



PORTABLE BUILDINGS OF THE NINETEENTH CENTURY a proposal for World Heritage listing

Portable Buildings World Heritage Nomination Task Force



Overseas advisers

Marc Braham, Belgium, structural engineer & historian
 Dr Tomo Inoue, Kyushu University, Japan, architectural historian
 Dr David Mitchell, Glasgow, Director of Conservation, Historic Scotland.
 Dr Sara Wermiel, USA, historian of technology
 Dr Yeo Kang Shu., President, ICOMOS Singapore

Overseas bodies

Construction History Society (UK): Dr Nina Baker; Michael Heaton

Australian advisers

The Hon Dr Barry O Jones, former Vice-President of the World Heritage Committee
 Sue Balderstone, former ICOMOS World Heritage Advisor
 Dr Pedro Guedes, Queensland, architectural historian
 Rosemary Rosario, Western Australia, conservation architect
 Paul Stark, South Australia, conservation architect
 Dr John Ting, ACT, architect and conservationist

Australian bodies

Association for Preservation Technology International, Australasia Chapter: Dr Donald Ellsmore
 Australian Centre for Architectural History, Urban and Cultural Heritage (ACAHUH)
 University of Melbourne, Professor Philip Goad, Professor Hannah Lewi, Professor Julie Willis
 Australia ICOMOS: Peter Romey, Convenor, Australia ICOMOS World Heritage Reference Group
 Australian Institute of Architects NSW Chapter Heritage Committee: Dr Jenifer Preston, chair
 Australian Institute of Architects Victorian Chapter Heritage Committee: Jude Doyle, chair
 City of Greater Geelong: Councillor Peter Murrhy; David Scott, Senior Heritage Planner
 Engineering Heritage Victoria: Guy Hodgkinson, chair
 Engineering Heritage Sydney: Frank Johnson, chair; Craig McPherson
 National Trust of Australia (Victoria), Simon Ambrose CEO; Felicity Watson, Advocacy Manager
 National Trust of Australia (Victoria), Geelong & Regional Branch, Jennifer Bantow
 Royal Historical Society of Victoria: Professor Charles Sowerwine

Executive

Tony Isaacson (convenor),
 Janet Beeston, Miles Lewis, Andrew Muir, Chips Sowerwine

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a proposal for World Heritage listing

Any information on buildings outside Victoria is provisional until it has been reviewed by the relevant bodies.

Recommendation

The Portable Buildings World Heritage Nomination Task Force [PBWHNTF] recommends to the State of Victoria and the Commonwealth of Australia that a submission be made to UNESCO for the World Heritage listing of the imported Portable Buildings of the Nineteenth Century which survive in Australia.

The PBWHNTF also seeks the support of the governments of New South Wales, the Northern Territory, Queensland, South Australia, Tasmania and Western Australia, in all of which examples of these buildings are found.

Rationale

The prefabricated buildings of the nineteenth century, known at the time as 'portable buildings', constitute an international phenomenon of historical, economic and technical significance.

The growth of prefabrication was one of the major outcomes of the Industrial Revolution, and these buildings are also associated with historical, episodes of great moment – including exploration, gold rushes (in Australia and the USA), the Crimean War and the development of steam navigation. They are also a reflection of economic conditions, because the trade in buildings required cheaper labour, cheaper materials and/or superior production capacity in the country of origin, as compared with the country of receipt. The trade reacted sensitively to changes in demand or in costs (notably the rise in the price of iron in the mid-1850s).

Prefabrication always stimulates the most advanced building technology, and in this case that technology included:

- the first panelised systems in timber
- various patented systems of cast iron framing components
- carpentry adapting Malay and Chinese traditions to European requirements
- a patent system combining timber and iron
- cladding in sheet zinc
- cladding in corrugated galvanised iron

- continuous arched roofing in corrugated iron, using minimal ties
- cast plate iron with lead-run joints
- patent conical roof vents

Fortuitously, most of the world's surviving examples are in Australia, and especially Victoria. They came mainly but by no means exclusively in response to the gold discoveries of the 1850s, because by the 1850s suppliers were geared up for export, having already sent buildings - in much smaller numbers - to the Californian gold rushes. All of the early Californian examples have since been destroyed, and an interesting side-effect of this is that the Australian buildings best illustrate what was once to be found in San Francisco. Australia not only has more prefabricated buildings of this period than any other country: it has, by a considerable margin, more than the rest of the world combined.

The critical period is approximately 1840 to 1880, because this is when the Australian market was pre-eminent. After this time prefabricated structures are important elsewhere, such as Latin America, although the numbers are far smaller. But if the period 1840 to 1880 were strictly adhered to, it would exclude some extremely significant buildings in Western Australia and the Northern Territory. Therefore the list incorporated in this proposal consists of examples imported up to 1900. It does not include buildings prefabricated within Australia itself.

There are 104 known examples (though some are very fragmentary). 63 of these are in Victoria, 16 in New South Wales, 13 in South Australia, 4 in Tasmania, 3 in Queensland, 3 in Western Australia, and 2 in the Northern Territory. A majority are already protected under the relevant heritage controls, and a number are in public ownership or in accessible uses such as guest houses, restaurants and shops. A significant proportion of them, perhaps 20%, are too fragmentary or altered to be understood visually, but they are nevertheless important to the story of prefabrication in Australia.

The national benefits of World Heritage listing in terms of prestige, tourism and national identity are well understood and have been demonstrated by the previous listings of cultural and natural sites, the former being:

- Royal Exhibition Building and Carlton Gardens
- Sydney Opera House
- Australian Convict Sites
- Budj Bim Cultural Landscape

World Heritage nomination process

[from [UNESCO World Heritage Centre - World Heritage List Nominations](#)]

1 Tentative List

The first step a country must take is to make an 'inventory' of its important natural and cultural heritage sites located within its boundaries. This 'inventory' is known as the Tentative List, and provides a forecast of the properties that a State Party may decide to submit for inscription in the next five to ten years and which may be updated at any time. It is an important step since the World Heritage Committee cannot consider a nomination for inscription on the World Heritage List unless the property has already been included on the State Party's Tentative List.

2 The Nomination File

By preparing a Tentative List and selecting sites from it, a State Party can plan when to present a nomination file. The World Heritage Centre offers advice and assistance to the State Party in preparing this file, which needs to be as exhaustive as possible, making sure the necessary documentation and maps are included. The nomination is submitted to the World Heritage Centre for review and to check it is complete.

3 The Advisory Bodies

A nominated property is independently evaluated by two Advisory Bodies mandated by the World Heritage Convention: the International Council on Monuments and Sites (ICOMOS) and the International Union for the Conservation of Nature (IUCN), which respectively provide the World Heritage Committee with evaluations of the cultural and natural sites nominated. The third Advisory Body is the International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM), an intergovernmental organization which provides the Committee with expert advice on conservation of cultural sites, as well as on training activities.

4 The World Heritage Committee

Once a site has been nominated and evaluated it is up to the intergovernmental World Heritage Committee to make the final decision on its inscription. Once a year, the Committee meets to decide which sites will be inscribed on the World Heritage List. It can also defer its decision and request further information from the States Parties.

5 The Criteria for Selection

To be include on the Word Heritage List sites must be of outstanding universal value and meet at least one out of ten selection criteria. These criteria are explained in the

Operational Guidelines for the Implementation of the World Heritage Convention which, besides the text of the Convention, is the main working tool of World Heritage. The criteria are regularly revised by the Committee to reflect the evolution of the World Heritage concept itself.

Until the end of 2004 World Heritage sites were selected on the basis of six cultural and four national criteria. With the adoption of the revised Operational Guidelines, only one set of ten criteria exists.

The criteria for selection

[from [UNESCO World Heritage Centre - The Criteria for Selection](#)]

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Selection criteria

- (i) to represent a masterpiece of human creative genius;
- (ii) to exhibit an important interchange of human values, over a span of time, or within a cultural area of the world, on developments in architecture or technology, monumental arts, town-planning, or landscape design;
- (iii) to bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared;
- (iv) to be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history;
- (v) to be an outstanding example of a traditional human settlement land-use, or sea-use which is representative of a culture (or cultures), or human interaction with the

environment especially when it has become vulnerable under the impact of irreversible change;

- (vi) to be directly or tangibly associated with events or living traditions, with ideas or with beliefs, with artistic and literary works of outstanding universal significance. (The Committee considers that this criterion should preferably be used in conjunction with other criteria);
- (vii) to contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance;
- (viii) to be outstanding examples representing major stages of earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features;
- (ix) to be outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals;
- (x) to contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation.

Nomination Format

The required format for a nomination is described in the document 'Format for the Nomination of Properties for Inscription on the World Heritage List', available for downloading from the World Heritage Site. Some features of it are:

- The name and location of the property
- Geographical coordinates
- Description of the boundaries
- Map showing the property and if applicable the buffer zone
- Details of the official local institution
- Description of the property
- History and development
- Justification for the inscription
- Synthesis
- Statement of integrity
- Statement of authenticity
- Protection and management proposals
- Comparative analysis
- Proposed statement of outstanding universal value

- Present state of conservation
- Development pressures
- Environmental pressures
- Natural disasters and risk preparedness
- Visitation provisions
- Number of inhabitants within the property and buffer zone
- Ownership
- Protective designation
- Means of implementing protection
- Existing planning provisions
- Management plan
- Sources of finance
- Sources of expertise
- Visitor facilities
- Presentation and promotion
- Staffing
- Monitoring
- Photographs and audiovisual material

Philosophy

World Heritage listing in general has evolved from single monuments to include routes, like the Silk Roads of the Chang'an-Tianshan Corridor, and culturally linked categories, like the Qanats of Iran and the Béguinages of Belgium. The Australian Convict Sites listing is an example of this, and has given Australia experience in multi-site and multi-state listings.

Procedure

Some general guidance can be obtained from the Commonwealth site:

<https://www.environment.gov.au/heritage/about/world/management-australias-world-heritage-listed/managing-world-heritage-australia>

The submission to UNESCO will require the list provided here to be developed in accordance with the requirements above. How management plans and other measures will apply to a multiple site listing is not entirely clear, but some indication will be obtained from other listings incorporating a number of separate public and private properties, such as that for the

Decorated Farmhouses of Hälsingland, Sweden. The essentials will be planning and/or heritage protection for all items, and firm plans for the restoration and interpretation of the major ones.

The procedure followed in Australia is in theory that one state brings a proposal to the Commonwealth, which then develops it for submission to UNESCO. That does not work for a nomination involving properties in more than one state, and a different procedure was presumably followed in developing the Australian Convict Sites nomination. We therefore call upon the Commonwealth to prescribe a procedure by which the present nomination proposal can be advanced.

In the meantime a suggested procedure is:

1. From the outset, and as the process continues, all preservation bodies, historical societies &c be encouraged to bring forward other eligible properties or to suggest corrections to the details on the present list
2. The government of Victoria take ownership of the proposal and submit it on a preliminary basis to the Commonwealth Government.
3. A data base be established, based upon the spreadsheet presently available.
4. Heritage Victoria and the equivalent interstate bodies review all items and undertake further research or recording where required (in necessary contracting out parts of the work)
5. Ownership details, precise GPS locations and curtilage boundaries and should be established for each item.
6. The present condition of each item be recorded by inspection and photographs.
7. All items be considered by the Heritage Council of Victoria and equivalent interstate bodies for state listing or registration.
8. All items be considered for the national list (this should happen as the items come forward, not wait until the completion of each state inventory)
9. Once the majority of properties have been processed, the proposal be added to Australia's Tentative List.
10. Items which do not already have it be given planning protection: given the numbers in Victoria, South Australia and New South Wales this might be achieved by an overlay at state level rather than a series of individual planning scheme amendments.
11. A fund be established to handle emergency repairs and maintenance.
12. Long term plans be prepared for the use, restoration, interpretation &c of the major properties, especially those in public ownership.
13. The nomination be prepared and submitted to UNESCO
14. A historical account of portable buildings in the world generally be prepared, providing context for those in Australia and to meet the requirement for a comparative analysis.

Although a limited document will probably suffice for the purposes of the nomination, the aim should be to develop something more extensive (a) as a prestige publication, and (b) as a source of interpretative material for use at individual sites.

Provisional list

NEW SOUTH WALES

Carey Cottage, 18 Ferry Street, Hunters Hill
 Post Office General Store, Kurrajong Heights
 The Chalet, 1 Yerton Avenue, Hunters Hill
 Wellings Gatehouse, 4 Woodstock Avenue, East Burwood
 Woolingubrah Inn, Coolumbooka Road, Cathcart
 John Ryrie house, Maffra via Dalgety
 Elford house, Davidson Whaling Station, Edrom
 Wingecarribee, Bowral
 former church, Numbaa
 former hotel, Numbaa
 shed, Numbaa
 Grissell [maker] building, Alexandria
 Mint Coining Works, Macquarie St, Sydney
 Legislative Council Chamber, Macquarie St, Sydney
 North Shore Gas Co retort house, Platypus Island
 235 Rowntree Street, Birchgrove

NORTHERN TERRITORY

Burrundie Mining Warden's office, Pine Creek
 former Knuckey St Wesleyan Church, Botanic Gardens, Darwin

QUEENSLAND

Yeddo, 5 Lynch St, Hinchingsbrook
 Bustard Head lighthouse
 Sandy Cape lighthouse

SOUTH AUSTRALIA

Friends Meeting House, Pennington Terrace, North Adelaide
 Walkley Cottage [a Manning house], Pennington Terrace, North Adelaide
 Manning [maker] house, Ringmer Rd, Burnside
 Manning [maker] house, Institute Rd, Montacute
 Manning [maker] house, Blakiston, near Littlehampton
 Manning [maker] house, Gerald Roberts Rd, Marananga
 Manning [maker] house, Greenock
 Wrigley [maker] house Quarantine Station, Torrens Island
 Troubridge Island Lighthouse, Troubridge Shoal
 Port Adelaide Lighthouse
 Cape Jaffa (Margaret Brock) Lighthouse, now at 32 Marine Parade, Kingston
 Tipara (Tiparra) Reef lighthouse, now at Wallaroo Heritage and Nautical Museum
 Palm House, Adelaide Botanic Gardens

TASMANIA

Currie Harbour lighthouse, King Island
 Edwin Maw [maker] building, behind the Lucas Hotel, 46 Gilbert St Latrobe
 Edwin Maw [maker] building, grounds of Longford House, 120 Catherine St, Longford
 timber cottages, Longford

VICTORIA

Woodlands homestead, Woodlands Drive, Greenvale
 Woodcot Park, 345 Tannery Rd, Tarraville
 La Trobe's Cottage, Dallas Brooks Drive, Domain, Melbourne
 Bungalow Cottage, 78 Mercer St Queenscliff
 Singapore cottage, The Gums, Woolsthorpe Rd, 12 km east of Penshurst
 Singapore cottage, Portarlington Bakehouse 48-50 Newcombe St, Portarlington
 Singapore cottage [ex Brunswick], 136 Sackville St, Collingwood
 Singapore cottage [ex St Kilda], 136 Sackville St, Collingwood
 Singapore cottage [ex East Melbourne/Mentone], 136 Sackville St, Collingwood
 Singapore cottage [ex Prahran], 125 Easey St, Collingwood
 Former Wattletree Inn, 196 Wattletree Rd, Malvern
 Sidney Seymour Cottage, 20 Palmer St, Romsey
 Singapore cottage, 17 Coventry Place, South Melbourne
 Singapore cottage, 129 Elizabeth St, Geelong
 Singapore cottage, 7 Wellington St, Geelong
 Singapore cottage, 25 Brewongle Ave, Geelong
 Singapore house, 8 Swanston St, Geelong
 51 Ormond Rd, Moonee Ponds
 Edinburgh cottage, Carranballac, 5945 Glenelg Highway, Carrangallac
 The Heights, 140 Aphrasia St, Newtown, Geelong
 Watford Villa, 14 Dundas St. Avoca
 Osborne House, 456-8 Victoria St, North Melbourne
 252-4 Pakington Street, Geelong
 Keyham, 275 Pakington Street, Newtown, Geelong
 Crimea Hut, Flagstaff Hill, Warrnambool
 Lyndhurst Hall, 46 Walhalla St, Coburg
 Oberon, 2 Lambeth St, St Kilda
 5 Tranmere St, North Fitzroy
 American Cottage, 21 Station St, Coburg
 Fenagh Cottage, 7 Burnett St, St Kilda
 Japanese Tea House, Marina, 678 Esplanade Mornington
 former railway waiting room, Prosper Valley Rd, Budgeree
 Eastern Shore Light, 650 Point Nepean Rd, McCrae
 J H Porter [maker] store, Alphington Park [from 111 Queens Parade, Fitzroy]
 former 71 Little Malop Street store, Sovereign Hill, Ballarat
 iron cottage shell 'The Weatherboard', 24 Weatherboard Rd, Inverleigh
 Bellhouse [maker] house, 399 Coventry St, South Melbourne
 Walmsley [maker] building, Depot, Royal Botanic Gardens, South Yarra
 Ranger's house, 161-168 Gatehouse St, Parkville
 Abercrombie house, 399 Coventry St, South Melbourne

Morewood & Rogers [maker] building, Summerhill Farm, 155 Mt Duneed Rd, Mt Duneed
 St Paul's Op Shop [former corrugated iron church], 30 Fisher St, Gisborne
 All Saints Parish Hall, 95 King William St, Fitzroy
 Eudoxus 34 Fenwick St, Geelong
 Robert Walker [maker], building, 18 Douglas St, Toorak
 iron police building, off Oaklands Ave, Keilor North [relocated from Calder Highway]
 Marsh House, 7254 Midland Highway, Guildford
 Tintern, 10 Tintern Avenue Toorak
 Sun Foundry [maker] conservatory, Rippon Lea Estate, 192 Hotham St Rippon Lea
 Corio Villa, 56-58 Eastern Beach Rd, Geelong
 former Orderly Room, rear 51 McKillop St, Geelong
 Brown Brothers Store, 17-19 Mercer St, Geelong
 Loren, Old Gippstown, 211 Lloyd St, Moe
 former service station [originally church], 21 Main St, Bridgewater
 iron house fragment, rear 306 Bank Street, South Melbourne
 Robertson & Lister [maker] iron house, 399 Coventry St, South Melbourne
 iron house, Pioneer Settlement, Monash Drive Swan Hill
 former Melbourne GPO, Riverside Farm, Whanregarwen
 former Balmoral Hall, Stirling St, Balmoral
 former Fryerstown hotel, adjoining Diggers Store, 61 Main Rd, Campbell's Creek
 semi-detached iron houses 181-3 and 187-9 Brunswick Rd, Brunswick
 former Labassa conservatory 21 Manor Grove, Caulfield
 former church, 14 Graham St, Bacchus Marsh

WESTERN AUSTRALIA

Breaksea Island Lighthouse (old), near Albany
 former cable station, Broome
 former London and Hamburg Gold Recovery assay office, Maritana St, Kalgoorlie

EXAMPLES

The Friends Meeting House, Pennington Terrace, North Adelaide

Singapore Cottage, Formerly 1 Hoddle Street, East Melbourne

Edwin Maw Building, Longford House, Longford, Tasmania

Bellhouse House, 399 Coventry Street, South Melbourne

Corio Villa, Geelong, Victoria

Wingecarribee, Bowral, NSW

Port Adelaide Lighthouse

John Ryrie House, Maffra, Via Dalgety, NSW

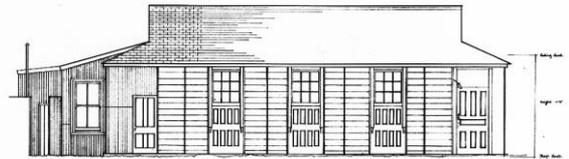
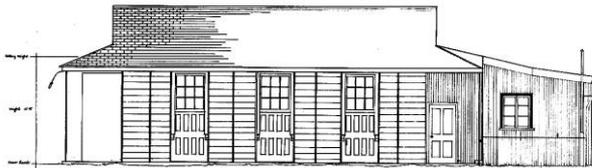
Wesleyan Methodist Church, Darwin

London And Hamburg Company Assay Office, Kalgoorlie, Western Australia

THE FRIENDS MEETING HOUSE, PENNINGTON TERRACE, NORTH ADELAIDE, 1839-40



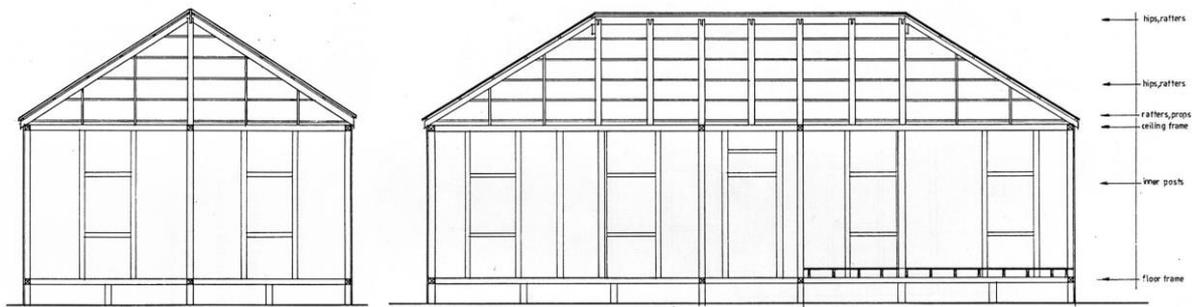
Friends Meeting House, Pennington Terrace, North Adelaide: Adelaide Explorer.



Friends Meeting House, Pennington Terrace, North Adelaide, south and north elevations: G E Laikve [ed], 'Survey Report on the Meeting House of the Society of Friends. Pennington Terrace. North Adelaide' (University of Adelaide, Adelaide, no date [1963]), pp 12. 13.

The Quaker meeting house was donated by the Society of Friends in London and fabricated in 1839 by the London builder Henry Manning. Manning prefabricated major buildings such as Government House, Auckland, in a conventional manner, but he also invented a panelised system which enabled a customer to buy the required number of panels, columns, doors, windows &c, thus avoiding the usual months of waiting, and allowing flexibility in design. This was a major development in the history of prefabrication. The original La Trobe's Cottage, Melbourne, was an example of this new system and the Friends Meeting House is also panelised, though it differs somewhat from the standard. The furniture, which was provided with it, is the only surviving Manning furniture.

SINGAPORE COTTAGE, FORMERLY 1 HODDLE STREET, EAST MELBOURNE, c 1853



The former 1 Hoddle St, sections: Robert Sands, 'Pre-fabricated Cottage 136 Sackville Street, Collingwood. Conservation Analysis' (Robert Sands Pty Ltd, Melbourne 1987), pp 34-5.

The gold rushes of the mid-nineteenth century stimulated the export of house entrepreneurs in Hong Kong and Singapore. The Hong Kong houses in both San Francisco and Melbourne have all disappeared, but a number of Singapore cottages survive in Victoria. Some hundreds of houses from Singapore reached Melbourne and Geelong in 1852-4, in some cases accompanied by Chinese carpenters to erect them, and in one case a foreman, Louis Ah Mouy (1826-1918), who was to become a prominent local citizen.

The houses were generally built of *dedaru* ('Singapore teak' or 'Singapore oak') and *meranti* ('cedar'), and were cultural hybrids. The dimensions and room sizes were designed to meet the European tastes of the market; the entrepreneurs were ethnically Chinese, and at least some of the labour was Malay. We know this partially from Chinese inscriptions painted on some of the timbers. Most of the characters are not very helpful, as they translate into words like 'gold', 'birth', 'beauty', 'water', and 'road', and probably served merely to identify individual joints. But there are some which might be construed as instructions, such as 'double', 'connection', 'secure', and 'fixed' and there is one proper name, 'Lee'. There is also some cruder writing in Arabic characters which seems likely to be that of Malay workmen. Most of these houses have or formerly had a series of horizontal members linking the kingposts at between a third and half the height. These have no structural or other apparent function, but are cultural - a version of the *-alang muda tunjuk langgit* in Malay house roof construction.



Former 1 Hoddle St, house frame as reassembled at Collingwood by Andrew Muir: Miles Lewis.



Details of the former 1 Hoddle St: (left) a hooked scarf joint in the base plate, over a stump (the left element decayed), (B) a roof strut or kingpost bearing a Chinese character: Miles Lewis.

A Singapore house at 1 Hoddle Street, East Melbourne was removed in the 1890s to make way for the construction of the Collingwood Railway, and was re-erected at Mentone. When threatened with demolition in 1983 it was rescued by Andrew Muir and re-erected on his property in Collingwood, where he has subsequently collected other examples.

EDWIN MAW BUILDING, LONGFORD HOUSE, LONGFORD, TASMANIA c 1854

Iron building, Longford House, Longford, Tasmania, view: Miles Lewis

Edwin Maw of Liverpool is first heard of in 1850, when he sent iron buildings to California, and by 1854 he was said to have large premises at the back of the Wallasey Pool for the manufacture of railway wagons, iron houses and other items. Ironfounders were peculiarly susceptible to financial crises, and the sharp increase in the cost of iron at the time of the Crimean War may well have had an adverse effect upon Maw. Be this as it may, he found himself in financial difficulties, and 1854 he became insolvent.

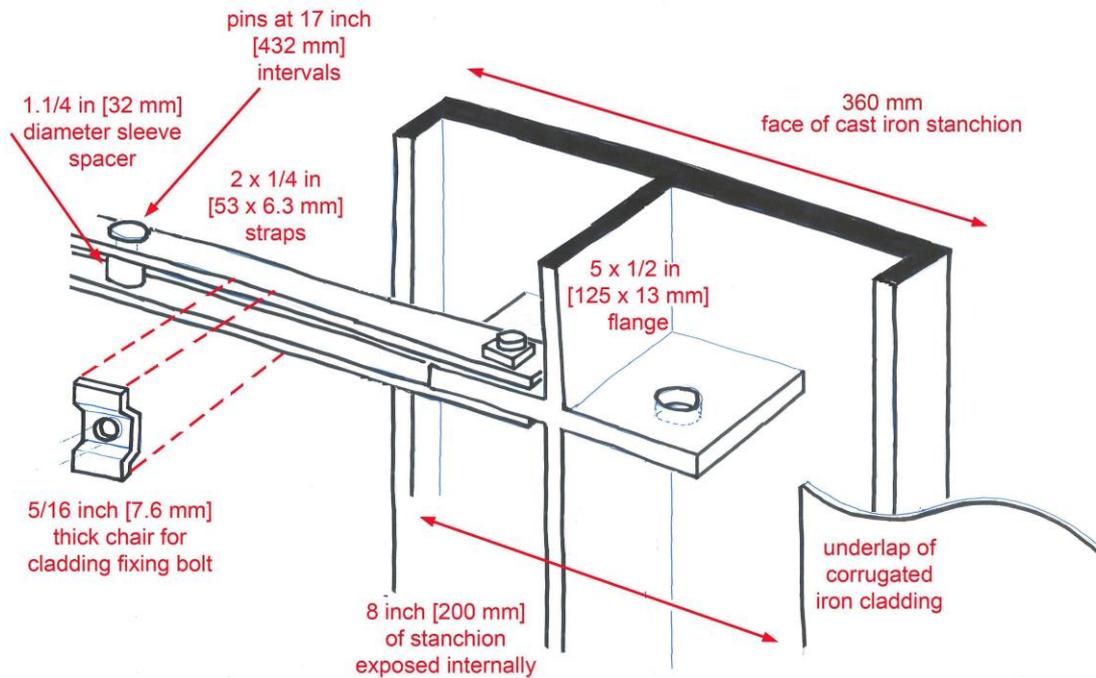
Maw had developed a very unusual system in which the whole structure was tied together with straps somewhat resembling bicycle chains. There are at least six Maw buildings surviving in Australia, but none elsewhere in the world. The shed at Longford is the most interesting of them because it is the least well preserved, and therefore the structure of the walls, floor and roof can be seen.



Iron building, Longford House, Longford, Tasmania, girt: Miles Lewis.



Iron building, Longford House, Longford, Tasmania, detail of the junction of a column base with a sub-floor tie and two base wall girts; lading mark on the corrugated iron: Miles Lewis.



Iron building, Longford, diagram of structure, Miles Lewis.



Former Presbyterian Church, Numbaa, New South Wales, by Edwin Maw, 1855, brand on a cast iron stanchion: Miles Lewis.

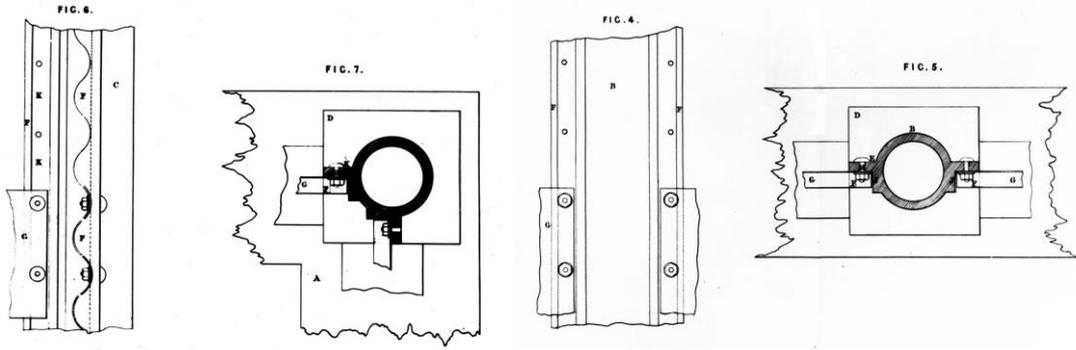
The building, which has been moved within the site, is in three bays, divided by pilasters. The flange projecting from the back of the pilaster measures $5 \times \frac{1}{2}$ in [125 x 13 mm]. The are horizontal girts at two levels, each consisting of paired flat bars, and identical chains run across the building linking the bases of opposite columns. The flats measure $2 \times \frac{1}{4}$ in [33 x 6.3 mm] and are linked with pins passing through 1.1/4 in [32 mm] diameter spacer tubes at 17 inch [432 mm] intervals. The corrugated cladding is fixed with 5/16 in [7.6 mm] diameter bolts passing through 5/16 in chairs resting between the straps

BELLHOUSE HOUSE, 399 COVENTRY STREET, SOUTH MELBOURNE, 1852-6

The Bellhouse house, 399 Coventry Street, South Melbourne: Miles Lewis.

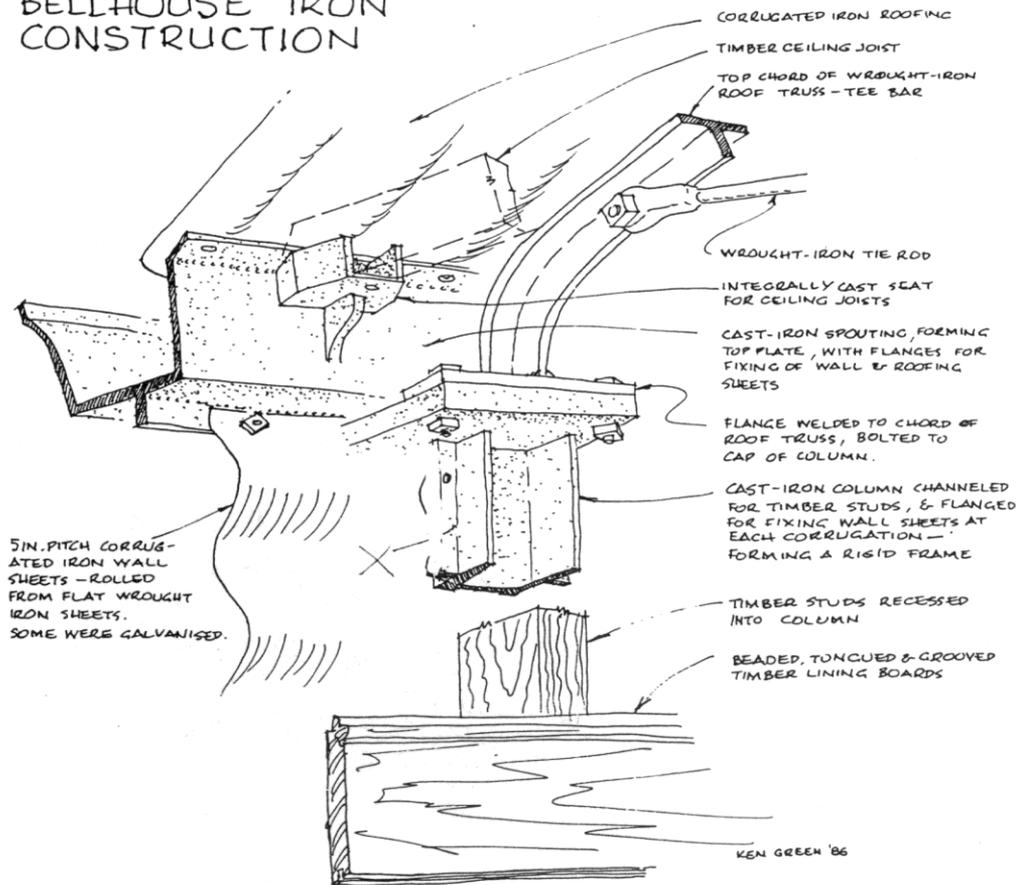
Edward Taylor Bellhouse of Manchester, a cotton mill engineer and colleague of William Fairbairn, entered the prefabrication trade to supply buildings to the Californian gold rush. By 1851 he had developed and patented an integrated system in which cast and wrought iron columns, and cast iron gutters and ridging, were shaped to fit the adjacent corrugated iron sheets. This attracted the attention of Prince Albert, who ordered a ballroom for the royal estate at Balmoral. That ballroom, and the Melbourne building, are the only surviving works of Bellhouse. He patented the system in March 1853.

The Melbourne building was put up in what is now Fitzroy in 1856, though it would have been manufactured no later than 1853. In 1971 it was threatened with demolition, and was removed by the National Trust to its present site. As originally erected it did not conform fully to the intended system, and it had suffered alterations over time: for these reasons the Trust did not attempt a full restoration, but preserved the shell in a manner designed to reveal the technical details.

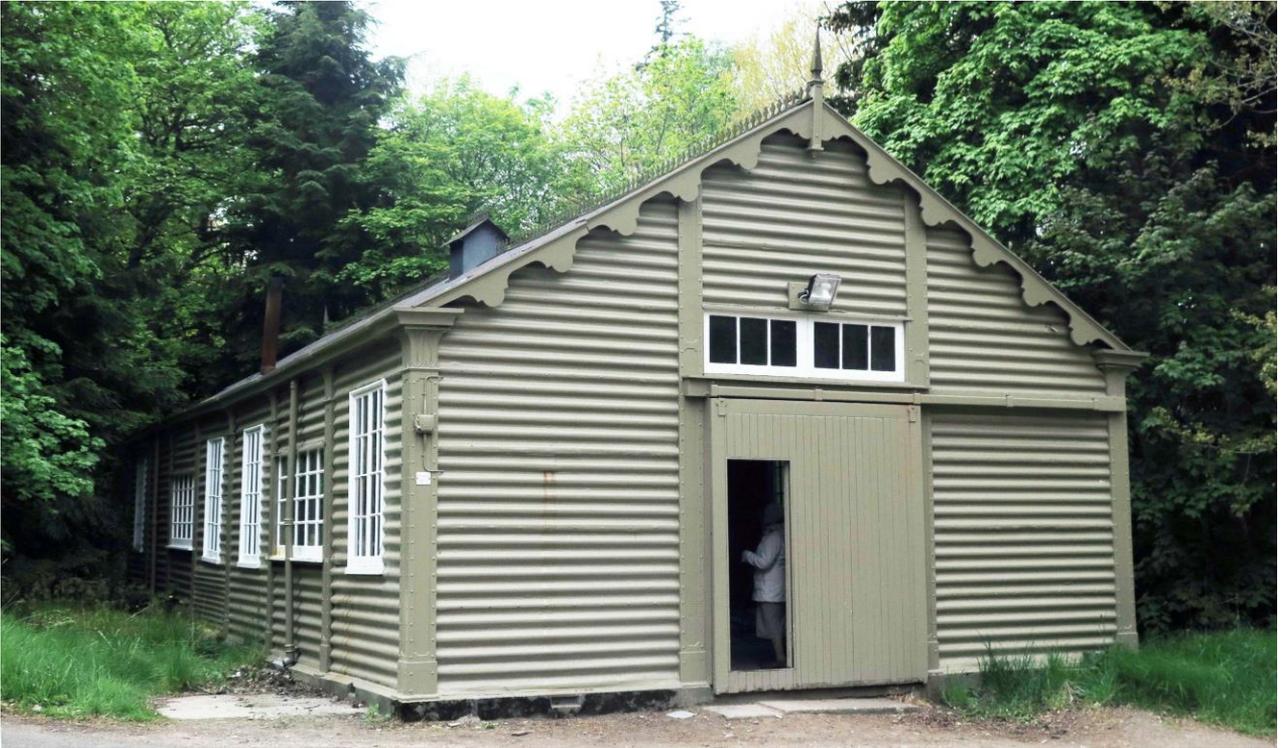


Details of stanchion from E T Bellhouse's British patent, 609 of 1853.

BELLHOUSE IRON CONSTRUCTION



Bellhouse house, sketch of the construction system, by Ken Green, 1986.



The former ballroom at Balmoral: Miles Lewis.

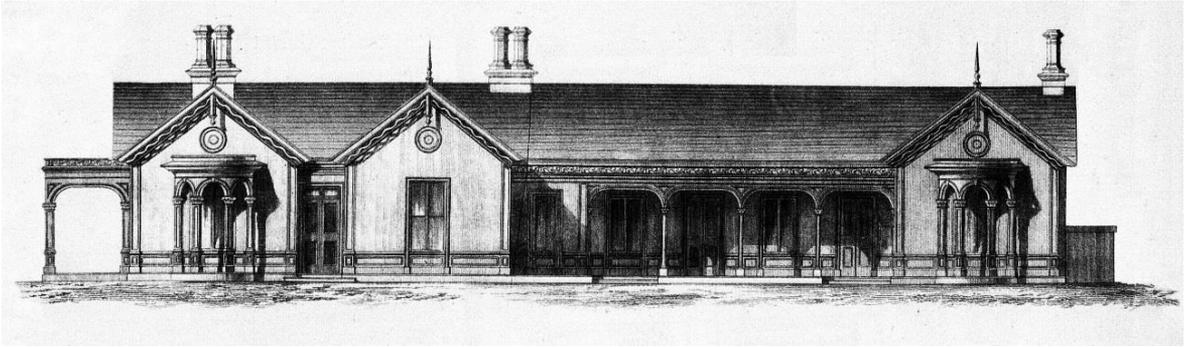
CORIO VILLA, GEELONG, 1853-5



Corio Villa, Eastern Beach, Geelong, designed by Bell & Miller and manufactured by Robertson & Lister, view of west front; Miles Lewis.

Robertson & Lister were the major Scottish manufacturers of iron buildings, and today all their surviving works are in Australia. They range from corrugated iron cottages and industrial buildings to plate iron faced structures of the greatest sophistication, such as the Legislative Council Chamber in Macquarie Street Sydney. Corio Villa is the most remarkable of them all. The house was ordered by the police magistrate W N Gray, and arrived at Geelong in August 1853. It was never delivered to Gray, who was at Hamilton, doubtless because of the exorbitant cost of cartage, and he died in June 1854. It was then put up on the present site by Alfred Douglass, the merchant to whom it had been originally consigned.

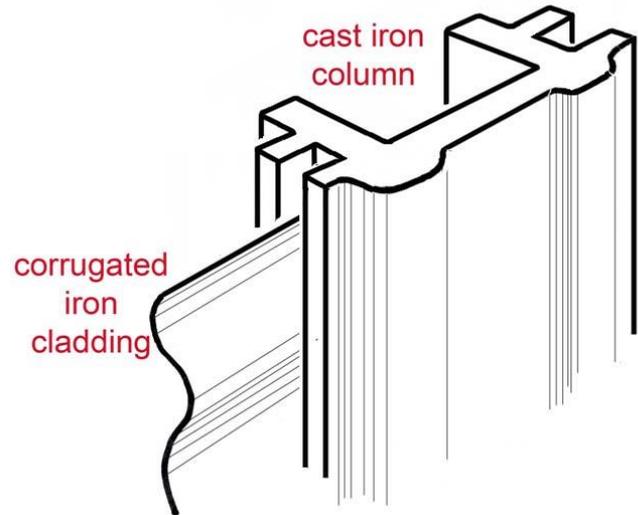
The house is beautifully constructed of heavy cast iron plate with joints run with red lead and virtually invisible externally, a system which was probably copied from Alexander Gordon's cast iron lighthouses. Within the wall there is a conventional timber frame carrying a conventional lath and plaster wall surface. The elaborately decorated verandah, semicircular porches, bargeboards and finials are all of cast iron. The square porch is an addition. The two walls not designed to be seen are more functional in character but still very substantial and technically interesting, with heavy gauge corrugated iron sheets running horizontally to fit into grooves in the sides of cast iron stanchions (though not shaped as in the Bellhouse system).



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

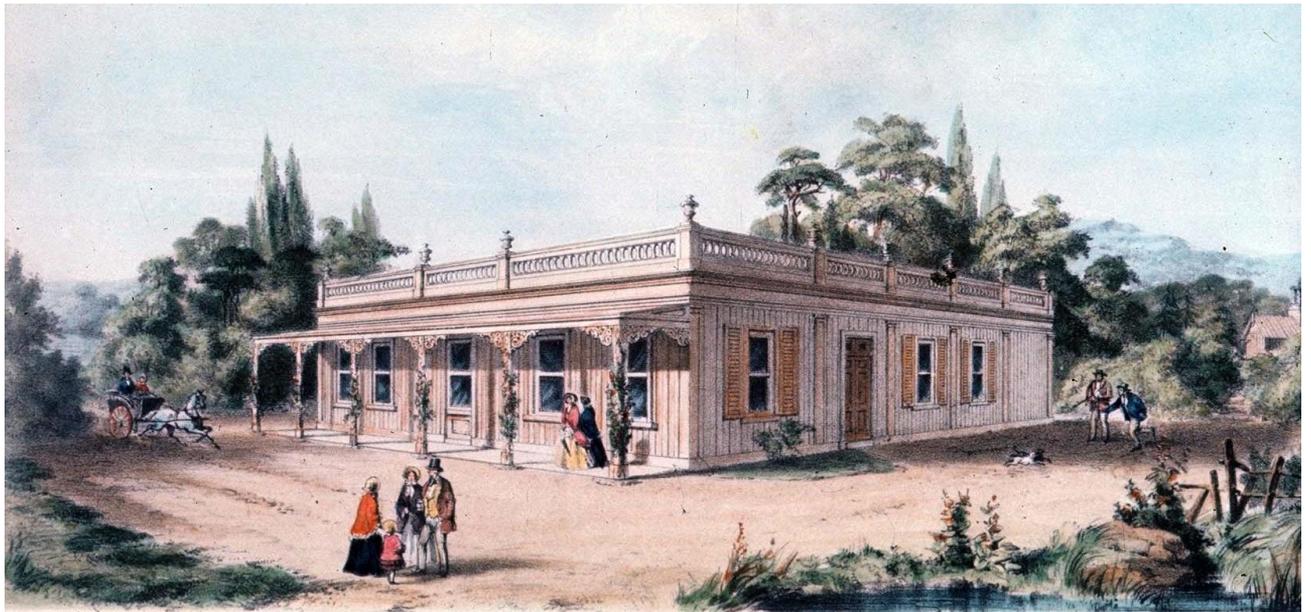


Corio Villa, assembly drawing by Bell & Millar: courtesy of Ian Shearer [digitally restored].
Construction of the cast iron plate walls: Geoffrey Drinnan [reworked Miles Lewis].



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

WINGECARRIBEE, BOWRAL, NSW, 1854-7



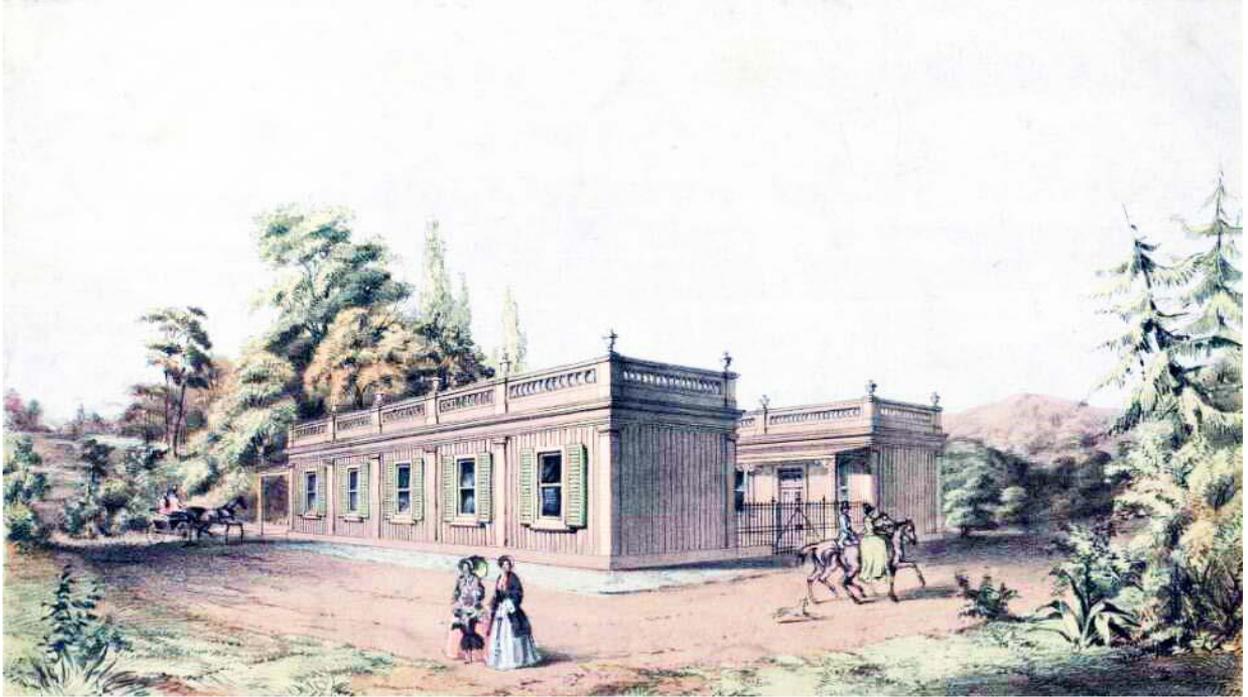
House; 'The Melbourne and Colonial House Investment Company, 13, Gresham St. London';
 'Hemming's portable Building Manufactory, Clift House, Bristol, and Bow Nr. London', view:
 State Library of Victoria H30150.

The most prolific manufacturer of iron clad buildings was Samuel Hemming, of Bristol, who made houses, shops, stores and churches, to the extent that his works gave overall impression of a town rising and falling in a week. A huge number Hemming's buildings reached Australia, but most these are not technically interesting, being timber frames clad in corrugated iron, and essentially shed-like. For the same reason they tend not to survive, though one of his churches, much altered, remains at Gisborne, Victoria.

However Hemming manufactured at least three houses of larger size and more substantial construction, designed originally for the Melbourne and Colonial House Investment Company. The house which became Wingecarribee is supposed to have been ordered in 1853 by J M Oxley, son of the explorer, and to have reached Sydney in 1854, but (as with Corio Villa) the packages could not easily be transported inland, and the Oxley family then had second thoughts. Henry Molesworth Oxley's diary for 15 March 1855 records 'Arranged to have the iron house that we sent for sold if possible.' But as it apparently did not sell, they finally erected it in 1857, by which time it proved more expensive than a conventional house.

The materials consisted of framing timbers, oak for sills, cedar for ceiling panels (which seems unlikely to have been supplied from Bristol), and 17 gauge [1.4 mm] galvanized iron for the walls, roof and ridge capping. The walls have a cavity space of one foot [300 mm] much larger than was typically provided in Hemming's buildings for insulation. The ceiling was supposed to have been insulated with felt, but this did not reach the site, and stringybark was used instead. The package included six panelled oak doors for use in

the interior, external louvred window shutters, and presumably the papier mâché rinceaux ceiling borders which were attached to a timber base.



'Portable House for Erection in the Colony. The Melbourne and Colonial House Investment Company, 13, Gresham St. London.' Australian National Library, Rex Nan Kivell Collection, NK 481.

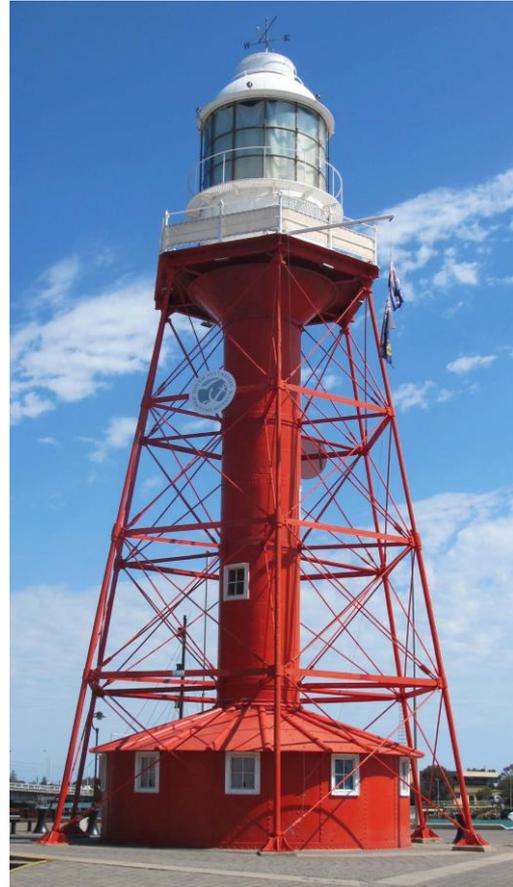


Wingecarribee, Bowral, c 1854-7, view: Miles Lewis



Wingecarribee, interior view in the former courtyard, and detail in one room: Miles Lewis.

PORT ADELAIDE LIGHTHOUSE, 1867-70



The Neptune Island (formerly Port Adelaide) light, designed by Alexander Gordon, manufactured by Richard Moreland & Son, London, 1867-70, extended 1875: Gordon Reid, *From Dusk till Dawn: a History of Australian Lighthouses* (Macmillan Australia, South Melbourne 1988), p 170.
The lighthouse on its present site at Port Adelaide: Miles Lewis.

In 1865 the South Australian government sought designs and prices for a lighthouse to be placed at the entrance of the Port River, and their Agent-General in London, G S Walters, approached Alexander Gordon, Lighthouse Engineer to the Board of Trade. Gordon proposed something quite unlike the solid trunk type for which he was best known – an iron tube, the submarine part of which was filled with concrete, and the short projecting portion surrounded by a platform. The platform was to be carried on conventional wooden piles shod with iron, as Gordon was an opponent of the screw pile. However George Wells, who now held the rights to Mitchell's screw piles (though the patent itself must have been long expired), heard that a lighthouse was required at Port Adelaide, and requested permission to send in a design, which the Agent-General somewhat grudgingly agreed to forward to Adelaide.

What followed is astonishing. The Agent-General sent out together the plans and specifications for the two proposals, but that of George Wells was subsequently 'lost', never to be found again, and Gordon's proposal was the only one to come

before the Marine Board. This did not pass unchallenged. Percy Wells, George's brother, was in Adelaide, and formed a partnership with the local architect Edmund Wright. Wright & Wells wrote back to England for replacement documents, and (according to their account) obtained an undertaking from the Commissioner of Public Works that no decision would be made in the meantime. However a few months later there was a change in the ministry, after which an order was put in for the lighthouse as recommended by Gordon. Wright & Wells were notified of this only the day after the letter had gone.

The ironwork for the Port Adelaide Lighthouse was manufactured by Richard Moreland & Son of London, and construction began when the components arrived from England in 1867. As described:

It is one on Mr. Alexander Gordon's principle, the main portion being composed of a cylinder of wrought-iron sunk down to the limestone rock, and filled to about 15 feet [4.5 m] above high-water mark with cement concrete. This cylinder is continued to the height of [?80] feet [24m] in cast-iron, and at the top will be placed the lantern which was ordered for Point Marsden. The lighthouse-keeper's quarters are to be erected on a stage of 50 feet [15 m] square, 40 feet [12 m] above the level at high water, and supported by piles of jarrah timber screwed into the limestone rock through 18 feet of sand. The whole will be bolted and braced firmly with cast-iron shoes and sockets, so as to render the whole structure secure and proof against sea and weather.

It was lit in January 1869, but there were immediate complaints about the poor visibility of the light, and the tower was substantially rebuilt in 1874-5. It was considerably increased in height and the light changed from fifth order to first class, necessitating a considerable increase in the diameter of the lantern, which was achieved by adding a flared top to the tower. To support what would now be a spindly, top-heavy structure it was surrounded by a structure of iron pillars and diagonal braces, fortuitously giving it much the appearance of a conventional openwork lighthouse in the tradition of Carysfort Reef, USA.

In 1890 the Port Adelaide Light was replaced by a new structure in a nearby location, which re-used the same lantern. The existing structure was moved to South Neptune Island and fitted with a new second order dioptric lens. It operated on the new site from 1900 to 1985 when it was acquired by the South Australian Maritime Museum, and moved to its present location. Despite being enlarged at an early date, and moved twice, it is well-preserved. The lower part of the shaft is believed to be the 1869 structure, and the upper part, the flared top and the openwork surrounding frame that of 1875 (making it much more like a typical openwork lighthouse than it had been when first built), and the lantern that of c 1900. The wrought iron plates are simple curved sheets bolted to an angle iron framework, unlike the distinctive flanged cast iron tray construction used in Gordon's solid trunk lighthouses.

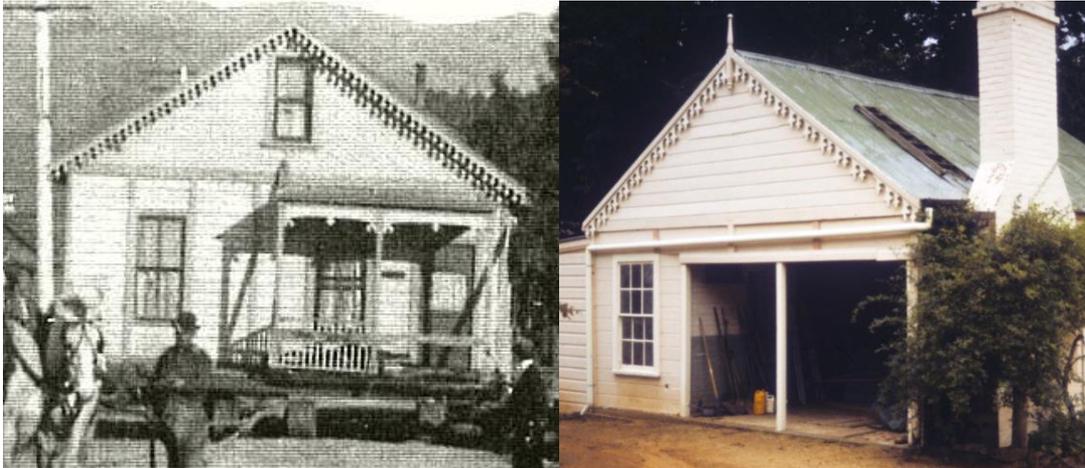


Port Adelaide Lighthouse, designed by Alexander Gordon, fabricated by Richard Moreland & Sons of London 1865-9, elevation, section & plans, National Archives of Australia A9568 4/1/2. Design for Port Adelaide Lighthouse. Control symbol 4/1/2. Citation NAA A9568 4/1/2, detail.



Iron lighthouse, Port Adelaide, interior detail; a base detail of the 1875 frame. Miles Lewis.

JOHN RYRIE HOUSE, MAFFRA, VIA DALGETY, NSW, 1884

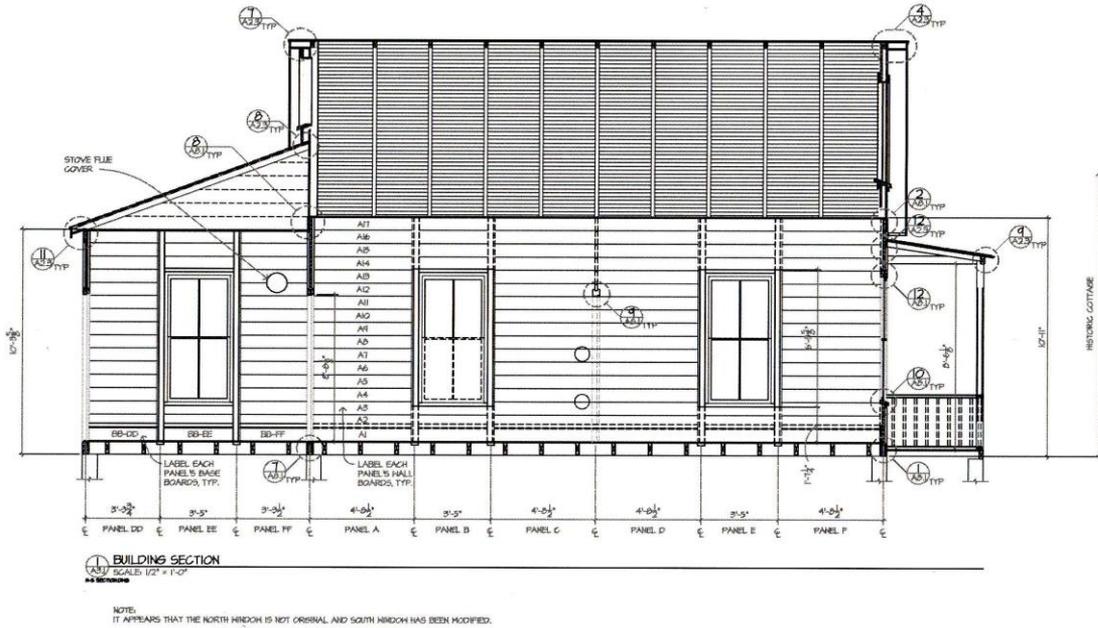


The Kenney Cottage, Berkeley, California, c 1881, during removal in 2003 from 2114 Addison St to 1725 University Ave, Berkeley Architectural Heritage Association:
http://www.berkeleyheritage.com/berkeley_landmarks/landmarks.html.
 John Ryrie's house, Maffra via Dalgety, NSW, an Elford patent portable house of Californian redwood, imported from the United States c 1884: Miles Lewis..

In 1883 a Melbourne firm was offering at auction a number of Elford's Patent Portable Houses. They were said to consist of three rooms, measuring in all 20 by 24 feet (6 x 7.2 m), made mainly of Californian redwood, and with the pieces numbered so that they could be built by unskilled labour. The patentee was William Elford of Oakland, California, but he is elusive, and the patent we know of is later than his houses in Australia, so that it probably represents some development of his original system. The only Elford building surviving in the United States, the Kenney Cottage, has been moved twice, dismantled, and is now in storage, whereas three Elford buildings survive in Australia, standing on their original sites.

In 1884 John Ryrie bought from George King & Co of Sydney an American-made redwood building which is identified in his correspondence as an Elford house, at a cost of £100. He put it up in March-April 1884 and it still stands at his property at Maffra, via Dalgety though it was moved to its present position on the site not long after it was first erected. It is a simple gable-roofed structure with an ornamental barge board, weatherboard cladding, and twelve-paned double-hung windows. The back end has been opened out to admit a vehicle, but the structure is in sound condition, contains three rooms, and has the same overall dimensions as the advertised houses. The wall construction consists of 180 x 29 mm tongued and grooved planks set horizontally between grooved posts 85 to 90 mm square. The short side was divided into four such panels of 5 ft [1.5 m] each, and the long side into four of 6 ft [1.8 m]. Ceiling joists run lengthwise from each of the end posts, and a boarded ceiling spans the 1.5 m intervals between them. The whole roof structure is lightweight, with rafters at 3 ft [0.9 m] centres, and an angled brace running back from the peak of each gable back down to the central ceiling joist.

The barge board is consistent with Elford's work in the USA, and as the verandah valance matches this, the verandah is probably part of the original package as well.



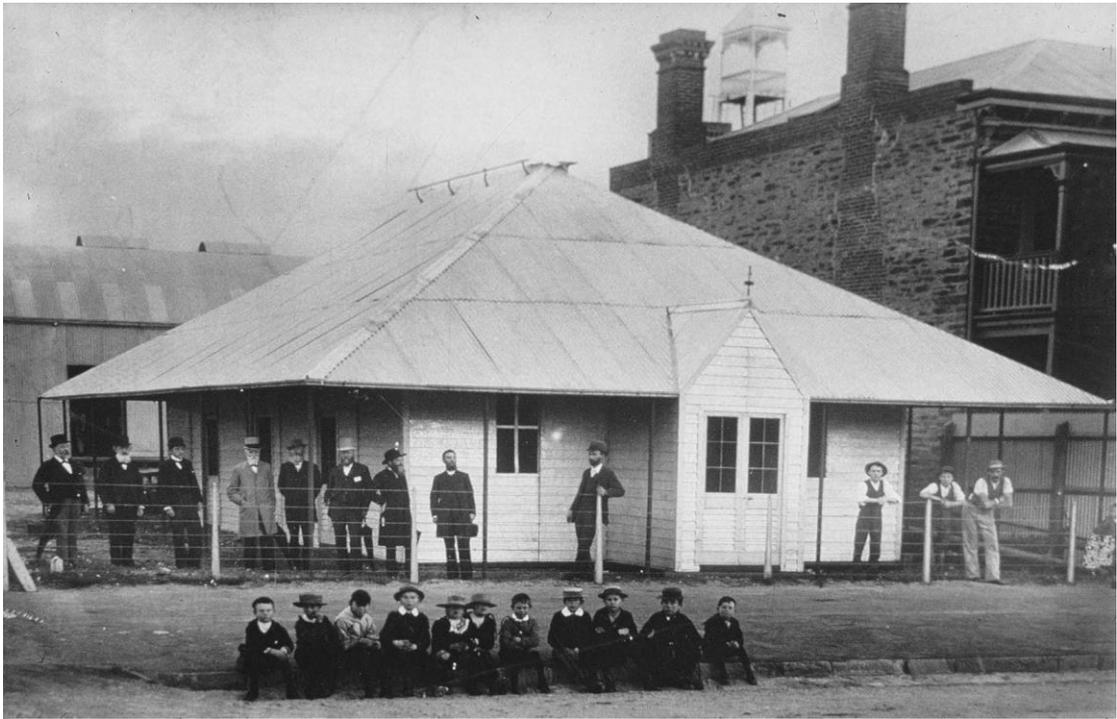
The Kenney Cottage, Berkeley, California, section: surveyed by the Berkeley Architectural Heritage Association, drawing A3.1.

WESLEYAN METHODIST CHURCH, DARWIN, 1898

Knuckey Street church on its present site in the Botanic Gardens, by Bidgee, 2008, Wikimedia Commons. [cropped].

The Wesleyan Methodist church at Darwin was destroyed by a cyclone in 1897, and replaced in the following year with a building which was supplied from Adelaide, but which was clearly of overseas, and probably Usonian origin. It has been moved in recent times and reconstructed in the Darwin Botanic Gardens without the transepts, which were additions.

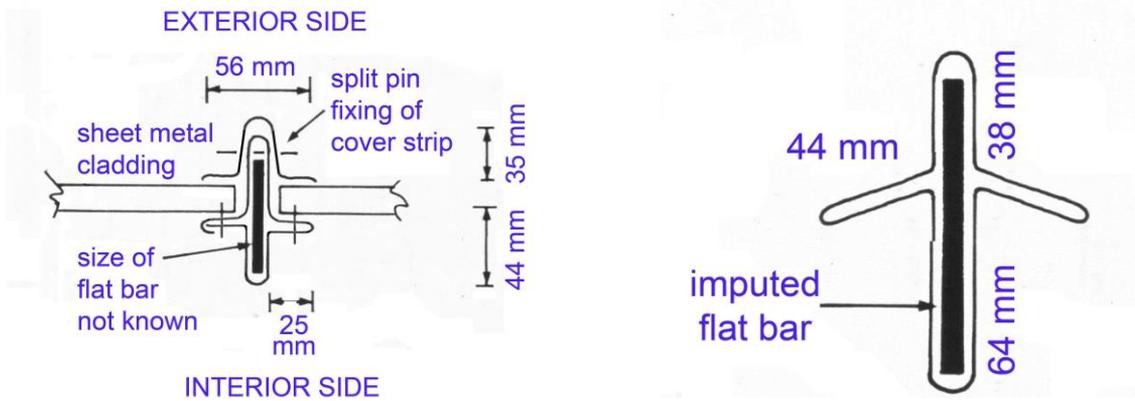
The building is of extraordinary technical interest. It is steel framed and clad in galvanized iron sheeting of weatherboard profile, something virtually unknown in Australia outside South Australia and the Northern Territory (but common in the USA). It had a very large ridge vent in response to the tropical climate, and specific cyclone protection measures such as cable anchors at the corners and hook bolts fixing the roofing iron to the purlins. But the most remarkable aspect is the lightweight framing created by wrapping galvanized sheeting around flat steel bars. The concept seems to relate to the Helliwell Patent Glazing used in the USA for greenhouse construction.



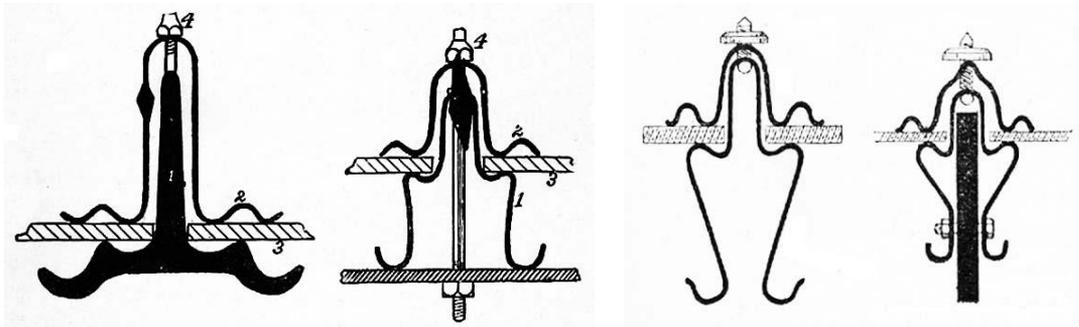
Knuckey St church, view at Simpsons' yard in Wakefield Street, Adelaide:
photo in the possession of the Rev Stafford.



Wesleyan Church, Knuckey Street, Darwin, 1897: detail of imitation weatherboard cladding,
seen from inside. Miles Lewis



Knuckey Street church: composite stud and cladding fixing system; approximate form of hip rafter: Miles Lewis.



Helliwell Patent Glazing, left with a steel bar, second left with a zinc or copper bar: L R Taft, *Greenhouse Construction: a Complete Manual on the Building, Heating, Ventilating and Arrangement of Greenhouses, &c* (Orange Judd, New York 1894), p 46. Third and fourth, Système Helliwell. Arthur Vierendeel, *La Construction Architecturale en Fonte, Fer et Acier* (A Uystpruyst, Louvain 1901), p 365

**LONDON AND HAMBURG COMPANY ASSAY OFFICE, KALGOORLIE, WA,
1898**

[also known as the former Commonwealth Health Laboratory]



London and Hamburg Gold Recovery Company assay office, 1898, now in the grounds of Kalgoorlie Hospital: Miles Lewis.

The assay office of the London and Hamburg Gold Recovery company on Hannan's Brown Hill mining lease near Kalgoorlie, Western Australia, was imported from Hamburg and put up in 1898. It was bought by the Commonwealth government in 1921 and moved to the Commonwealth Health Laboratory in Kalgoorlie, where it still stands off Maritana Street, and is now part of Kalgoorlie Hospital. The external walls are framed in steel and there is a steel beam around the periphery of the verandah floor, but the bulk of the building is of timber. The steel is labelled

REINER WALZWERK NP18 1897

The inside is framed in square posts with vertical board partitioning. Some of the timber boards (probably the top board in each bundle) bear the stencilled label 'wohnli Jauere Wandsch', and the posts have 'L. & H. 64 Calgoorlie (West Australia)'. The roof is double with a substantial space between the two layers, totally open around the periphery (apart from mesh), and the building stands upon cast iron pillars which incorporate cups for ant poison.



London and Hamburg Gold Recovery Company assay office, detail of the periphery beam showing the rolling mark: Miles Lewis



London and Hamburg Gold Recovery Company assay office, stenciled markings on the boarding and the posts: Miles Lewis



London and Hamburg Gold Recovery Company assay office, vermin-proof pillar: Miles Lewis

Cover illustrations:

1. 'Hemmings Portable House Manufactory, Cliff House Bristol. A view of the principal thoroughfare as it appeared the first week of August 1853 shewing the second church executed for the Diocese of Melbourne 1000 sittings'. State Library of Victoria.
2. Iron lighthouse, Port Adelaide, designed by Alexander Gordon, manufactured by Richard Moreland & Son, London, 1867-70, extended 1875, and moved to the present site in recent times. Miles Lewis.
3. Legislative Council Chamber, Macquarie Street, Sydney. Originally a dwelling house and store for MacCallum, Graham & Black, designed by Bell & Miller, and manufactured by Robertson & Lister of Glasgow, c 1854: brought from Melbourne to Sydney c 1856. Miles Lewis.
4. La Trobe's Cottage, the Domain, Melbourne, manufactured by Henry Manning of London, erected at Jolimont, Melbourne in 1839, moved to the present site and extensively reconstructed, 1959. Miles Lewis.
5. London and Hamburg Gold Recovery Company Assay Office, manufactured in Hamburg, erected at Brown Hill, Kalgoorlie, Western Australia, in 1898, moved to Maritana Street, Kalgoorlie, in 1921: Miles Lewis.
6. Corio Villa, Geelong, Victoria designed by Bell & Miller, and manufactured by Robertson & Lister of Glasgow, c 1853, erected in Geelong, 1854: Miles Lewis.
7. Lyndhurst Hall, 46 Walhalla Street, Coburg Melbourne, manufactured in or near London, 1854, erected in Brunswick, Melbourne, 1854; moved to the present site c 1866. Miles Lewis/