5.11 Building Boards

a. plywood
b. building boards
c. wood fibre boards in Australia
d. Masonite
e. cane boards
f. Solomit

a. plywood

Plywood seems to have developed in both Europe and the United States. Veneering machinery had a long history in Europe, and C D Elliott refers to the use of a circular saw to cut veneer in England in 1805, and to the introduction of a veneer slicer in France in 1830.[1] A veneer slicer in which the log rotated was patented in Britain in 1847,[2] but generally large circular saws were preferred, and Brunel established a veneering works using eight saws from 2.1 to 5.1 metres in diameter.[3] Though it is not very clear when layers of veneer were combined to create plywood, laminated cases for grand pianos were made in about 1860.[4] In the United States a number of patents had been taken after the Civil War out for layering wood veneer with the grain at right angles in alternate courses, the earliest known being that of John K Mayo in 1865 for making 'scale boards'.[5] It is unlikely that much was produced under this patent but plywood seems to have appeared around 1870.

Early in the 1870s George Gardner of Brooklyn began bending the material by steam to make plywood benches for uses such as railway stations.[6] Gardner & Co exhibited successfully at Philadelphia in 1876 and Paris in 1878, and their products included bent and perforated timber veneer for use in seating generally.[7] In 1882 a factory was established in Reval, Estonia, to produce three-ply birch seats for bentwood chairs.[8] By the 1880s the Grand

1 C D Elliott, *Technics and Architecture* (Cambridge [Massachusetts] 1992), p 20.

2 Akira Satoh [ed Ralph Morton], *Building in Britain, the Origins of a Modern Industry* (Aldershot [Hampshire]1995 [1986]), pp 136-7.

3 *Builder,* IX (1851), p 672.

4 F P Kollman, 'Veneer, Plywood and Lamination', in F P Kollman et al, *Principles of Wood Science and Technology, II, Wood Based Materials* (New York 1975), pp 154-5.

5 T C Jester, 'Plywood', in T C Jester [ed], *Twentieth-Century Building Materials* (Washington [DC] 1995), p 132, citing Thomas D Perry, *Modern Plywood* (New York 1942), pp 26-7.

6 F T Schwab, 'Victorian Prototypes', *Architectural Record* [New York], September 1945, quoted in R B White, *Prefabrication* (London 1965), p 11.

7 C B Wood III Inc [bookseller], *Catalogue 97* (Cambridge [Massachusetts] 1998), pp 10-13, citing David Hanks, *Innovative Furniture in America,* and Kenneth Ames, 'Gardner and Company of New York', *The Magazine Antiques,* August 1971, pp 252-5.

8 Elliott, *Technics and Architecture,* p 20.

Rapids Portable House Co of Grand Rapids, Michigan, was making prefabricated buildings of three-ply panels, suitable for summer cottages, hunters' cabins, children's playhouses, camp meeting cottages, bathhouses, photograph galleries, candy stands, and so on, each weighing between 225 and 900 kg including cases. These buildings were shown at the New South Wales Agricultural Society's exhibition of 1890, and were available in Australia through William Fleming of 22 and 24 Clarence Street, Sydney.[9] This may have been the first significant appearance of plywood on the Australian scene. By 1913 James Moore of Melbourne was advertising three-ply oak ash and walnut for panelling, furniture, &c, and alder as the cheapest and easiest type for ceilings and rough lining.[10] There was no sign of any Australian timber or any Australian manufacturer of the material.

A description of an American veneering works appeared in the *Australian Engineering and Building News* in 1881,[11] but there is no indication that it had any local relevance or effect. However an American veneer cutting machine was brought to Australia, probably in the 1890s and certainly before 1904. It was not used to make plywood, but fruit baskets and other products of the Bee-Keepers' Supply Co of Melbourne.[12] In 1907 Beale & Co of Sydney installed machines for slicing and sawing veneers of figured wood for use in the manufacture of pianos.[13] It seems to have been in about 1912 that Alexander Sturrock went to the United States to learn the trade, taking a job as an ordinary machine hand in a factory. He then arranged to ship a plant to Australia, and spent two years experimenting with it before going into full production. At first the American knives were unsatisfactory, but this problem was resolved. Some local hardwoods from particular districts proved unsuitable, but others proved very satisfactory. Then it appeared that the foreign glue was neither strong enough nor waterproof, and Sturrock began experimenting with casein. By late 1914, when the Royal Victorian Institute of Architects visited the factory, Sturrock had finally achieved full production.[14]

Other machines followed rapidly upon Sturrock's heels. A later estimate, though one which it is not easy to accept, put the amount of plywood manufactured in Australia in 1918 at at about eight million super feet [18,900 m^3].[15] In about 1915 J McG Williams had installed a lathe for the rotary peeling of hoop pine for three-ply at his Brisbane works. In 1916 D G Brims & Co built a plywood mill at Yeerongopilly, Brisbane, the operations of which expanded rapidly until its destruction by fire in 1943.[16] In 1931 they were

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9 *Australasian Ironmonger, V*, 5 (1 May 1890), p 131.

10 James Moore & Sons Pty. *Ltd*., *Price List 96 August 1913* (Melbourne 1913), p 2.

11 *Australian Engineering and Building News,* 1 October 1881, p 64.

12 James Smith [ed], *The Cyclopedia of Victoria* (3 vols, Melbourne, 1903, 1904, 1905), II, p 144.

13 I H Boas, *The Commercial Timbers of Australia: their Properties and Uses* (Melbourne 1947), p 88.

14 'Three-Ply Board', *Journal of the Royal Victorian Institute of Architects,* XII (November 1914), pp 237-8.

15 'Three-Ply Board', pp 237-8.

16 I H Boas, The *Commercial* Timbers of Australia: their Properties and Uses, (Melbourne 1947), p 88.

producing plywood under the 'Triangle' brand using hoop pine, tulip oak, and various Queensland timbers, as well as Borneo cedar. By about 1930, plywood began to be manufactured by Brown & Broad, the well-established timber merchants and house builders of Brisbane. In 1934 they had an output of 15,000 square metres a week, using their own sawmills, an Australian-made lathe, and a two hundred tonne press said to be the largest in the country. They had even begun to export to England.[17] Plywood had became popular by the 1930s, most commonly as a panelling material, and usually in dark hues. Rotary cut plywood was being made locally from tulip oak, silver ash, hoop pine, oregon, pacific maple and other timbers. Timbers used in knife-cut plywood included Touriga mahogany, white ash, silver maple, Jarrah, Victorian and Tasmanian oak, cedar, black bean, silky oak, and imported species like sapelli-mahogany, white and grey sycamore, oak, zebrano and rosewood.[18] In 1939 Römcke Pty Ltd of Melbourne were advertising 'all grades and varieties' of waterproof and bending plywoods, as well as a range of doors and panelling.[19]

Casein glue, as used by Sturrock, had been produced commercially in Switzerland and Germany since about 1900,[20] but it was still very novel. According to Elliott the traditional hide glue, made from animal bones and skin, was replaced by blood albumen glue in 1912, and only after that by casein glue, during the period of the Great War.[21] The authoritative American text, D F Holtman's *Wood Construction,* of 1929, writes of the material as 'new commercially, though it has been used long enough to determine definitely that it has more advantages than any other glue'.[22] Earlier alternatives were hide glue, as used in the earliest plywood; vegetable glue from cassava flour, introduced in 1905; blood albumen glue, perfected by Henry Haskell in 1912; and soy glue, used in the 1920s.[23] In Australia casein glues were said in 1934 to have become common 'only in recent years', and it is unclear whether they were yet manufactured locally. Reference is however made to the fact that American manufacturers claimed to have developed a non-staining type, and thus to have overcome one of the main drawbacks of casein.[24]

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17 Ambrose Pratt [ed], *The National Handbook of Australia's Industries* (Melbourne 1934), pp 387-8.

18 *Journal of theRoyal Victorian Institute of Arcghitects,* XXXIV, 4 (September 1936), pp 109-110.

19 W H Hallam, *Building Costs* (1st ed, *Melbourne* 1939), p 51. Two years earlier the range had been much more limited - furniture plywoods and veneer, various types of door, and ‘Insula’ moisture resisting wallboard: *Bulletin of the Melbourne University Architectural Atelier* (Melbourne 1937), p 3. See also F W Ware & W L Richardson [eds], *Ramsay's Architectural and Engineering Catalogue* (Melbourne 1949), §24/3.

20 F P Kollman, 'Adhesion *and* Adhesives in Wood', in F P Kollman et al, *Principles of Wood Science and Technology, II, Wood Based Materials* (New York 1975), p 1.

21 Elliott, *Technics and Architecture,* pp 20-21.

22 D F Holtman, *Wood Construction* (New York 1929), p 409.

23 Jester, 'Plywood', p 134.

24 *Glueing Practice Part 2. Casein Glues* [Trade Circular no 19 of the Division of Forest Products, Council for Scientific and Industrial Research] (Melbourne 1934), passim.

In 1926 Gunnersen Nosworthy were advertising 'Picus Panels' of three-ply made from West African timbers using a 'secret waterproof glue process', probably in England, though this is unstated.[25] This process is likely to have used an artificial resin. The first synthetic resin, bakelite, had been developed by L H Baekeland in 1909-10, and first used for cheap Art Deco jewellery and for electrical fittings.[26] By 1936 the Council for Scientific and Industrial Research was of the opinion that artificial resin glues, and phenolic resins in particular (already common in the United States and Europe) would now prove competitive for plywood manufacture in Australia. They were already being used successfully in the commercial gluing of cross bands and face plies to solid corestock.[27] Synthetic resin glue in sheet form was a German development, and although it was not made commercially there until 1933,[28] it was introduced in the United States only in 1931,[29] and from 1935[30] was available in the form of a spray or a film.[31] The consumption of plywood increased during World War II when great advances were made in plastic bonding glues, notwithstanding difficulties in supply By the 1940s Tego Film, a phenol formaldehyde resin, was being used in some waterproof plywood, and urea resin glues had been used in 'marine' plywood and in various products for wartime use in the tropics. However most manufacture was still based upon casein glue, or to a lesser extent soya bean glue. Wartime shortages had brought about the blending with casein glue of substitute materials such as peanut flour and dried buttermilk.[32] Internationally, resin-bonded plywood was valued for its fire resistance, and was being used in prefabrication.[33] After the war the main glues were urea formaldehyde and phenol formaldehyde, of which the latter was better but required a high temperature for setting, using a hot press. Resorcinol formaldehyde had similar properties and did not require a hot press, but it was expensive and as yet little used in Australia.[34] However Furness Limited, a South Australian

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25 *Australian Home Beautiful,* 12 January 1926, p 5.

26 Charles Wood, *Catalogue 106. Conservation & Restoration &c* (Cambridge [Massachusetts] 2000), p 41. Wood's notes relate to the publication, General Bakelite Co, *Bakelite. Information No. 1* (New York, November 1910). He refutes the statement in the *Random House Collector's Encyclopedia* that the material was invented in 1913. Elliott, *Technics and Architecture,* p 21, dates it to 1912, also incorrectly. Brian Grant, 'Plastics', in Eric de Maré [ed], *New Ways of Building* (London 1958 [1948]), p 222, dates the introduction of phenolic resoinoids of the Bakelite type to 1910, when they were used as shellac substitutes in varnishes anmd lacquers, whereas Baekeland's first phenol formaldehyde moulding powder dates from 1916.

27 *Glueing Practice Part 4. Artificial Resin Glues* [Trade Circular no 31 of the Division of Forest Products, Council for Scientific and Industrial Research] (Melbourne 1936), pp 5, 7.

28 Elliott, *Technics and Architecture,* p 21.

29 Jester, 'Plywood', p 134.

30 Jester, 'Plywood', p 134.

31 Elliott, *Technics and Architecture,* p 21.

32 Boas, *Commercial Timbers of Australia,* p 97.

33 W J Dunning, 'Plastics', in John Madge [ed] *Tomorrow's Houses: New Building Methods Structures and Materials* (London 1946), pp 66-7.

34 H G Higgins, 'Recent Developments in Composite Woods', *Commonwealth Engineer,* 1 June 1948, p 428.

plywood and veneer manufacturer, seem still to have been using urea glue exclusively in 1954.[35]

Ralph Symonds [1896-1961], who had a Sydney company called Standardized Furniture, during the early 1930s invented his own slicing and rotary peeling machines, and in 1933 formed Panels Pty Ltd to manufacture decorative panels and plywood. By 1938 he was developing plywood for structural purposes for the first time in Australia, and he built hot presses to manufacture this using phenolic resin. During World War II he placed all his patents at the disposal of the government, and he was involved in a number of wartime developments, such as folding plywood boats,[36] as well as in the laminated arch construction which is discussed below. In 1944 the *Australian Home Beautiful* reported on whast musdt have been Symonds's company - one which at the outbreak of war had been manufacturing 'Standis' brand furniture. During the war it had been fully engaged in war work, including marine and aircraft plywoods, and in the marine work commonly used synthetic resin glue.[37]

A complete house using Douglas fir plywood for exterior walls, interior walls and roof sheathing, was shown at the New York World's Fair of 1939.[38] In Australia in 1944 Römcke engaged A V Jennings to design and construct a prototype prefabricated plywood house, a structure which still stands at 55 Naroo Street, Balwyn, though the project did not proceed.[39] In Sydney Veneer and Plywood Pty Ltd were helped by the Commonwealth Experimental Building Station to establish a factory and make a prefabricated plywood house.[40] By 1947 there were twenty-five plywood factories in Australia: eleven in Queensland, nine in New South Wales, two in South Australia,and one each in Victoria, Tasmania and Western Australia.[41] In the 1950s plywood began to regain popularity as an internal lining, in lighter hues and matter finishes than those favoured before the war, and in in 1954 Römcke were advertising 'Ply-Lac', a stipple finish plywood made in Queensland, which came in ivory, autumn cream, blue, green and 'mauvy pink'.[42] In 1960 'Graindek' pre-finished plywood panels were advertised as ideal for feature walls.[43] In 1954 a sheet of plywood measuring 27 by 7 feet

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35 F W Ware & W L Richardson [eds], Ramsay's *Architectural and Engineering Catalogue* (Melbourne 1954), §24/4.

36 Wyatt, Ken, 'Early Glue-Laminated Arches in Australia; the Buildings of Ralph Symonds' [typescript, edited version of a talk given to the Institution of Engineers, Sydney, 17 October 2000] (Sydney 2000), p [6].

37 *Australian Home Beautiful,* September 1944, p 10.

38 T C Jester [ed], *Twentieth-Century Building Materials* (Washington [DC] 1995), pp 16-17.

39 Don Garden, *Builders to the Nation* (Melbourne 1992), p 63.

40 'Mass-produced All-timber House', *Architecture,* XXXVIII, 4 (October-December 1950), p 135.

41 Boas, *Commercial Timbers of Australia,* p 88.

42 *Ramsay's Catalogue* [1954], §24/6.

43 *Australian Home Beautiful,* June 1960, p 89, cited in Peter Cuffley, *Australian Houses of the Forties and Fifties* (Knoxfield [Victoria] 1993), p 83.

[7.5 x 2.l m], claimed to be the largest in the world, was used to roof the Australian exhibit at the Canadian National Exhibition, Toronto.[44]

A waterproof plywood for external use, 'Super Harbord', had been introduced in the United States in 1934,[45] and the synthetic resin glues developed during the war had enabled the creation of better plywoods for such purposes. Metal-faced plywood was also increasingly used in engineering applications by the late 1940s, and was made using a mixture of a phenolic resin with rubber, the resin sticking to the timber and the rubber to the metal.[46] The two ideas were dramatically combined in the Myer Music Bowl in Melbourne, in which marine plywood panels were faced with aluminium sheeting, and special joints were designed to allow for movement.[47]

b. building boards

Building boards come in such a bewildering variety of materials and finishes, and even more bewildering variety of trade names, that they are amongst the hardest materials to grapple with historically. Fibre boards, which are central to the present discussion, were produced from timber waste or other organic material by two basic processes - one, the lamination of thin layers, and the other the compression of pulp to produce a homogeneous sheet. They were of two basic but not mutually exclusive functions, a surfacing or wallboard, and an insulating board. In broad terms, the laminated products tended to be denser and more dimensionally accurate, and therefore suitable as wallboards, while the pulps tended to be less dense and better suited for insulation.[48] A third use, in the earlier years of the twentieth century, was what was referred to as 'lathing' - a base upon which plaster or render could be laid (though without the gaps or perforations normally associated with lathing).

It is useful to note the distinctions made by the British Building Boards Joint Committee in 1947, while bearing in mind that the categories are not absolute, and that most manufacturers produced boards in more than one category:[49]

Insulating Boards:
homogeneous insulating boards
laminated insulating boards

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44 *Cross-Section,* no 25(1 November 1954), p 2.

45 Jester, 'Plywood', p 134.

46 Higgins, 'Recent Developments in Composite Woods', p 428.

47 See *Cross-Section,* no 57 (1 July 1957), p 3; no 59 (September 1957), p 3: also no 80 (1 June 1959), p 2, for the award of £11,000 to the architects by the Reynolds Memorial Fund, of the USA, for promoting aluminium in good building work; and *Plywood and Plywood Products,* I, 6, pp 33-6, cited by Gavin Balharrie, 'Plywood', History of Building Construction 1995, pp 4-5.

48 R F Turnbull, *Fibre Boards* [CSIR Division of Forest Products technical paper no 6] (Melbourne 1932), pp 7-8.

49 Building Boards Joint Committee, *Fibre Building Boards* (London 1947), p 1.

bitumen impregnated building boards
acoustical boards

Wallboards:
homogeneous fibre wallboards
laminated fibre wallboards
bitumen laminated wallboards

Hardboards:
medium hardboards
standard hardboards
super hardboards

American usage tends to categorise them all as 'wallboards' and to refer to the intermediate category instead as 'medium density fiberboard'.[50]

In 1870 a United States patent was granted to W E Hale for an improved sheathing board, and in the following year a patent was issued for strawboard.[51] The first compressed fibre board on the Continent was developed by Radecke, and had reached the English market by 1887.[52] In 1890 the construction of multi-cylinder machines first made it possible to produce boards of a specified thickness without gluing together separate layers.[53] D M Sutherland, who from about 1875 had been experimenting in Edinburgh with processes for manufacturing boards from wood waste, succeeded in producing a millboard, which by 1882 had been used as a backing for Lincrusta Walton. He than established the Patent Millboard Company at Sunbury on Thames, and began marketing what has been described as a lining board in England from 1898.[54]

In 1906 E G Soltmann of New York was advertising his 'Compo Board' in the first edition of *Sweet's Catalogue,* as being suitable for walls and ceilings, and available in a 6.6 mm thickness, 1.2 metre width, and various lengths. It seems likely that this was a millboard or paper-based product quite unrelated to the 'compo board' which later appeared in Australia, and which incorporated wooden laths. Soltmann also made 'Fiberena' paper board for less prestigious applications such as attics and barns, and this came in rolls of up to 1.75 metres wide.[55] This may have been imported, but in 1908 a plant was established by the Agasote Millboard Co at Trenton, New Jersey,[56] to supply millboard to the American market and to avoid import duties. The

50 Carol Gould et al, 'Fiberboard', in T C Jester [ed], *Twentieth-Century Building Materials* (Washington [DC] 1995), p 132, citing Thomas D Perry, *Modern Plywood* (New York 1942), p 120.
51 Gould, 'Fiberboard', p 120, citing US patent 99,432 to W E Hale, 1 February 1870.
52 Murray Leslie, 'Fifty Years of Architecture and Building, 1887-1936', in J E Sears & J E Sears [eds], *The Architects' Compendium and Annual Catalogue* (London 1936), p v.
53 Turnbull, *Fibre Boards,* p 8.
54 Marian Bowley, *Innovations in Building Materials* (London 1960), p 120.
55 *'Sweet's' Indexed Catalogue of Building Construction* (New York 1906), p 2.
56 F P Kollman, 'Fiberboard', in F P Kollman et al, *Principles of Wood Science and Technology, II, Wood Based Materials* (New York 1975), p 553.

material was made by forming a wet lap of wood waste on an intermittent board-making machine, and then transferring it to a steam heated plate for drying.[57] This is possibly the same product which has been described as the first wallboard properly so-called, designed to provide a finished surface, though a date of 1906 is given for this.[58] The company later turned to the manufacture of a paper board, 'Homasote', which will be mentioned below.

In 1909 'Ten Test' insulation board was produced at Thorold, Ontario,[59] the first rigid insulating board made in Canada from wood pulp.[60] By 1931 the Canadian manufacturer was International Fibre Board Ltd,[61] but there seems to have been some sort of link with the manufacturers of Beaver Board, as will appear. Ten Test was still being exported from Canada to Britain in 1950, and advertised for sale through the Tentest Fibre Board Co Ltd of Hadley Wood, Barnet, Herefordshire.[62] Another Canadian board, 'Donnacona' was to become well-known in Australia in the 1930s. This was made by the Donnacona Paper Co of Donnacona, Quebec.[63]

J P Lewis, a struggling paper manufacturer of Beaver Falls, New York, invented Beaver Board in 1903. He took the mat board which he produced for picture framing and glued individual plies together to create large sheets to use for lining his attic. On the strength of this he in 1906 established the Beaver Manufacturing Company, which was to dominate the wallboard market for the next two decades. In 1914 a patent for 'Wall-Board' was obtained on the company's behalf by John Thickens, formerly of the Forest Products Laboratory, and this was the product which made the company's name. The inner layers were of ground wood in short loose fibres, which had good insulating characteristics but not much strength or moisture resistance; the outer layers were of cooked wood, in thin close-knit fibres which were strong and resistant to moisture penetration; and a final outer layer of ground wood was placed over this for decorative effect.

The Beaver company headquarters were moved to the outskirts of Buffalo in 1910, and in 1911 satellite plants were established at London, Ottawa, and Roanoke Rapids, North Carolina. The Ottawa plant was moved south to Thorold two years later, and was claimed in a local advertisement to be the 'largest wallboard fibre mill in the world'.[64] As Thorold was the location of the Ten Test plant it seems possible that the latter had been taken over or in some way merged into the Beaver business. It is also unclear whether there

57 Bowley, *Innovations in Building Materials,* p 120.
58 K C Milley, 'Homasote: the "Greatest Advance in 300 Years of Building Construction"', *APT Bulletin,* XXXVII, 2-3 (1997), p 58.
59 Kollman, 'Fiberboard', p 553.
60 Turnbull, *Fibre Boards,* pp 8-9.
61 *Ramsays Architectural Catalogue* [Melbourne 1931], pp 512-517.
62 Evelyn Drury et al [eds], *Architects', Builders' and Civil Engineers' Reference Book* (London 1950), pp 227, 233.
63 Joanna Dowling, 'Blanketing the Home: the Use of Thermal Insulation in American Housing, 1920-1945', *APT Bulletin,* XL, 1 (2009), p 34.
64 Shelby Weaver, 'Beaver Board and Upson Board', *APT Bulletin,* XXXVII, 2-3 (1997), pp 71-2.

was a connection with the Beaver Lumber Company of Canada.[65] There probably was, for an advertisement of 1915 refers to the Beaver Companies of Great Britain, Canada and the United States (with O D Gordon of Sydney as Australian representative).[66] Ultimately the main Beaver company fell a victim to its high debt levels, and in 1928 it was sold to the Certain-teed corporation, which maintained a wallboard under the Beaver brand until at least the 1940s.[67]

'Upson Board', was another laminated fibre board made in the United States.[68] It is said to have shared the exact raw materials, product and market of Beaver Board, but to have been run with a more conservative and sales-driven approach, which was to help it to weather economic downturns. It was founded by Charles Upson in Lockport, New York, in 1910, in association with his brother William Upson. It grew steadily, and in the 1950s expanded into prefabricated houses and building boards for exterior use, then in 1955 bought the old Beaver Board plant at Buffalo from the Certain-teed Corporation and revived the Beaver brand name in a bid to capture the remaining loyal market. In the 1970s Upson ran into financial problems and it finally closed its doors, bankrupt, in 1984, though it soon afterwards reopened under the management of Niagara Fiberboard.[69]

'Amiwud' [that is, 'Am I wood?'] [70] was a compressed wood pulp board intended as a finished surface for wall panelling and ceilings. It came in 'golden oak', 'weathered oak', 'jenisero', 'mahogany' and plain, in sheets of up to 10 ft 6 in by 2 ft 8 in by $^{3}/_{16}$ thick [3.23 m x 0.82 m x 4.8 mm], and was finished with 'battens' or cover straps at the joints.[71] The makers were the Paraffine Paint Co of San Francisco and Chicago, better known for their 'Malthoid' roofing, and they insisted that it was 'a mechanical reproduction (not an imitation) of the beautiful artistic Oak and other hardwood grains'. A local product, though probably a short-lived one, was a pulp wallboard made in the 1920s by the Australiuan Paper and Pulp Company Ltd under their APPCO brand.[72]

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65 Reportedly one of the largest lumber companies, with sixty yards across Manitoba and Saskatchewan: G Mills, *Buying Wood & Building Farms* (Ottawa 1991), pp 24, 43.

66 *Building,* 12 January 1915, p 132.

67 Weaver, 'Beaver Board and Upson Board', p 73. Beaver Colo wallboard was still being advertised in Britain into the 1960s, by the Merchant Trading Company Ltd: Drury, *Architects', Builders' &c Reference Book* (1950), p 226; William Kinniburgh, *Dictionary of Building Materials* (London 1966), p 38.

68 Waldo Bros. and Bond Company, *Building Materials and Construction Equipment* (Boston, no date [c 1920]), p 348; *Sweet's Architectural Catalogue* (1922), pp 1126-7. Waldo Bros list another type, 'Walbro Board', which has not been reported in Australia.

69 Weaver, 'Beaver Board and Upson Board', pp 73-4.

70 R A Prevost, *Australian Bungalow and Cottage Home Designs* [Sydney 1912], rear endpaper advertisement; *The Salon,* I, 1 (July-August 1912), advertisement p xi.

71 Mayes, *Price Book* (1914), p 238.

72 V C Marshall, *The 'Herald' Ideal Homes Exhibition, Wirth's Park, Melbourne* [catalogue] ([Herald, Melbourne] 1923), p 116.

Subsequent developments in America included a rigid fibre board patented by Carl G Meunch[73] and made from the ground wood tailings of a paper mill by the Minnesota & Ontario Paper Co at International Falls, with a pilot plant established in 1914 and marketed from 1915 or 1916 as 'Insulite',[74] and the material seems to have been manufactured in Britain as well as the United States.[75] 'Cornell', a compressed wood fibre board with an 'oatmeal' finish, was made by the Cornell Wood Products Co of Chicago at least by 1922.[76] Amongst the subsequent United States products in this category was 'Sterling Wallboard' made by a mill in western New York State in sizes up to four feet by twelve [1.2 x 3.6 m], $^{3}/_{16}$ inch [5 mm] thick, and sized on both sides.[77] By the 1930s the United States Gypsum Co alone marketed 'Weatherwood Hardboard', of wood fibre; 'Fiber Wallboard', similar but less dense; 'Weatherwood Insulating Board' of felted wood fibre; Weatherwood Insulating Tile Board, Weatherwood Insulating Plank, and other products.[78] By 1950 'Maftex' board, made from fibres of liquorice root, was being exported from the United States to Britain, though it has not been reported in Australia.[79]

Mineral bonded wood wool slabs are said to have been first produced in Austria in 1914, using Portland cement or other hydraulic binders.[80] However this seems inconsistent with the fact that the combination of wood fibre with cement was patented in the United States in 1904,[81] and that in 1914 a building board of this sort using 'lime cement', was apparently available in Australia (allegedly called 'Sackett Board', which is puzzling, as this was generally known as a plaster board). It was supposed to serve as a basis for plaster in lieu of laths.[82] The Austrian material was called 'Heraklith',[83] and used a magnesite cement. It was later manufactured by W F Schlesinger & Co Ltd of London,[84] and later still in Australia, as will appear below. An English type which does not seem to have reached Australia is 'Centulith'.[85]

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73 Gould, 'Fiberboard', p 132.

74 Kollman, 'Fiberboard', p 553; Turnbull, *Fibre Boards,* p 9.

75 F E Drury et al [eds], *Architects', Builders' and Civil Engineers' Technical Catalogue* (London 1946), pp 225, 313. 'Maftex' would appear to be a name derived from the British distributors, Macandrew & Forbes, so the original name is probably different.

76 *Sweet's Architectural Catalogue* (1922), pp 1124-5.

77 Chicago Millwork Supply Co, *Millwork and Building Material* (Chicago, no date [c 1925]), p 49.

78 United States Gypsum Company, *A Catalog of Building Materials* (Chicago 1936), section B, p 10, and section C, pp 1-10.

79 Drury, *Architects', Builders' &c Reference Book* (1950), p 226.

80 Pedro Guedes, *The Macmillan Encyclopedia of Architecture and Technological Change* (London 1979), p 276.

81 Elwood O Baylor of Adrian, Michigan, was granted US patent 751,712 on 9 February 1904 for a 'building block' consisting of a combination of concrete and a woody fibrous substance. *Concrete,* I, 1 (March 1904), p 25.

82 Mayes, *Price Book* (1914), p 28; advertisement p 51.

83 Bridget Jolly, 'Solomit in Australia and its European Context' (PhD submission, University of Adelaide, 1998), p 198.

84 Kinniburgh, *Dictionary,* p 132. This is probably the same as the material referred to as 'asbestos-wood' in Percy Thomas, *Modern Building Practice* (4 vols, London, no date [c 1935]), III, p 498.

85 Kinniburgh, *Dictionary,* p 69.

c. wood fibre boards in Australia

By 1900 a 'compo' board was being advertised in Australia, consisting of laths of wood with the grain in different directions, laid edge to edge, and with 'fireproof cement' between them and in a layer on either face, then outside this on both faces a layer of 'damp-proof pulp board'. This material was available in lengths from eight to eighteen feet [2.4-5.4 m].[86] This was not a wood fibre board, but what was known in England as a 'laminated board', made in thicknesses from a half to two inches [13-52 mm] and much used for flush doors and furniture.[87]

Four early wood fibre boards marketed in Australia can be named, 'Ten Test', 'Beaver Board', 'Upson Board' and 'Amiwud'.[88] By 1913 Gunnersen Nosworthy of Melbourne stocked 'Ten Test' in lengths of up to seventeen feet [5.1 m],[89] though later the available sizes seem to have been smaller - up to 8 ft x 4 ft x $^{7}/_{16}$ inch [2.4 m x 1.2 m x 9.5 and 4.8 mm].[90] It was being regularly advertised in Australia by 1931,[91] and R S Couche & Co of Melbourne sold it especially as a base for flooring materials over concrete slabs.[92] They advertised it as being of 'British manufacture', apparently in reference to its being made in a British dominion, for the raw material was now explicitly identified as Canadian spruce.[93] In 1930-1 it was used as floor insulation and roof lining in the Third Church of Christ Scientist at Elsternwick, Melbourne, probably one of the earliest uses, as Couche sought permission to photograph the building.[94] Towards 1936 it was used ingeniously in the interior of Rogers, Sellers & Myhill's Melbourne showrooms, with moulded edges creating decorative bands to conceal the joints.[95] However it seems to have disappeared from the local market soon after this time.

Beaver Board was available in Australia by 1914, and was used as a base for plastering. It was made of spruce wood fibre, and $^{3}/_{16}$ in [4.8 mm] sheets 32 and 48 inches [0.82 and 1.23 m] wide by up to ten feet [3.07 m] long.[96] It was

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86 *MMBW Sewerage Scheme* (Melbourne 1900), no page [CHECK THIS]. What must be the same composition or 'compo' board was available in 1914 very cheaply - 3d per square foot as opposed to 1s 6d for plasterboard - in four foot [1.2 m] wide sheets from ten to eighteen feet [3 to 5.4 m] long: C E Mayes, *The Australian Builders & Contractors' Price Book* [8th ed, Sydney 1914], pp 28, 238.

87 Kinniburgh, *Dictionary,* p 149.

88 SOURCE? Apparently not *Building.*

89 S. A. Burns Ltd., *Price List,* p 19.

90 W H Hallam, *Building Costs* (1st ed, Melbourne 1939), p 1.

91 *Ramsays Architectural Catalogue* [Melbourne 1931], pp 512-517.

92 RVIA, *Journal,* XXI, 3 (July 1933), advertisements p xii.

93 D W Tulloch, *Details of Australian Building Construction* (Melbourne, no date [c 1933]), p 76.

94 Information from Marie Moore, 2001. See also W L Richardson, *Ramsay's Architectural and Engineering Specifications [Volume 1]* (Melbourne, no date [1934]), p 67.

95 *Journal of the Royal Victorian Institute of Architects,* XXXIV, 4 (September 1936), p xxvi.

96 Mayes, *Price Book* (1914), p 238.

a four-ply laminated material.[97] An example of Beaver Board from 1918 has been identified by Geoff Ashley at Willandra homestead, New South Wales.[98] By 1926 Beaver Board in lengths of up to twelve feet [4.8 m] could be bought in Adelaide[99] and Brisbane, where there was also a 'Jumbo' Beaver Board (a zoologically mind-boggling concept), 25% thicker and costing 12.5% more.[100] In Sydney lengths could be had up to 16 feet (4.8 m), in both $^{3}/_{8}$ in and $^{3}/_{16}$ inch (9.5 and 4.8 mm) thicknesses,[101] of which the former was presumably the 'Jumbo', even though the difference is not 25%.

'Upson Board', was also imported to Australia.[102] 'Amiwud' was available in Australia by 1912,[103] and was probably the same as the material being advertised by James Moore in 1913, as an imitation oak finish pulp board suitable for wall or dado panels.[104] By 1917 Colton Palmer of Adelaide were offering sizes up to 4 four by sixteen feet [1.2 x 4.8 m].[105] By 1934 an insulation board called 'Insulate' was available in Australia,[106] and in 1938 this was described as the 'original wood-fibre insulating board', 'duo surfaced' with 'burlap' and smooth sides, and suitable for wall and ceiling surfaces,[107] though it is not known whether this was the American or the British variety. Another board calld 'Alderite' has been found in the lining of the, former Viticultural Research Station at Narara, New South Wales, built in about 1915.[108] Only one board, 'Adamo' [pronounced *Ad*amo] seems to have been made in Australia from Australian wood pulp, and it was sold in all states by William Adams & Co Limited. It was claimed to be light, tough, rigid and white ant resistant, and was stocked in widths of 1 ft 6 in to four feet [0.45 to 1.2 m] and lengths of up to twelve feet [3.6 m].[109] It seems to have been short-lived.

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97 *Sweet's Architectural Catalogue* (17th ed, New York 1922), pp 1122-3.

98 Geoff Ashley, 'Two Centuries of the Western NSW Dwellings', in Peter Freeman & Judy Vulker [eds], *The Australian Dwelling* (Red Hill [ACT] 1990), p 80.

99 *The South Australian Building & Allied Trades Directory and Handbook* (Adelaide 1926), p 15.

100 *Architect and Builder's Journal of Queensland,* 10 July 1926, p 81.

101 S. A. Burns Ltd., *Price List* (Sydney 1926), p 19 & rear endpaper.

102 Turnbull, *Fibre Boards,* p 9. See also the advertisement for Upson Board in Alex Smith, *The Australian Home Carpenter* (Melbourne 1929), p 122.

103 R A Prevost, *Australian Bungalow and Cottage Home Designs* [Sydney 1912], rear endpaper advertisement; *The Salon,* I, 1 (July-August 1912), advertisement p xi.

104 Moore, *Price List 1913,* p 2.

105 Colton, Palmer & Preston, Ltd., *You are Secure with Us for Builders Hardware* (Adelaide 1917), p 95. After the war it was available in New Zealand in sheets up to twelve feet [3.6 m]: .Jeremy Ashford, *The Bungalow in New Zealand* (Auckland 1994), p 59.

106 Richardson, *Ramsay's Specifications*, p 67.

107 Mayes, *Australian Builders' Price Book* (1938), p 323.

108 Information posted on the NSW Heritage Advisers Network web site by Chris Betteridge, 8 October 2013. He does not specify the nature of the board. The Research Station later became the Gosford Horticultural Institute, then the Gosford Primary Industries Institute.

109 *Building,* 12 October 1922, p 4; *Every Man's Home,* II (October 1922), p 13. See also *Book of Australian Bungalows* (Sydney, no date [c 1923]), p 108.; V C Marshall, *The 'Herald' Ideal Homes Exhibition, Wirth's Park, Melbourne* [catalogue] ([Herald, Melbourne] 1923), p 41.

Imported boards proliferated in the 1920s and 1930s. The American 'Fiberlic' laminated fibre wallboard was available in Brisbane in 1922,[110] and 'Cornell' board[111] was available locally by 1927 in sheets which measured up to 4 x 16 feet [1.23 x 4.92 m x 11 mm].[112] In 1937 there were agents throughout New Zealand for a board called 'Treetex',[113] which was apparently imported from Britain,[114] and it was sold in Australia by Gibbs, Bright & Co.[115] By the 1940s New Zealand was producing its own wood fibre board, 'Pinex', claimed to be stronger than the board previously imported to that country[116] - presumably Treetex - but there seems no evidence that this product reached Australia either. By about 1935 'Donnacona' insulating building board was being advertised by the New South Wales agents A C Saxton & Sons of Sydney.[117] Its source was unstated, and though it was advertised as a British product[118] it was in fact Canadian, as explained above. It was available in lengths of twelve feet [3.6 m] and in $^1/_2$ and $^3/_8$ inch [13 mm and 9.5 mm] thicknesses, in a 'standard board' or roughcast, or in 'burl board' or smooth finish.[119] By 1939 the Melbourne agents, H Beecham & Co, were able to illustrate local projects including the Belgrave Picture Theatre, the Australian Broadcasting Commission's 3LO studio, and shop displays at Ball & Welch's drapery store.[120]

By 1937 the mineral bonded wood wool slab, Heraklith, had been tested in Australia and had been used in extensions to a hotel at Manly, New South Wales. The slabs were designed to be nailed to a timber frame, bonded with cement, rendered externally, and plastered internally. By the 1940s it was being manufactured in Australia as 'Woodtex'.[121] The makers were the Woodtex Company of South Melbourne, and Aldaco Building Products of St Mary's, New South Wales, both under licence from the Woodtex Company of Melbourne.[122] In 1948 'Woodtex' was being advertised in Melbourne as a

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110 *Architectural and Building Journal of Queensland,* I, 3 (7 September 1922), p 35. The board is identified as being from the United States in Drury, *Architects', Builders' &c Reference Book* (1950), p 225.

111 *Sweet's Architectural Catalogue* (1922), pp 1124-5.

112 S. A. Burns Ltd., *Price List* (Sydney 1926), p 19. A C Saxton and sons of Sydney marketed it: *Book of Australian Bungalows* (Sydney, no date [c 1923]), p 2.

113 *Building Progress* [Auckland], II, 5 (Wellington edition, May 1937), p 7.

114 It was advertised in a number of forms by Treetex Limited of London: Drury, *Architects', Builders' &c Reference Book* (1950), pp 227-8.

115 *Argus,* 4 February 1937, p 7.

116 *Building Progress* [Auckland], VIII, 1 (January 1943), inside front cover & p 15; VIII, 2 (February 1943), p 15.

117 J P Brogan, *101 Australian Homes*(Sydney, no date [c 1935]), p 112.

118 *Building Progress* [Auckland], II, 5 (Wellington edition, May 1937), pp 7, 11; *Journal of the Royal Victorian Institute ofArchitects,* XXXIV, 4 (September 1936), p xxxiv.

119 Mayes, *Australian Builders' Price Book* (1938), advertisements p 27 & pp 87-8. The Canadian origin is stated in the 1939 brochure, belkow.

120 H Beecham & Co Pty Ltd, *Donnacona Insulating Board* (Melbourne, no date [1939]), passim.

121 Jolly, 'Solomit in Australia', p 198, ref *dvertiser* [Adelaide], 27 November 1937, p 24; South Australia, Building Act Enquiry Committee, *First Progress Report* (Adelaide 1937), p 11; Council for Scientific and Industrial Research file, '"Woodtex" Wall Covering', AA (SA), AP 665/1/0, G3387.

122 Robin Boyd, *Victorian Modern* (Melbourne 1947), advertisements, no page.

light, strong, borer and fungus-proof material, unaffected by moisture, steam, rain or sun.[123] Meanwhile by 1938 'Fibrerock' was being sold in Australia - of 'wood fibre petrified in cement (no Magnesite)',[124] and in more recent times still a Czech soil scientist, Dr Holly, is supposed to have experimented in central Australia with compressed spinifex and cement.[125] It is therefore puzzling that a product on the market in the early 1960s, 'Magnelite', claimed to be the first in Australia to be manufactured from wood wool and magnesite formed under pressure, cured, and carbonised in ovens. This sounds like one of the same group of materials, and its properties, water resistance and the ability to be cut, screwed and nailed, were also similar.[126]

By 1937 the Swedish 'Ankarboard' had reached Australia, and was advertised by S D Hillas of William St, Melbourne, as the 'all-wood insulating wallboard'.[127] It probably came by way of its British agents, the Wood-Fibre Wallboard Co of London, and was available in the forms both of insulating board and hardboard, in addition to 'certain special types'.[128] What impact these had in the local market is not known, but Ankarboard is shown on drawings for the Rialto Theatre, in the Melbourne suburb of Kew in 1941.[129] In 1954 Römcke Pty Ltd of Melbourne were advertising Swedish 'Branlac' and 'Hammerlac' fibre lacquered wallboards, which came plain or 'tiled in all colours'. Römcke also advertised British 'Sundeala' and two others which were probably British, 'Weryroc ' and 'Plimberite'.[130] Henry Berry &Co of Melbourne advertised S/K Board, described as a 'fibre-reinforced waterproof, air-proof, and dustproof board' which would not weather and crack like rigid materials. It was suitablke for holiday houses, shacks and sleepouts, and had one smooth and one textured surface, both amenable to decoration.[131] Another product was 'Genesco' wallboard, but an advertisement for it is uniformative.[132]

A coreboard caled 'Okal' was manuactured at Mount Gambier by Coreboard Pty Ltd, a subsidiary of the Kauri Timber Co. This was a chipboard with cylindrical tubes running through it, and finished on both sides with a timber veneer. It was used in 1962 to line the company's 'Component Home', a

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123 Ashley, loc cit, citing Australia: Council for Scientific and Industrial Research, *Fibre Boards* (Melbourne 1932) [Australian National Library Technical Paper 6].

124 C E Mayes, *The Australian Builders' and Contractors' Price Book* (10th ed, Sydney 1938), p 324.

125 Alistair Knox, *Living with the Environment* (Canterbury [Victoria] 1975), p 149. Jolly, 'Solomit', pp 8-9, identifies him as the A B Holly who visited Ernabella in 1971.

126 *Tasmanian Architect,* [F, c January 1963], p 34.

127 *Argus,* 4 February 1937, p 7.

128 Ankarsviks Ångsågs Aktiebolag, *Fibre Building Boards, Ankarboard, Insulation and Hardboards, Manufactured in Sweden, Technical Notes for Architects and Builders* (Sundsvall [Sweden], no date), passim. This was in a batch of local trade pamphlets in the hands of a Melbourne dealer, which suggests that the material was probably sold here.

129 H VivianTaylor & Soilleux, architercts, 20 August 19412: State Library of Victoria LTAD 162/87.

130 *Ramsay's Catalogue* [1954], §24/6.

131 *Argus,* 4 February 1937, p 7.

132 *Argus,* 4 February 1937, p 7.

newly developed prefabricated or precut dwelling.[133] Corkboard never became prominent in Australia, but one type was introduced in about 1954 by the Richard Scandrett Co of Sydney, consisting of granular cork with a hard plastic surface, and intended for use in partitions.[134]

d. Masonite

Masonite and its successors can be seen as being the fulfilment of an American dream, for in 1833 J A Etzler, a German living in Philadelphia, put forward a utopian vision for the United States, in which something of the sort was envisaged. The monotonous forests would be 'ground to dust' then 'cemented by a liquor' to create 'a universal building material'. This substance could be moulded to any shape, and could be vitrified to make it virtually indestructible and to give it a 'crystal-like brilliancy.'[135]

In 1858 one Lyman discovered a process for separating wood fibres by the expansion of hot water, steam or compressed air, and this was developed by William Horatio Mason, a collaborator of Edison, who established the Mason Fibre Company plant at Laurel, Missouri, in 1926 to produce a wood pulp board by the explosion process.[136] He and his fellow-investors were able to take advantage of the massive amounts of wood waste then being generated by the local timber industry, using equipment for which Mason received a series of patents in 1925-8.[137] It seems that the timber was initially broken into small pieces by mechanical means, and was than passed through a steam gun to explode it,[138] and it was said

> clean wood chips are exploded under high steam pressure, so that the wood is reduced to fibre. The pulp thus produced consists entirely of long cellulose fibres, with their strength unimpaired and the lignins, or natural cementing structure of the wood, entirely retained. No chemicals are used; the exploding process is purely a physical one.

At later dates waxes and water-compatible resins such as phenol formaldehyde were added to improve the strength and moisture resistance of the material.[139] In addition to the wood product a wheat straw board and a cornstalk strawboard, were produced respectively in Missouri in 1928, and Iowa in 1929.[140]

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133 *Australian Home Beautiful,* March 1962, pp 12-13.

134 *Cross-Section,* no 15 (1 January 1954), p 2.

135 John Carey, *The Faber Book of Utopias* (London 1999), p 229, quoting J A Etzler, *A Paradise within the Reach of All Men, &c* (2nd ed, [?Pittsburgh (Pennsylvania)] 1842 [1833]).

136 Turnbull, *Fibre Boards,* p 9.

137 Carol Gould, 'Masonite: Versatile Modern Material for Baths, Basements, Bus Stations, and Beyond', *APT Bulletin,* XXXVII, 2-3 (1997), p 64.

138 *Architect and Builder's Journal of Queensland,* 10 March 1931, p 17.

139 Gould, 'Masonite', p 64.

140 Turnbull, *Fibre Boards,* p 9.

'Masonite' was made in both an insulation board, 'Masonite Structural Insulation'[141] and a wallboard grade, 'Presdwood', which was more durable and was formed under hydraulic pressure. By 1931 it was on the market in Australia.[142] In 1932 a patent was obtained for 'Tempered Presdwood', in which liquid and heat treatments made the surface more resistant to abrasion and moisture, and the finished panels were soaked in oils and baked at high temperatures. The original boards were of a natural brown colour, finished smooth on one face and with a fine mesh imprint on the other, but by 1939 prefinished panels in oyster white, ivory, green and buff were being manufactured. The Mason patents governing the hardboard (Presdwood) material were sufficiently powerful to protect it and to enable the company to sell it on to others such as Celotex, the Johns Manville Corporation, the Armstrong Cork Company, the National Gypsum Co, and the Certain-teed Co, which marketed it under their own brands.[143] It was also manufactured in Sweden and exported to England.[144]

By about 1936 the CSIR estimated the Australian market for fibreboard at approximately 56 million feet [5.2 million m^2] per annum.[145] The Colonial Sugar Refining Company experimented at their Macknade mill in Queensland in about 1936-7 with hardboard made from Australian hardwood fibre, but did not proceed to full-scale manufacture because the Masonite Corporation of the United States was building a factory at Raymond Terrace near Newcastle to produce its own board.[146] In March 1937 J H Thickens, the Masonite Corporation's vice-president in charge of production, came to Australia to investigate the possibility of setting up a plant, and as a result Masonite Corporation (Australia) Ltd was established in September. The products to be manufactured were 'Masonite Constructional Insulation', for wall sarking and roof insulation; 'Quatrboard', a 'semi-hard' board for interior surfaces, which would take paint well; 'Presdwood', a dense smooth-surfaced board; 'Tempered Presdwood'; and 'Temprtile', with the mock tile finish.[147]

It appears that the Masonite factory came into production towards the end of 1938,[148] and Masonite was distributed by CSR for five years, until that company began manufacturing its own version in 1947.[149] This was known as 'CSR Hardboard' until 1952, when the name was changed to 'Timbrock'.[150]

141 *Specifications and Details. Masonite Manufactured Lumber* [brochure, Avery Library, Ross no 76] (Chicago, no date [after 1926]), p 1. A far more comprehensive account of the manufacturing processes, not specific to Masonite in particular, is given in Turnbull, *Fibre Boards,* pp 10-16.

142 *Architect and Builder's Journal of Queensland,* 10 March 1931, p 17.

143 Gould, 'Masonite', pp 64-5.

144 Kinniburgh, *Dictionary,* p 165.

145 *The Story of Masonite* (Sydney, no date [c 1937]), unpaginated.

146 A G Lowndes [ed], *South Pacific Enterprise* [Sydney 1956], p 212.

147 *The Story of Masonite,* passim.

148 Mayes, writing in 1938, says the event is scheduled for October or November: Mayes, *Australian Builders' Price Book* (1938), p 37.

149 Lowndes, *South Pacific Enterprise,* pp 212, 219.

150 *Building, Lighting, Engineering,* 24 June 1952, p 5.

It was to receive a boost in 1953, when it was reported that CSR researchers had built thirty-eight samples of various building boards in white ant-infested country where, after a year, only the Timbrock and the Caneite were found to be intact.[151] In 1949 the Masonite Corporation of Australia was advertising in its own right, with branches in most capitals and a factory at Raymond Terrace, New South Wales, which made use of Australian hardwoods to produce Presdwood, Tempered Presdwood and Temprtile, but not, it would seem, Quatrboard. In the 1950s Masonite was available locally in sheets measuring 4 x 12 feet [1.23 x 3.69 m], and had been augmented by 'Masonite Primecote' with a surface prepared for painting.[152] From 1953 'Burnie Board', a local product made from Tasmanian hardwoods, was on the market in the same sizes, and also in a standard and a tempered form.[153]

Masonite 'Temprtile' was finished in imitation tile finish, a idea which had been introduced in America by Beaver Board at least by 1922,[154] and by the Upson Company even earlier.[155] In 1923 the Upson Fibre Tile was described as[156]

> made of clean, strong, wiry wood fibers, mostly spruce, formed under enormous pressure into panels nearly a quarter of an inch thick, four feet wide, and from six to twelve feet long. It is permanently embossed in two tile-like patterns, oblong and square, giving the same beautiful effect that is produced by ceramic tile ...
> Upson Fibre-Tile is finished with flat paint and enamel after being applied to the walls.

The Upson tile had been sold in New Zealand,[157] and doubtless also in Australia.

At a later date the Masonite Corporation brought 'Marlite' onto the local market. It was manufactured for them by Service Industries Pty Ltd, of Melbourne and Sydney, and was a 'high heat baked melamine plastic enamel' finish on panels of Presdwood, produced in a tile finish, 'Lustrtile', as well as other finishes such as 'Leatherboard'. By 1949 Chas E Tims & Son of Melbourne were producing something similar to Masonite 'Temprtile', called 'Timsontile', in both plain and tile pattern sheets, with an 'organic semi-gloss finish, scientifically processed on hardboard',[158] but by 1959 Tims was selling the Service Industries product, 'Lusrtrtile', in cream and green.[159] In 1956

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151 *Cross-Section,* no 15 (1 January 1954), p 2.
152 Phillip Mayes, *The Australian Architects, Builders and Contractors Price Book and Guide* (11th ed, Glebe [New South Wales] 1951), p 88; advertisement p 2.
153 *Tasmanian Architect* [F, c January 1953], p 13.
154 *Sweet's Architectural Catalogue* (1922), p 1122.
155 Waldo Bros. and Bond Company, *Building Materials and Construction Equipment* (Boston, no date [c 1920]), p 349.
156 *The Upson Company. Fibre Board Authorities* (Lockport [New York] 1923) [brochure, Avery Library: Ross cat 9 no 20], pp 3-4.
157 Ashford, *The Bungalow in New Zealand,* p 70.
158 *Ramsay's Catalogue* [1949], §22/3.
159 *Australian Home Beautiful,* February 1951, p 69.

stove enamelled or 'Epiclad' CSR hardboard was produced in New South Wales by the Factorite Corporation Ltd and marketed as 'Facto-Tile',[160] though little more is heard of it, and it was probably short-lived. By the 1960s Burnie Board was available in the 'Oceana' finish, intended to suggest woven reeds.[161]

e. cane boards

In 1907 a 'bagasse fibrous composition for ceilings and walls' was available in Australia in the form of plain panels with cover moulds, ready for fixing, as well as ornamental panels and cornices.[162] The source of this is a total mystery, but it is likely to be American and it foreshadows the development of 'Celotex'. The system for producing Celotex insulation board from bagasse (sugar cane waste) was developed by Professor C E Monroe,[163] probably for the United States company, Texal Ltd,[164] and a patent taken out in 1921.[165] The Louisiana Celotex Company established a plant in 1921 at Marrero, Louisiana,[166] on the Mississippi River opposite New Orleans. This was within easy reach of sugar plantations capable of supplying enough bagasse to produce two million square metres of Celotex Board per year, and also in a position to received additional imports from Cuba.[167] The material was marketed from 1922.[168] Celotex was produced both as a sheathing material and as a base for plaster, and came in 7/16 inch [11 mm] thickness. In the 1940s a layer of asbestos cement was added to the surface to create a cladding board,. and by 1945 there were four products, Celotex Building Board, Celotex Tile Board, Celotex Finish Plank and Celotex Lath.[169]

Celotex was promoted in Britain and then in France.[170] Then in 1923 an American report on the manufacturing process was reproduced by the company in connection with its plans to establish a Celotex mill in the Australian sugar cane districts[171] and, though this project lapsed, Celotex

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160 *Cross-Section,* no 41 (1 March 1956), p 2: it had been developed from the process of enamelling refrigerators.

161 *Australian House and Garden,* December 1965, p 81.

162 Walter Jeffries, *The Australian Building Estimator* (Sydney 1907), p 209.

163 S G Roberts, 'Manufacturing Fibre Board from Sugar Cane Waste', *Scientific Australian,* XXVIII (12 (15 March 1923), p 231.

164 Bowley, *Innovations in Building Materials,* p 351; Kollman, 'Fiberboard', p 553.

165 Gordon Temple, 'Utilising Waste', *Science Progress,* XXII, 1927-8, p 476, quoted in Jolly, 'Solomit', p 153.

166 Kollman, 'Fiberboard', p 553. Jolly, 'Solomit', p 153, refers to a factory in New Orleans in about 1922.

167 Roberts, 'Manufacturing Fibre Board', p 231.

168 Turnbull, *Fibre Boards,* p 9.

169 Joanna Dowling, 'Blanketing the Home: the Use of Thermal Insulation in American Housing, 1920-1945', *APT Bulletin,* XL, 1 (2009), p 36.

170 An undated publication in French is illustrated with mainly US and British examples: *Emploi du Celotex,* passim.

171 Turnbull, *Fibre Boards,* p 9, citing the *Industrial Australian and Mining Standard* (1924), 72, pp 428, 725 and 772. Turnbull does not name the company which had this plan, but

came onto the Australian market from the United States, and a product from Hawaii called 'Canec' was expected to join it.[172] The material became well established in Australia during the 1920s,[173] and was apparently made from either bamboo or cane fibre,[174] though generally taken to be the latter. Augustus Aley wrote of it in 1927 as 'a new building board of sugar cane fibre, which is claimed to have good insulating properties.'[175] Millar's Timber & Trading Co were selling Celotex in Melbourne by 1928,[176] and an early Celotex brochure indicates that Burns Philp & Co were agents for New South Wales and Queensland, V B Trapp & Co for Victoria, Elder Smith & Co for South Australia and Western Australia, and A C Webster & Sons for Hobart.[177] Celotex was made not only in the United States but in Britain, where an existing group of companies was reorganised as Celotex Ltd in 1937.[178] By 1950 Celotex Ltd of London were making six different versions of the product.[179]

Celotex was promoted as an insulation material for sheathing the outer face of a timber building frame, prior to cladding it with weatherboard or asbestos cement, finishing it in metal lath and roughcast, or encasing it with a veneer of brick.[180] This sort of construction is more typical of the United States than of Australia, and there is no clear evidence that it was in fact implemented here. Celotex was also promoted for sarking roofs, insulating floors, as a substrate for linoleum, as a base for plastering, and as a self-finishing wall and ceiling lining, generally with straps at the junctions, but otherwise with V- or round-edged butt joints.[181] In these latter uses, and in various acoustic forms, it seems to have achieved general acceptance, especially in Brisbane. It was also used for the lining of the police station built in 1928-9 at the remote South Australian settlement of Innamincka.[182] A particularly interesting

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it is identified in C E Mayes, *The Australian Builders & Contractors' Price Book* (9th ed, Sydney 1927), p 370; advertisement p 15.

172 *Australian Home Builder,* 15 January 1925, pp 54-5, referring also to the previous December issue, not yet sighted. Canec was produced by the Hawaiian Cane Products Co of Honolulu: Joanna Dowling, 'Blanketing the Home: the Use of Thermal Insulation in American Housing, 1920-1945', *APT Bulletin,* XL, 1 (2009), p 34.

173 Mayes, *Australian Builders Price Book* (9th ed, 1927), advertisement p 15.

174 Mayes, *Australian Builders Price Book* (9th ed, 1927), p 370.

175 Augustus Aley, 'Constructing the Home', in Bebarfalds Ltd, *Safe Home Planning* (Sydney, no date [1922]), p 39.

176 *Australian Home Beautiful,* 1 December 1928, p 84.

177 *Celotex Insulating Building Boards* [trade brochure] (Sydney, no date [c 1930]), inside rear.

178 Bowley, *Innovations in Building Materials,* p 351.

179 Celotex insulating board, a low density cane fibre insulating board; Celotex utility board, a cane fibre building board; Celotex roof insulation, a low density insulating board; Celotex standard hardboard, a high density compressed fibreboard; 'Flexcell' expansion jointing, an impregnated cane fibre board; and Acousti-Celotex cane fibre tiles: Drury, *Architects', Builders' &c Reference Book* (1950), pp 227-8. See also Kinniburgh, *Dictionary,* pp 9, 65, which refers to 'Celobestos', an incombustible board containing asbestos and other mineral fibres.

180 *Ramsays Architectural Catalogue* (1931), pp 496-8.

181 *Ramsays Architectural Catalogue* (1931), pp 419-511.

182 H M Tolcher, *Innamincka* (Innamincka [South Australia] 1990) p 26, where it is referred to as 'sellotex'.

application was the reconstruction of the Melbourne Town Hall in 1927, after it had been largely destroyed by fire. Large panels of Celotex were placed along the side walls of the auditorium for acoustic reasons, and decorated by the artist Napier Waller with the murals that survive to this day. The artist explained:

> The conventional line decoration has been adopted because of the limitation of the material as a painting surface - as no sizing or skin of paint can be put on the panels without probably interfering with the acoustic qualities of these panels; hence by the line treatment all but a very small part of the panels will be uncoloured. No binder is necessary as the stain becomes fixed in the absorbent celotex. The decorative effect will depend on the warm tone of the celotex itself with the play of the umber line and the suggestion in small quantities of a powder blue background.[183]

Before 1929, when it was destroyed by fire, the Railway Hotel at Barcaldine, Queensland, had been built with internal walls of Celotex.[184] The material was also used with apparent success in 1929 to line the roof of the Presbyterian Church at Enoggera Terrace,[185] and in 1930 to line the 37.5 m diameter dome of Brisbane City Hall,[186] claimed by Florence Taylor to be 'the biggest Celotex job in the world'.[187] This was in the form of Acousti-Celotex tiles.[188] An issue of *Celotex News,* probably of 1930, reports the use of the material in a range of houses and churches, wine cellars, cool stores, and the T & G Building and British Medical Association Hall in Sydney. It reports its use in the Burns, Philp headquarters at Suva and in many other of the company's stores and houses on the islands, including a cool store on the island of Salamoa, which is illustrated. The material had also been used to insulate railway carriages, containers for taking butter from cool stores to ships, and even a chicken incubator.[189]

'Canec', the Hawaiian board whose arrival was adumbrated by Turnbull in 1932, was being advertised by Pabco in 1934 as a 'structural insulation board',[190] and it was subsequently marketed by George Hudson Limited as sole agents for New South Wales. It was said to be 'registered' by the United States Patent Office, and was presumably of US manufacture.[191] In 1936 it was claimed to be 'the only 100% Sugar-cane Fibre Insulating Product, and came in sizes three and four feet [0.9 and 1.2 m] wide by six to fourteen or in

183 M Napier Waller to Stephenson & Meldrum [architects], 10 August 1927, copy kindly supplied by Allom Lovell & Co.

184 *Western Champion,* 2 Nov ember 1929, p 84: reference supplied by Jinx Miles.

185 *Building,* 12 September 1929, p 33: reference supplied by Michael Kennedy.

186 Illustrated in *Celotex Insulating Building Boards,* p 11.

187 F M Taylor, *A Pot-Pourri of Eastern Asia* (Sydney 1935), p 45.

188 RVIA *Journal,* XXXI, 3 (July 1933), advertisements p xxiv.

189 *Australian Celotex News,* no 3012-3 (Sydney, probably 1930), passim.

190 W L Richardson [ed], *Ramsay's Architectural and Engineering Specifications [Volume 1]* (Melbourne, no date [1934]), p 67.

191 George Hudson Pty. Limited, *Price List* (Sydney 1938), pp 41-4.

some instances sixteen feet [1.8 to 4.2 or 4.8 m] long, and in thicknesses from 1/4 inch to eight inches [6.4 to 200 mm].[192]

The first locally made board was a CSR product, made on a pilot basis at the company's Macknade plant in about 1936-7, and launched into full production at Pyrmont as 'Cane-ite' in 1939,[193] though it was listed already in Mayes's price book of 1938 in two thicknesses and a number of sizes.[194] A 'Masonite-Cane-ite House' was shown at the House and Building Exhibition, Melbourne, in 1939.[195] Cane-ite was made from megass or sugar cane fibre residue (later diluted with waste paper and hardwood pulp.[196] By 1938 Slade, Allen & Co as local agents were advertising the Stanley Company's new fibre board tools, a cutter and a beveller.[197]

Meanwhile in 1930 the Council for Industrial and Scientific Research, in cooperation with the Forestry Commission of New South Wales and the Forests Department of Western Australia, tested the suitability of three local timbers for fibre board manufacture, the outcome of which was a report by R F Turnbull published in 1932. Turnbull's conclusion was that there were no major technical obstacles to the production of either insulating or hard-pressed boards from local material.[198] The annual consumption of fibre board in Australia was an average of 1.4 square feet per head, compared with 7.7 in the United States (and 1.3 in England). Imports were currently being received from the United States (Beaver, Upson and Pacific Boards), Canada (Ten Test), Britain (Pabco) and Germany (Schumacher and Schumite Boards).[199]

During the 1940s, when supplies of Cane-ite were inadequate, similar products such as 'Finnboard' were imported from Europe.[200] In mid-1948 it was announced that Paper Makers Pty Ltd, a subsidiary of Australian Pulp and Paper Mills Ltd, was to establish a hardboard plant in Tasmania. The plant superintendent had recently investigated manufacturing methods in Sweden,[201] and this was presumably to be the basis of production, though whether the raw material was to be timber or straw is not apparent.

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192 J Murray More Pty Ltd, *Price List Canec September, 1935* (Melbourne 1935); Andrew Cook & Sons Ltd., *Price List* (Newcastle [New South Wales] 1936), no page. See also More's advertisements, *Journal of the Royal Victorian Institute of Architects,* XXXIV, 4 (September 1936), p xii; *Argus,* 4 February 1937, p 7

193 Lowndes, *South Pacific Enterprise,* pp 209-10.

194 Mayes, *Australian Builders' Price Book* (1938), p 37.

195 *Australian Home Beautiful,* XVII, 4 (April 1939), p 28, cited by Peter Cuffley, *Australian Houses of the '20s & '30s* (Fitzroy [Vic] 1989), p 145.

196 Lowndes, *South Pacific Enterprise,* p 210.

197 Mayes, *Australian Builders' Price Book* (1938), advertisements pp 15, 34.

198 Turnbull, *Fibre Boards,* pp 9-10.

199 Turnbull, *Fibre Boards,* p 23.

200 Peter Cuffley, *Australian Houses of the Forties and Fifties* (Knoxfield [Victoria] 1993), p 83.

201 *Commonwealth Engineer,* 1 June 1948, p 451.

A semi-flexible insulating board had been produced from flax straw in Minnesota in 1909,[202] and a wheat straw board and a cornstalk straw board were produced respectively in Missouri in 1928 and in Iowa in 1929.[203] Of more direct relevance to Australia was the European development of another board made of compressed and treated straw, between strong paper faces, which appeared on the British market in about 1945. Interestingly, it was described as 'licence-free'.[204] It was a wheat straw board developed in Sweden by Theodor Diedin in 1933-5 and then, after the patents had expired, developed in Britain in the late 1940s by Torsten Mossesson as the commercial product 'Stramit'.[205] It is described as consisting of compressed straw faced with an impregnated paper, fabric, aluminium foil, or hardboard.[206] By 1950 it was being manufactured in England by Stramit Boards Limited.[207]

Meanwhile, in July 1937 Dieden, with Nils Ryberg (both of Carlsbund) applied for and apparently received an Australian patent for an 'Improved method of and apparatus for the manufacture of boards for building and insulating purposes.'[208] In 1955 Stramit began manufacture in Melbourne in sheets four feet [1.2 m] wide by two inches [50 mm] thick,[209] and later in the same year a Stramit factory was under construction at Northam, Western Australia, and a machine costing £15,000 was on its way there from Sweden.[210] In 1956 manufacture began at Bendigo, Victoria..[211] The material was used for ceilings, partitions, and even as a roof surface, when coated with bitumen.[212]

f. Solomit

A form of strawboard had been pioneered in the nineteenth century when B Nicholl of Piccadilly developed a 'fireproof slab' which he showed at the Paris Exposition of 1867. A 'framework' of wire about 1/8 inch [3 mm] in diameter contained a mass of straw or other fibrous material 'woven by the aid of a powerful machine', saturated with a fireproofing solution and subjected to great pressure. The faces were finished in cement, normally imitating the appearance of stucco on the outside, and providing a plain surface on the inside for decorating. The thickness was 4 1/2 inches [115 mm], and it was

202 Kollman, 'Fiberboard', p 553.
203 Turnbull, *Fibre Boards,* p 9.
204 H B Newbold, *Modern Practical Building* (2nd ed, 4 vols, London, no date [1946]), I, fig 207, p 350.
205 Jolly, 'Solomit', p 8, refers to Alex Wilson, 'Straw, the next great building material', from *Environmental News,* IV, 3 (May-June 1995): http://www.ebuild.com /Archives/Features/Straw, p 8.
206 Kinniburgh, *Dictionary,* p 187.
207 Drury, *Architects', Builders' &c Reference Book* (1950), p 328; see also p 787.
208 Jolly, 'Solomit', p 17, refers to patent no 104,569, accepted 12 July 1938.
209 *Cross-Section,* no 31 (1 May 1955), p 1.
210 *Cross-Section,* no 34 (1 August 1955), p 3.
211 *Cross-Section,* no 44 (1 June 1956), p 2.
212 Cuffley, *Australian Houses of the Forties and Fifties,* p 85.

claimed to be as strong as nine inch brickwork.[213] The idea of a strawboard was raised in the United States in a patent granted to Judd Cobb in 1871 but nothing seems to have come of it, and it is unlikely to have been a structural material.[214]

The true successor of Nicholl's invention was 'Solomit', the history of which has been researched by Bridget Jolly of South Australia. It appears to have been the invention of Serge Tchayeff, a Russian Jew living in Paris, and was first reported in 1925. Tchayeff's patent was extended to Australia in 1927, for 'Plastic masses of straw, reeds and similar materials, compressed and reinforced and method and apparatus for the production thereof'. The drawings show the straw packed tightly with the strands lying parallel, and bound around with wire to create a compact slab, which was then faced on either side with sheet material. This might be steel, plywood, asbestos cement, millboard &c (or different combinations on the inner and outer face), but the patent also allowed for running material such as asbestos cement directly into the face of the straw, impractical as this might seem.[215]

One of the earliest uses of the material was in the 'Minimal' house designed by Le Corbusier and Jeanneret to satisfy the requirements of the *Loi Loucheur* for workmen's dwellings at minimal cost. These were designed as duplexes, with a party wall of conventional stonemasonry as a concession to tradition and to the need of employment for masons. Otherwise the structure was essentially a frame of steel channels and I-sections, with the walls filled with panels of Solomit, firred out to carry an extrernal face of zinc sheeting, and a painted veneer board internally. The floors and roof were similar, except that the roof was finished with layers of cement and asphalt on top of the Solomit.[216]

The business seems to have been based in Germany, where the patentee was Dr Willi Schacht, a cellulose chemist, and it was the Solomit Strohplatten G.m.b.H. of Berlin which entered an agreement with an Australian company set up to manufacture the product, the Modern Economic Construction Co. The Australian company was represented by Robert W Viney, a draftsman by profession. However, the German lawyers involved in the project were apparently Jews, and were interned by the Nazis, while for their part some of the Australian parties were subsequently interned in Australia as aliens.[217]

Notwithstanding these problems Viney obtained an Australian patent in his own name in 1936 for 'Improvements in and relating to the construction of

213 R S Burn, *Modern Building and Architecture* (London, no date [c 1870]), p 77.

214 Gould, 'Fiberboard', p 120, citing US patent 111, 611 to Judd Cobb, 7 February 1871.

215 John Burchard, 'Survey of Efforts to Modernize Housing Structure', in A F Bemis [ed], *The Evolving House,* vol III, *Rational Design* (Cambridge [Massachusetts] 1936), pp 470-2, ref *Architectural Record,* August 1930.

216 Jolly, ''Solomit', passim. This is the source of what follows, except where indicated as derived from correspondence with Jolly or from other sources.

217 Jolly, ''Solomit', passim. This is the source of what follows, except where indicated as derived from correspondence with Jolly or from other sources.

buildings with infilling plates or sheets fitted to skeleton frames'. In that year demonstration houses were built at Gepp's Cross, South Australia, using Solomit plates imported from Germany. Local manufacture now seems to have begun, with the involvement of James Bradley of Adelaide, who was possibly already established as the maker of 'Impervia'.[218] The Australian Government seems to have been actively supportive, for in November 1937 tenders were called for six railway employés' houses at Port Pirie. By 1938 the South Australian Government had built twelve Solomit cottages at port Pirie.[219] In 1938 the prospectus of Solomit (S.A.) Ltd. was issued, and it was claimed that the material had been used already in South Australia and at Nhill and Horsham in Victoria. The factory was at Freeling, South Australia, where two wood-framed Solomit houses were built in the 1940s, with the outer faced cement rendered by hand.[220] In at least one of these, the Schuster house, the surface was scored and painted fawn in imitation of freestone.[221] About a dozen Solomit houses were built at Tanunda, four of which survive.[222]

In Sydney several Solomit houses were built (five are known) with a Gunite cement finish.[223] In Victoria fifteen or twenty houses of using of Solomit faced with concrete, were proposed in 1939 to be built at Altona, allegedly costing 20% less than brick construction.[224] They were designed by Marcus Barlow, and in the event only twelve were built, though they were meant to be the first of a much larger number - reportedly 1,200, though 120 may have been meant - on land which had been bought for the purpose. Before 1941 one Solomit house was built at Coburg, and two in the country - one at Horsham for F Langlands, and one at 'Blackwood' near Penshurst (designed by Leighton Irwin & Ferries of Melbourne).[225] In about 1938 a Solomit factory had been established in a converted flour mill at Murtoa, though presumably not brought into production in time to supply the Altona houses.

The house at 34 Jessie Street, Coburg, was built by the brothers Baden and Jack Levings for Jack Morris, using Solomit plates imported from Adelaide. According to Baden Levings the carrier, when asked what they were for, replied that they were mattresses for horses. The house frame was of two inch [50 mm] angle steel, so that the two inch straw plates fitted in to leave a flat surface. The house was completed in 1940 at a total cost of about £1000.[226] The house at Blackwood still stands in good condition, with a

218 See also John Dallwitz & Susan Marsden, *Heritage of the Lower North* [South Australian Department of Environment and Planning] (no place, 1983), p 200.

219 *Age,* 28 February 1939, from RVIA Press Cuttings, 1934-9, SLV.

220 See also John Dallwitz & Susan Marsden, *Heritage of the Lower North* [South Australian Department of Environment and Planning] (no place, 1983), p 200.

221 Bridget Jolly, 20 September 1994.

222 Information in 2007 from Stephen Dutscke, who has one of ther houses. He is aware of another which was at Angaston. but has been demolished.

223 Bridget Jolly, 11 August 1994.

224 *Argus,* 23 & 28 February 1939.

225 Bridget Jolly, 6 September 1994.

226 Baden Levings to the Coburg Historical Society, 3 October & 14 November 1989, kindly provided by Laurie Burchell.

nearly horizontal skillion roof, and a rendered surface which conceals the construction, though Robin Ritchie reports that it too is steel framed. The best account of the framing of these houses is that of a man who worked as a labourer in the construction of one at Wilpena, South Australia, in 1941. He recalls the uprights as being 4 by three inch [100 x 75 mm] steel tees, giving two inches [50 mm] of support to the panels on either side. To the stem of each tee were welded at intervals lugs measuring about 75 x 25 mm, which would be bent down over the face of the panel, then hammered down to secure it.[227]

By 1939 a company had been formed in New South Wales, one was almost established in New Zealand, and another was proposed for Queensland. By mid-1940 Solomit had been used - not necessarily for complete buildings, but for partitions and other purposes - in 162 dwellings in South Australia, Victoria, New South Wales and the Northern Territory. From about 1936 the material was marketed in Britain as 'Thatchboard' by Newall's Insulation Company of Durham. Data on its thermal transmission properties for the insulation of reinforced concrete walls was presented in a Newnes data sheet which was forwarded to Australian military engineers in 1941.[228] In 1946 a steel framed Solomit house was built in Sydney with a Gunite finish, and three other houses are known of in the state, though whether Gunite finished or not is unclear.[229]

In the post-war period Solomit was put to a new use. The architect Robin Boyd, always innovative and always influential, used it in 1946-7 to roof his new house in the Melbourne suburb of Camberwell, with the upper surface finished in bituminous felt and gravel.[230] The idea was taken up by the operator of the New South Wales factory at Molong, upon which the Sydney agents, Cropper Andrew, sought advice from the Commonwealth Experimental Building Station on the appropriate spacing for battens. The upper surface was finished with one eighth inch [3 mm] thickness of Colas and sand in the ratio 1:2, and/or with three ply bituminous felt bonded with Colas sand to the upper surface.[231] In 1954 a shopping centre at Frankston, Victoria, was roofed in much this way, with steel joists carrying steel decking, then two inch [50 mm] Solomit, sealed with bituminous felt.[232] However it seems to have been a more general practice to do the reverse, and clad the Solomit roof over with steel decking, and indeed it soon became fashionable to expose the straw surface as a naturalistic ceiling. It continued to be used

227 Bridget Jolly, 29 September 1994.

228 Jolly, 'Solomit', p 168, citing 'Newnes (London) Modern Building Practice. Builders' Data Sheet No. 29'.

229 Bridget Jolly, 6 September 1994.

230 Geoffrey Serle, *Robin Boyd: a Life* (Melbourne 1995), p 87.

231 Bridget Jolly, 20 September 1994, citing 'Programme of work for physical testing of Solomit slabs for roofing' [Commonwealth Experimental Building Station Confidential Office Record no 77, [?February] 1949; D Dalgleish, 'Loading Tests on Solomit Roofing Panels' [CEBS Confidential Technical Memorandum No. 168, March 1949].

232 *Cross-Section,* no 21 (1 July 1954), p 3.

by Boyd,[233] as well as by designers such as Alistair Knox of Eltham, near Melbourne, in a continuous layer extending out to the edge of the eave. The result was that it was saturated whenever the gutter overflowed, and the effect of this was that the straw sprouted and grew, a characteristic which became notorious.

In 1952 Solomit was used to infill the walls of a steel frame structure prefabricated by the Wiles company of South Australia, in the process of converting it for St John's Lutheran School, Highgate, and it was also used for the roof, beneath a layer of tiles.[234] In 1957 the Graham Steen house in Beaumont, Adelaide, by Lawson, Cheesman & Doley, had a Solomit ceiling throughout.[235] Another later way of using Solomit was sandwiched between perforated masonite sheets as an acoustic material.[236]

233 As in the Baker house, Bacchus Marsh, of 1964: Robin Boyd, *Living in Australia* (Rushcutters Bay [New South Wales] 1970), p 37.

234 Bridget Jolly, 20 May 1995.

235 *Australian Home Beautiful,* June 1957, pp 18-21.

236 Bridget Jolly, 20 September 1994.