended that tenders for government buildings should be called in England, that parts such as joinery should be prefabricated there, and that the labour for the rest should be brought out. He estimated that the cost would be about half that current in Melbourne, and his scheme was partially approved but set aside 'for the present' by the Legislative Council.^[6] Ginn's report on this proposal, placed before the Executive Council on 1 March 1852, envisaged wooden houses of four rooms, each fifteen feet [4.6 m] square and containing a fireplace. The cost including erection would be about £250..^[7] The next development was in August, when he was required to report on the possibility of iron houses, and recommended that thirty be obtained..^[8] He was in fact authorised to prepare a requisition for thirty-six houses to be obtained through the Colonial Agent in London. This requisition, for thirty-six iron houses 'to be rented by Government Employés' was forwarded by Ginn to the Colonial Secretary on 24 August 1852,^[9] and it was presumably upon this basis that the order was sent to England, early in 1853.^[10] These were clearly the same thirty-six houses for 'emigrants sent out by Government to Australia' as were referred to in Walker's advertisement.

The houses do not appear to have arrived until March or April 1854, when La Trobe expressed surprise at their number, being under the impression that only twelve had been called for. Of those that arrived, two were put up in William Street for the Colonial Surgeon and the Registrar General, and one was allocated to the Steam Navigation Board. The costs were, per house,

	£
Invoice Cost	405
Freight	184
Lighterage	29
Cartage &c	17
	635

The cost of erection and fitting of the three mentioned was £550 each, making a total of £1,185. Ten were appropriated for the Police Barracks at Richmond, where their erection was estimated to cost £400 each, and most of the others were allocated to the Commissariat Department. James Balmain, the Chief Architect, estimated that the average all-in cost would be no less than £1200.^[11] 'I am afraid a very bad speculation' noted La Trobe, suggesting that the Colonial Agent General had not been judicious in his purchase, and that even the cost of the houses in England had been unduly high.^[12]

[5] *Builder* (London), 2 July 1853), p 422.

[6] Ginn to Colonial Secretary, 31 August 1851: Col Sec C52/3335, PRO.

[7] Report by Ginn, untitled, annotated as an item for the Executive Council, 1 March 1852: . Col Sec C52/3335, PRO.

[8] Ginn to Colonial Secretary, 11 August 1852:Col Sec C52/3335, PRO.

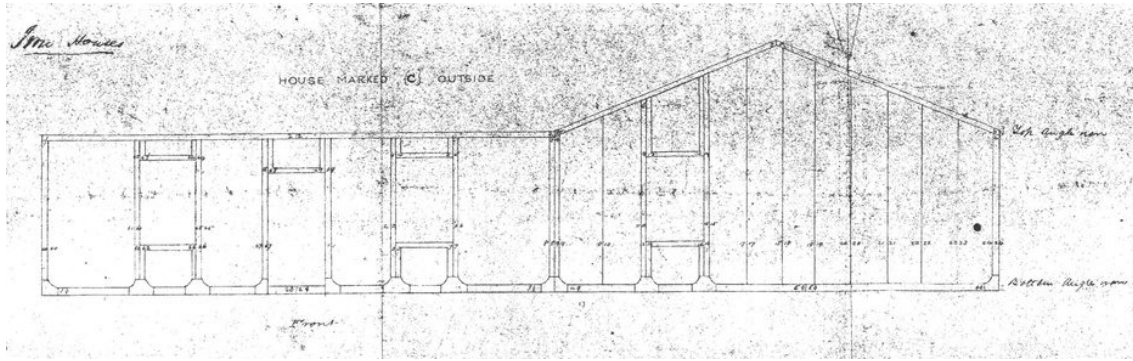
[9] Ginn to Colonial Secretary, 24 August 1852.

[10] Responding to a question in the Legislative Council on 31 December 1852, the Auditor-General conceded that the order had not yet been sent: *Argus* (Melbourne), 1 January 1853, p 5.

[11] James Balmain, Chief Architect, Minute of Cost +c of Iron Houses Imported from England'.

[12] Memo by C J La Trobe on 52/3421, 21 April 1854Col Sec Series B, 52/642, &c, to 52/3241, PRO. Copies provided to me by courtesy of the late Peter Alsop.

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Contract drawing for the erection of iron houses at the Police Depot, Richmond,; Public Works Department, 18 May 1854:Public Record Office, Victoria, police file, series 937 (1852-), 'The Depot', box 141 no 3, detail The drawing combines one side elevation and one end elevation.

There survives a specification of April 1854 by the Colonial Architect's Office for the erection of ten iron houses in the Richmond Police Paddock, signed as a contract document by Edward Blake & Partner on 18 May. However it is a standard printed text with only minor additions and amendments, and it does not name the maker or convey much about the buildings beyond the facts that the parts were numbered, and that the manufacturer was the same as for the Colonial Surgeon's office in William Street.[13] A sheet of drawings also survives, and it shows the building itself as well as the system of numbering applied to its components.[14] The structure is framed in angle iron with vertical corrugated iron infill, just as described in the case of the Sand Key lighthouse, which leads to the conclusion that the buildings supplied were on Walker's already established system. The drawing therefore must be an *ex post facto* representation of the buildings as supplied and not an original design by the Colonial Architect's office.



Iron house at 'The Weatherboard', Inverleigh, fabricated by John Walker, c 1853-4: Miles Lewis.

[13] Victoria, Colonial Architect, 'Specification of Work Required in Erecting Iron Houses in Richmond Paddock' (Melbourne 1854).

[14] Police files, PRO Series 937 (1852-), 'The Depot', Box 141, no 3, kindly made available by Mr Ted Collins, Police Historian.



Maker's plate on the house at Inverleigh: Miles Lewis.



Details of the house at Inverleigh, gusset base joint, corner angle labelled '60/A': Miles Lewis.

The one building which can definitely be attributed to Walker carries two cast iron plaques bearing his name and the address of his works, Millwall, Poplar, and conforms pretty exactly to this drawing, though the numbers are different by one digit from those illustrated. It was built on the sheep station called 'The Weatherboard', and still stands near Inverleigh. None of floors, partitions, lining, doors, nor any other woodwork except some part of the windows survives, but the shell, consisting of the corrugated sheets, angle iron framing, and connecting gussets, remains in excellent condition with the galvanizing intact. The only rusting is on a few connecting straps and brackets which were apparently not galvanized.

There was no attic, and the absence of the partition walls makes it impossible to determine the plan from what remains, but we know that it was originally intended to have four rooms and a central passage. It is below the end windows that the plaques are found. This Inverleigh house represents a considerable advance towards true system building. The top and bottom plates, corners and jambs are of 2 by 2 inch [51 x 51 mm] angle iron with one flange pointing inwards and the other appearing on the face, so as to overlap the infill panels of corrugated iron. The jambs, on either side of every window and door, run the full height of the wall, and the spandrel panels above and below the openings are inserted separately, and are framed in angle iron on three sides. For example, in the spandrel above a window the angle runs across to form the window head, with the flange on the face of the building pointing away from the opening so as to overlap the corrugated iron above it. At either end the angle is actually bent upwards in a right angle - a triangle is cut out of the face flange, so that when the angle is bent the two cut edges meet in a mitred joint. A spandrel below a window is likewise three-sided, forming a sill-piece and two edges, and in every case the edges have the inward-pointing flange backing against that of the jamb angle, so as to have the combined effect of a T-section. At the top of the walls the angle which forms the top plate is allowed simply to overlap the vertical members, but the angle at the bottom is in each case connected with flat gussets which appear on the outer face - either L-shaped or T-shaped as the joint demands, but cut with curves rather than sharp re-entrant angles.

The two long sides of the building are connected at the centre by a wrought iron tie rod of about 19 mm diameter, with forked ends and a turnbuckle at the centre. At the third points there are two trusses, or rather pairs of T-section rafters linked in each case by a collar tie consisting of an ungalvanised strap of 1 1/2 by 1 in [38 x 25 mm] iron. Close to the ridge, and about half way down the slope, are purlins of 1 5/8 by 1 5/8 in [41 x 41 mm] angle. The corrugated iron sheets measure 2.13 by 0.78 m, and have a pitch of only 4 1/4 in [108 mm]. The roof has no eave at the ends or along one side, but on the other the sheets continue out about one metre and are trimmed at the end with a piece of angle. This overhang was originally a verandah supported on rather extraordinary spindly posts consisting of a wrought iron rod bent double, with the bend at the bottom, and the two ends at the top finished in a pair of ornamental scrolls. One of these posts survives elsewhere on the property. Inside the angle jambs of the windows are fitted with 4 by 3 in [102 x 76 mm] pieces of timber, apparently to trim for the wooden sash windows, but on the outside faces of the jambs are hinges which originally carried iron shutters to close the opening. Some of these hinges also survive.

This building was on the site by March 1855, when it was mentioned in an advertisement for a mortgagee's sale.

The improvements consist of a weatherboard house, four-roomed iron house, kitchen, overseer's cottage, men's huts, stockyard, large paddocks, &c.[15]

This indicates that the house was put up either for William Harding, the then proprietor of the Weatherboard run, or for his immediate predecessor J H Mercer. A photograph of about 1890 shows a timber structure which was attached to the Inverleigh house, but this was subsequently moved to higher ground, because the old site was flood-prone.[16]

Given its close conformity to the Ginn drawing one must ask whether Harding had been able to acquire one of the houses imported by the Victorian government. But there is no specific evidence to suggest that any of those houses found their way into private hands before 1881, when the Richmond depot was broken up and the the remaining stock sold, as discussed below.

[15] *Argus* (Melbourne), 21 March 1855, p 3.

[16] Information 2016 from Chris Ganly [mailto:chris_ganly@hotmail.com]. He believes that the present family, the McCallums, have had the property since the 1880s.



The ranger's house, 161-168 Gatehouse St, Parkville by [Benjamin] Walmsley (or John Walker) fabricated c 1853, erected by 1862: Miles Lewis.

The ranger's house in Parkville[17] which matches that at Inverleigh, was indeed in government use. It was moved from the city in March 1858,[18] suggesting that it was probably one of those which had been put up in William Street for the Colonial Surgeon and the Registrar General. In 1862 it became the house of Francis Meaker, a zoo employee, and later the Royal Park ranger and Crown lands bailiff of Royal Park. For at least the next seventy years the house was occupied by Meaker and his family, for his son succeeded him as ranger.[19] Various stories which have become attached to the house - that it is made of Scotch iron, that it was built for the mounted police, and that it was regularly visited by the local Aborigines, stem mostly from a fanciful report in the Melbourne *Argus* in 1923,[20] and have been quite irresponsibly promulgated by modern consultants.



The ranger's house, Parkville, detail of the Walmsley plaque and a gusset connection: Miles Lewis.

[17] 161 Gatehouse St, Parkville, near Royal Parade.

[18] *Age* (Melbourne), 17 March 1858, p 2.

[19] W A Sanderson, 'Royal Park', *Victorian Historical Magazine*, XIV, 3 (May 1932), p 17.

[20] *Argus* (Melbourne), 28 August 1923, p 7.

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The ranger's house was almost certainly made by Walker, not by Walmsley. There is no record of the Victorian government importing any iron houses other than the thirty-six by Walker, and it is most unlikely to have done so, given that the Walker houses themselves arrived only after the accommodation crisis had receded, and that they cost more than four times the original estimate.

However at least three other buildings of the original thirty-six bore Walmsley's plate. The Richmond Police Depot, where ten of the houses were built in 1854, was cleared out in 1881. By that time only three of the houses survived, all of them attributed to Walmsley (the full details appear below).

The fact that the ranger's house in Parkville and the house at Inverleigh were largely (if not entirely) identical raises the question of whether the design should be attributed to the Colonial Architect, Henry Ginn, to John Walker or to Benjamin Walmsley. Ginn had first proposed the importation of wooden houses for government purposes, and his later report upon the possibility of iron houses proposes their dimensions and suggests a slate roof. But there is no indication and little likelihood that he was involved in the technical details. Indeed, that would be hardly possible, as the unusual construction of corrugated iron sheets set in an angle iron frame is the same as that which Walker had previously used in his Sand Key Reef lighthouse, and is not known to have been used by any other manufacturer.

Benjamin Walmsley, of 127 London Road, Southwark, was a retail ironmonger, not a manufacturer. [21] He could no doubt have supplied corrugated iron sheets, but he does not appear to have been a fabricator of buildings, and certainly had nothing approaching Walker's large works and four hundred employees. Even if he had, he could not have made buildings on the same system as Walker unless they had an agreement. The probability is that there was an agreement - not an agreement that Walmsley should manufacture the buildings but that he should put his name to them. It seems likely that he was a front man, to give the appearance of competitive tendering, and it also seems likely that the Colonial Agent, who placed the order, was complicit in this. The arrangement is almost the reverse of that at the Sydney Mint, discussed below, where the Horseley Company was the successful tenderer, but appears to have subcontracted the work to Walker.

We have seen that ten of the government's imported iron houses were put up in the Richmond Police Paddock, later known as the Richmond Police Depot, under a contract of May 1854. In 1881, when the depot was abolished, three of these houses remained, together with other buildings, some of which probably incorporated corrugated iron cannibalised from the demolished houses. An advertisement listed for sale:

Lot

1. Bluestone building used powder magazine; spouting, ridging, downpipes, &c, are of Copper
2. Wooden and Iron sheds and outbuildings.
3. Wood and iron building forming stable and hay loft, fencing and pitching.
4. Three roomed wooden building, Iron roof.
5. Two storied brick building (nearly new), bluestone foundations, slate roof.
6. Long wooden building, new iron roof, used as stable, with loose boxes, harness, and chaff rooms, &c.
7. Two roomed wooden building, with fences; also, smithy and wheelwrights' shops, &c.
8. Main store, iron on stone foundations, wood floors, in excellent order, and easy of removal.
9. Four old wood and iron lockups.
10. Brick building, stone foundations, slate roof.
11. Iron cottage, by "Walmsley," of London, on stone foundations, with outbuildings and fencing; easily removed and re-erected.

[21] His identity was first established by the South Yarra historian Oscar Slater, and he has since been more fully researched by Simon Reeves. Walmsley was born in 1812. By 1850 he was a retail ironmonger at 127 London Rd, and the business expanded to take in the adjoining shops 126 and 128 before disappearing in 1858: Simon Reeves, 'The Walmsley House at Royal Park: La Trobe's Other Cottage', *La Trobeana*, 7, 3 (November 2008), p 13.

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12. Brick chimney, and stone foundations of cottage, and riding-school, and fencing.
13. Iron house, by "Walmsley," of London, stone foundations, verandah and outbuildings, brick detached kitchen, forming three distinct cottages, separate entrances.
14. Iron and paling fencing, adjoining lot 13.
15. Iron house by "Walmsley," stone foundations, in good order, verandah, porches, &c., portable bathhouse, &c., divided into cottages, fencing, &c
16. Newly erected brick building, stone foundations, slate roof.
17. Lavatory and bathhouse, brick, slate roof stone foundations, in good order.[22]

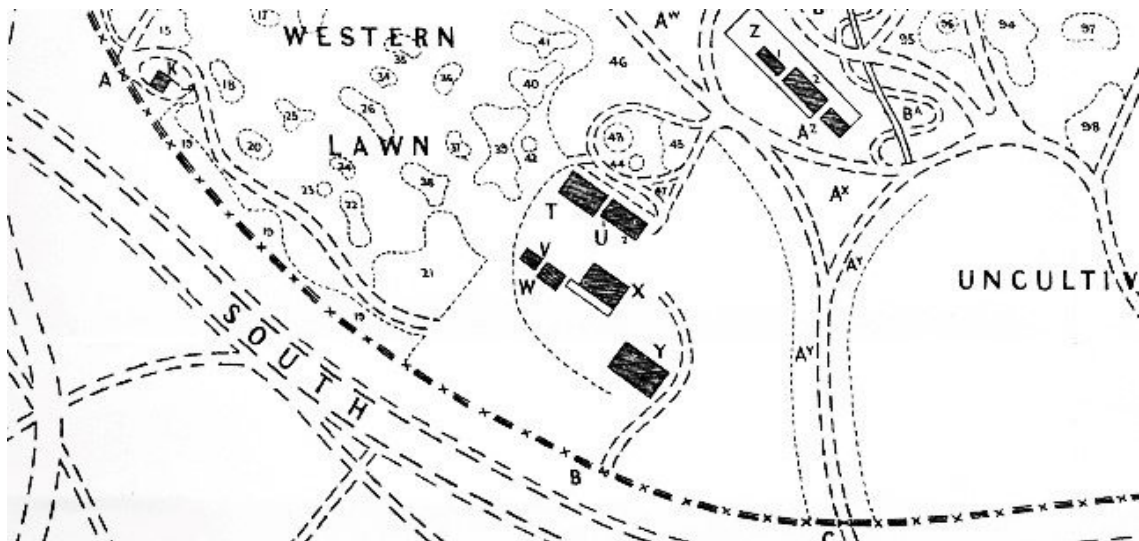
With one exception, we do not know what happened to these buildings, or even whether they were scrapped or re-erected.



The Walmsley labelled building, Royal Botanic Gardens, Melbourne, view, and detail of one of the plaques: Miles Lewis.

[22] *Argus* (Melbourne), 16 April 1881, p 2.

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The Walmsley building at the Botanic Gardens (marked T): map from William Guilfoyle, *Catalogue of Plants under cultivation in the Melbourne Botanic Gardens* (Government Printer, Melbourne 1883) [detail].

The exception is a building now in the nursery complex at the Royal Botanic Gardens. It was apparently acquired at some date between 1875, when it does not show on a map of the gardens, [23] and 1883, when it does.[24] It is a simple gable-roofed structure clad in three inch corrugated iron, with timber casement windows glazed in three panes per sash, and with roof battening (visible at the ends), spaced for slates or shingles rather than the present iron. Nothing about it suggests prefabrication except that it carries two metal plates the same as that at Parkville, naming the manufacturer as Walmsley of London.

The probability is that it is one of the buildings from the Richmond Police Depot, disposed of in 1881, and specifically the main store building identified as lot 8 in the advertisement. If so, it is a locally built timber frame clad in iron recycled from the demolished houses. It carries the Walmsley plaques simply because it was easier and less destructive to leave them attached to the corrugated iron sheets. The windows bear some resemblance to those at Parkville, and may also have been recycled.



'Eudoxus', 34 Fenwick Street, Geelong, originally a semi-detached pair by John Walker, erected 1854: photo from the Victorian Heritage Register [cropped].

[23] 'Plan of the Melbourne Botanic Garden', Crown Lands Office, August 1875: State Library of Victoria MAPS 821.08 MELBOURNE 1875.

[24] Information 2021 from Colin Walker, Supervisor of Facilities at the Gardens.

There are a number of references to non-government buildings by Walker, and one of these survives in Geelong. The drapers Towle & Turpin had a large iron store attached to their premises, probably dating from 1853,[25] and they built another in 1854 when they moved to set up a wholesale establishment elsewhere.[26] These may or may not have been Walker buildings, but the partners did invest in a pair of houses by Walker which they offered for sale in a partly completed state. They were, most unusually, a two storey semi-detached pair:

2 VERY Elegant Galvanised Iron COTTAGES, each containing Four Rooms, about 12 feet 6 inches by 14 feet, lined and floored throughout, with sashes (glazed), doors, Venetian blinds, paper, canvass, water closets, porch, locks, bolts, &c, complete.

These Cottages are two stories each, and the pair are made to stand upon an allotment of ground having 25 feet frontage.

They were built by the celebrated John Walker, of Mill Wall, Poplar [*sic*], by the order and under the inspection of an old colonist.

A fortnight would complete the two erections, at a comparatively trifling expense.
[27]

The houses are now united as the single building 'Eudoxus', 34 Fenwick Street, Geelong, with a verandah and balcony added.

A certain amount is known of Walker's later history. In 1853 he constructed what was described as 'the completest iron building yet sent to the colonies', a coaling station for steamers at Capetown, measuring 45 by 15 m and consisting of 'corrugated iron plates, fastened by iron tie-rods of great strength, with strong girders outside to support the building'.[28] In April 1854 he advertised that a number of buildings had been erected and were available for inspection at his works at Millwall, Poplar

consisting of all sizes, in dwellings, shops, with mahogany sashes and plate-glass fronts, equal to many in our best streets in London; stores of all sizes, two, three, and four stories high, one in particular, 300 feet long by 150 feet wide [90 x 45 m], acknowledged to be the finest ever manufactured; wooden houses of all sizes, of most tasteful designs. The Royal Branch Mint at Sydney, an iron bridge of 100 feet [30 m] span, and several other important structures in the course of erection for Australia.[29]

So far as the Sydney Mint is concerned, Walker's claim is somewhat exaggerated. The Mint building proper was the southern part of the old Rum Hospital, converted to its new use in 1853. To this were added certain buildings of stone with a prefabricated iron internal structure, housing offices, factory, smelting house and workshops, and completed in 1855. Three such structures survive today: the coining room, the engine room, and one other.

Tenders were invited in 1853 for works including about two hundred squares of roof framing, roofing, a large cast iron cistern, thirty-three cast iron sashes and frames, twenty-four columns, girders, &c.[30] The Horseley Company was the successful tenderer, but appears to have subcontracted the work to John Walker, probably because of his more extensive involvement in

[25] *Geelong Advertiser*, 19 January 1854, p 2. It was described as a 'recently-erected commodious Iron Store ... capable of storing hundreds of tons of merchandise'.

[26] *Geelong Advertiser*, 18 January 1854, p 3.

[27] *Geelong Advertiser*, 6 June 1854, p 7.

[28] *Illustrated London News*, 21 January 1854, p 48. The building was apparently constructed at Millwall, not at the new Gillbrook works (see below). It was for the firm of Walton and Bushell, and cost about £1,200 including erection.

[29] *Illustrated London News*, 29 April 1854, p 403.

[30] Captain E Ward to the Horseley Company, 9 September 1853, Archives Office of New South Wales, 2/783, quoted in Fiona Starr et al, *The Royal Mint, Sydney (1853-1926): a Survey of the Documents Associated with the Mint* (Sydney 2001), p 20.

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iron building manufacture. On 28 January 1854 Walker wrote to Captain Ward to say that the remainder of the boards for the Mint roofs were now at the wharf alongside the *Hannibal* (the ship by which the materials were sent) awaiting inspection. A few days later he reported that the roofs for the workshop, one of the flat roofs, tank plates, tank girders, thirty foot girders, stores and ranges, were all at his Mill Wall factory, awaiting inspection.[31] One year later the building was reported to be 'in course of erection',[32] and on 14 May 1855 it was opened to receive gold bullion. [33]



The Royal Mint, Sydney, framing system: Miles Lewis.

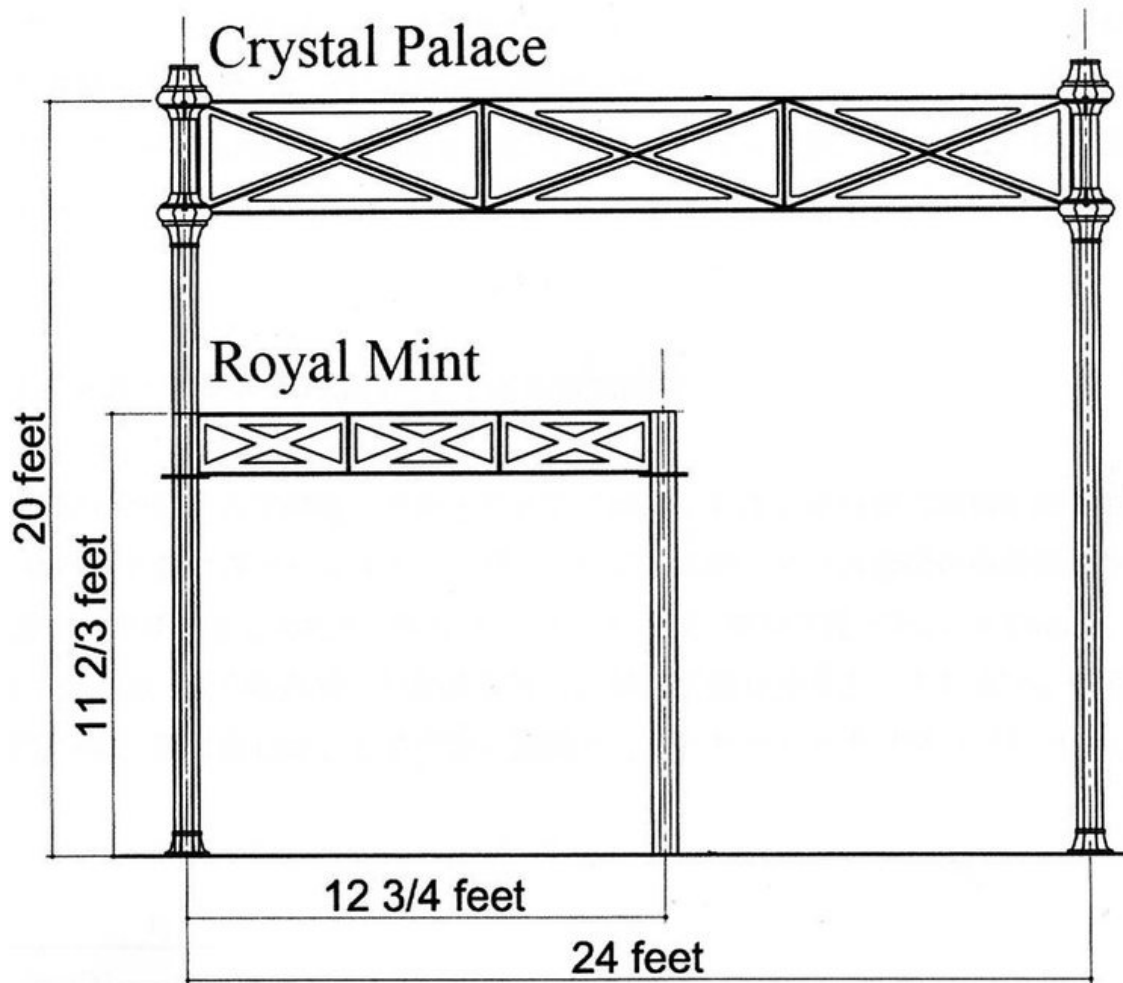


The Royal Mint framing system, detail: Robert Griffin.

[31] John Walker to Captain E Ward, 24 January & 2 February 1854, Archives Office of New South Wales, 2/764.

[32] *Sydney Morning Herald*, 26 January 1855, p 4.

[33] *Maitland Mercury and Hunter River General Advertiser* (NSW), 16 May 1855, p 2.



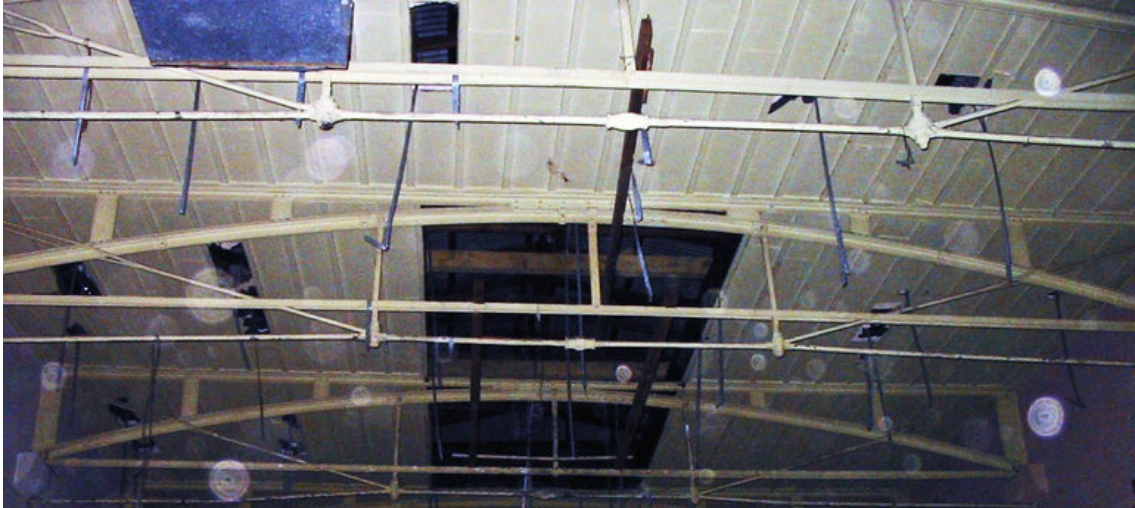
Dimensional comparison of the Royal Mint, Sydney and the Crystal Palace: Yosuke Komiyama, 'Tracing the Construction of the Crystal Palace: towards architectural construction history' (PhD, University of Tokyo, 2018), p 116 [modified].

In general the records and the surviving structure show that what Walker supplied was the iron interior frame, including the girders to carry an upper floor over a small part of the plan area, the iron roofing, including similar girders in some areas, the glass for the skylights, and presumably the skylights themselves.[34] The columns are cruciform and the girders are of the Howe truss type, with cross-cross bracing in each panel, and all apparently of cast rather than wrought iron,[35] very similar to the system of Paxton's Crystal Palace, London. The resemblance is probably explained by the fact that the Mint's designer, Edward Ward, had an official role at the Great Exhibition as Secretary to the Department of Jurors.[36]

[34] The buildings are described in the Illustrated Sydney News, 28 April 1854, p 203. The surviving records are the Royal Mint, Sydney Branch: Letters received 1853-1855, Archives ref 2/763-2/765, at the Mitchell Library, Sydney. The Deputy Mitchell Librarian has kindly had the material checked.

[35] Inspection with Eddie Butler-Bowdon & David Dolan of the Powerhouse Museum, 1994. Since that time the structures have been further investigated, and Mike Bogle of the Historic Houses Trust has advised, May 2001, that there are three prefabricated structures of 1854. The coining factory has Crystal Palace-like construction. The Engine Room has a bow truss, with ties bonded to the iron walls. The third building had a geometric frame and skylights in the roof, but the roof was subsequently raised to create a clerestory.

[36] Great Exhibition of the Works of Industry of all Nations, Reports by the Jurors on the Subjects in the Thirty Classes into which the Exhibition was divided (Royal Commission, London 1852), p xxv.



The Royal Mint, roof trussing: Miles Lewis.



Royal Mint, Sydney, slate slab roofing: Miles Lewis.

JOHN WALKER

The roofing was 'of wrought-iron, of great strength, neatly trussed, and possessing every facility for the admission of light and the circulation of air.' The lighting was 'by means of skylights, in iron frames', but these have gone and no illustration survives. Much or all of the roofing consisted of slate slabs set between iron joists, with a layer of concrete, and possibly one of asphalt, on top.

By June of 1854 Walker's advertisements indicate that his offices are now at the corner of Arthur Street West, London Bridge, and that he has works not only at Millwall but at Gillbrook, Birkenhead. [37] This is an important fact, because it may help to explain how Walker might be producing buildings on two quite distinct structural systems, especially if the Birkenhead works had been acquired from an already established manufacturer such as McKean and Perkes - this, however, is no more than speculation. Walker immediately began obtaining local business, and was reported in December to have constructed the roof of Price's Bromborough Pool Candle Works, not far from Liverpool. The building covered 1.5 hectares, and the galvanised iron roof was divided into spans of twelve metres each.[38]

[37] *Builder* (London), 10 June 1854, p 316.

[38] *Illustrated London News*, XXV, 715 (2 December 1854), pp 553-4.

ROBERTSON & LISTER

MILES LEWIS

004 235 Rowntree Avenue, Birchgrove, Sydney
016 Legislative Council Chamber, Macquarie St, Sydney
091 Corio Villa, 56-58 Eastern Beach Rd, Geelong
092 former Orderly Room, rear 51 McKillop St, Geelong
093 Brown Brothers Store, 17-19 Mercer St, Geelong
094 James Hogg house, Old Gippstown, 211 Lloyd St, Moe, Victoria
095 former service station [originally church], 21 Main St, Bridgewater, Victoria
096 iron house fragment, rear 306 Bank Street, South Melbourne
097 Robertson & Lister [maker] iron house, 399 Coventry St, South Melbourne
098 iron house, Pioneer Settlement, Monash Drive Swan Hill, Victoria

Australia received not only the system-built corrugated iron buildings of the major English manufacturers, but also a few more substantial cast iron structures in the older tradition of iron prefabrication. All of these more impressive works originated in Glasgow, and most of them from the one firm of Robertson and Lister. The designs used by the firm were subsequently taken over by C D Young & Co, which has since caused endless confusion.

It is necessary, first of all, to clarify the overall position. The buildings made by or attributed to Robertson & Lister vary from the finest and most architecturally pretentious cast iron facades, down to utilitarian corrugated iron stores and cottages. The documentation is far more specific in relation to the grander buildings, but these present distinctive technical details in common with the next rank down, and those in turn share details with the humblest ones. Many of the grandest ones are illustrated in a catalogue produced by C D Young & Co in 1856, though there is enough documentation to establish that some, and to suggest that all in this category, are the work of Robertson & Lister, whose business, or at least whose catalogue designs, must have been acquired by Young.

There is in fact no evidence – with one possible exception – that Young actually made any prefabricated buildings at all, or anything illustrated in his catalogue other than structures like the Dublin Exhibition building, the Kensington Gore Museum and the Manchester Art Treasures Exhibition, for which he was a regular building contractor or subcontractor.

The partnership of Robertson & Lister (George Robertson and Alexander Lister^[1]) then appeared in the Glasgow directory of 1848 as smiths, engineers, millwrights and iron roof constructors, at the Victoria Docks, 69 Mitchell Street. In 1853 they are still listed in this way, but they appear also as iron house builders at 340 Parliamentary Road.

Their first known building is the Fruit Market which survives in Ingram Street, Glasgow, reputedly designed in February 1852 by John Carrick 'with input from John Baird' (though it seems more likely to have been designed by Bell & Miller), and made by Robertson & Lister at the Victoria Foundry.^[2] It is not prefabricated, but bears a generic resemblance to their Dismorr building in Melbourne (discussed below).^[3]

By 1854 the business appears as Robertson and Co, smiths, engineers, iron house builders and roof constructors, at the Parliamentary Road address only.^[4] The transformation of the firm into iron house builders must have been a major investment decision, because when they were subsequently sold up the range of equipment was astonishing.

[1] K R Murdoch, 'Charles D Young Final Report' (Glasgow 2006), p 15.

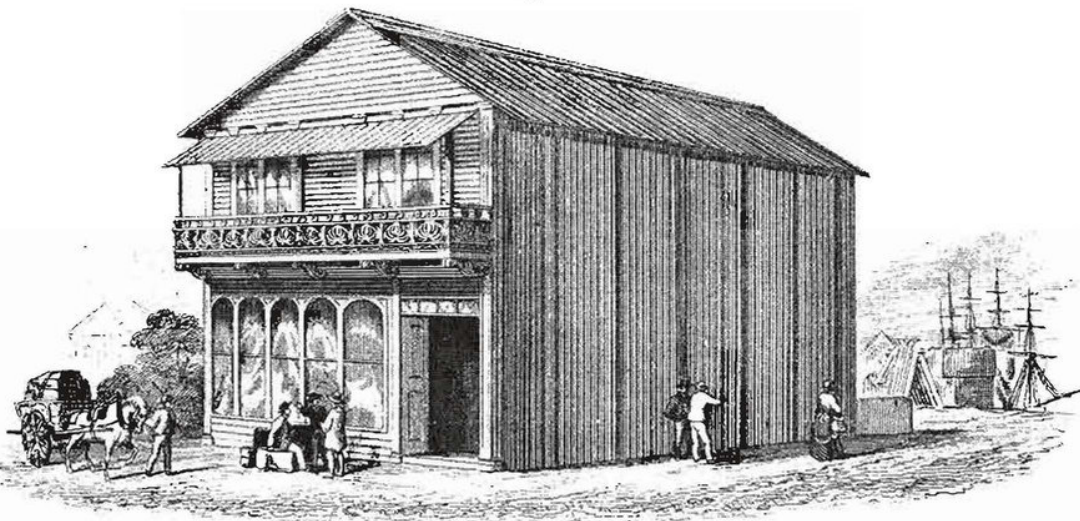
[2] The building is said to be in good condition: Scottish Ironwork site, <http://www.scottishironwork.org.catdetail.asp?ironid=563>, consulted April 2004. The information is attributed to Mark Watson, but not otherwise sourced.

[3] It is illustrated in Tom Swailes, *Scottish Iron Structures* (Historic Scotland, Edinburgh 2006), pp 5-6, but his suggestion that it resembles the Crystal Palace is absurd.

[4] My information is from Mr C W Black, at that time City Librarian, of the Mitchell Library, Glasgow.

ROBERTSON & LISTER

The first of their buildings for Australia was commissioned by Macfarlane, Bogle, & Co of Glasgow, and completed early in October 1852. It was two-storeyed, with a dwelling on the upper level and store below and measured 38 by 28 feet [11.4 x 8.4 m] and 20 feet [6 m] high at the eaves. The building was of corrugated iron with twenty-four cast iron pillars, and though there is no suggestion of any cast iron front, as in some of their later buildings, there was 'a neat balcony'.^[5] We do not know why the building was required, but the probability is that Macfarlane Bogle were sending a representative to open a branch in Melbourne. As a general rule buildings commissioned in this way seem to precede those sent out as speculations.



One of the 'shops which have actually been constructed for Melbourne, Adelaide, and other places', probably the building completed by Robertson & Lister for William Clapperton & Co in February 1853. Charles D Young & Company, *Illustrated and Descriptive Catalogue ... South America and Other Countries* (London & Edinburgh, no date [?1858-9]), plate 25 figure 2.

A second building for Australia was completed in February 1853, and was in many respects similar. It was again commissioned by a Glasgow firm, William Clapperton & Co, and it was consigned to Crombie Clapperton & Co of Melbourne, arriving on the *Clara* on 23 July following.^[6] Presumably, the Melbourne firm was some sort of branch or offshoot of the Glasgow one, and the building was for their own use. This firm was later listed as Crombie, Clapperton & Findlay, or Clapperton Findlay & Co, drapers and clothiers.^[7] The size of this building was almost identical with the previous one, and four similar buildings of various dimensions, nearly complete, were to be seen in Robertson & Lister's yard.^[8]

Robertson & Lister's more pretentious buildings were quite different in character, with elegant cast iron fronts. Although they continued to produce large numbers of utilitarian corrugated iron buildings as well, their later warehouses no longer had balconies and they mostly had arched rather than pitched roofs. Most or all of Robertson & Lister's buildings were designed by the local architects and engineers, Bell & Miller (R D Bell & D Miller^[9]).

[5] *Glasgow Herald*, 11 October 1852, p 5. The same report, slightly abridged, appeared in the *Geelong Advertiser*, 23 March 1853, supplement p 1, quoted as being from an 'English paper' and another in the *Sydney Morning Herald*, 10 June 1853, p 2.

[6] *Argus* (Melbourne), 25 July 1853, p 4.

[7] The most useful reference is to 41 Lonsdale street west as the premises lately occupied by Crombie, Clapperton & Findlay: *Age*, 1 October 1856, p 1. But it is unlikely that the iron building was constructed here because the by-laws had been amended to make it difficult to construct iron buildings within the area covered by the *Melbourne Building Act*.

[8] *Glasgow Herald*, 4 February 1853, p 5. A slightly abridged version of this report appeared in the *Geelong Advertiser*, 28 June 1853, supplement p1 (and misleadingly implies that all the buildings referred to were made for Clappertons).

[9] James Cowan, *Statement of Mr. James Cowan, relative to the Iron Building Sent to Melbourne for use of Free Church there* (Edinburgh 1859).

In May 1853 when Robertson & Lister had fifteen buildings standing at their works (referred to as 346 Parliamentary Road), some of them described as three storey dwellings measuring 66 by 25 feet [20.1 x 7.6 m] and 33 feet [10 m] high, and others including an 'enormous' warehouse of 83 by 33 feet [25.3 x 10.1 m]. The largest structure was intended as a 'saloon' for the well-known commercial agent, Hart, of Melbourne, weighing 25 to 30 tonnes and costing £600. It was a single room but for two small private apartments partitioned off at one end, and was 'beautifully lined and finished with planking'. In this building Robertson and Lister held a ball, attended by about three hundred people including one Rhind, Hart's local agent. For the occasion the walls were adorned with grand plate glass mirrors and hung with pink drapery and evergreens, the floor covered in white cloth, and a series of superb gaseliers hung from the roof.[10]

These first buildings must still have been of corrugated iron, for nothing is said to the contrary. Robertson & Lister do not seem to have used cast plate iron until later, and they never used it for more than the principal façades of any building. In the *Sydney Morning Herald* of 14 February 1854, Lamont, Carson & Co announced that they had been appointed agents for Robertson & Lister, and they even had an iron building erected at their stores in Lower George Street.[11] Three Robertson & Lister buildings were advertised in Melbourne in March 1855.[12] Buildings attributed to Robertson & Lister were reaching Sydney as late as 21 April 1855:

IRON HOUSES. - A very superior [*sic*] two-storied galvanized corrugated Iron House is now being landed at Circular Quay; built by Robertson and Lester [*sic*], of Glasgow, also four and two roomed houses, by the same makers. Two only out of the last shipment of iron villa residences remain on hand. C. R. ROBINSON and CO., 35, Hunter-street.[13]

The business failed and was sequestrated on 26 February 1855.[14] We may surmise that a major cause of this was the rise in the price of iron at the time of the Crimean War. The plate iron façades made in Glasgow used iron profligately, and even the corrugated iron was of a heavier gauge than was normal in England. Any manufacturer who was locked into fixed sum contracts would have been drastically affected by the price rise. A secondary but linked cause was the collapse of the Melbourne market. C D Young was to report £1000 lost in bad debts 'during the late Australian crisis'.[15]

The first of the cast iron fronts made by Robertson & Lister to Bell & Miller's design was probably that of a warehouse destined for the drapery of J S Dismorr in Collins Street, Melbourne.[16] The facade was twenty feet [6.1 m] wide and the side walls of corrugated galvanized iron extended back seventy feet [21.3 m]. The reporter of *McPhun's Australian News*, who was treated to a champagne lunch in the building when it was on the point of being dismantled and packed, retained sufficient of his wits to collect a press release describing the building:

The first storey is supported on handsome coupled columns, resting on panelled pedestals, and surmounted by bold projecting cornices. Between these columns are slender pillars of polished mahogany. The doorway occupies the centre compartment

[10] *McPhun's Australian News*, 5 (May 1853), p 9.

[11] *Sydney Morning Herald*, 14 February 1854, p 8.

[12] *Argus* (Melbourne), 24 March 1855, p 2.

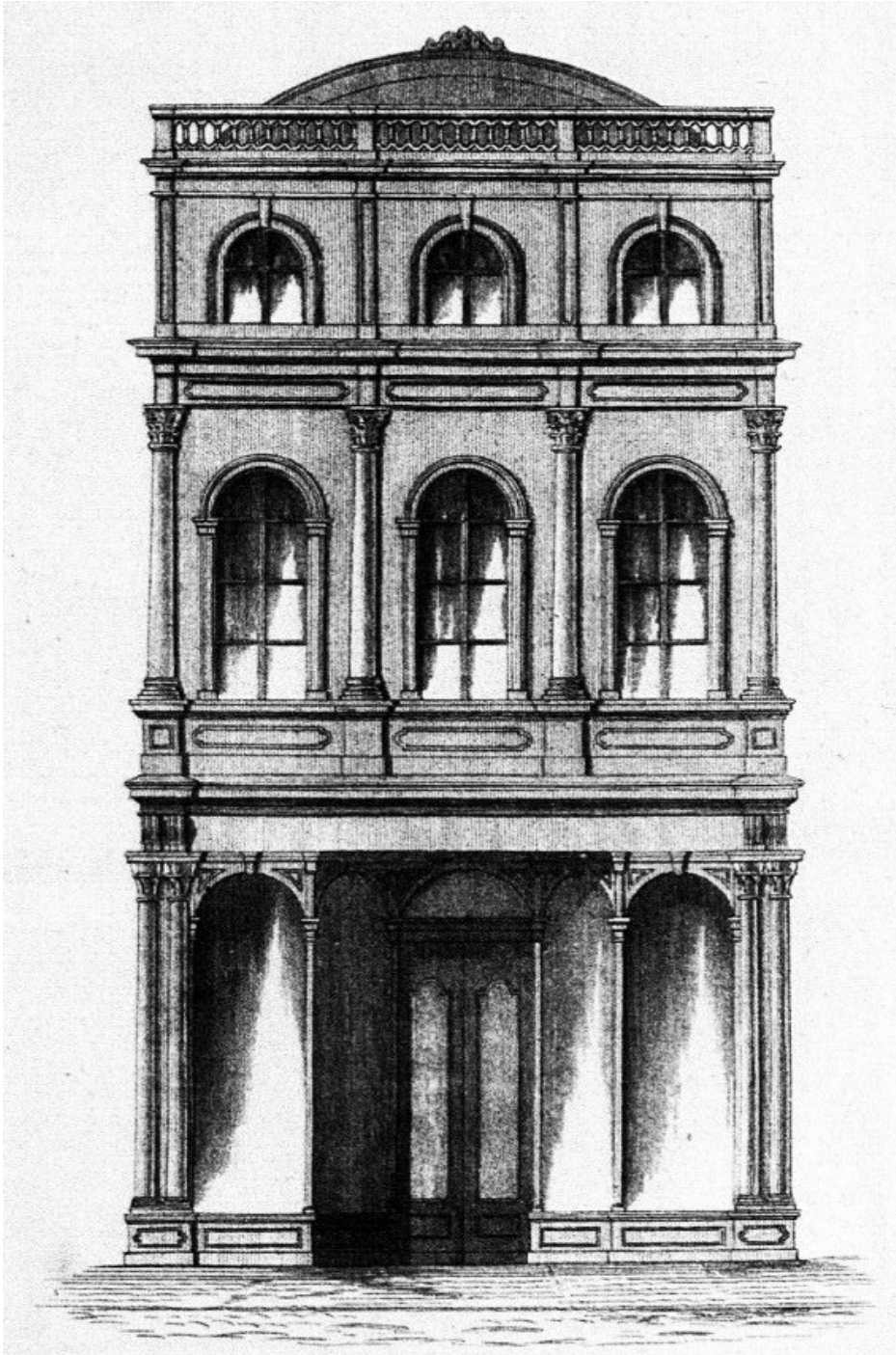
[13] *Sydney Morning Herald*, 21 April 1855, p 6.

[14] *Glasgow Herald*, 2 March 1855, p 7, from the *Edinburgh Gazette*, 17 February 1855. See also Murdoch, 'Charles D Young', p 14, citing National Archives of Scotland, reference CS 279 / 2137. David Mitchell, of Scottish Ironwork, advises me that the document is Robertson & Lister, Glasgow, sequestration petition, 1855, reference R.33.

[15] *Scotsman*, 31 July 1858, p 4.

[16] Material collated by the La Trobe Library, State Library of Victoria, from directories, the 1856-7 Electoral Roll, and other sources, sheds some light on Dismorr. A Nathaniel Stewart Dismorr lived in Sydney in the 1840s and was declared insolvent in 1842. James Stewart Dismorr was listed in Collins Street as a haberdasher in 1845 and as a draper in 1847. In 1851 Nathaniel Dismorr (*sic*) is at 53 Collins Street, and in 1854 J S Dismorr (*sic*) appears at 43 Collins Street East, while Nathaniel Dismorr (*sic*) is still at no 53. In 1855 and 1856 Dismorr and Millar, drapers, are at no 43. There are no such entries for the next three years, but the 1856-7 Electoral Roll shows J S Dismorr as owner of the freehold of 43 Collins Street, though his address is at St Kilda, and Nathaniel Dismorr as being in receipt of a salary from Miller and Dismorr.

and the other compartments are filled with plate glass. The doors are of mahogany, with panels of plate glass, and are fitted with patent self-acting springs, and move both ways on their hinges. The whole front is enclosed by Messrs. Bunnett and Co.'s patent revolving iron shutters. The second storey is sustained by highly ornamental fluted columns, which support a rich entablature and cornice. Circular-headed windows, surrounded by moulded architraves, are placed between the columns. On the third storey is another row of arched windows; and squared pilasters support an ornamental cast iron balustrade along the top of the facade.[17]



One of the 'shops which have actually been constructed for Melbourne, Adelaide, and other places', probably the building completed by Robertson & Lister for William Clapperton & Co in February 1853. Charles D Young & Company, *Illustrated and Descriptive Catalogue ... South America and Other Countries* (London & Edinburgh, no date [?1858-9]), plate 25 figure 2.

[17] *McPhun's Australian News*, 7 (July 1853), p 6. Another description, apparently derived from this, appears in the *Civil Engineer and Architect's Journal*, XVI (1853), p 339.

ROBERTSON & LISTER

The building was novel in that the corrugated iron of the sides, which ran between cast iron pilasters, was galvanized, for the first time in Robertson and Lister's work. The ground floor at the front was occupied by a sale room or saloon, and above it was a mess room for the young men employed in the business, from which rose a stair to their sleeping quarters above. The back part of the building was a full height warehouse, lit by an elegant glass roof,[18] and the front was 20 ft 6 in [6.15 m] wide.[19]

A champagne lunch held in the building at Glasgow in July of 1853, before it was despatched, and 4 November that the Melbourne architect Charles Laing called tenders for erecting 'an extensive iron building of 3 storeys in Collins Street for J. S. Dismore [*sic*].'[20] The building was put up for sale in 1856, upon the dissolution of the partnership of Miller & Dismorr.[21] It survived into the early twentieth century as the Collins Street branch of Cole's Book Arcade at 246-250 Collins St.[22]

The Free Presbyterian minister Alexander Cairns, reached Melbourne from Scotland in September 1853 bringing with him the 'very handsome iron house' which was to be put up as his manse. It seems likely to have been by Robertson and Lister, as certainly was the 'splendid iron church,' seating 700, which followed in due course.[23] This church, and its partner, destined for Sydney, were reported in May 1854 to have been completed by the company and opened for divine service before they were shipped:

The two iron church [*sic*] which have been for some time in progress in the Building Yard of Robertson & Lister, Parliamentary Road, and now about completed, and show, in a striking manner, the applicability of iron to church architecture. These edifices are of the most substantial construction, and from the material of which they are composed, being principally cast iron, the requisites of strength and architectural beauty are combined in a manner that augurs well for the more extensive employment of this material for building purposes, both for the country and the colonies. One of the churches is for the Rev. Dr. Cairns, Melbourne; the other for the Rev. Mr. Salmond, Sydney. They are similar in size and general appearance with the exception that Mr. Salmond's church has got two spires, one at each side, and Dr Cairns' [*sic*] one spire. Springing from the centre of the pediment. The front elevation presents a handsome facade, the chief feature of which is an arcade of ornamented columns and arches, standing out in bold relief, supporting a pediment, and flanked at the sides by massive towers, in which are placed the stairs leading to the galleries. The lower series of columns is roofed by a balcony, forming an open porch, whence access is had to the church and to the stairs of the galleries. The dimensions of each are seventy-three feet in length and forty-five feet in breadth. The interior is fitted up with galleries and handsome pulpit at one end. It is lighted on each side by a series of circular headed windows, each twenty feet in length; and at the back by two large stained glass windows. The vaulted ceiling, supported on cast iron arched girders springing from the iron columns, rises to a height of forty feet, and has a very fine effect. In the crown of the arched ceiling will be placed iron or zinc perforated gratings, for the purpose of securing proper ventilation, so essential in a warm climate. The external roofing is formed of corrugated iron. A neat vestry house, entered from each end by enclosed porches, is placed at the back of the church. The spires will not be elevated to their places in this country, but are merely erected on the ground, in front of the churches, to show their effect. Both of these churches are from the designs of R. B. Bell & D. Miller, civil engineers and architects.[24]

[18] *McPhun's Australian News*, 7 (July 1853), p 6.

[19] *Argus* (Melbourne), 19 December 1856, p 8.

[20] *Melbourne Herald*, 4 November 1853, p 3; *Argus* (Melbourne), 5 November 1853, p 1.

[21] *Argus* (Melbourne), 19 December 1856, p 8.

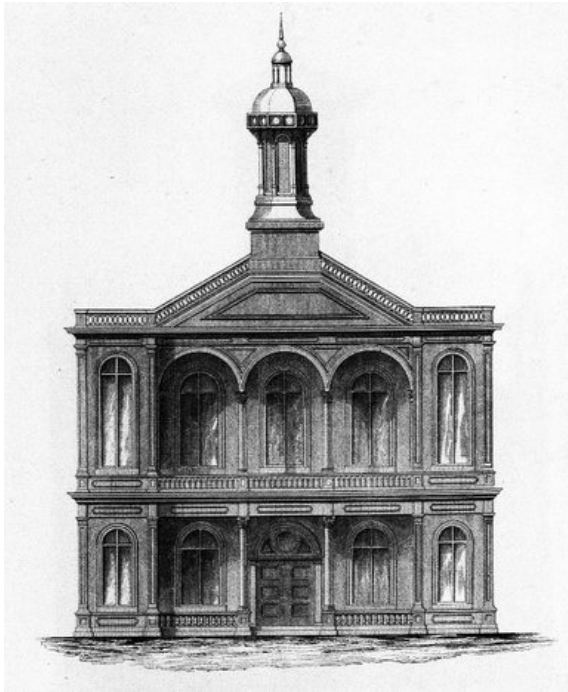
[22] It can be seen to the left of Howey House in a photograph in the Howey papers, Melbourne University Archives, LS 5/3/2, prior to its replacement by 'Howey House Extension' or 'Lyric House'.

[23] *Banner* (Melbourne), 16 September 1853, p 7.

[24] *Glasgow Herald*, 26 May 1854, p 7. Reports based upon this appear in the *Builder*, XII, 593 (17 June 1854), p 326, and the *Civil Engineer and Architect's Journal*, XVII, 244 (July 1854), p 278.

ROBERTSON & LISTER

It is easy to identify the two churches which are described. The double-spired one became the Free Presbyterian Church in Sydney, and the single-spired one was sent to the Free Presbyterians in Melbourne, but never put up. The single-spired version is also illustrated in C D Young's catalogue, as previously had been Dismorr's warehouse.



(Left) Church made for the Free Presbyterians, Melbourne, designed by Bell & Miller, and manufactured by Robertson & Lister, but never erected: Charles D Young & Co, *Illustrations of Iron Structures for Home and Abroad*, no place or date (c 1856), pl 11, design no 17.

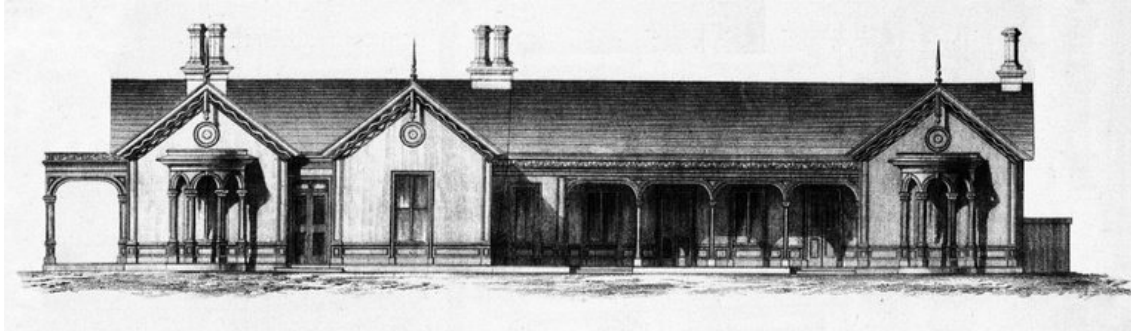
(Right) Free Presbyterian Church, Macquarie Street, Sydney, designed by Bell & Miller, and manufactured by Robertson & Lister, later the Lending Library: *Art and Architecture*, 1910, p 123.



Former Free Presbyterian Church, Macquarie Street, Sydney, during dismantling, 1899: State Library of New South Wales PXE 1077 [cropped].

ROBERTSON & LISTER

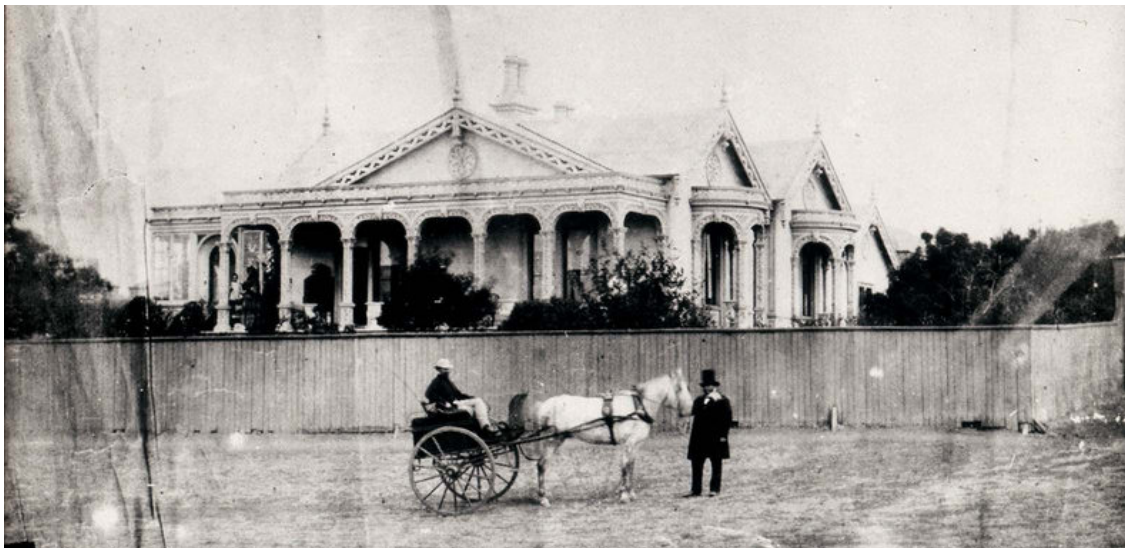
The Sydney church was put up in Macquarie Street in 1854,[25] and there it was used for twenty years, first as the Macquarie Street Free Church, then as St Stephen's Presbyterian Church until it was bought by the government in 1874. It was dismantled and moved in 1899, and subsequently demolished.[26]



Villa for W N Gray, Geelong, designed by Bell & Miller, manufactured by Robertson & Lister. Charles D Young & Co, *Illustrations of Iron Structures for Home and Abroad*, no place or date (c 1856), pl 9, design no 14.



Corio Villa, Geelong, 1853-4, elevation, from a measured drawing survey by R Graham & M Krause, 1981, sheet 2, detail: State Library of Victoria H82.190/2. One curved portico has been moved northwards at the time of erection, and a square porch added at a later date. The Edwardian timber addition is visible at the left.



Coro Villa, Eastern Beach, Geelong, as erected c 1854-5 view c 1861: State Library of Victoria H2177. [cropped]

[25] *Illustrated Sydney News*, 14 October 1854, p 295, cited in L J Dockrill, 'Developments in Architecture in New South Wales during the Victorian Period' (6 vols, PhD, University of New South Wales, 1983), I, p 73.

[26] ** Gilbert Herbert, 'Some Problematic Iron Buildings of the Eighteen-Fifties', pp 12-13, where he cites additional sources: J Campbell Robinson, *The Free Presbyterian Church of Australia* (1947), p 98; an undated newspaper clipping; an advertisement in the Parkes correspondence, volume 22, p 110; and ML document 314, all in the Mitchell Library, Sydney. He points out that the Presbyterian Free Church and St Stephen's Presbyterian Church are one and the same building, not separate ones as implied by E G Robertson, *Sydney Lace* (Melbourne 1962), pp 13 and 16.



Corio Villa, 1860: *Geelong Advertiser*, 21 April 2021.

A building which appears in Young's catalogue as 'a Country Villa, in a neat style of architecture, with Verandas to correspond',^[27] was assembled in a slightly modified form,^[28] and survives today as 'Corio Villa' at 56-8 Eastern Beach Rd, Geelong. It was ordered by or on behalf of the police magistrate W N Gray,^[29] and was despatched on the *Nautilus*, which sailed from Liverpool,^[30] presumably after loading the house in Glasgow, and reached Geelong in August 1853.^[31] The building had been consigned to the Geelong merchant Alfred Douglass,^[32] who was presumably acting on behalf of Gray, for Gray himself was stationed some days travel to the west. Indeed this was probably the reason why the house was not forwarded to him, for the cost of transporting it overland would have been enormous. The components must have remained in Douglass's hands in a state of limbo until June 1854, when Gray died at Hamilton in western Victoria.^[33]

It seems that Douglass resolved the issue by buying the components from Gray's estate at a much reduced price^[34] and putting it up in Geelong for his own use. A month after Gray's death the architect Andrew McWilliams called tenders for the labour required to erect a nine-roomed iron house at Geelong.^[35]

[27] Young, *Iron Structures for Home and Abroad*, pp 3-4 and plate 9, design 14.

[28] What is now the west elevation had three gables, two at the north end and one at the south, with a semicircular porch attached to those at either end. As built the porch at the south end has been eliminated, and there are two at the north end.

[29] E G Robertson, 'Cast Iron Ornamentation', *Victorian Historical Magazine*, XVII, 4 (November 1971), p 692. Allan Willingham has claimed that the order for the house was placed with C D Young's Liverpool branch, a fact attributable to the Grey family's ownership of property near Liverpool, and previous business dealings with Young: information from Allan Willingham, November 2000. But as the house was not made by Young, and his Liverpool branch did not apparently exist at this time, this assertion can be disregarded.

[30] Marten Syme, *Shipping Arrivals and Departures Victorian Ports Volume 2 1845-1855* (Roebuck Society, Melbourne 1987), p 423.

[31] *Geelong Advertiser*, 17 August 1853, p 2.

[32] *Geelong Advertiser*, 17 August 1853, p 2.

[33] *Geelong Advertiser*, 20 June 1854, p 5.

[34] In a note of 22 September 1949 Mrs. Sampson says 'I believe he bought the house at rather a bargain price'

[35] *Geelong Advertiser*, 20 July 1854 p 5.



Corio Villa, with its early or original decoration representing ashlar masonry, in a photograph of the H P Douglass family: courtesy of Ian Shearer.

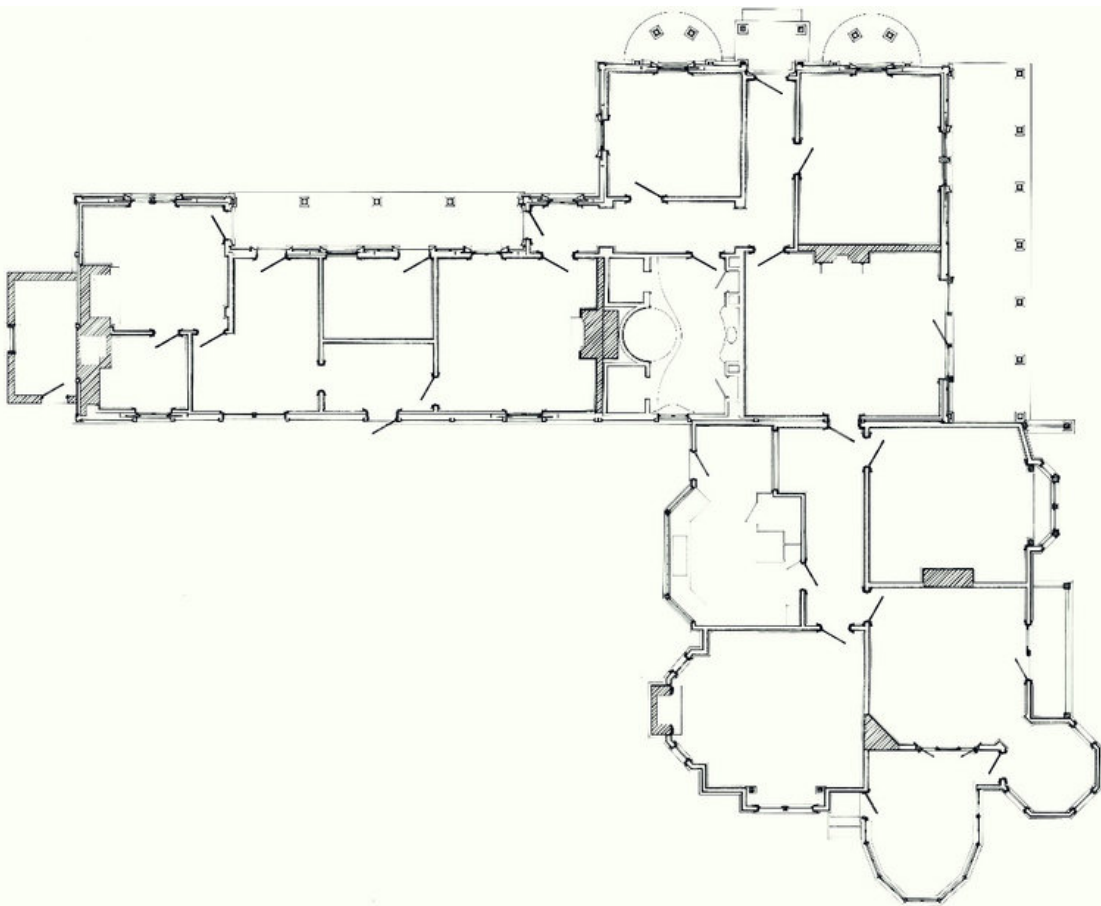


Bell & Miller's assembly drawing with 'cast iron side wall', 'corrugated iron side wall', 'front corrugated iron wall' and 'back view', copy signed 'N. R. McC.': courtesy of Ian Shearer [digitally restored].

The *Geelong Observer* described the building as:

a beautiful villa residence, in the Italian style, erected by Mr. Alfred Douglas [*sic*]: the whole edifice is of cast iron, but so put together, painted, and embellished, as to wear the appearance of some other material, such as stone or brickwork. The rooms inside are capacious and lofty, the appearance outside elegant, light and chaste. The building contains 13 apartments, and has a highly pleasing effect.[36]

The description is a just one, and it would be difficult today for an observer to establish whether the wall surfaces were iron or cement render. Originally (though perhaps after the *Observer* report) they seem to have been actually coloured in imitation of stone blocks, as shown in a somewhat later photograph, though the joints represented bear little or no relation to the actual joints in the ironwork. This consists of cast iron plates measuring 3 ft x 3 ft x 1/2 in (914 x 914 x 13 mm) with inward pointing flanges around the perimeter, through which they are bolted together.[37] This is essentially the same as the construction of the cast iron façade of the Legislative Council Chamber in Sydney discussed below,[38] and of some of the early cast iron lighthouses by Alexander Gordon. A drawing showing the assembly of the plates and sheets in the four elevations survives.[39] It is a copy of an original by Bell & Miller, and was held by the Douglass family, demonstrating that one of the myths surrounding the house - that it was put together without the aid of drawings - is at least partially untrue.



Corio Villa, Eastern Beach, Geelong, plan, by R Graham & M Krause, State Library of Victoria H82.190/1. The lower or east wing is an Edwardian timber addition, and the square porch at the top an earlier addition in iron. North is to the right. The north and west walls of the iron building are plate iron, the east and south walls corrugated iron.

[36] Quoted in the *Australian Builder*, 26 (28 August 1856), p 208.

[37] Drinnan, *op cit*, p 6, gives the sizes, and for the flanges I rely on verbal information from Mr Chris Smith of the Historic Buildings Council, and a photograph taken by him. Measured drawings of the house, done by R Graham and M Krause in 1981, are held by the State Library of Victoria.

[38] Verbal information from David Earle, 28 May 1985.

[39] The drawing is a copy, signed 'N. R. McC.', or possibly 'N. A. McC.' Ian Shearer has kindly provided a scan of it, but the location of the original copy, intended to be deposited in the Melbourne Museum, is unknown.



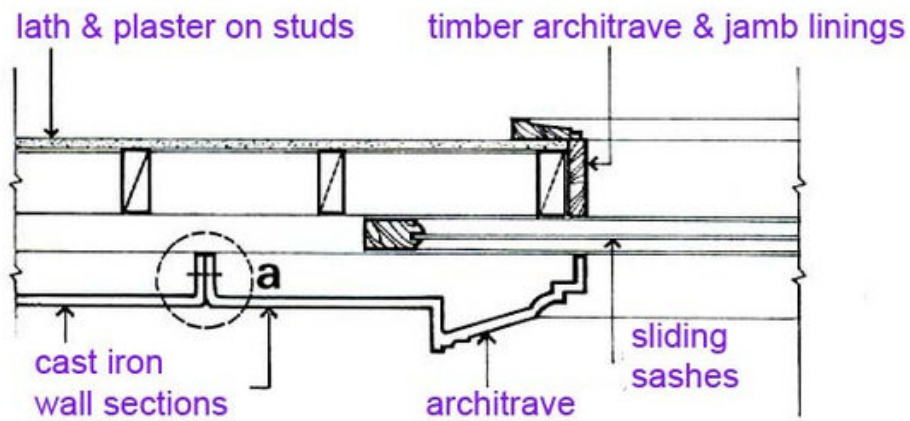
Corio Villa, Eastern Beach, Geelong, view of west front. Miles Lewis.



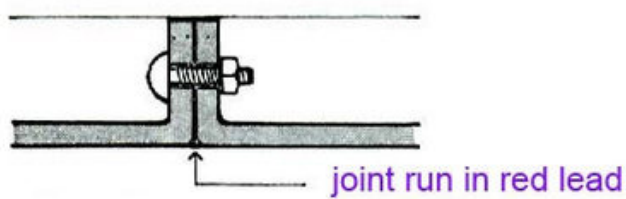
Corio Villa, details of the cast ironwork: Miles Lewis.



Corio Villa, Eastern Beach, Geelong, detail of the inside face of the west wall, showing timber studs stripped of lath and plaster, and behind these bolted iron tray construction. Miles Lewis.



PLAN OF WALL AT WINDOW



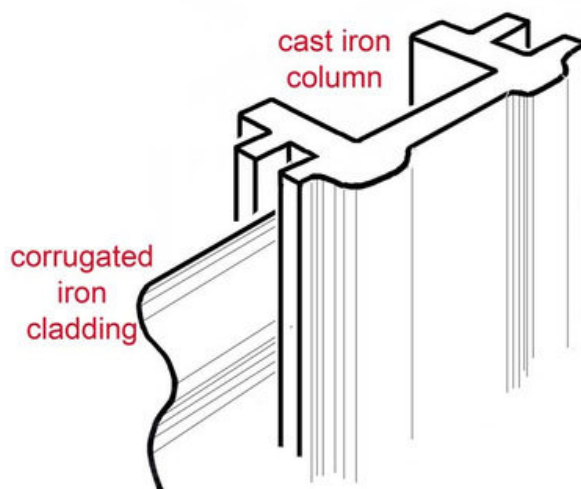
DETAIL AT 'a'

Corio Villa, Eastern Beach, construction of the cast iron plate walls: Geoffrey Drinnan [reworked]. Drinnan's inside elevation of a section of walling, showing 600 x 300 mm panels laid in stretcher bond is incorrect, and is not reproduced here.

The decorative castings of the verandah columns, valance, and especially the barges, are exceptionally delicate in execution, and there is nothing to compare with them in any other prefabricated iron building. The rear walls, by contrast, are simply heavy gauge corrugated iron running horizontally between cast iron stanchions, just like the side walls of the Macquarie Street church as seen in photographs. The internal lining is of lath and plaster, making a total wall thickness of about 230 mm, into which slide the cast iron window sashes.[40] Young's catalogue describes the sashes, as well as the doors, as being of mahogany; the walls (of unspecified material) lined and prepared for paper; and the ceilings of papier mâché. Certainly inspection shows the vegetable ornament on the soffits and reveals of arched openings in the passage to be of papier mâché, notwithstanding Drinnan's description of it as 'fine woodcarving which might well be from the chisel of Grinling Gibbons.'



Corio Villa, a cast iron stanchion from the rear [corrugated iron] wall, and a cast iron gutter removed from the structure: Miles Lewis.



Corio Villa, detail of the corrugated iron rear wall, and diagram of the construction: Miles Lewis.

The catalogue design for this house is by Bell and Miller, as is the assembly drawing, and there can be little doubt that it was made by Robertson & Lister, rather than C D Young. The order for the house must have been placed before Gray's death on 11 June 1854, which would have been during the period when Robertson and Lister were still making cast iron fronts. There has been some suggestion[41] that the original foundry which made Corio Villa was burnt, and all the patterns destroyed, before 1858, but this seems to be without foundation. What did happen, however, is that Robertson & Lister's business failed in February 1855, as we have seen (and Young's followed in

[40] Drinnan, 'Corio Villa', p 6.

[41] Allan, *Victorian Centenary Book*, p 79. See note above.

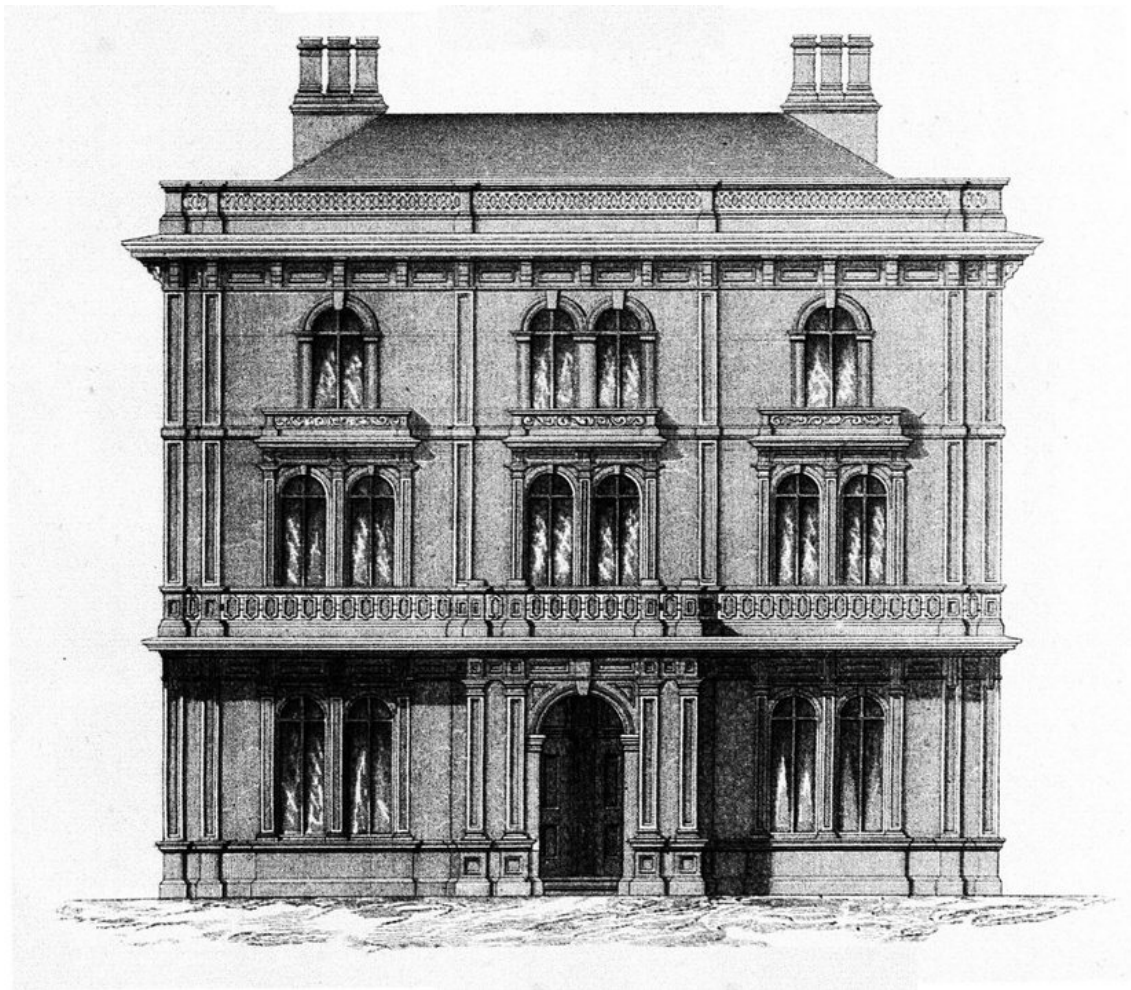
ROBERTSON & LISTER

1857-8). C D Young, who bought the rights to the Robertson & Lister designs (as will appear below) could have bought the complete or incomplete house and exported it in his own name in fulfillment of the original order. But this is very unlikely, as it is not referred to in the sale of Robertson & Lister's assets, and even if it were the case, Young would be unlikely to have fabricated any substantial part of it.

The subsequent history of the house itself included the addition of a square cast iron porch on the west side, locally made, and a timber wing on the north-east by the Geelong Architects Blake & Tombs in 1891-2.[42] The fine bluestone and cast iron street fence was added in 1872 to the design of Davidson & Henderson.

Young's catalogue comprises a group of corrugated iron buildings which may have been his original product, as he is believed to have made such buildings; then there are seven cast iron-fronted buildings design by Bell and Miller and made by Robertson and Lister. Then follows the cast iron fronted church which came to Melbourne, which we know to have been designed by Bell and Miller and also fabricated by Robertson and Lister. Next come a further ten designs which we have not yet considered.

Because the buildings attributable to Robertson and Lister appear in C D Young's catalogue, it seems certain that Young had taken over this aspect of their business. As the takeover was in 1855 (after the Melbourne market had collapsed) it is almost certain that all the buildings sent to Australia were made before the demise of Robertson and Lister, and that all the cast iron fronts in Young's catalogue were their work.



Dwelling house ordered for Australia but put up in Glasgow. Charles D Young & Co, Illustrations of Iron Structures for Home and Abroad, no place or date (c 1856), pl 8, design no 13. [Institution of Civil Engineers, London]

[42] Ian Shearer holds copies of the Blake & Tombs drawings, dated 16 September 1891.

ROBERTSON & LISTER

A three-storey dwelling said to have been ordered for Australia, but actually put up in Glasgow, can be identified as a structure put for sale from Robertson & Lister's sequestrated estate in March 1855:

Large Cast-Iron Double Dwelling House (unfinished), consisting of Three Flats, with projecting porch and Ornamental Balcony. This House is 34 feet deep, by 44 feet of front, and 34 feet in height to the Eaves. ...

intended for a first-class Street Dwelling House, designed in one of the best styles of modern Street Architecture, and for effect will bear favourable comparison with any Stone House in our largest Towns.

The Shell of the House is complete, and as the Flooring and internal arrangements are only commenced, the interior could be fitted up in accordance with the original plan or otherwise; lined with either Wood or Brick it would form a most comfortable Dwelling House, impervious to either damp or cold, and admirably adapted for the Country, or as a Coast House.[43]



Detail of an aerial survey of Dowanhill, Glasgow, in the 1930s, showing Richmond House at the centre: courtesy Gordon Urquhart.

[43] *Glasgow Herald*, 23 March 1855, p 8.



View of Richmond House prior to demolition in 1966:
Frank Worsdall, *The City that Disappeared*
(Molendinar Press, Glasgow 1981).

It failed to sell, and was offered again in April,[44] and then in June (though the stated dimensions differ somewhat):

LARGE IRON HOUSE AND STORE, BY AUCTION,
(Belonging Sequestered Estate.)

Upset Price Reduced. Hutchison & Dixon will Sell, (by order of Walter Mackenzie, Esq..) at 346, Parliamentary Road. Glasgow, on Friday, 8th June, Two o'clock, P.M.. Large THREE-STORY GALVANIZED CORRUGATED IRON HOUSE, with Ornamental Front and Balcony, 40 Feet Deep by 33 Feet Front, and 36 Feet in Height to the Eaves.

The above is of elegant Architectural Design, Wood Lined, with Moveable Panels, and fitted up in superior style. The Ground Floor might be used as a Shop.

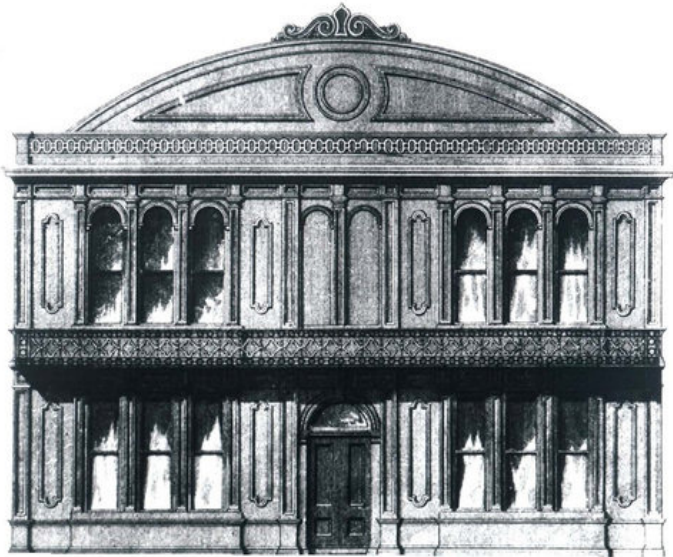
May be inspected prior to Sale.

For further particulars, apply to Messrs Aitken & Mackenzie. 66, St. Vincent Street, Glasgow.

[44] Glasgow Herald, 27 April 1855, p 6.

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It must have been bought some time after that for local use. It has been identified by Gordon Urquhart as 'Richmond House, built by 1858 in Linfern Road, Downanhill, where it became, appropriately enough, the home of David Laidlaw of the Alliance Foundry. It was demolished in 1966.



Dwelling house and store for Maccallum, Graham & Black of Glasgow, designed by Bell & Miller, and manufactured by Robertson & Lister. Charles D Young & Co, *Illustrations of Iron Structures for Home and Abroad*, no place or date (c 1856), pl 8, design no 11. [Institution of Civil Engineers, London] Legislative Council Chamber, Macquarie Street, Sydney. Photo, Miles Lewis

Yet another Bell and Miller design is for 'an Iron Store and Dwelling-house, with ornamental cast-iron front (the other walls being of corrugated sheets)', said to have been constructed for Maccallum, Graham & Black of Glasgow, and sent out to Australia. This building stands today as the Legislative Council Chamber in Macquarie Street, Sydney. When the bicameral legislature was introduced £10,000 was allocated by the Legislative Council for the provision of the necessary extra accommodation. This proved quite inadequate, so the iron building was bought in Victoria, and delivered to Sydney at a total of £1835. Even after £4000 had been spent on its erection and modification by Thomas Spence, it was considerably cheaper than a conventional building would have been.[45] It is a two-storey structure on a high masonry base, with a strongly articulated mongrel renaissance facade and a segmental pediment. The segmental shape would have reflected the arched roof form behind, as was the case in many warehouses and in a two storeyed iron dwelling which was later claimed to have been the first house erected in the Melbourne suburb of Heidelberg.[46] But in the Sydney building the arched roof was replaced by a timber pitched roof in 1859. In 1892 the iron front was moved three metres westward, to enlarge the building.[47]

[45] *Empire* (Sydney), 22 May 1856, p 4. See also *Old Times*, 1, 4 (July 1903), pp 246-7. I was informed by Peter Bridges, personal communication, 23 September 1978, that before 26 February 1856 William Weaver, the Colonial Architect of New South Wales, had accepted the offer of the Sydney merchant and agent James Dean, to deliver the building from Melbourne to Sydney for £1,760. Weaver's successor, Alexander Dawson, on 18 April entered a contract with Thomas Spence, Thomas Dawson and Richard Reilly to build it for £4,475. NSW Government Archives, Colonial Architect's bundles, Boxes 2/605A and B. Gatis Gregors, 'Prefabrication in Australia 1788-1910' (2 vols, BArch, Sydney University 1981), p 26, refers to James Dean as being 'of J B Griffiths', and cites Archives 2/598). W K Charlton (Clerk of Parliaments) in *Journal of the Royal Australian Historical Society*, XXX, part iv (1944), p 256, stated that the structure had been intended for a church at Bendigo, but had been hastily put up in response to the demand for accommodation at Melbourne. It was transported to Sydney on the ship Callender. According to Bridges only the facade and a small part of one return wall are of cast iron, and the remainder is brick and timber; the triangular top of the pediment above the segmental arch is of timber, and the boarding of the timber partitions had previously been used for packing cases.

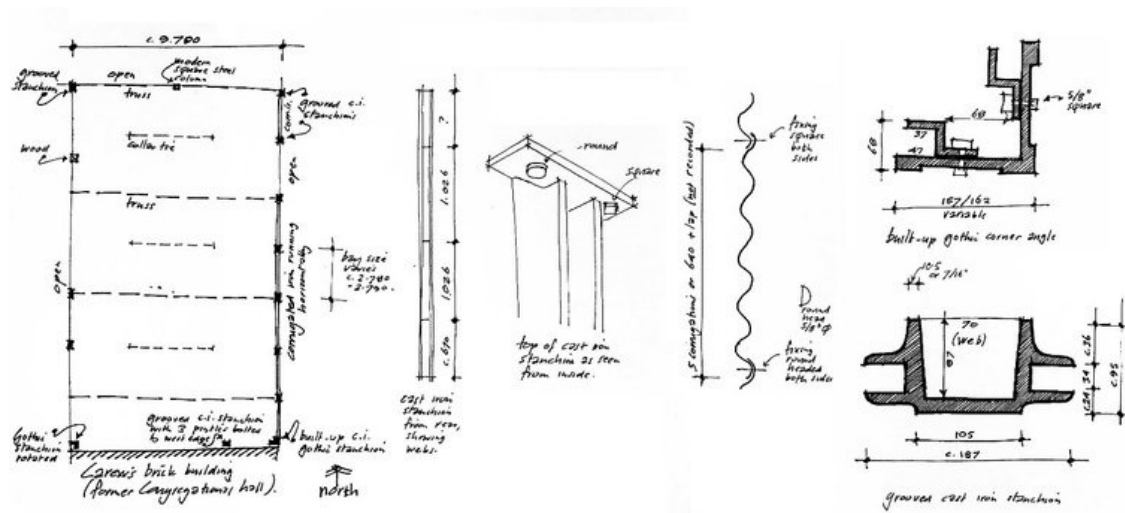
[46] *Australasian*, LXII, 1610 (6 February 1897).

[47] Conservation management plan by Clive Lucas, Stapleton & Partners 2012, as advised by Jennifer Preston, 2012.

These plate iron fronted buildings had side and rear walls of corrugated iron running horizontally between cast iron stanchions. Some more utilitarian buildings which used this construction throughout, and have exactly the same form of stanchion but no plate iron facades, must be presumed to be the work of the same manufacturers. To speak of these as a group is somewhat speculative, because the only surviving example is fragment of a former warehouse- type building originally an orderly room, at the rear of the former Congregational Hall, 51 McKillop Street, Geelong. The building is reported to have been first erected on the Artillery Reserve in Ryrie Street in 1863 (though it must have been manufactured well before that date), and moved to the present site in 1879.[48] The other Robertson & Lister warehouses in Geelong were probably similar. This structure in turn has some characteristics - notably a particular form of corner stanchion, which link it with a whole group of buildings of distinctive characteristics.



Store, rear of former Congregational Hall, 51 McKillop Street, Geelong, view prior to reconstruction. Photo, Miles Lewis.



Store off McKillop Street, Geelong, rough survey, 1985: Miles Lewis.

This group of related buildings comprises the Brown Brothers Store, Geelong; a small two-storeyed house formerly in Curzon Street, North Melbourne, but now re-erected by the National Trust at the Moe Museum; a much mauled and moved store or church building which became a service station at Bridgewater, and is currently a garden centre; a collection of dwellings at South Melbourne, of which one remains substantially intact on site and another has been moved to Swan Hill, and three demolished buildings, one at Bank Street, South Melbourne, one at Tennyson, and one at Dunolly.

[48] From a display at the building.

They are framed principally in wrought iron angle and T-sections, between these is corrugated iron running vertically in some panels and horizontally in others, and the windows are casement frames of cast iron, commonly with an arched glazing bar at the head.

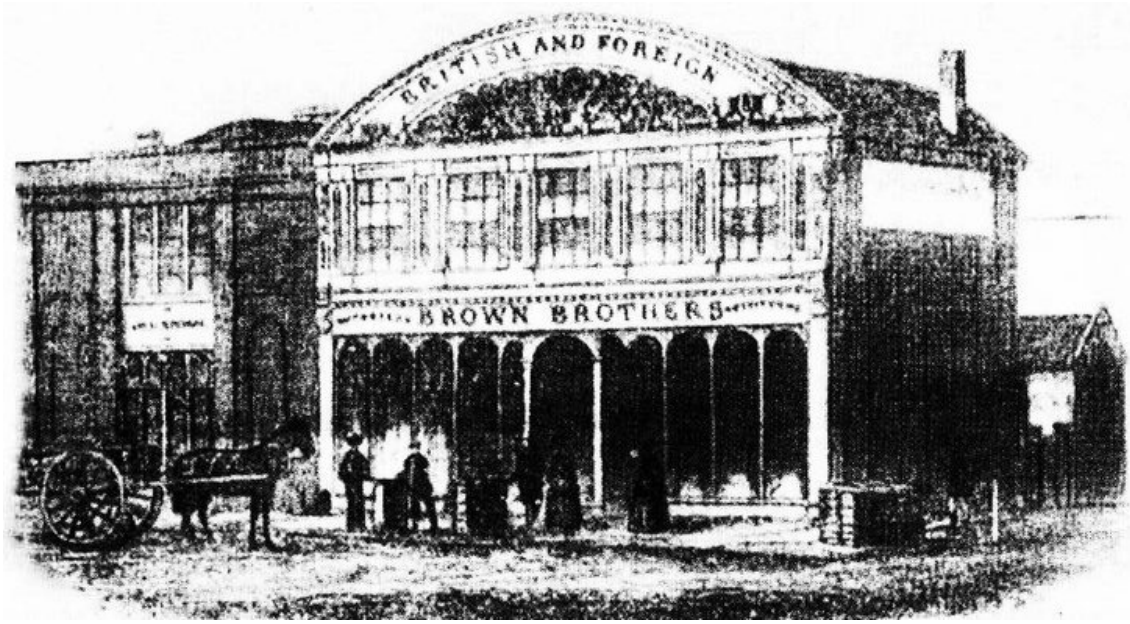


Store, rear 51 McKillop Street, Geelong, detail of corner column. Brown Brothers store, Ginn & Mercer Streets, Geelong, detail of column at rear corner (partly concealed by the modern yellow cladding at left: both Miles Lewis.

The corner stanchion at McKillop Street - quite unlike the intermediate ones of the type already discussed - is a symmetrical cast iron angle measuring 165 x 165 x 19 mm [6 1/2 in by 6 1/2 in by 3/4 in], with shallow recessed panels in the face, each with a rudimentary Gothic arched top. Lewis and Lloyd originally pointed out that this was found in both the Brown Brothers store and the house now at Moe,[49] but the McKillop Street building was at that time unknown. At the Brown Brothers building, unlike the McKillop Street store, the intermediate columns are wrought iron T-sections, and this is true of most of the other buildings in this group. This unusual combination of cast and wrought iron supports calls to mind the description of Robertson and Lister's buildings of 1854 with 'strong standards of cast and malleable iron'.

[49] Lewis and Lloyd, loc cit.

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Brown Brothers store, 17-19 Mercer St, Geelong, from a bill-head of the 1850s: Geelong Heritage Centre 1612/4/50.



Brown Brothers store, front view as restored: Tony Isaacson.



Brown Brothers store, mid-twentieth century side view; Peter Alsop.
Rear view: Miles Lewis

Research by the late Peter Alsop has shown that Warren Hastings Brown reached Victoria in the *Sarah Sands* on 16 December 1852, while his brother and sister-in-law, George and Amelia Brown, left Gravesend in their own chartered ship, the *Ridderkerk*, on 16 November 1853, and reached Port Melbourne on 22 February 1854. George Brown's journal refers to an iron house they had brought with them: 'I hope we may have it as fine [?]as] when we have our iron house to put up', and a note in the family papers indicates that this was a two storey iron building which had been shown at the Glasgow Exhibition of 1853, and was bought to be their future home. Although they found a house elsewhere, and therefore did not occupy it, there is little doubt that this refers to the building which survives at Mercer Street.[50]



Brown Brothers store, roof space showing the queen post truss suspension system: Miles Lewis.

[50] Peter F B Alsop, 'Iron Store - cnr Mercer & Ginn Streets, Geelong' [manuscript note, 29 May 1989]. The reference to the Glasgow Exhibition of 1853, unless it is a mistake, for the Dublin Exhibition, may refer to the 1853-4 exhibition of the Art Union of Glasgow, held in the Dilettanti Rooms 151 Buchanan Street. If that is the case it suggests that an illustration was shown, as the building itself was shipped out well before the closure of the exhibition.



Brown Brothers store, window pintle and latch: Miles Lewis

The site was acquired by George Brown and Warren Hastings Brown on 16 September 1854^[51] and the building was opened in November.^[52] Its elegant façade is illustrated on the bill-head of an invoice of March 1859 of 'Brown Bros., Wholesale and Retail Drapers'.^[53] The lower part of the façade was a plate glass shop window now destroyed, but the upper part still has some unusual ornamental features, including large carved wooden consoles and a segmental tympanum divided radially, and surrounded by cable mouldings made literally of rope. Behind this is an arched roof spanning about 9.7 metres, and the roof structure is divided into three bays by two timber queen post trusses. Rods hang from the panel points, two to each truss, to carry the first floor beams, thus allowing a clear span in the ground floor. The upper floor is divided into rooms as living quarters, and the rods are artfully concealed within the partitioning. The side elevations are not visible, one being inaccessible and the other re-clad, but the rear face shows a mixture of vertical and horizontal five inch iron between the wrought iron framing members, but for the corner columns, which are of cast iron, the building being of two storeys. There are cast iron window sashes in this elevation divided by three horizontal and on vertical glazing bar into eight main panes, but with a further semicircular arch bar at the top.

Although we know that the Browns imported their own building, newspaper advertisements in Melbourne described very similar ones made by Robertson & Lister. For example:

Four commodious iron houses, suitable for shops and warehouses on ground floor, and dwelling houses above, per Abigail, from Glasgow.

These houses are of a most superior description, being made to order by the well-known firm of Robertson and Lister, of Glasgow, who are justly noted for the substantiality of their work. They were designed and their construction superintended by Messrs. Bell and Miller, iron architects. These houses are made of

[51] Title details held by Peter Alsop, Geelong.

[52] *Geelong Advertiser*, 2 November 1854: G & W H Browne [*sic*] advertise that they are to open their new establishment on 'Saturday first'. Quoted by the National Trust of Australia (Victoria) in 'Submission for inclusion on the Historic Buildings Register of No. 19 Mercer Street (cnr. Ginn Street), Geelong' (mimeograph report, December 1976), p 1.

[53] The invoice is in the Commercial Memento collection, Geelong Historical Records Centre. There seems to be no foundation for a statement that the iron was imported from Scotland as part of a shipment used in erecting three similar structures, which appeared in an advertisement in the *Geelong Advertiser*, 21 May 1969.

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the best description of corrugated iron, supported on strong standards of cast and malleable iron; are lined, floored, and ceiled with wood; air-spaced and ventilated; and are altogether of a most superior description, and well worthy of the attention of parties requiring a substantial house or store, either in town or country.[54]

These buildings seem in most other respects very similar to the Brown Brothers store, though the dimensions are not stated. They are given for a similar building, which is substantially smaller than Brown Brothers:

For Sale, ex Kirkman Finlay, Corrugated Iron Warehouse, 22 x 38 x 18, two stories, lined and ceiled with wood, upper floor divided into five rooms, and otherwise complete, by Robertson and Lister, Glasgow.[55]

The buildings in question do not appear to have had shop windows like Brown Brothers, but another advertisement refers to a plate glass window:

For sale, a corrugated iron Shop, constructed by Robertson and Lister, Glasgow, 22 feet width, 43½ feet length, and 20 feet height to eaves, with handsome front fitted with plate glass, and is lined, floored and ceiled with wood. Has an upper floor divided into six apartments, with two closets, complete with doors, locks, shutters, &c., and one extra plate glass for window in case of breakage.[56]

A Sydney advertisement does not name the maker, but describes a very similar building.

IRON HOUSE and STORE.- For sale, a galvanised corrugated iron warehouse and dwelling, 23 foot frontage by 37 feet deep, and 16 feet to eaves, with ornamented balcony, plate-glass for front windows, iron spiral staircase, vestibule, mahogany doors with plate-glass, &c, &c.

The dwelling house is in the top story, and contains 6 rooms and attics above. The walls and roof are timber-lined, and every necessary in the shape of locks, screws, bolts, hinges, &c, is provided.[57]



James Hogg house, formerly at 62 Curzon Street, North Melbourne, attributed to Robertson & Lister, c 1853, view on the original site in 1959: Clare Lewis & Mary Lloyd, 'Portable Buildings' (BArch, University of Melbourne 1959), plate 24B. As relocated at Old Gippstown, Moe: from the Old Gippstown web site, 2014.

[54] *Argus* (Melbourne), 25 March 1854, p 7.

[55] *Argus* (Melbourne), 30 June 1854, p 1; similarly, 27 June 1854, p 8.

[56] *Argus* (Melbourne), 11 May 1854, p 8.

[57] *Sydney Morning Herald*, 22 December 1854, p 8.



62 Curzon Street, North Melbourne, ground floor plan, west and north elevations, detail of corner column [slightly corrected].
Clare Lewis & Mary Lloyd, 'Portable Buildings' (BArch, University of Melbourne 1959), plates 25-7.

In the building from 62 Curzon St, North Melbourne ['Loren'], now at Moe, the columns are again T-sections measuring 4 by 2 by 3/8 in [102 x 51 x 9.5 mm], and the cladding is of corrugated sheets measuring 2 ft 9 in by 8 ft 6 in [0.84 x 2.59 m]. The cast iron corner columns are, as previously discussed, the same Gothic panelled type as at McKillop St and the Brown Brothers building. The ground floor front windows have cast iron casement sashes measuring 0.7 by 1.8 m and divided into four panes high by two across, identical with those at the Brown Brothers store, except for the absence of the arched bar at the top. The cladding again runs partially horizontally, partially vertically, on the end elevation, except that for a metre or so near the top it is all horizontal. On the sides, which has no openings, it is all vertical.

The most extraordinary feature of all is the roof, which is of a basically gabled shape in which the two sloping surfaces are curved concavely so as to give an odd sweeping effect. This is believed to be original, unlike that of the Bridgewater store, below, and there are examples of this type by other manufacturers. However it gives a very clumsy effect, as the stanchions terminate on an arbitrary horizontal line rather than on the chord of the pediment as at the rear of Brown Brothers. The use of a timber sash window at this level, and indeed the timber entrance door below, contribute to the ad hoc effect. The inner timber framing or nogging for the wall lining was very crude and of varying sizes including 3 by 2 inch [76 x 51 mm], 4 by 3 inch [102 x 76], and studs next to the windows 4 1/2 in [113 mm] wide. The exterior wall, before the building was moved, had vertical 9 by 1/2 in [229 x 13 mm] boarding to a wainscot height of 1.2 m, the remaining part probably having been lined with canvas, and perhaps papered.

The ground floor ceiling, at a height of 2.7 m, was lined in 6 in [152 mm] tongued and grooved varnished deal with a false groove at the centre in imitation of three inch boarding, but was possibly not original, as gas piping was built in above it. The floor boards were 6 by 1 inch [152 x 25 mm], but these again may not be original - indeed, the building is something of an enigma. At the time it was removed from North Melbourne the iron on the south side had been replaced by a nine inch party wall and chimney, containing various types of machine pressed bricks, while others were found under the floor joists. Some of the bricks in the wall bore the Hoffman brand, which dates them after 1870. It is not impossible that the floor was replaced, or that a timber floor was not originally provided (some of Bellhouse's buildings relied on the owner providing some sort of earth floor). All that can usefully be said of the history of this building is that it first appeared in the Bourke Ward (North Melbourne) rate book of 1854 in the occupation of one James Geddes, and was subsequently occupied by a series of tenants until from about 1880 it seems to have been left vacant for some years. The reconstruction work may date from this period.[58]

[58] Nothing of significance emerges from the history of this building. It stood on Crown Allotment 11, Section 1, Parish of Jika Jika, which was first sold to George Evans on 8 September 1852.

ROBERTSON & LISTER



Former store, 21 Main St, Bridgewater, Victoria: Mike Butcher.



Former store, Bridgewater, side wall: Miles Lewis.



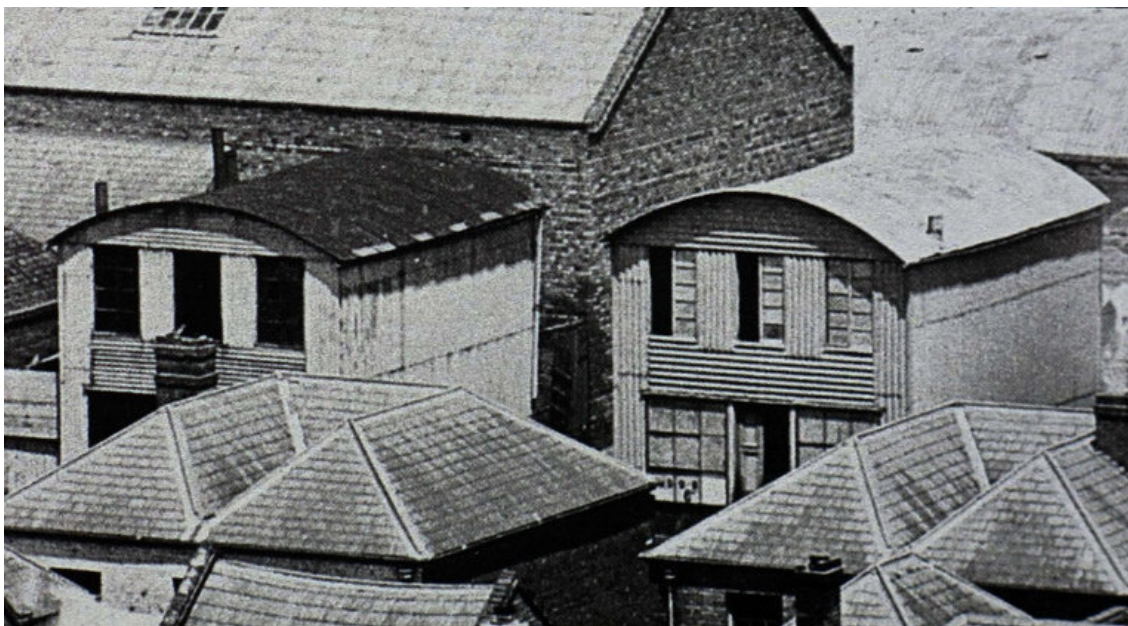
Former store, Bridgewater, roof structure: Mike Butcher

Of the next Victorian building in what might be called this family, not very much need be said. It is now at Bridgewater and is a retail garden centre, but was formerly a service station, and before that was on a property not far away, and it is said to have been originally a church in Collins Street.[59] It appears to have been of the arch-roofed type, but in the last move the roofing sheets were inverted to form a gable roof of two concave sections like that of the Curzon Street house: this change seems

[59] Mr R W Sinclair advised me on 21 April 1981 that he knew of this building as a Methodist church originally imported for use in Collins Street. According to Mr A E Wylie, in a letter to the National Trust of 21 September 1972, the building was re-erected in December 1898 as an overseer's dwelling on the East Loddon sheep station at Serpentine, owned by Ettershank, Eggleston & Mann. It was later sold to W Bassett, who proposed to use it as a shearing shed on his farm, but the farm was sold and the building was then bought by A E Wylie's younger brother, who put it up on the present site in Main Street, Bridgewater, for his petrol station and agency business. He subsequently sold it to J Lynch.

to be confirmed by the rusting on the present underside or convex side of the sheets. The iron is again of five inch pitch, the framing of wrought iron T-sections, and there are the familiar cast iron sashes to the casement windows, in some case of a plain rectangular paned type, and in others with the arched bar at the top. The portion now standing is not the same size as the original building, as a number of component parts have been discarded, and many members, such as ties, are not original or appropriate.

There are or were two fragmentary examples of the genre, as well as others known only from old photographs. A building first put up at White Hills, Bendigo, but moved to Tennyson, north of Bendigo, in 1875 to become the 'Junction Hotel and Store', [60] consisted at the time of inspection only of a number of components of lying on the ground. However there are or were photographs of the building before it was demolished. It had a pretentious shopfront with panelled stallboards, paned windows and a recessed central doorway. There was an arched roof, but no externally visible framing members. The cast iron sashes were of 2 x 4 lights, like others in this group of buildings, but lacking the arch bar at the top [61] On one piece of iron was a stencilled lading mark consisting of a figure in a diamond adjoined by another figure, resembling the form found on the Patterson houses, below. Given the relative scarcity of such buildings on the goldfields, it seems possible that this was the former Helm Store in Sailor's Gully, which was advertised for sale in 1858 (though referred to as being English). This was two storeyed, measured 22 by 34 feet [6.6 x 10.2 m], and had plate glass windows. [62]



Panorama of central Melbourne by John Noone, photographer, 1869, detail of the south side of Little Bourke Street. State Library of Victoria H41470/7.

The appearance of the Tennyson building was virtually identical, at least so far as the upper part of the façade is concerned, with a pair of buildings on the south side of Little Bourke Street, Melbourne, which appear in two panels of John Noone's famous panoramic photograph cycle of 1869. [63] There are three rectangular windows in the upper floor, each with a pair of casement sashes, and each sash divided vertically into five (rather than four) panes. Although the framing members are not visible there is the same odd combination of vertical and horizontal corrugated sheets as in other buildings of this group. Vertical sheets run up either side of the façade as far as the chord of the arched roof, flanking the shop windows below and the outer casement windows

[60] The building is said to have been imported from Scotland and intended as a boot factory, but by 1865 had come the White Hills Hotel, near the corner of White Hills Road and Old Bridge Street, and conducted by David Jack. 'In the Spotlight', undated cutting from the [*Bendigo Observer*], kindly supplied by Bernie Crumpler, of Tennyson.

[61] *Tennyson Heritage Group* [newsletter, April 1989].

[62] *Argus* (Melbourne), 25 May 1858, p 8.

[63] State Library of Victoria H41470/6 & H41470/7

above. Vertical sheets also run between the casement windows. Horizontal sheets run continuously across below these windows, and also in the whole of the segmental area below the arched roof.



London Chartered Bank of Australasia, Dunolly, ambrotype by G H Jenkinson, c 1861: State Library of Victoria H26118.

The London Chartered Bank at Dunolly, known only from an ambrotype, was unmistakably of this school, as indicated by the combination of vertical and horizontal corrugated panels, and the other elements of the façade.

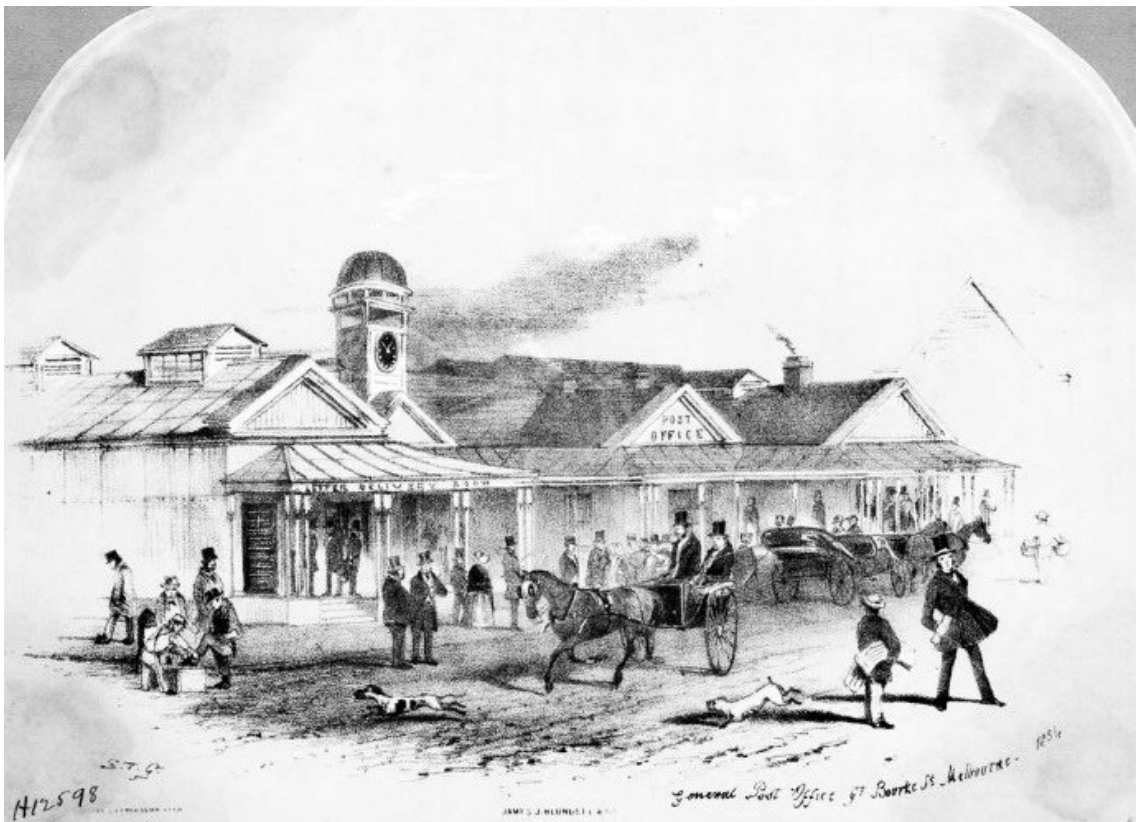


House at 306 Bank Street, South Melbourne, exposed rear wall as in 1983, and cast iron window sash: Miles Lewis.



306 Bank Street, South Melbourne, gutter and downpipe brackets, believed to be original: Miles Lewis.

The last example is a house at 306 Bank Street, South Melbourne, where (at the time of inspection in 1983) some of the iron wall survived at the rear, though the building had been given a brick façade later in the nineteenth century, and much altered in other respects. The small area of rear wall surface showed broad pitch vertical corrugated iron, with no particularly distinctive features. However there was a cast iron window sash in eight panes, similar to those of other buildings in this group but lacking the arch bar at the top, just as at Tennyson.



'General Post Office Gt. Bourke St, Melbourne - 1854', by S T Gill, State Library of Victoria H12598.

Only a fragment remains, though a fascinating one, of the Melbourne General Post Office extension of 1853. The post office was hastily extended to meet the demands of the gold rush, and Balmain, the Colonial Architect, reported that they had 'half finished the work before we received regular instructions to begin.' [64] The contractor was W C Cornish, and illustrations show that it was of corrugated iron.

[64] Digest of evidence given by James Balmain to the Public Works Committee of Parliament, 13 September 1853: *Geelong Advertiser*, 25 April 1854, p 4.



Marking on the iron of the Whanregarwen building, believed to be from the Melbourne General Post Office 1853: Natica Schmeder.

In 2006 Natica Schmeder discovered the Niagaroon woolshed at Riverside Farm, Whanregarwen, south of Alexandra, Victoria,[65] which according to local tradition is clad in iron from the first Melbourne Post Office. The iron is of five inch pitch, suggesting that it does indeed from the 1850s, and is marked with the single letter 'V' in a diamond - presumably for Victoria.[66] Unless the labelling system used by Robertson & Lister was one in more general use – for which there is no evidence – this points to the firm as the source of the post office, or at least of the iron used to clad it.

This brings us to the small colony of houses which stood in Coventry Street, Montague Street and Patterson Place, South Melbourne, consisting of two basic types, a two-roomed cottage with an attic, and a four-roomed house with a two-room attic. Though there are other partially complete houses and separate components in the vicinity, the only one of these which is substantially intact on its original site is one of the larger type at 399 Coventry Street, restored by the National Trust. Another of the large type has been re-erected at the Swan Hill Pioneer Settlement, and the component parts of two of the smaller type were held at Bendigo for ultimate erection in the Victoria Hill Mining Museum development, but now seem to have disappeared.

A Melbourne advertisement describes three four-roomed houses by Robertson & Lister which sound very similar, 'with attics, lined throughout, well ventilated.'^[67] Except that the attic rooms are not mentioned, an advertisement in the *Sydney Morning Herald* for sale of six houses seems to suggest the same models:

[65] Since identified as Niagaroon Station Woolshed, 4799 to 4849 Maroondah Highway, corner Whanregarwen: Context Ltd [Natica Schmeder et al], *Murrindindi Shire Heritage Study Stage 2 Volume 3 Heritage Place & Precinct Citations* (Context, Brunswick [Victoria] 2013), p 480.

[66] Information and photo from Natica Schmeder, 2006.

[67] *Argus* (Melbourne). 25 March 1854, p 7.

Three (3) of two rooms each, contained in 28 packages each house

Three (3) of four rooms each, contained in 50 packages each house.

The above are from the celebrated makers, Messrs Robertson and Lister, Glasgow, and are of excellent workmanship and strength. C.R. Robinson and Co., 46. Hunter-street.[68]

Another Sydney advertisement offering two, three, four, five, and six roomed houses, seems likely to refer Robertson & Lister structures, though no detail is given.[69] Twelve houses which reached Melbourne from Glasgow in August 1854[70] were probably of the Robertson & Lister type, and although they were consigned to Begg, Mitchell, & Webb rather than directly to Patterson, they might represent a later instalment of his development.

The South Melbourne cottages were apparently imported in or from 1853 by Robert Patterson, whose initials are found on the lining boards, and the earliest of them were put up in 1853-5[71] on land which he had bought on 26 January 1853.[72] They would have been a speculation by Patterson, who is believed to have been the Scottish squatter Robert Patterson (1811-1859).[73]

The houses first appear in the Lonsdale Ward ratebooks in 1854-5. In 1854 five six-roomed houses each valued at £60 per annum appear in Coventry Street, and in 1855 fourteen of the smaller size, each valued at £30, appear in Patterson Place. Even more seem to have been put up after these dates.[74] The whole property seems to have remained in single ownership until 1874 when it was in the hands of a local estate agent, A J Faram, who subdivided most of it and put the lots up for sale. He offered six lots in Coventry Street with a seven roomed cottage on each (the seventh room presumably a rear addition); one at the corner of Coventry and Montague Streets which had another seven roomed cottage, but was suggested as a prime site for a hotel, which was in fact to eventuate; a vacant block at the corner of Montague Street and Patterson Place; and six lots in Patterson Place, each with a five-roomed cottage.[75] The latter would represent only one side of Patterson Place, so it seems that the south-west side was not sold at this time, The total then amounts to seven of the larger sized cottages and probably twelve of the smaller.

In 1959 Lewis and Lloyd seem to have found four of the six room houses standing in Coventry Street, two of which were over-clad in timber, and an unspecified number of the smaller ones in Patterson Place. By 1966 only numbers 8, 10, 11, 13 and 15 remained in Patterson Place and it was reported that they were being demolished, [76] though in fact one or two houses survived a few years longer.

[68] *Sydney Morning Herald*, 1 August 1854, p 8.

[69] *Sydney Morning Herald*, 16 August 1854, p 6. They are said to be landing from the *Countess of Elgin*, though I can find no clear reference to them in the published report of the ship's cargo. It sailed from Liverpool, but had possibly taken on cargo at Glasgow, as it carried a quantity of fencing by C D Young & Co.

[70] *Argus* (Melbourne). 22 August 1854, p 4.

[71] A title search undertaken for the National Trust indicates that the subdivision, including Patterson Place itself, appears on the titles only in 1874 after Patterson had sold the whole development to A J Faram, a local estate agent. In fact, however, it was in existence from the earliest years, as has been confirmed by the rate books and other contemporary records checked by Reg Macey in his investigations of the area.

[72] Section 11, allotments 16, 17, 18, 19: *Argus* (Melbourne), 29 January 1853, p 5. Put together, these amount to a rectangular block at the west corner of Coventry and Montague Streets. This and other information has been contributed by the research of Andrew Linden in 2022,

[73] This is the conclusion of Andrew Linden.

[74] See the extracts from the rate books in Lewis and Lloyd, 'Portable Buildings', pp 24, 25. For an illustration of the cottages, in what seems to be a view of Patterson place looking south-west - a row of four in the foreground, and others opposite and in the background - see Victoria, Housing Investigation and Slum Abolition Board 1936-1937, *First (Progress) Report* (Melbourne 1937), p 54.

[75] *Argus* (Melbourne), 21 March 1874, p 2,

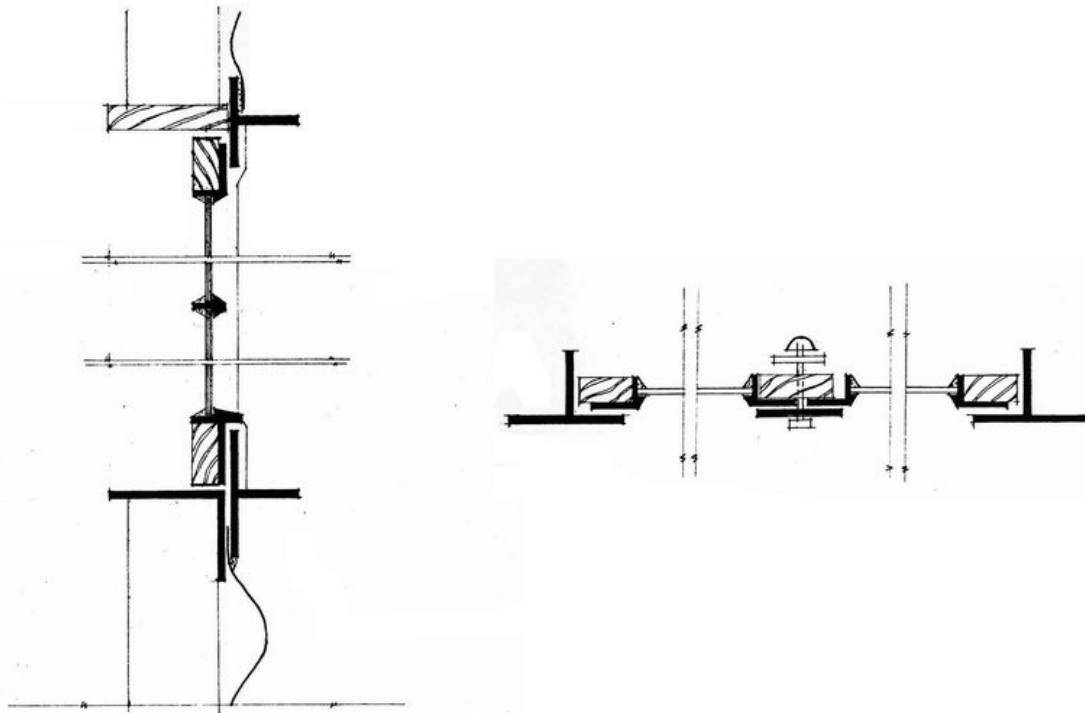
[76] David Saunders [ed], *Historic Buildings of Victoria* (Jacaranda Press, Melbourne 1966). p 130.



Patterson Place, South Melbourne, looking east, and showing the row of six iron cottages (nos 5 to 15) on the south side, 1933, photo by J K Moir. State Library of Victoria, no 819570.



Iron cottage, 15 Patterson Place: Brian or Hilary Lewis.



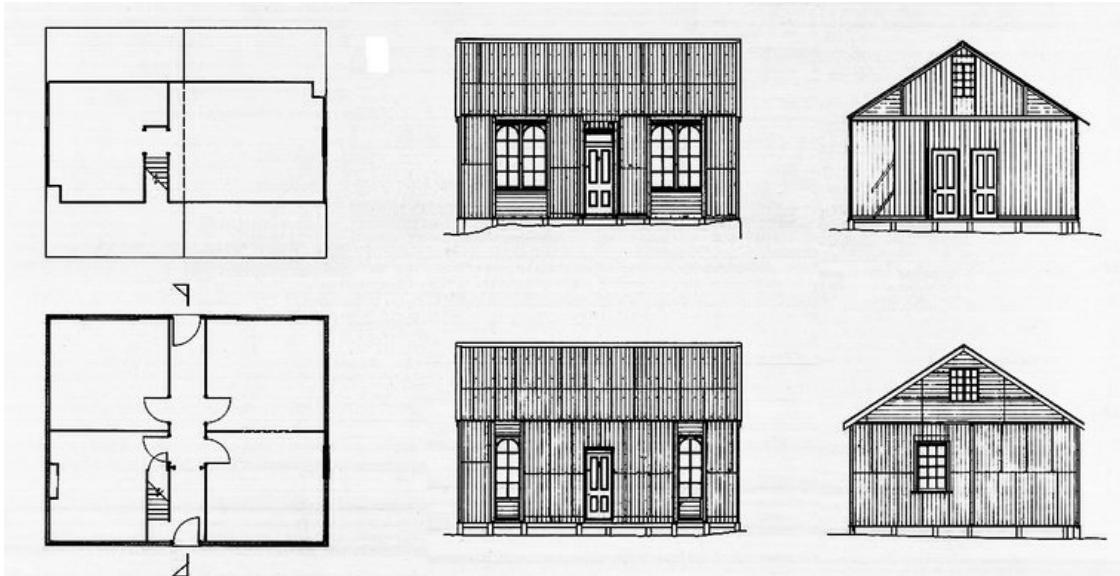
Iron cottages, Patterson Place, window details, vertical section and plan: Clare Lewis & Mary Lloyd, 'Portable Buildings' (BArch, University of Melbourne 1959), plate 33.



Iron cottage, Coventry Street (probably no 385, moved here c 1875, perhaps from the Patterson Place end of the site), view and survey as in 1959. Clare Lewis & Mary Lloyd, 'Portable Buildings' (BArch, University of Melbourne 1959), plates 29-31.



399 Coventry Street, Miles Lewis.



Iron house, 399 Coventry Street, : front and side elevations, measured and drawn by Pru Sanderson, 1980: State Library of Victoria: H82.189/19.



Iron house, 399 Coventry Street, 'RP' [Robert Patterson] monogram and lading marks, from the internal lining boards. Miles Lewis.



Iron house, 399 Coventry Street, fireplace. Miles Lewis.



Iron house at the Swan Hill Pioneer Settlement, believed to be from the corner of Montague Street and Patterson Place: Miles Lewis.

The smaller houses measure 3.6 by 7.2 m [12 by 24 ft] and consist of two rooms with a ceiling height of 2.1 m, opening off a narrow central passage which also contains the steep stair to the attic, a room lit only by windows in the gable ends. Rather oddly an advertisement appeared in 1880 for the sale of eight iron cottages in Montague Street and Patterson Place, describing them as having three rooms and a large attic.[77] The third ground floor room can only be explained by the rear skillions which are known to have existed on at least some and perhaps all of the cottages.[78] The larger houses vary somewhat in their plans and dimensions but 399 Coventry Street measures 8.1 by 6.75 m [27 ft x 22 ft 6 in], and, like all of them, consists of four ground floor rooms, a passage, and two attic rooms. The plans vary according to whether the entrance is from the gable end or the side, and whether the passage runs right through, with the stair at the side, or stops in the middle of the house, with the stair at right angles.

The exterior walls of the buildings are framed in wrought iron, and the interior is entirely of timber. The base is a wrought iron angle, with the vertical flange rising behind the corrugated iron cladding: from this base rise vertical members consisting of angles at the corners, and T-sections in between with the stem pointing inwards, so that the flanges overlap the sides of the corrugated iron panels. These panels are of 2.4 m by 965 mm [8 ft by 3 ft 2 in] corrugated iron sheets, 127 mm [5 inch] pitch, with the corrugations running vertically, except in the spandrels above doors and above and below windows, where they run horizontally. In the spacing of the wrought iron framing members no special attempt has been made to conform to the sizes of the corrugated sheets. Inside there are timber members, bolted to the iron sheets, to which are nailed thin tongued and grooved lining boards running vertically. The ceilings are also lined in boarding, and internal partitions consist of a single thickness of boarding held in place only by small strips of timber on either side planted onto the ceiling and onto the floor, thus holding the ends of the boards. Above the ceiling line, and visible in the side spaces of the attic are two tie rods running across the roof span, and probably tying the whole building together.

There is at the 399 Coventry Street house one conventional timber sash window, in one of the end walls, but the windows generally are cast iron paned casement sashes with a timber surround attached to them, and in one case the frame continues to include a lower panel of horizontal corrugated iron, so that the whole opens as a French window or glazed door. This house appears to have had fireplaces in two of the ground floor rooms, and the one surviving consists of a small grate and a shallow mantelpiece, all of iron and built up from separate castings. The front door of this building is an ordinary panelled timber one, and appears to be original, along with the very heavy and crudely dovetailed timber frame surrounding it and the iron fanlight above.

[77] *Argus*, 29 May 1880, p 3.

[78] By the time of the first Melbourne & Metropolitan Board of Works survey plan all the surviving cottages have rear skillions. Many are full width, almost doubling the plan area, but four of the cottages on the south side of Patterson place have half width skillions (on the east side), suggesting that this was originally the standard form for that row of cottages, and that this skillion was the third room in each case.

The front windows of the South Melbourne cottages are pairs of cast iron casement sashes opening inwards, each with a rectangular angle iron frame, to the back of which is attached the surrounding timber frame, and each divided by three horizontal glazing bars and a semicircular bar at the top of the rectangle, so as to allow four main panes and two small corner lights above the arch. The South Melbourne buildings are certainly by the same manufacturer as the five buildings mentioned at Geelong, Moe, Bridgewater, Bank Street and Tennyson.

The lining boards carry stencilled and hand painted markings of two types, the initials 'RP' in a diamond, indicating the consignee, Robert Patterson, and 'A#\$', followed by a numeral, the 'A#' probably identifying the specific building, and the numeral that of the bundle or package of materials. This links the Patterson buildings not only with the White Hills building and Melbourne General Post Office, both discussed above

In 1854-5 a number of arch-roofed houses were advertised, especially in Sydney.[79] Some, and probably all of these, were by Robertson and Lister. One was described in an advertisement in 1855

One very superior, strong, and commodious corrugated Iron House, now landing, ex Alan Ker, consisting of four rooms and two attics. The house is 24 feet by 22 feet, and is contained in 72 packages. It was constructed by Messrs. Robertson and Lister, Victoria Works, Glasgow; is of great strength, with malleable iron bars, to which the sheets are secured by bolts, and screws inside, and in addition to the usual wooden framework has the iron framing, which entirely binds and supports the roof and sides, independent of the wooden framing for nailing the lining to; four-corner ornamental iron pillars; the flooring feathered and grooved, &c.

Dimensions: - Frontage, 24 feet
Depth back, 22 feet
Height to eaves, 10 feet
Rise to attic roof, 7 feet 6 inches.[80]



Two houses in Ballast Point Rd, Birchgrove, Sydney, with a hipped roof and a arched roof respectively, detail from the Panorama of Sydney from the Holtermann Residence c 1871-5, State Library of New South Wales ON Box 61 No C.

A house of this description, but of different dimensions, survives today. Two houses which were at what are now 57, 59 and 59A Ballast Point Road, Birchgrove, are visible in the Holtermann panorama of Sydney in 1875, and have been researched by Ray Stevens, Geoffrey Levey and Peter Emmet. One of them has an arched roof. The other is more conventional in appearance, but the documentary evidence suggests that it was also of iron and was in fact, apart from the roof, a twin of the first.

Rose Adcock, a wealthy spinster and developer, bought this land from Charles Smith in 1853, and must have built the houses no later than 1857, when a neighbouring property is described as being 'close to Miss Adcock's iron houses'. [81] About a year later they were put up for sale as:

[79] *Sydney Morning Herald*, 17 April 1854, three 2 room houses, 10 ft 6 in x 18; 1 four room house 21 x 17; 7 August 1854, p 6; four 2 room houses 12 x 12 ft; 1 one 3 room house 12 x 18 ft .

[80] *Sydney Morning Herald*, 7 August 1854, p 6.

[81] *Sydney Morning Herald*, 12 December 1857, p 1.

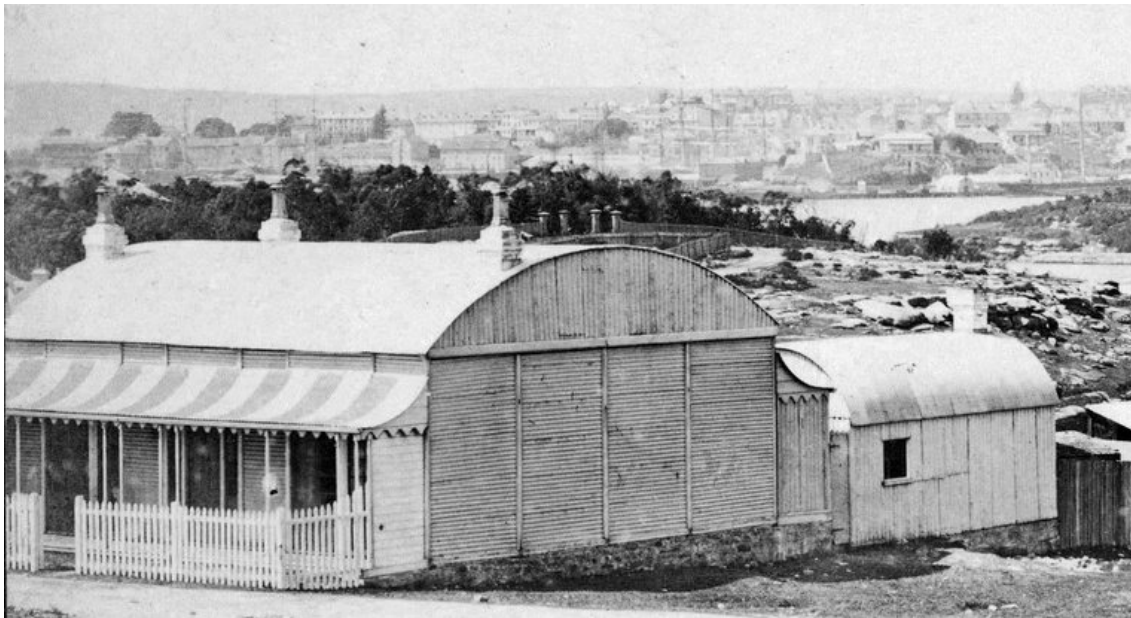
ROBERTSON & LISTER

... two remarkably handsome COTTAGE RESIDENCES, built of corrugated Iron, and containing each - hall, five rooms, and detached kitchen, and store or servant's room, with wide verandah surrounding the house; at the rear, good yards and abundance of water.

These cottages ... are not erected (as is generally the case with iron houses), in a flimsy manner, but are strongly put together, and will bear inspection as a well-built property.

The rooms and hall are all lined with wood, canvassed, and neatly papered ... [82]

They were bought (probably at this time or at least before 1868) by the brothers Henry Chamberlain Russell and Robert Russell (whose names appear on an 1868 plan). H C Russell bought a further property at what is now 235 Rowntree Street, from T S Mort on 25 October 1876, and it seems that he moved his iron house to the new site, where it can be seen in a photograph of 1879, and where it still stands today. His brother, Robert Russell, died in 1876, and his widow continued to live at 57 Ballast Point Rd until about 1884. This house was demolished some time before 1926.



House now at 235 Rowntree Street, Birchgrove: detail of a photo of 1879 in the State Library of New South Wales, courtesy Ray Stevens.

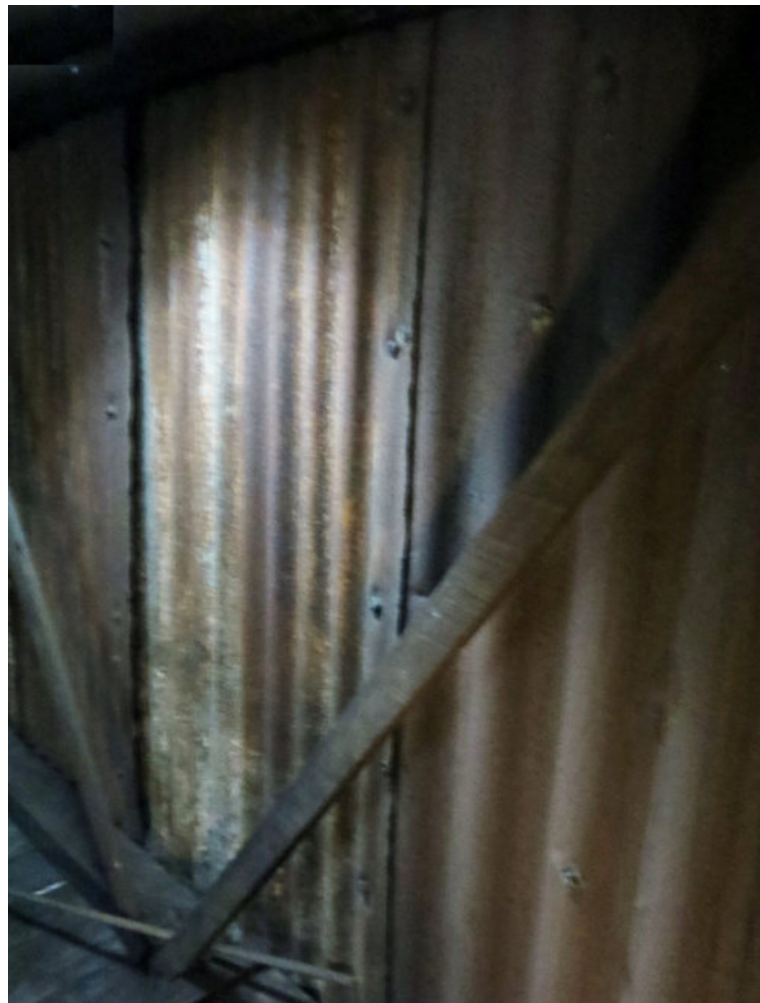


235 Rowntree Street Birchgrove modern view: Ray Stevens.

[82] Sydney Morning Herald, 28 January 1859, p 7.



235 Rowntree Street, Birchgrove front view: Miles Lewis.



235 Rowntree Street, Birchgrove, stencilled timber formerly visible at entrance door sidelight: Jisuk Han.
West gable cladding from inside the roof space: Miles Lewis.



Verandah, with reconstructed roof and replicated columns: Miles Lewis.

Front doorway, with largely original joinery: Miles Lewis.

West window bay, central part reconstructed: Miles Lewis.

The surviving house at 235 Rowntree Street, Birchgrove, was first identified by Ray Stevens as that in the 1879 photograph,[83] though it is not easily recognised today. In form the building rather resembles the later catalogue illustrations of Young, but the construction is typical of Robertson & Lister. The end wall is clad in horizontal corrugated iron, now covered over, between what seem to be the characteristic Robertson & Lister cast iron stanchions at the corners, one of which is visible. The pitch of the vertical gable iron, measured from within the roof space, is 122 mm.[84] The dimensions are 11 x 9.6 m in plan, excluding the verandah; and 5.1 m height from the floor to the top of roof:[85]

After Robertson & Lister's bankruptcy in 1855 all their equipment, some buildings held in stock, and their 'patterns', presumably meaning their designs, were sold up by the trustee.[86] There is no report about the sale of the goodwill of the business, but a trustee in insolvency would have been remiss if he did not attempt to recover something from this. We surmise that the goodwill was sold with the 'patterns', as it would be difficult to separate them. We can reasonably assume that it was Young who bought Robertson & Lister's patterns, as he would not have been able to publish them if they were the property of somebody else. If he also bought the goodwill of the business, this would explain why he could publish these designs as his own works. There is no evidence that he actually constructed any of them.

Although no surviving building reasonably attributable to Young has been identified in Australia, there is some corrugated iron probably attributable to him, and there are other complete buildings which seem to be Scottish and could well be his work. We might infer that he did export some prefabricated iron buildings from the fact that at the time of his bankruptcy in 1858 he attributed a loss of £3226 to 'a San Francisco house', and £1000 to 'Wharton, Caird, & Liddle' of Melbourne.[87] But on the other hand he may have acquired these debts along with the Robertson and Lister business.

[83] Information December 2017 by Ray Stevens, ray@oikos.com.au. The photograph has been dated to 1879.

[84] Inspected December 2018, courtesy of the owner Jisuk Han.

[85] So Jisuk Han tells me, by email of 23 September 2021.

[86] *Glasgow Herald*, 25 March 1855, p 8; 30 March 1855, pp 7, 8.

[87] *Scotsman*, 31 July 1858, p 4. As mentioned above, Young also refers to £10,000 lost to bad debts 'during the late Australian crisis', but these presumably arose over his whole range of merchandise, not merely his iron buildings

ROBERTSON & LISTER

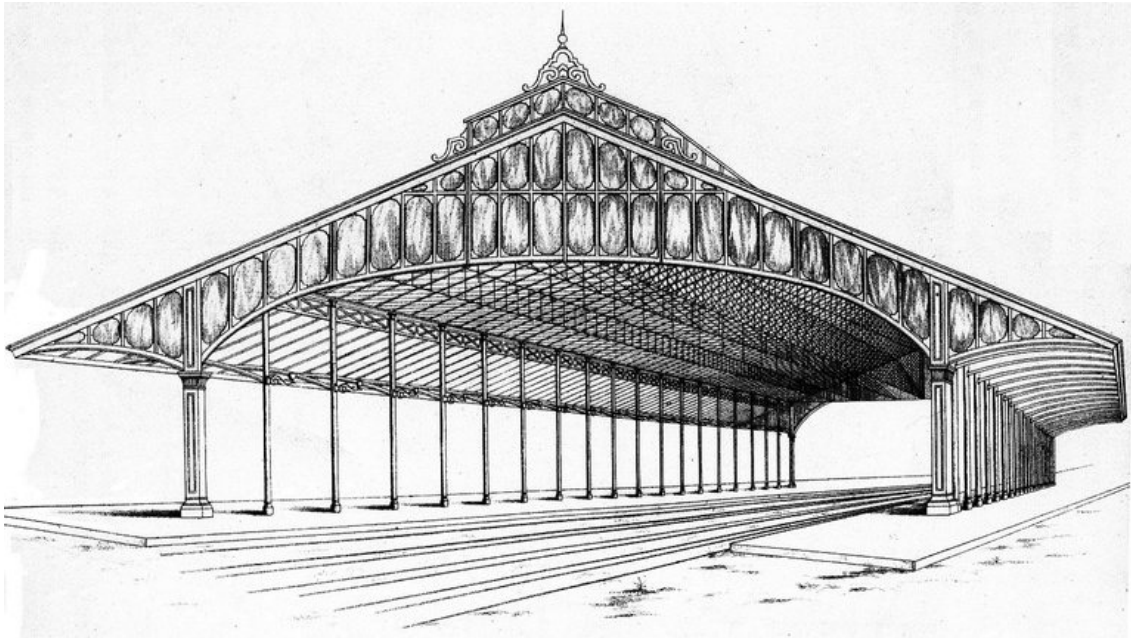
Wharton, Caird & Little, as they in fact were, did sell iron buildings which were not attributed to any manufacturer:

Corrugated galvanized iron houses, of 1, 2, and 4 rooms, lined with wood, floored, glazed, and complete in every other respect.[88]

Iron warehouses –
30 x 60, two stories high (of a very superior make)
31 x 63 x 12, one story
25 x 50 x 10, one story.[89]

Even more tellingly, the shipping records show that on 16 May 1854 there reached Melbourne, for Wharton, Caird & Little, '92 packages iron house; 40 packages wooden house, 22 iron pillars, 42 battens, 3114 floor-boards, 160 sheets iron'.[90] The 22 iron pillars are very suggestive of Robertson & Lister's two storey stores, one of which had 24 pillars. All of these Melbourne references precede the failure of Robertson & Lister, an event which might well have enabled Wharton, Caird & Little to repudiate the debt, and explain why Young had been unable to enforce it four years later.

While there is no specific evidence of Young as a prefabricator in any normal sense, he was known for his conventional structures, such as the Dublin Exhibition building of 1853, for which he supplied the columns and other cast ironwork,[91] and the Kensington Gore Museum of 1855-6, which he designed and constructed as a package.[92] Young also built barracks, cookhouses, straw stores and other buildings for the military at Colchester and Aldershott.[93] By 1856 he had branches at 19 Great George Street, Westminster; 1 Castle Buildings, Derby Square, Liverpool; 32 St Enoch's Square, Glasgow; and 48 New Buildings, North Bridge, Edinburgh.[94] He was also a contractor for William Dredge's stiffened suspension bridges.[95]



'Iron railway station roof' allegedly constructed by Young: Charles D Young & Co, *Illustrations of Iron Structures for Home and Abroad*, no place or date (c 1856), plate 15. [Institution of Civil Engineers, London]

[88] *Argus*, 24 September 1853, p 7.

[89] *Argus*, 25 September 1854, p 8.

[90] On the *Hornet*, from Glasgow: *Argus*, 17 May 1854, p 4.

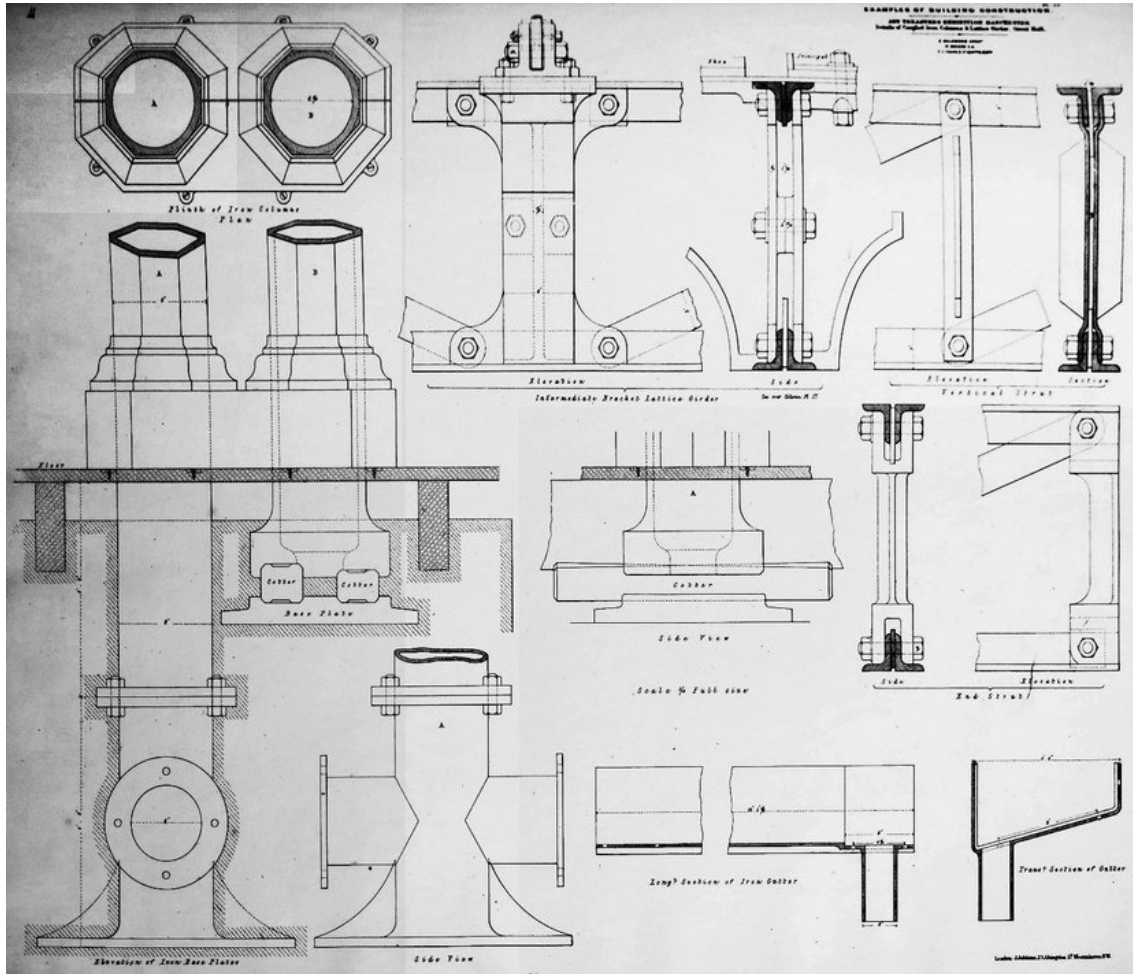
[91] Young, *Iron Structures for Home and Abroad*, p 7; Hitchcock, *Early Victorian Architecture*, I, p 567.

[92] Young, *Iron Structures for Home and Abroad*, pp 6-7; Hitchcock, *Early Victorian Architecture*, I, pp 567-8; II, §XVI, pls 42-7.

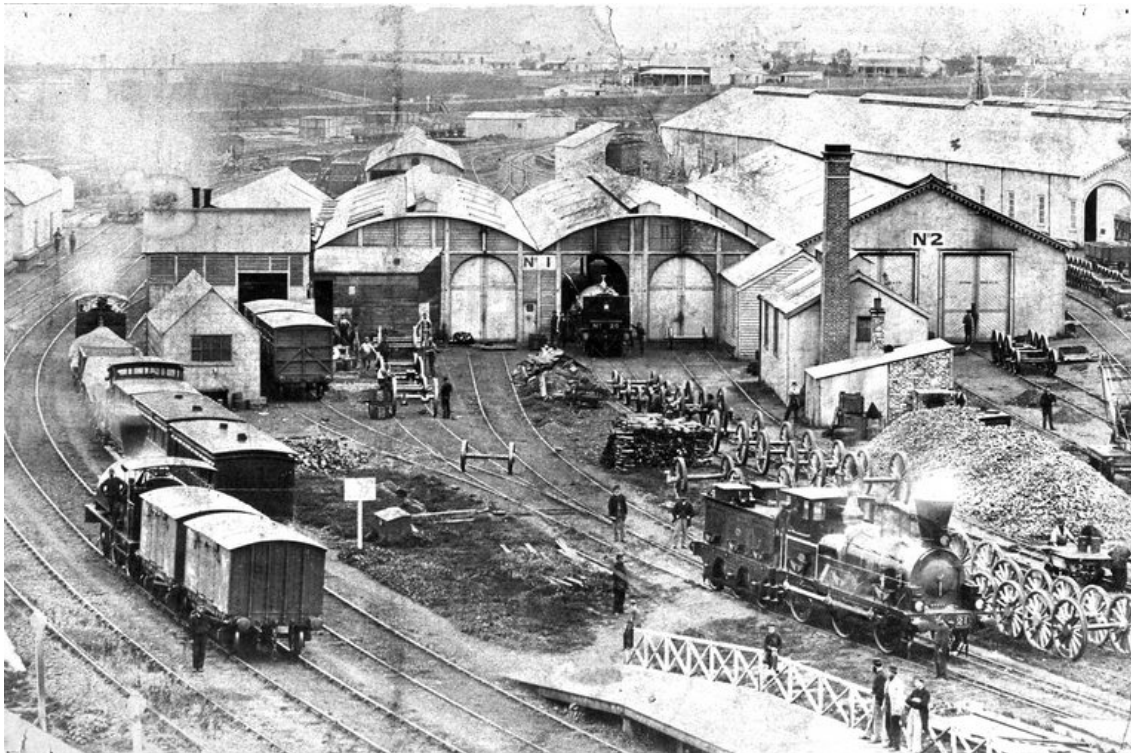
[93] Young, *Iron Structures for Home and Abroad*, p 5.

[94] Young, *Iron Structures for Home and Abroad*, title page.

[95] Information from Tom Swailes, 17 October 2004.



Iron work details from the Art Treasures of the United Kingdom building, Manchester, by E Salomons, architect and J Dredge, engineer; constructed by C D Young & Co, 1857: [Henry Laxton], *Examples of Building Construction, intended as an Aide-Memoire for the Professional Man and the Operative, being a series of working drawings to a large scale, &c, ...* ([Laxton], London no date), plate 2.58.



Williamstown Railway Workshops, Andrew Rider, photographer, 1858: State Library of Victoria H4023 PCLTAF 30.

A possible example of Young's work was the Williamstown Railway Workshops, Melbourne, begun in 1858. Here the number 1 shed was a building with two spans of arched roofing with ventilating ridges and skylights, and the whole of the corrugated iron cladding ran horizontally between exposed columns. When it was sold in 1924 (for re-erection as a factory in South Melbourne) it was said that

the galvanised iron sheets were of exceptional thickness and were riveted together. Its width was 93 feet [27.9 m] and its depth from 105 to 190 feet [31.5 to 57.0 m]. The columns were of cast iron and the framing iron and timber.[96]

Young's business now failed. His Glasgow office closed at the end of 1857, leaving only the London branch and his then headquarters in Edinburgh at the time of sequestration. However the books held in London proved to be incomplete, the manager was dispensed with in August 1858, and it was found that over £3,000 was missing. There were a number of bad or overdue debts including amounts due on the Chelsea Bridge and the Westminster Bridge. His business seems to have been chaotic. It appears that staff in both London and Edinburgh were embezzling money (though in the latter case only that to which they felt entitled); his books were not regularly balanced or audited. He attributed his loss of £18,000 on the Chelsea Bridge to alterations required by the engineer, but which were not accepted by the government, but this suggests a complete disregard for the normal principle of claiming for variations in contracting work. Most remarkably of all, he lost £14,000 on the Manchester Exhibition 'wind having no fewer than seven times blown down part of the work'. [97] The Edinburgh Bankruptcy Court assessed Young's assets at £23,070 and liabilities £116,253. [98] He was discharged on a composition of 2s 6d in the £.[99]

No buildings by Young are known to survive. By contrast Robertson & Lister, though as yet barely recognised, must be classified amongst the most important of the prefabricators. Their utilitarian buildings are numerous and substantial and of much more technical interest than the timber-framed structures of Samuel Hemming and others. Most of all, however, the firm is important as a pioneer of the architectural cast iron façade. In New York Bogardus was earlier, but his work was of a different character. In Britain, and more particularly in Glasgow, Robertson & Lister were quickly followed by Chaplin, Dixon & Robb; John Baird; P & W McLellan and others, but none of these produced so many buildings of this substantial type.

[96] *Williamstown Advertiser*, 30 August 1924, and information and photograph supplied by Mr Wilson Evans. The photograph has been reproduced in Wilson Evans, *Port of Many Prows* (Melbourne 1969), p 137.

[97] *Scotsman*, 31 July, 1858, p 4.

[98] Murdoch, 'Charles D Young', p 4.

[99] Murdoch, 'Charles D Young', p 5.