

## 8.08 *Pressed Metal*

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### *a. stamped work*

Pressed metal pelmets, either japanned or gilded, seem to have been common in nineteenth century Australia, but their survival rate is low, and they have never attracted much attention. They are likely to have originated in Birmingham, which was the centre of manufacture of stamped brass, and of hollow ware which is also marginally relevant.<sup>1</sup> Wyatt Papworth dates the introduction of stamped metal ornament (apparently in Europe as a whole) to 1852,<sup>2</sup> but this is quite incorrect. Stamped brass originated in John Pickering's patent of 1769,<sup>3</sup> and was adapted to 'window cornices' or pelmets in the 1830s. In France the firm founded by Louis Durand [d 1860] in the early part of the century, becoming Monduit & Bécher then Gager, Gauthier & Cie, developed as manufacturers of decorative architectural metalwork, roofing in lead, zinc and copper, copper domes and cast copper statues, amongst all of which stamped work apparently played a small role.<sup>4</sup> When stamped cornices began to be imported into Britain from France and Russia it at first seemed that the English trade would be wiped out, but in the event the Birmingham manufacturers were able to improve their efficiency and reduce their prices to compete with the imports.<sup>5</sup>

At the Great Exhibition of 1851 the French makers Karcher & Westerman of Metz showed 'articles in stamped iron', tinned or varnished', and Hyppolite Lecocq of Paris

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<sup>1</sup> Jonathan Taylor of Birmingham had been granted a patent in 1779 for casting oval-bellied pots, and Izon & Witchurst, who bought the patent, had exploited it in a range of kitchen utensils. By the early nineteenth century the hollow ware trade embraced a variety of other products including hinges and pulleys, but does not seem to have extended to larger items such as cornices. See William Kenrick, 'Cast Iron Hollow-Ware, Tinned and Enamelled, and Cast Ironmongery', in Samuel Timmins [ed], *The Resources, Products and Industrial History of the Birmingham and Midland Hardware District* (London 1866), pp 105, 107.

<sup>2</sup> Wyatt Papworth [ed], *The Dictionary of Architecture* (London 1853-92), sv Zinc.

<sup>3</sup> W C Aitken, 'Brass and Brass Manufactures', in Timmins, *Birmingham and Midland Hardware District*, p 297.

<sup>4</sup> Hugh Pagan, *Catalogue 55* (London 2006), p 42, notes on J B Gauthier, *La Plomberie au XIX Siècle* (Paris 1885).

<sup>5</sup> Aitken, 'Brass and Brass Manufactures', p 298.

'frames of ornaments in stamped work'.<sup>6</sup> The Birmingham manufacturers D Malins & Son showed brass window cornices and ornaments; John Hands, specimens of 'ornamental brass-foundry'; Samuel Whitfield, a range of 'window cornices in stamped brass-foundry'; and James Kennedy, window cornices and other items.<sup>7</sup> In 1852 another Birmingham man, Martin Billing, described himself as 'cast and stamped brass founder, manufacturer of cornice poles, rings, bracket ends, curtain bands, stair rods, dish railing, & general factor'.<sup>8</sup> The quality of the execution was reportedly better, as a rule, than the design itself.<sup>9</sup> The cornices commonly had a 'rich dead gold-like colour', the technique for which had been accidentally discovered a decade or so earlier. The object was scaled by immersion in a weak acid solution, 'fezzed' or passed through a stronger solution, 'deadened' by a different acid process, dried in sawdust, then passed through ordinary acid and dipped in water, dried and burnished.<sup>10</sup> However it became common for them to be japanned, gilded or otherwise refinished.

Stamped 'window cornices' or pelmets survive at 'Buninyong House', Buninyong, Victoria, of 1859, and at 'Mount Pleasant', near Launceston, where they may date to the original construction of the house in 1865.<sup>11</sup> By the 1860s large ornaments of brass were being made, to take the place of traditional plaster and papier mâché centre flowers. The process was to stamp the sheet between a convex and a concave die of the required design, using a number of blows. A slightly more sophisticated version of this process was introduced by Daniel J Fleetwood after the mid-century.<sup>12</sup> Such products might be tinned, japanned, galvanized, enamelled or otherwise finished, and japanning was a speciality of Wolverhampton, also in the Birmingham district.<sup>13</sup> In 1879 William Udal & Co of Birmingham showed stamped cornices, and a range of other products, at the Sydney exhibition.<sup>14</sup>

Zinc decoration was also an established tradition on the Continent in the early nineteenth century. But it is unclear, in examples such as the Neues Museum, Berlin, of the 1840s, which elements are cast and which are pressed,<sup>15</sup> for Geiss of Berlin produced much cast work, as will appear below. By 1863 J W Tyler of Westminster was advertising 'ornamental stamped zinc, in rich designs', which included richly ornamented dormers, mansards, curbs, ridges, vases and finials.<sup>16</sup> As he also sold Vieille Montagne zinc roofing, the Vieille Montagne company was probably the

<sup>6</sup> London, Great Exhibition of the Works of Industry of all Nations, 1851, *Official Descriptive and Illustrated Catalogue* (3 vols, London 1851), III, p 1255.

<sup>7</sup> London, Great Exhibition, 1851, *Catalogue*, II, pp 622, 637, 638.

<sup>8</sup> *Slaters General and Classified Directory of Birmingham, and its Vicinities for 1852-3* (Manchester 1852), p 107.

<sup>9</sup> London, Great Exhibition, 1851, *Reports by the Juries on the Subjects in the Thirty Classes into which the Exhibition was divided* (London 1852), p 498.

<sup>10</sup> Note by W C Aitken in London, Great Exhibition, 1851, *Catalogue*, II, p 622.

<sup>11</sup> Inspected 2006.

<sup>12</sup> Aitken, 'Brass and Brass Manufactures', pp 304-6.

<sup>13</sup> Henry Loveridge, 'Wolverhampton Trades', in Timmins, *Birmingham and Midland Hardware District*, p 117.

<sup>14</sup> Sydney International Exhibition 1879, *Official Catalogue of the British Section* (London 1879), p 192.

<sup>15</sup> Werner Lorenz, 'Classicism and High Technology - the Berlin Neues Museum', *Construction History*, XV (1999), p .

<sup>16</sup> F W Laxton, *Laxton's Builder's Price Book for 1863* (43rd ed, London 1863), advertisements, no page.

source of the zinc sheet which he used for stamping. In one of the international expositions of the 1870s, probably Paris 1867, there was shown a full system of mansard roofing with metal ridging, cresting, finials, lucarne window, and so on, all in the highest Second Empire style. It is illustrated by R S Burn, and though the manufacturer's name and location are not given,<sup>17</sup> certain ornamental details suggest that it is probably the work of the Vieille Montagne company. However there are other possibilities, including Mme Deydier of Vaugirard, who in 1851 showed zinc roofing for a belfry, and a dormer window.<sup>18</sup>

There seems to have been a distinct European tradition of elaborate lucarnes and ridging, mainly in zinc, probably deriving from the Vieille Montagne Company, but also illustrated in the products of Johann Blaschke of Vienna,<sup>19</sup> and probably those of Perin-Grados in Paris.<sup>20</sup> Ornamental forms of metal roofing like these were never prominent in Australia. Nor was sheet metal in the form of external cornices, finials, lucarne windows &c, but it did have a role. In Sydney, for example, the sheet metal works established in Redfern by E D Bush in 1878, later taken over by Allen Brothers, made not only regular items such as spouting, but also 'stamps, cornices and brackets.'<sup>21</sup> The Vieille Montagne Company's products were the first to be marketed directly in Australia, as opposed to being supplied to order for projects like Parliament House, Brisbane. Ostermeyer, Dewez & Co of Sydney were appointed Australian agents in 1881, and the system illustrated at that time included cornices, dormer windows, finials, ridge cresting, and an imitation tile roof cladding which will be discussed below.<sup>22</sup>

One of the first fully Second Empire style mansards was on a building in Swanston Street, Melbourne, probably Buxton's Stationery Warehouse by W S Law, of 1885. A writer of the time (probably Ernest Wunderlich) referred to it as 'a fine mansard in florid Parisian style', which was clad in slate but with zinc hips, cornices, lions' heads at the corners, swags and pendants, all, it was believed, in cast rather than stamped zinc.<sup>23</sup> These were presumably Vieille Montagne products, but the thirteen metre spire on the Melbourne Stock Exchange of 'highly enriched zinc work' was slightly later, 1888-9,<sup>24</sup> and could well have been by F Peters of Berlin, whose products were to form the initial basis of the Wunderlich's Australian industry.

<sup>17</sup> R S Burn, *Modern Building and Architecture* (London, no date [c 1870], pl IV, fig 80.

<sup>18</sup> London, Great Exhibition, 1851, *Catalogue*, III, p 1219. The belfry is probably what was illustrated as a 'summerhouse' in the *Art Journal Illustrated Catalogue* (London 1851), p 147, where Mme Deydier is also given as a male.

<sup>19</sup> Johann Blaschke, *Illustrierter Preis-Courant Johann Blaschke Special-Werkstatt für Zink-Ornamente* (Vienna, no date [c 1895]), passim.

<sup>20</sup> This company's catalogue of 1889, which I have not seen, is described as including a range of finials, flagpoles and other roof ornaments, designed for the company by such leading architects as Destailleur, Davioud, Parent and Sedille, and installed on prominent buildings such as the Musée Carnavalet in Paris and the Palais de Justice, Antwerp. Perin-Grados, *La Décoration des Toitures à l'aide du Plomb, du Cuivre, du Zinc, &c* (Paris 1889), cited in Hugh Pagan, *Architecture* (catalogue 32, London 1998), pp 36-7.

<sup>21</sup> *Australasian Builder & Contractor's News*, 10 November 1888, p 127.

<sup>22</sup> *Australian Engineering and Building News*, 1 April 1881, pp 182, 184.

<sup>23</sup> *Australasian Builder & Contractor's News*, 5 January 1889, p 2.

<sup>24</sup> D M Cash, *The Gothic Bank of Collins Street* (Melbourne 1989), p 20, quoting the *Australian Insurance and Banking Record*, 17 July 1891, p 503.

### *b. architectural sheet metal*

The available evidence seems to suggest that the United States played a more substantial role in the development of architectural sheet metal, than in that of discrete cast and pressed zinc ornaments, which arose in Europe, and in Germany in particular. Sheet metal cornices had appeared in the United States by the late 1830s, when the first cornice brakes (or presses) were patented there, but seem to have gained little currency until at least the 1850s.<sup>25</sup> The Philadelphia Architectural Iron Works claimed to have been making galvanized iron cornices from this time,<sup>26</sup> but it seems likely that these were no more than classically moulded sheet iron gutters, such as are illustrated in the 1854 catalogue of Marshall Lefferts & Brother.<sup>27</sup> An early example seems to have been the Rice Theater, built in Chicago in 1851, a brick building with cornices of galvanized iron.<sup>28</sup> Soon the trade in cornices was extensive, but in America at least it was generally served by tinsmiths and small local works on a more or less *ad hoc* basis.<sup>29</sup> By 1872 the Philadelphia company produced a range of elaborate classical entablatures, consoles, dormers, and complete mansard roofs in galvanized sheet iron.<sup>30</sup>

In 1872 the first complete galvanized iron façade appeared in Chicago on the Lord & Smith building, as a facing over a brick carcass.<sup>31</sup> In 1873 Kittredge, Clark & Co of Ohio published the *Manual of Sheet-Metal Architectural Work*, giving a comprehensive catalogue and price list for the convenience of consumers,<sup>32</sup> then shortly afterwards reorganised itself as the Kittredge Cornice and Ornament Co. This is an indication of its scope, which certainly did not extend to the wide range of ornamental lining, ceiling, cladding and roofing which were to characterise the trade within a decade. A number of ornamental cartouches and spandrels were supplied for the Art Gallery of the Centennial International Exhibition,<sup>33</sup> and for commercial buildings elsewhere. In particular a complete sheet metal pavilion was supplied for the Exhibition,<sup>34</sup> probably the first totally pressed metal clad building in the world, only to be denounced by the *American Architect and Building News* as 'perhaps the

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<sup>25</sup> Simpson, *Cheap, Quick, & Easy*, p 35.

<sup>26</sup> Philadelphia Architectural Iron Company, *Iron Buildings &c* (Philadelphia 1872), p 15, reproduced in D S Waite, *Architectural Elements* (New York, no date [1972]).

<sup>27</sup> Marshall Lefferts & Brother, *Patent Galvanized Iron* (New York 1854), p 27, pl 7, reproduced in Waite, *Architectural Elements*.

<sup>28</sup> F A Randall, *History of the Development of Building Construction in Chicago* (Urbana [Illinois] 1949), p 43.

<sup>29</sup> A O Kittredge, *The Compendium of Architectural Sheet-Metal Work* (Philadelphia 1877), especially p [1].

<sup>30</sup> Philadelphia Architectural Iron Company, *Iron Buildings*, plates 5-18.

<sup>31</sup> Randall, *Building Construction in Chicago*, p 66, ref *Land Owner*, August 1873, p 148.

<sup>32</sup> Kittredge, *Architectural Sheet-Metal Work*, p [1]. There was presumably some connection with Jonathan Kittredge, who in 1854 was manufacturing fireproof doors and other products in San Francisco, and by 1864 claimed to have sent his products to nearly every town in California and Oregon: Malcolm Edwards, "'Substantial, Fire-Proof Edifices ...' Made so by the Marvelous Invention of Iron Door and Window Shutters", *California Historical Quarterly*, 50 (1971), p 436.

<sup>33</sup> Kittredge, *Architectural Sheet-Metal Work*, pp 315-336, 337-347.

<sup>34</sup> Kittredge, *Architectural Sheet-Metal Work*, p 360.

most offensive building in the grounds', which was 'loaded with coarse ornament of the most pretentious kind'.<sup>35</sup>

In 1877 A O Kittredge published *The Compendium of Architectural Sheet-Metal Work*, and planned 'the manufacture in a wholesale way, of what has heretofore been made only in a retail way', or 'to do for the tinner and cornice-worker what a planing mill does for the architect and builder.' To this end it illustrated a huge range of mouldings, cornices, modillions and architectural ornaments, in most cases in a great range of sizes. It stated the prices, and presumably ensured a consistent quality, so that the consumer could rely upon the system.<sup>36</sup> Subsequently 'the remains' of the Kittredge Cornice and Ornament Company were to be sold to Thomas H Bakewell, who took into partnership W H Mullins, and, as Bakewell & Mullins, grew to be one of the largest pressed metal manufacturers in the Mid-west. They were known mainly for their architectural statuary, but after Mullins bought out Bakewell's share of the business, in 1890, he diversified considerably.<sup>37</sup>

John Bernard Mesker established a sheet metal business before the American Civil War, first in Cincinnati, Ohio, and then at Evansville, Indiana. It is not at all clear if or when he began producing the sorts of decorative stamped sheeting discussed here, but the business was carried on by his son, George L Mesker, whilst two other sons, Ben and Frank, opened a rival enterprise in St Louis in 1881, as Mesker Bros. The two companies became the leading producers of galvanised iron building fronts in the United States, and the St Louis firm distributed half a million catalogues annually from the mid-1880s, and sold 5,264 fronts in twenty-three years, whilst thousands more were sold from Evansville.<sup>38</sup> Their products included imitation brick and rock-faced stone sheeting, and these were combined with pilasters, architraves, cornices and pediments to create façades of the utmost elaboration.<sup>39</sup> By about 1893 the Mesker business in St Louis seems to have become Mesker and Bro,<sup>40</sup> but it may later have reverted to the original name for, as we shall see, Mesker Brothers were soon to figure as prominent makers of steel windows, and indeed of proto-curtain walls.

The Meskers seem to have initiated a general evolution towards complete pressed metal fronts, as opposed to the use of individual pressed metal elements such as cornices and window hoods, used in the upper levels in conjunction with cast iron or other substantial ground floor façades. By 1887 Scherpe & Koken of the Enterprise

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<sup>35</sup> 'Centennial Architecture', *American Architect and Building News*, 10 June 1876, p 187, quoted in Waite, *Architectural Elements*, p 12, and Pamela Simpson, *Cheap, Quick, & Easy* (Knoxville [Tennessee] 1999), p 30.

<sup>36</sup> Kittredge, *Architectural Sheet-Metal Work*, p [1].

<sup>37</sup> Simpson, *Cheap, Quick, & Easy*, p 43.

<sup>38</sup> L H Nelson, 'The 1905 Catalogue of Iron Store Fronts Designed and Manufactured by Geo. L. Mesker & Co., Architectural Iron Works Evansville, Indiana', *APT Bulletin*, IX, 4 (1977), p 3.

<sup>39</sup> Geo L. Mesker & Co., *Store Fronts* [catalogue] (Evansville [Indiana] 1905), passim: reproduced in *APT Bulletin*, IX, 4 (1977), pp 5 ff. Charles Wood, *Catalogue 112* (Cambridge [Massachusetts] 2002), p 284, cites an earlier catalogue: George L Mesker & Co, *Architectural Iron Works* (Evansville [Indiana] 1901). A surviving example of this character, though not identifiable with any specific illustration in the Mesker catalogue, is the Taix Block, 313 Third Street, San Juan Bautista, California: photo provided by Peter Barrett, 2001.

<sup>40</sup> Mesker and Bro., *Mesker and Bro. Manufacturers of Complete House Fronts* (catalogue, St Louis [Missouri], no date [c 1904]), p 12, includes a testimonial letter to 'Mesker & Bro' of 1893.

Architectural and Ornamental Iron Works & Foundry, St Louis, Missouri, were advertising a range of iron shopfronts from one storey upwards, all in twenty-five foot [7.5 m] widths.<sup>41</sup> In 1894 the W H Mullins Company of Salem, Ohio, announced that 'to meet a class of competition which has recently sprung up in the west' they had developed a line of relief building façades in 'light gauges of sheet metal'. They were not recommended for the best work, but for 'when cheap work to meet the competition is wanted'.<sup>42</sup> Other companies, such as the Canton Steel Roofing Co, also of Ohio, made their own ranges of shopfronts<sup>43</sup> and other products. Dierickx lists known catalogues by Bakewell & Mullins, 1887; the Canton Steel Roofing Company, 1889; Henry S Northrop, 1889; the Berger Manufacturing Company of Canton, 1893; W H Mullins, 1894; the Metal Stamping and Spinning Company, 1894-5; the E E Souther Iron Company, 1895; and a number of others after the turn of the century.<sup>44</sup> Between 1900 and 1925 about forty-five different companies advertised pressed metal ceilings in the Chicago-based journal *National Builder*.<sup>45</sup> Later catalogues included those of Wheeling Metal Ceilings (1923), Milcor 'Invisible Joint' Metal Ceilings and Walls (1926), and Penco Metal Ceiling and Sidewall (1933).<sup>46</sup>

In Canada the YMCA Building in Quebec (later the Capitol Theatre), begun in 1879, has a curved mansard roof of what appear to be a complete suite of pressed metal ornament - a continuous band of antefixae at the eave, coarse rope-like mouldings at the top, a deep striated frieze along the crown of the roof, and oval lucarne windows on the curved roof surface.<sup>47</sup> This was presumably imported, and probably from Europe. The Metallic Roofing Company of Canada Ltd was established in Toronto in 1884, as a general manufacturer of sheet metal products, specialising in a patent form of shingle, but by 1895 also producing metal ceilings and cladding.<sup>48</sup> By 1904 their catalogue contained 440 pages illustrating metal shop fronts, roofing, siding, ceilings, dados and window surrounds.<sup>49</sup>

The rival Canadian company had originally been formed by Henry Pedlar as an ironmongery and tinsmiths in Ohio in 1861, but in 1892 his son George installed a stamping plant and began producing metal roofing, cladding and ceilings.<sup>50</sup> In 1900 it took the name Pedlar Metal Roofing Co, and in 1911 incorporated as the Pedlar People.<sup>51</sup> It claimed in 1899 to have 'the largest plant in the world for the exclusive

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<sup>41</sup> Scherpe & Koken, *Enterprise Architectural and Ornamental Iron Works & Foundry* (trade catalogue, St Louis [Missouri] 1887), cited in Elton Engineering Books, *Catalogue Number 18* (London 2005), p 43, no 84.

<sup>42</sup> Simpson, *Cheap, Quick, & Easy*, p 40, quoting W H Mullins, *Sheet Metal Architectural Ornaments* (Salem [Ohio] 1894), p 1.

<sup>43</sup> *The Canton Steel Roofing Co* (catalogue, Canton [Ohio] 1899), pp 40-42.

<sup>44</sup> Dierickx, 'Metal Ceilings', pp 88-9.

<sup>45</sup> P H Simpson, *Cheap, Quick, & Easy* (Knoxville [Tennessee] 1999) p 7.

<sup>46</sup> Illustrations from these are reproduced in Mike Jackson, 'Main Street and Building Codes the "Tin Ceiling" Challenge', *APT Bulletin*, XXXIV, 4, pp 29-31.

<sup>47</sup> A J Richardson, 'Guide to the Buildings in the Old City of Quebec', *APT Bulletin*, III, 3 & 4 (1970), pp 57, 119.

<sup>48</sup> Simpson, *Cheap, Quick, & Easy*, p 68.

<sup>49</sup> Letter from Stephen Otto, Toronto, 20 February 1991.

<sup>50</sup> Simpson, *Cheap, Quick, & Easy*, pp 37, 69.

<sup>51</sup> S E Howse, 'Tin Ceilings, a History' [report for the Annapolis Royal Historic Restoration Society] (Annapolis Royal [Nova Scotia], 2001), p 7.

production of sheet metal building products'.<sup>52</sup> Some of the Pedlar goods were subsequently marketed in Australia and New Zealand, but in the latter case they were advertised as British made.<sup>53</sup> This might suggest that the company was based in Britain, and that any organisation in Canada was a branch or agency. However it seems that the current usage described manufactures in the British Dominions as British (as with the Ten-Test brand, discussed above), and Pedlars was in fact a Canadian-based company.

### *c. Wunderlich*

Ernest Wunderlich arrived in Sydney in 1885 and established himself as a manufacturers' agent. He did little at first to develop his agency in stamped zinc windows and roofing, but after 1887, when he was joined by his brother Alfred, this aspect developed, and the brothers also began to import stamped zinc ceilings from Peters. Ernest Wunderlich took out a patent for stamped metal ceilings in 1888, and was able to obtain a contract for the Sydney Town Hall [Centennial Hall] ceiling, completed in 1889. In November 1888 it was reported that a portion of the zinc for the main ceiling of Centennial Hall had reached Wunderlich from Berlin and was awaiting erection.<sup>54</sup> This report seems to have been premature, for a week later this material was still awaited, and Wunderlich had already installed his first ceilings in Beale and Co's showrooms in George Street. There were three of these, each different, and they were 'the first ever put up [presumably in Sydney] completely in stamped or moulded zinc.' The work had been carried out under the supervision of a competent foreman specially brought out from Germany. Several other buildings in the course of erection were also to have Wunderlich ceilings.<sup>55</sup>

This was to become a major business, first in importing and then in manufacturing pressed metal sheeting. Although roofs were at first the major focus of his business, it was not long before linings, claddings, and especially ceilings came to be of far more importance. The company founded by Wunderlich continued to dominate the market for a long time, and as the story of that company has been told by Susan Bures in *The House of Wunderlich*, only a limited amount remains to be said here - more about the origins of the industry, the rivals of the Wunderlich company, and the way the material produced by Wunderlichs and their competitors was put to use.

In December 1889 Wunderlichs sold the patent rights for stamped metal ceilings to W H Rocke & Co, a leading Melbourne furniture warehouse, and Ernest and Alfred Wunderlich became Rocke's managers in Melbourne and Sydney respectively. Rocke & Co established factory in Melbourne at Carlton and in Sydney on land which they leased in Baptist Street, Redfern. Rockes got into financial difficulties in the depression, as has been discussed in relation to roofing tiles, and late in 1892 they became insolvent in Sydney and sold the patent rights back to Wunderlichs. In 1893

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<sup>52</sup> Letter from Stephen Otto, Toronto, 20 February 1991.

<sup>53</sup> G W Phillips, *Designs for New Zealand Houses and Residences* (Christchurch [New Zealand], no date [c 1910]), no page: advertisement for Pedlar stamped steel ceiling, or art steel ceiling, marketed by Wingate & Co Limited of Auckland.

<sup>54</sup> *Australasian Builder & Contractor's News*, 17 November 1888, p 455.

<sup>55</sup> *Australasian Builder & Contractor's News*, 24 November 1888, p 462.

Wunderlichs raised £10,000 and formed themselves into a limited liability company under the style of the Wunderlich Patent Ceiling and Roofing Company Ltd.<sup>56</sup> By 1905 the company had its own offices in Melbourne, managed by S R O Allen.<sup>57</sup>

One may surmise that the sale of the patent rights in 1889, just as the ceiling business was taking off, and the demotion of the Wunderlich brothers to be employees of Rockes, was not as simple as it seems. This is more especially so as Wunderlichs were a couple of years later in a position to buy back from Rockes the pressed metal rights as well as the whole tile and terra cotta business. The likelihood is that the 1889 deal was done to raise the capital for the local manufacture of the ceilings, and that Wunderlichs acquired a shareholding in Rockes as a part of it. All of this can only be speculation, but the earliest known Wunderlich catalogue, of 1889, clearly derives from overseas, and has text in French and German as well as in English,<sup>58</sup> and the material presumably is still being imported from Peters.

Wunderlichs' 1893 catalogue indicates delays of two months and three months respectively for items not in stock, and items made to order, and Bures infers from this that these were still being imported from overseas. By contrast the 1895 catalogue speaks of 'entirely New Machinery and a Complete Plant' at Redfern, enabling them to 'accomplish all the processes of manufacture on the spot'.<sup>59</sup> It seems clear to the present writer that even now some items continued to be imported. The 1893 catalogue was a German one, as Bures points out, which Wunderlichs simply reissued under their own name. One of the items in it is a grotesque mask to crown a mansard roof,<sup>60</sup> and these masks appear on the Record Office, Melbourne, in 1901, and the Customs House, Hobart, in 1902, though they seem too specialised and elaborate to have been worth making locally.

The development of the Wunderlich business was probably similar to that of the smaller US concerns like W F Norman and H T Klugel, which sold pressed metal supplied by the large manufacturers, kept some items in stock, and made some themselves as required, gradually increasing the proportion of their own input.<sup>61</sup> Britain, the natural source of imports to Australia, seems to have entered the market too late to capture much of a share. A catalogue of F W Braby, undated but probably around 1900, illustrates quite an extensive range of zinc and copper goods, including fish scale and other roof sheeting, finials, lucarne windows, and - most interestingly - a suite of elements for mansard roofing which almost matches the German one, right down to the lion head masks.<sup>62</sup> There is no report of these elements appearing in any

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<sup>56</sup> Susan Bures, *The House of Wunderlich* (Kenthurst [NSW] 1987), pp 21-5, 29-30.

<sup>57</sup> James Smith [ed], *Cyclopedia of Victoria* (3 vols, Melbourne, 1903, 1904, 1905), III, pp 94-5.

<sup>58</sup> A copy held by Allan Willingham, not so far sighted by the present writer, has the Wunderlich name deleted and that of Rockes overprinted

<sup>59</sup> Bures, *House of Wunderlich*, p 41.

<sup>60</sup> Bures, *House of Wunderlich*, p 39.

<sup>61</sup> Simpson, *Cheap, Quick, & Easy*, pp 43-4.

<sup>62</sup> Frederick Braby & Compy., Ltd, *Braby's Designs for Embossed Zinc or Copper for Buildings of Every Description* (London no date [c 1900]), especially pl xlii. Although the catalogue is undated, the addresses differ from that in the 1883 catalogue, which were the head office at 356-362 Euston Rd. London NW, and branches at 6-8 Hatton Gardens, Liverpool, and 335 Argyle St, Glasgow. The Glasgow address is changed in the later catalogue to St Enoch Square.

Australian building, but there was pressed metal from sources other than Wunderlich, as will appear below.

As a portable material, pressed metal probably spread fairly quickly from its Melbourne and Sydney base, but it is not well documented elsewhere until the turn of the century. There are prominent examples after that date, such as 'Raymont Lodge' in Brisbane, designed by Claude Chambers and built in about 1904-5.<sup>63</sup> Ceiling designs may have come from the United States rather than Europe, for a similar range was available there,<sup>64</sup> though correlations in individual patterns have yet been demonstrated.

#### *d. metallic shingles*

Zinc tiles, as we have seen, were available by the 1860s, but these are quite distinct from the more rigid metal shingles of the later part of the century. Metallic shingles were patented in the United States in 1877, and manufactured by the Iron Clad Manufacturing Co. They presented an exposed face of a diamond shape, but the upper end, concealed by the overlap, finished as a rectangle. This meant that the proportion of overlap was a little more than one third. The exposed face was pressed with a central rib and with decorative ribs on either side.<sup>65</sup> By 1881 these were being made for the English market at Wolverhampton.<sup>66</sup>

In 1884 John Walker obtained a United States patent and began manufacturing what were claimed to be the first time shingles in the country other than 'those which covered more than two-thirds of their surface to get one-third exposed to the weather.'<sup>67</sup> In other words they stood in relation to flat sheet shingles (such as might be made by a common tinsmith) as does the Marseilles tile to the crown tile. An interlocking edge to bar the weather allowed the elimination of a huge percentage of the overlap, and reduced the cost proportionately. This more efficient shape was produced by pressing. It is not apparent whether the Walter Patent Shingles, which were manufactured by the National Sheet Metal Roofing Co, were very different in principle from those of the Garry company or other makers. The material, however, was tin - sometimes 'galvanized' or dipped in zinc.<sup>68</sup> They were designed to be laid in staggered or stretcher bond. The overlock at one side produced a raised band, which was continued onto the centre of the shingle beneath, then forked to either side in a shape like an inverted Y. They were still being produced to the original pattern in 1890,<sup>69</sup> but had been joined by Cooper's patent 'Queen Anne' shingles, which were of

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<sup>63</sup> Information from Richard Allom and Peter Marquis-Kyle, 1991; Janet Hogan, *Historic Houses of Brisbane* (Brisbane 1979), pp 110-112.

<sup>64</sup> The Canton Steel Roofing Co., *Catalogue C. Stamped Steel Ceilings* (Canton [Ohio] 1898).

<sup>65</sup> Advertisements in Palliser, Palliser & Co, *Palliser's Modern Homes* (Bridgeport [Connecticut] 1878), no page, and A J Bicknell & Co, *Specimen Book of One Hundred Architectural Designs, &c* (New York 1878), p 75. The patent date of 4 September 1877 is visible on the illustrated shingle in Palliser, and stated in the text in Bicknell, so this is certainly the same patent as referred to by Papworth, *infra*.

<sup>66</sup> Papworth, *The Dictionary of Architecture*, sv Shingles.

<sup>67</sup> National Sheet Metal Roofing Co, *Practical Hints to Builders* (New York 1890), p 20.

<sup>68</sup> National Sheet Metal Roofing Co, *Practical Hints*, p 35.

<sup>69</sup> National Sheet Metal Roofing Co, *Practical Hints*, p 14.

the fishscale type, laid staggered, and by the first bronze shingles in the United States (and, as it was thought, in the world).<sup>70</sup> In fact it seems that both the Walter and Cooper shingles were made in tinplate, steel, galvanized tinplate, bronze and copper.<sup>71</sup>

One of the most prominent United States manufacturer seems to have been the Garry Iron Roofing Co. of Ohio, which by the late 1880s sold 'metallic tiles or shingles' which could be made in 'Garry Refined Roofing Iron or Steel' painted with metallic paint, or in galvanised iron, or in tin. They were fourteen inches [350 mm] finishing as twelve inches [300 mm], designed to be laid on the diagonal, and embossed with an ornamental pattern of four radiating lozenges.<sup>72</sup> By 1891 they were being referred to as 'Continental' metal shingles - and they may well have been derived from a European pattern - but the company was now also making 'Swiss Cottage Metallic Siding and Roofing', of the same size but more intricately patterned.<sup>73</sup>

Levi Montross, one of the founders of the Metallic Roofing Company, Toronto, took out patents for metal shingles in 1884, 1885, 1886 and 1887, and produced the 'Eastlake' metal shingle, soon to be one of the most popular in both Canada and the United States.<sup>74</sup> Early in the twentieth century the Montross Metal Shingle Co of Camden, New Jersey, was selling metal tiles describes as octagon shingles, Eastlake shingles, diamond tiles, Victor shingles, gothic tiles, and others.<sup>75</sup> By 1905 the Montross Co was selling the 'Victor' metal tile with the 'Montross Telescope Side-Lock', basically like a Roman or Bridgewater tile in appearance. They had Canadian rivals in the Pedlar company, referred to above.

In the United States the Cortwright Metal Roofing Co of Philadelphia and Chicago made 'metal slates' and 'Victoria shingles', of which the latter (it would seem) were rectangular tiles to be laid in staggered courses, each with a superimposed fish scale or spade shape embossed on it. The Chattanooga Roofing and Foundry Co made all styles of steel and tin roofing, and especially patent metal shingles of tin or galvanised iron. Those illustrated were like the Cortwright ones except that the decorative shape was less like a spade and more like an anthemion, with radiating elements.<sup>76</sup> Merchant & Evans of Philadelphia made 'Gothic' shingles which were rectangular and designed to be laid staggered, the form of each shingle being embossed to create a downward pointing Gothic form. They also made tiles of a fine diamond shape, with the main surface standing out proud.<sup>77</sup>

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<sup>70</sup> National Sheet Metal Roofing Co, *Practical Hints*, p 31.

<sup>71</sup> National Sheet Metal Roofing Co, *Practical Hints*, p 68.

<sup>72</sup> Garry Iron Roofing Co, *Garry's Patent Iron and Steel Roofing* (Cleveland [Ohio] no date [?c1887]), pp 18-19.

<sup>73</sup> Garry Iron Roofing Co, *Garry's Patent Iron and Steel Roofing* (Cleveland [Ohio] 1891), pp 18-21.

<sup>74</sup> Simpson, *Cheap, Quick, & Easy*, p 36, quoting: Margaret Carter & J S Smith, 'The Metallic Roofing Co. Showroom, a Look at Preservation' [report to the Ontario Heritage Foundation] (1997-8); 'New Metallic Tile', *Carpentry and Building*, July 1884, p 132.

<sup>75</sup> Charles B Wood III Inc [antiquarian bookseller], *Occasional List 1996-1* (Cambridge [Massachusetts] 1996), item 32, which is a catalogue of this company dated by Wood to c 1904.

<sup>76</sup> G F Barber, *American Homes* (3rd ed, Knoxville [Tennessee] 1905), advertisements, no page.

<sup>77</sup> 'Sweet's' *Indexed Catalogue of Building Construction* (New York 1906), p 178.

Individual shingles later began to give way to sheet materials patterned to look like shingles or tiles. In the 1890s the Canton Steel Roofing Company made five sheets of this sort and only one type of individual shingle. The individual type were Cushman Patent Shingles, a very simple rectangular form with an X-like indentation which formed continuous diagonal lines over the whole roof. The five sheet patterns were Eastlake shingles; Gothic tile (patented in 1892); cluster slate roofing; and two patterns of cluster shingle siding (imitating wood shingles).<sup>78</sup> In 1910 Sears Roebuck were also marketing a sheet manufactured by mills in Ohio in the form of 'cluster shingles' of a rather ornate pattern, in either painted or galvanised steel. They were also selling elaborate steel ceilings similar to those which had now become common in Australia.<sup>79</sup>

In Australia the use of metal tiles was fairly sporadic. The diamond-shaped tiles of the Vieille Montagne company have been mentioned, and by the 1880s there were apparently instances of 'American copper shingles'.<sup>80</sup> The metal roofing of the Sydney Hospital, in Macquarie Street, apparently zinc, was in the form of the Courtois tile,<sup>81</sup> and the roof of the Port Pirie Railway Station, South Australia, of 1901-2, appears to be the same. By 1908 Mayes's price book listed 'interlocking zinc roof tiles' as well as 'zinc fish-scales, small pattern'.<sup>82</sup> The latter were probably sheets embossed to look like tiles, the first of which had been the Vieille Montagne type available in Sydney in 1881. These latter were diamond-shaped sheets each representing either nine or sixteen round-edged tiles (laid out as 1:2:3:2:1 or 1:2:3:4:3:2:1). The top edges, which would be concealed in the finished roof, were folded over and fixed by short straps to a boarded surface.<sup>83</sup> An alternative method was to use simple rectangular embossed sheets, fix them in position, and solder them together. This represented a saving of labour especially for small surfaces such as the sides of dormer windows.<sup>84</sup>

One of the most elegant metal shingle patterns in Australia is that used on the tower roof of the house 'Fortuna' at Bendigo, and elsewhere. It resembles a fishscale pattern, though the shape would be more accurately described as a slightly pointed tongue. The surface is slightly convex, with a raised decorative motif, and with a narrow raised band around the edge. These are probably of early twentieth century date, and as they do not resemble the common American type, may well have originated in Belgium or Germany.

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<sup>78</sup> *The Canton Steel Roofing Co* [catalogue] (Canton [Ohio] 1899), pp 10-12.

<sup>79</sup> Sears, Roebuck and Co, *Sears, Roebuck Home Builder's Catalog* (New York 1900 [Chicago 1910]), p 150.

<sup>80</sup> L J Flannagan's specification for the Richard Shann house, 'Mendip Hills', North Preston, of 1888, p 33, contains alternative clauses for roofing porches and bay windows in slate or in these copper shingles, but the shingles clause is deleted. It provided for 'American copper shingles of approved description well secured on top of felt to boards with anticorrosive nails or copper nails'. Melbourne University Architectural Collection, WD HOU 172, La Trobe Library.

<sup>81</sup> *Forty Years of Wunderlich Industry* (Sydney 1927), p 12.

<sup>82</sup> C E Mayes, *The Australian Builders and Contractors' Price Book* (7th ed, Sydney 1908), p 203.

<sup>83</sup> *Australian Engineering and Building News*, 1 April 1881, pp 182, 184.

<sup>84</sup> *Australasian Builder and Contractor's News*, 5 January 1889, p 2.

### *e. metal ceilings*

Ornamental pressed metal ceilings in Australia were at first imported, mainly from Germany. Even after local manufacture began, it was inspired mainly by Continental sources, though one would normally expect British products, such as W B Simpson & Sons' 'Decorated Enamelled Iron for Ceilings and Walls',<sup>85</sup> to dominate the colonial market.

The ceilings of the United States were at first quite different. Alfred Northrop of Pittsburgh was advertising his 'Panelised Iron Ceiling' by 1880<sup>86</sup> and took out a US patent in 1884 for his system of small panels of finely corrugated iron with cover strips over the joints.<sup>87</sup> By 1890 Northrop claimed to have ceiled twenty-seven school buildings, mainly in New York and Brooklyn.<sup>88</sup> These small panels were given some decorative quality by varying the direction of the corrugations from one to the next, and by the addition of pressed mouldings and rosettes. By 1889 Northrop was offering embossed tinplate panels to create decorative borders. By contrast a German company, as reported in 1886 in the US journal *Carpentry and Building* offered ceilings still containing finely corrugated panels, but enhanced with deeply moulded ribs and centrepieces. By 1889 the extensive use in France and Germany of ceilings combining iron and zinc was reported. Meanwhile US manufacturers, beginning with W R Kinnear in 1888, began to replace the combination of corrugated iron and embossed zinc components with larger die-pressed steel sheets.<sup>89</sup> One such maker, the Edwards Manufacturing Co of Ohio, was in 1911 using only 28 or 29 gauge mild steel formed between dies with a powerful hammer blow, a process said to produce sharper angles than slow hydraulic pressure.<sup>90</sup>

In Australia, similarly, Wunderlichs were at first assembling a multiplicity of embossed zinc components, though not, it seems, with corrugated iron panels between. The fine corrugations of the Northrop ceiling are almost unknown in Australia, and where they do appear - in the rear ground floor rooms of the J R Hoskins house, Bendigo, of 1898 - they are probably attributable to the fact that the owner was a timber merchant and building materials importer, and they may well be American. Fine corrugations also appear in the Mitchell patent, which will be referred to below, but which seems to have proved nugatory.

Wunderlich's success with the ceilings of the Sydney Town Hall and Beale & Co was only a beginning. During 1889 the plaster ceilings of Aaron's Hotel in Sydney collapsed due to rain damage, and was often to be the case henceforward, the owners opted for the security of metal, and their architect, W Pritchard, ordered a zinc ceiling

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<sup>85</sup> *Building News*, 20 April 1888, p xxii

<sup>86</sup> *American Architect and Building News*, 14 August 1880, advertisement, reproduced in A L Reeve, *From Hacienda to Bungalow: Northern New Mexico Houses, 1850-1912* (Albuquerque [New Mexico] 1988), p 46. See also *American Architect and Building News*, 15 March 1884, cited in Mary Dierickx, 'Metal Ceilings in the U.S.', *APT Bulletin*, VII, 2 (1975), p 84.

<sup>87</sup> Simpson, *Cheap, Quick, & Easy*, p 56.

<sup>88</sup> *American Architect and Building News*, 19 April 1890, p 192, & 4 October 1890, p 18, cited in Dierickx, 'Metal Ceilings', p 84.

<sup>89</sup> Simpson, *Cheap, Quick, & Easy*, pp 56-7.

<sup>90</sup> Edwards Manufacturing Co., *Metal Ceilings and Side Walls* (Cincinnati [Ohio]), p 3.

from Wunderlich.<sup>91</sup> In December a report appeared of the ceiling in the dining room of the Exchange Hotel, which was remarkable not only for its elaborate form but for its painting and gilding. No artist is mentioned, and this may mark the beginning of the factory predecoration of ceilings by Wunderlichs:

The whole of the beams, soffits, panelling and ground-work of this ceiling have been enriched with mouldings and ornamentation of true architectural design, carried out in embossed zinc, painted and gilded so as to make it a perfect work of art.<sup>92</sup>

In Melbourne the architect William Salway made the first use of metal for ceilings in October 1889, and he was soon followed by William Pitt and Alfred Dunn.<sup>93</sup> Salway used the material in O C Beale's mansion 'Oma' in Kooyong Road, Malvern, presumably because Beale was satisfied with ceiling of his Sydney showroom. Here it was said:<sup>94</sup>

The flat surface of the ceilings the cornices, brackets, centre-pieces, mouldings, &c., are of thin metal after the manner of *répoussée* work, made in lengths, and held in position by nails and screws. the effect is very Elaborate, and when decorated has a most handsome appearance.

These ceilings, as we learn from a later advertisement, were made of zinc and originated in Aix-la-Chapelle,<sup>95</sup> which suggests the Wunderlichs were not importing solely from their Berlin supplier, Peters. The ceiling of the Melbourne Stock Exchange, completed in 1891, was also in embossed zinc. It consisted of square panels, each containing a centre flower from which hung an electric light fitting.<sup>96</sup> So far there is no indication that any metal ceiling was either designed or made in Australia, and though one writer has referred to that in Sydney Town Hall as designed by the architect McRae,<sup>97</sup> it is known to have been imported from Germany and is most unlikely to have been designed locally. The first known exceptions are the ceilings of the Australia Hotel, Sydney, manufactured by Wunderlichs in 1891 to the design of Lucien Henry.<sup>98</sup>

We have seen that the first Wunderlich ceilings in Sydney and Melbourne were of zinc, and it seems that zinc produced better relief in 'artistic work', and was therefore preferred, while sheet iron was used for cheaper ceilings. According to Bures they also worked in galvanised iron, lead, copper, aluminium and muntz metal, all

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<sup>91</sup> *Australasian Builder and Contractor's News*, 25 May 1889, p 485.

<sup>92</sup> *Australasian Builder and Contractor's News*, 28 December 1889, p 629.

<sup>93</sup> *Australasian Builder and Contractor's News*, 2 August 1890, pp 268, 280, quoted by Ian Kelly, 'The Development of Housing in Perth (1890-1912)' (MArch, University of Western Australia, 1991), pp 137, 211.

<sup>94</sup> *Australasian*, 13 August 1892 [check the year], p 332.

<sup>95</sup> *Argus*, 26 April 1890, p 37.

<sup>96</sup> Cash, *The Gothic Bank of Collins Street*, p 20, quoting the *Australian Insurance and Banking Record*, 17 July 1891, p 503..

<sup>97</sup> Charles Pickett, 'Lucien Henry and Sydney Architecture', in Ann Stephen [ed], *Visions of a Republic: the Work of Lucien Henry* (Sydney 2001), p 100.

<sup>98</sup> Pickett, 'Lucien Henry and Sydney Architecture', p 100, quoting Ernest Wunderlich to R T Baker, 29 December 1915, Powerhouse Museum MR S 202 / 1915 / 2382.

imported in sheet form from Laughland Mackay & Co of London.<sup>99</sup> This is rather surprising, as aluminium was still a rare and expensive material, and no examples of such sheeting have been reported. In 1897 Wunderlichs explained that they could use any malleable sheet metal, but that their highest grade work, suitable for public buildings and first class houses, was done in embossed sheet zinc. For cheaper work they had introduced 'composite ceilings' made partly of zinc and partly of iron or steel. They also made all-steel ceilings, but these could not be so 'boldly stamped', and were less durable than those of zinc. To resist corrosion, all the steel ceilings were coated with oil on both sides.<sup>100</sup> The appearance of steel at this time reflects the fact that John Lysaghts of Bristol began producing thin sheet steel, which Wunderlichs then imported in quantity.<sup>101</sup>

At some date (not specified by Bures) the prominent decorative artist Phil Goatcher was retained to execute pre-painted ceilings.<sup>102</sup> It is not easy to tell a pre-painted ceiling from a post-painted one, but some delicately coloured examples survive, as in the Star Hotel, Beechworth, Victoria; 43 Alfred Crescent, Fitzroy; 'North Park' or 'Woodlands', Essendon; the 1907 renovations of 'Currawong' homestead in the Lachlan District;<sup>103</sup> and an unspecified Queensland house illustrated by Balwant Saini.<sup>104</sup> Which of these ceilings are Wunderlich ones it is impossible to say, for it is only when there is a record of the contract, or when the design can be matched to a catalogue illustration, that the manufacturer can be identified. The painted decoration tends to be in matt finishes, the reason for which is explained in an American publication: 'Where much oil is used in the paint the effect is a shiny finish that has a tendency to blunt the sharp appearance of the pattern, making the fact that the ceiling is stamped very obvious.'<sup>105</sup>

Although Wunderlichs were probably the first importer of metal ceilings, and although they outlasted their rivals, the general impression that they were unique is quite unfounded. As early as March 1890 the *Building and Engineering Journal* illustrated Mitchell Brothers' patent iron and steel ceilings and cornices,<sup>106</sup> a venture of which nothing further is heard, probably a victim of the depression of the 1890s. Other makers by 1907 included G E Crane & Sons, makers of patent steel and zinc ceilings;<sup>107</sup> Wormwald Brothers of Melbourne and Sydney, with metal ceilings 'plain and enriched of wonderful variety';<sup>108</sup> William Young of Lonsdale Street, Melbourne;<sup>109</sup> and the Australian 'Embosteel' Ceiling Co of Sydney and Melbourne,

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<sup>99</sup> Bures, *House of Wunderlich*, p 45.

<sup>100</sup> Wunderlich, *Wunderlich's Patent Embossed Metal Ceilings* [brochure] (?Redfern [New South Wales] 1897), Wunderlich Collection, Powerhouse Museum, A7437-9/1, p 16.

<sup>101</sup> Bures, *House of Wunderlich*, p 45.

<sup>102</sup> Bures, *House of Wunderlich*, pp 43-4.

<sup>103</sup> Peter Freeman, *The Homestead: a Riverina Anthology* (Melbourne 1982), pp 114-5.

<sup>104</sup> Balwant Saini, *The Australian House* (Sydney 1982), pp 92, 97.

<sup>105</sup> Edwards, *Metal Ceilings and Side Walls*, p 4.

<sup>106</sup> *Building and Engineering Journal*, 29 March 1890, plate: see also text p 111, yet to be sighted.

<sup>107</sup> Walter Jeffries, *The Australian Building Estimator* (Sydney 1907), advertisements, no page.

<sup>108</sup> With a patent metal ceiling factory at Harrington and Essex Streets, Sydney: Jeffries, *Australian Building Estimator*, advertisements, no page; also found in the journal *Building* during 1907, according to Eddie Butler, of the Powerhouse Museum, Sydney, 1991..

<sup>109</sup> Found in *Building* during 1907 according to Butler.

makers of 'art metal' ceilings.<sup>110</sup> In 1911 Young's claimed that their 'new line' in metal ceilings as the only one manufactured in Victoria,<sup>111</sup> but it seems likely that most of their designs were imported.

Pedlar's Ceilings - presumably imported from Canada - were advertised by Charles Dobson Franks & Co of Melbourne in 1908,<sup>112</sup> but by 1914 Dobson Franks Limited, of Melbourne and Sydney, were advertising unidentified 'stamped steel ceilings' as if they were themselves the makers.<sup>113</sup> Lassetter & Co of Sydney also advertised steel ceilings in 1911 but (although not attributed to any manufacturer), they appear to be Wunderlichs.<sup>114</sup> Crane & Sons claimed in 1911 to have six different factories, and manufactured amongst other things 'Art Metal Ceilings and Walls'.<sup>115</sup> The reference to walls probably means internal linings, not external ones. Crane's pressed metal was used for the ceilings, wall linings and verandah frieze of Tubbo homestead in the Murrumbidgee district, and the frieze is elegantly Greek, with alternating anthemions and palmettes.<sup>116</sup> By 1927 'Griffin Steel Ceilings' were also available from W R Phillips of Melbourne.<sup>117</sup>

In Western Australia the material was apparently slower to catch on, but by 1901 imports of metal ceilings to the value of £1,695 are recorded, not only from New South Wales and Victoria, as might be expected, but also from Singapore and the United Kingdom.<sup>118</sup> One of the earliest documented examples was installed by J H Eales in 1903 at 'Gracemere', Adelaide Terrace, Perth.<sup>119</sup> In 1904 Splatt, Wall & Company established a factory at Cottesloe, and this later developed a capacity of five thousand square feet [about 500 m<sup>2</sup>] a day, selling at twenty-one shillings a square foot as opposed to thirty shillings for the imported [presumably Wunderlich] product. They also produced 'small fluted galvanised iron' for ceilings.<sup>120</sup> This company seems to have been responsible for the ceilings of J T Hassell's house, 'Kenderup', West Perth, in 1905.<sup>121</sup> Wunderlichs ultimately bought them out. In New

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<sup>110</sup> *Building*, 12 December 1910, p 5; also found in *Building* during 1907 according to Eddie Butler.

<sup>111</sup> *Building*, 12 May 1911, p 25.

<sup>112</sup> *Cazaly's Contract Reporter*, XXIV, 25 (23 June 1908), p 97.

<sup>113</sup> C E Mayes, *The Australian Builders & Contractors' Price Book* (8th ed, Sydney 1914), advertisements, p 37.

<sup>114</sup> Six designs were illustrated in *Lassetter's Commercial Review*, no 26 (1911), reproduced in *Australia in the Good Old Days* (Sydney 1976), p 28. Two of these, numbers M1 540 and M1 542, can be identified in Wunderlich Limited, *Ceilings for Every Room in Every Home* (Sydney 1919) as numbers 1118 (p 8) and 1071 (p 9).

<sup>115</sup> Mayes, *Australian Builders Price Book* (1914), p 12.

<sup>116</sup> Peter Freeman, *The Homestead: a Riverina Anthology* (Melbourne 1982), pp 66, 207.

<sup>117</sup> *Australian Homes* (Melbourne 1927), p 74. See also *Journal of the Royal Victorian Institute of Architects*, September 1929, p vi.

<sup>118</sup> *Western Australian Statistical Register*, 1901, quoted in Michal Bosworth, *Pensioner Cottage, Bassendean* [report for the Heritage Council of Western Australia] (no place, 1991), p 4.

<sup>119</sup> Ian Kelly, 'The Development of Housing in Perth (1890-1915)' (MArch, University of Western Australia, 1991), p 211, quoting the *West Australian Mining, Building and Engineering Journal*, 6 June 1903, p 48.

<sup>120</sup> Grant Adams, 'Western Hotels 1890-1918' (elective dissertation, School of Architecture, University of Western Australia, 1982), ref R P Muhlins, 'Some Aspects of Architecture in Perth and Fremantle 1895-1903' (School of Architecture, University of Western Australia, 1982), p 21.

<sup>121</sup> Kelly, 'Development of Housing in Perth', p 213, quoting the *West Australian Mining, Building and Engineering Journal*, 2 April 1904, p 19: see also Kelly, pp 239, 231.

Zealand Wunderlichs seem to have enjoyed a monopoly, and their ceilings were particularly favoured by F W Petre in his great basilicas for the Roman Catholics - St Patrick's, South Dunedin (1879-94); St Patrick's, Oamaru 1893-4); and the Cathedral of the Blessed Sacrament, Dunedin (1901-3).<sup>122</sup>

The eclipse of pressed metal set in during Word War I, when the price of steel rose and when Wunderlichs found themselves competing with other makers of the material, as well as a range of quite different but also competitive products:<sup>123</sup>

In view of the fact of the comparatively cheap price of Wood, Plaster, Corrugated Iron, Beaver Board, Fibro-Cement, Scandia and other ceiling boards, a number of which are very low in cost and which are being strenuously pushed and widely advertised, and also in regard to Competitive Metal Ceiling Firms ... the extra 10% [proposed for Wunderlich's pressed metal products] will have a grave effect on our turnover.

Pressed metal ceilings then suffered a rapid decline in popularity in Australia between the wars, though they were still being marketed. Lining and cladding materials seem to have lost favour even more rapidly. However Wunderlichs made a tile-like pattern which was used especially for lining hospitals, kitchens and other areas where ceramic tiles might be expected, and at least a superficial appearance of hygiene desired. They were left to be painted by the user, unlike those of the New York Metal Ceiling Company, which produced such sheeting in an enamel finish.<sup>124</sup> In 1950 Wunderlichs were again making both ceilings and wall linings of aluminium.<sup>125</sup> In the 1960s they were still making pressed metal ceilings, of a rather sub-modern character, as well as the imitation tile pattern for kitchen and bathroom walls.<sup>126</sup> There can hardly have been much demand, except perhaps for specialised uses like the undersides of shop verandahs. The company was trapped in a time warp and would soon implode.

### *f. metal cladding*

On the information available it seems that Wunderlichs and Cranes may have been the only Australian companies to make pressed metal for exterior cladding purposes. In 1897 Wunderlichs were advertising 'gable fillings' and 'fishscales'.<sup>127</sup> The gable fillings may well have been the imitation roughcast which was commonly used in such locations at later dates, and the fishscales were the roof sheets imitating fishscale tiling, now commonly used in small wall areas such as spandrels, or to roof ornamental projections such as oriel windows. At first Cranes made only external

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<sup>122</sup> Peter Shaw, *New Zealand Architecture* (Auckland 1991), pp 74-5.

<sup>123</sup> Eddie Butler-Bowdon & Charles Pickett, 'The Fibro Frontier' [typescript paper kindly supplied 1994], quoting the Heads of Staff Minute Book, Wunderlich Limited, October 1915, held by the Powerhouse Museum.

<sup>124</sup> Barber, *American Homes*, advertisements, no page.

<sup>125</sup> Wunderlich, *Wunderlich Aluminium Ceilings and Stamped Wall Linings* [brochure] (\*\*\*) [1950]), Wunderlich Collection, Powerhouse Museum, A7437-9/47.

<sup>126</sup> *Wunderlich Limited, Melbourne Branch, Trades Price List* (Melbourne 1964), pp 30-32,

<sup>127</sup> Bures, *House of Wunderlich*, p 40.

elements like finials, cresting and turrets,<sup>128</sup> but by the 1920s they advertised 'Galvanized Roughcast and Fishscale Sheetting' for gable ends and window hoods.<sup>129</sup>

These wall claddings are more likely to have been American than European-inspired. The Canton Co of Ohio, for example, produced a pressed steel brick pattern and at least five rock-faced masonry patterns, some with tooled margins like those of the Wunderlich product.<sup>130</sup> Mesker & Bro by 1904, and probably much earlier, produced rock face, margin dressed rock face and 'smooth steel brick' siding.<sup>131</sup> The Scully Steel & Iron Co of Chicago also produced a brick pattern.<sup>132</sup> In 1908 Mayes listed as 'suitable for garden walling etc.' brick pattern galvanised sheetting and rock-faced sheetting, the latter being painted and sanded, and in consequence more than twice as expensive.<sup>133</sup> By 1914 Wunderlichs offered patterns described as 'Rockface, Brick, Stucco (Roughcast), Vermiculated Quoins, Fish-scale Sheets, Voussoirs for Arches, Mouldings, etc',<sup>134</sup> though the brick pattern seems to have been promoted less for exterior use than for interior surfaces in areas required to be kept sanitary.

In Victoria there are buildings clad the masonry pattern which may date to the late 1890s, such as 'Arlington', Mildura, and there are early twentieth century buildings clad in the brick pattern.<sup>135</sup> The brick pattern is commonly laid so that the joints project rather than recede, as if tuckpointed, but when it is found in its original red colour it looks remarkably convincing. 'Arlington' is a very complete specimen, with not only rock-faced masonry, but a pressed metal roughcast gable, and a complete suite of metal ceilings and linings. A later and equally complete example in Victoria is 'Burn Brae', on the Old Midland Highway at Yinnar, of 1912, which has exterior sheetting simulating rock-faced stonework, and interior walls and ceilings in a variety of patterns.<sup>136</sup>

In New South Wales pressed metal is used at 'Athole', Morundah, not only throughout the house, but for at least one outbuilding.<sup>137</sup> In South Australia one of the most elaborate examples is the Port Pirie railway station of 1901-2, where Martin Dugdale has found that twenty different patterns of zinc and probably of galvanised steel sheets were used. All were apparently by Wunderlichs, for the company is named a

<sup>128</sup> List 48 of the Sydney book dealer Richard Neylon, in 1997, lists as no 20, G E Crane & Co, *The Crane Art Metal Manufactures General Catalogue No. 22* (Sydney, no date), which Neylon suggests is of about 1910, and describes as including decorated metal ceilings, borders, wall sheets and panels, cornices, centre flowers, consoles and trusses, finials and crestings, turrets, mansards, a spire, cupola and dome, advertising letters, and 'sundries'.

<sup>129</sup> *Book of Australian Bungalows* (Sydney, no date [c 1920])p 10.

<sup>130</sup> The Canton Steel Roofing Co., *Catalogue C. Stamped Steel Ceilings* (Canton, Ohio) 1898; *The Canton Steel Roofing Co* [catalogue] (Canton [Ohio] 1899), pp 33-6. The former has only five but the latter six rock-faced patterns.

<sup>131</sup> Mesker & Bro, *Complete House Fronts*, p 2, 8, 43, 44, &c.

<sup>132</sup> Scully Steel & Iron Company, *Stock List* (Chicago 1899), p 27.

<sup>133</sup> Mayes, *Australian Builders Price Book* (1908), p 205.

<sup>134</sup> Mayes, *Australian Builders Price Book* (1914), advertisements, p 26. See also Wunderlich Limited, *Ceilings for Every Room in Every Home* (Sydney 1919), pp 30-31.

<sup>135</sup> For example 'Koala Park', French Island.

<sup>136</sup> Information from Dr John Milton-Smith, 1978, on National Trust file no 4376.

<sup>137</sup> Advice of Christine Downer, 1993. The shearers' quarters are also of pressed metal. The house is now owned by Sandra Gooden.

number of times on the working drawing.<sup>138</sup> The extent to which pressed metal was custom-designed is somewhat problematic. The Geelong architects Laird and Barlow drew up a gable design with a rising sun against a roughcast background, to be executed in 'punched zinc' for the house 'Cloyne', 84 Aberdeen Street, Geelong, 1904.<sup>139</sup> This may well have been common enough practice.

In Western Australia 'metal imprinted with mock tiles' was used in about 1900 for a gazebo in Peppermint Grove designed by J T Hobbs.<sup>140</sup> At Broken Hill many houses have the end spandrels of the verandah finished in Wunderlich ceiling sheets imported from Sydney by the Gibb Timber Company in the 1890s, and after 1910 directly from the Wunderlich plant established in Adelaide. Others are clad in pressed metal sheets imitating rock-faced stone, brick and roughcast, sometimes expressed as a roughcast face with stone quoins.<sup>141</sup> In Queensland there is the Longreach building of Queensland Ambulance Transport, a fairly imposing two storey structure of 1921, which has metal brick cladding dressed with metal stone quoins.<sup>142</sup>

Sheet metal internal wall linings come into general use later than ceilings, and probably later than external cladding, notwithstanding examples like 'Arlington'. The imitation brick pattern came to be used internally as well as externally, and was advertised especially for wet areas like laundries and bathrooms, as well as for hospitals. A tile pattern would have been more logical.

There are a few examples in Adelaide and elsewhere of a cladding in imitation of weatherboard, which was not made by Wunderlichs or Cranes, and seems likely to have been imported. If so, it may be surmised that it was from the United States, as the only country which is known to have manufactured imitation weatherboard cladding, and probably the only country likely to have done so. The Porter Iron Roofing and Corrugating Co of Cincinnati, Ohio, published a catalogue in about 1885-90 including imitation weatherboard [or American 'clapboard'] cladding.<sup>143</sup> The Garry Iron and Steel Roofing Co of Cleveland, Ohio, has nothing of the sort in its catalogue of about 1887, but in 1891 lists for the first time not only clapboard but imitation 'drop siding' [shiplap, or in Queensland 'chamferboard'] and brickwork.<sup>144</sup> The Canton Steel Roofing Co catalogue of 1899 also offered 'Weather-Board Siding' in lengths up to ten feet [3 m],<sup>145</sup> the Scully Steel & Iron Company was also producing 'steel weatherboarding' in 1899,<sup>146</sup> Mesker and Bro of St Louis reportedly

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<sup>138</sup> Martin Dugdale, *Conservation Work Report Port Pirie Railway Station* (North Adelaide 1996), p 3; also copy of drawing kindly supplied by Martin Dugdale, 2001.

<sup>139</sup> Information from Lorraine Huddle, 1996.

<sup>140</sup> Ian Molyneux, *Looking Around Perth* (East Fremantle [Western Australia] 1981), p 33.

<sup>141</sup> Geoff Ashley, 'Two Centuries of the Western NSW Dwelling' (paper at 'The Australian Dwelling' conference, Hay, NSW, 1990), p 12. A subsequently published version of this paper lacks the illustration.

<sup>142</sup> Janet Hogan, *Building Queensland's Heritage* (Brisbane 1978), pp 108-9.

<sup>143</sup> *Porter Iron Roofing and Corrugating Co* [trade pamphlet, Cincinnati, Ohio, no date [?c 1885-90]).

<sup>144</sup> Garry Iron and Steel Roofing Co, *Garry's Patent Iron and Steel Roofing* (Cleveland [Ohio] 1891), pp 14-15.

<sup>145</sup> *The Canton Steel Roofing Co* [catalogue] (Canton [Ohio] 1899), p 32.

<sup>146</sup> Scully, *Stock List*, p 27.

offered weatherboard profile sheet by about 1904,<sup>147</sup> and the American Sheet and Tin Plate Company did so by 1906.<sup>148</sup>

The earliest known use of the imitation weatherboard in Australia is in the former Wesleyan Church in Knuckey Street, Darwin, which was prefabricated in Adelaide in 1897. The extraordinary framing of this building suggests that it or its components must have been imported, and though there is no indication of its origins, and this tends to support the hypothesis that the cladding itself came from overseas.<sup>149</sup> The church was built by A Simpson & Son of Adelaide,<sup>150</sup> and was assembled on their premises in Wakefield Street<sup>151</sup> before being despatched. Simpsons were metalware manufacturers, making safes, bedsteads, ovens, windows, enamelware, &c,<sup>152</sup> but no other buildings so far as is known. The church is described as being made of 'sheets of iron', and it is said that the sections were numbered (to provide for re-erection) when the building stood in Adelaide.<sup>153</sup>

Of the other known examples of metal weatherboarding, one is an undated extension built onto the house 'Kingsmead' at 78 Brougham Place, North Adelaide, and another the roof of a verandah added probably in about 1920 to a house at 73 Jeffcott Street, North Adelaide.<sup>154</sup> The material is also found on the Elizabeth Symon Nursing Home of the Australian Inland Mission building at Innamincka, of 1928-9, which was built by an Adelaide firm.<sup>155</sup> One of the few examples not in or demonstrably deriving from South Australia is a shopfront in Cloncurry, Queensland, where metal imitation

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<sup>147</sup> Mesker and Bro., *Mesker and Bro. Manufacturers of Complete House Fronts* (catalogue, St Louis [Missouri], no date [c 1904]), cited in Elton Engineering Books, *Catalogue Number 16* (London 1899), p 50.

<sup>148</sup> *'Sweet's' Indexed Catalogue of Building Construction* (New York 1906), p 174.

<sup>149</sup> The structural members consist of flat steel bars, wrapped about in lighter sheet metal to build up a cruciform cross-section, which provides lateral stability and the capacity to attach cladding to the flanges. Similar methods of forming skylight bars in the United States suggest that country as the most likely source. F T Hodgson et al, *Architecture, Carpentry, and Building* (5 vols, Chicago 1925-6 [1910]), III, p 420, fig 148.

<sup>150</sup> Photograph by McGann, 'Portable Iron Church for the Palmerston Wesleyan Congregation built by A Simpson & Son - Adelaide 1897', in the possession of the Rev Stafford, cited by Duncan Marshall, AHC file note (a), 10 January 1989.

<sup>151</sup> Stafford believed the building to have been assembled in Pirie Street, however this is contradicted by the company's centenary history, *Today not Tomorrow, a Century of Progress*, Adelaide 1954, p 28, cited by Duncan Marshall, AHC file note (a), 10 January 1989. This states that the building was erected on a vacant lot in Wakefield Street, and elsewhere it makes reference to the existence a factory owned by the firm in Wakefield Street in the 1890s (pp 24-5) and to a two acres site there in 1894 (p 33). Marshall has observed that the factory buildings and fire tower in the background of the photograph suggest Wakefield Street as the location.

<sup>152</sup> *Today not Tomorrow*, passim.

<sup>153</sup> *Today not Tomorrow*, p 28.

<sup>154</sup> Both inspected on information from Paul Stark, 1991. For 78 Brougham Place see Danvers Architects Pty Ltd, *Kingsmead and Belmont Conservation Study* (Adelaide 1987), pp 35-6.

<sup>155</sup> Initial information from Duncan Ross-Watt, 1991. The home was designed by Thomas McAdam and built by Fred Marsh and forty tradespeople of Chapman Building Industries, Adelaide: 'Innamincka Hosts Historic Outback Reunion', *Australian Geographic*, 38 (April-June 1995), pp 76-8. The materials were transported by overland tracks 640 km from Broken Hill. The ground floor was of concrete but the smaller upper storey, it seems, was clad in the metal weatherboarding. The home was closed in 1951 and the building was subsequently moved to become a manager's house at 'Mount Lennard', near Betoota: Elizabeth Burchill, *Innamincka* (Melbourne 1960), pp 44-5, 172, and plate between pp 88 & 89.

weatherboard, brick and stone are combined.<sup>156</sup> Whether some Adelaide merchant had continued to import and market the cladding after 1897, or whether some as yet unknown local maker began producing it, remains an unanswered question. Beasley speaks of it being used in Western Australia around 1900, rather oddly on 'iron-framed houses'.<sup>157</sup>

It seems probable that all of this imitation weatherboard cladding was imported from the United States, and the clinching example is a building at Mansfield, Victoria, which has pressed metal weatherboard cladding: it was put up in 1907, and has always been believed to have been imported from the United States.<sup>158</sup> In 1903 a US patent was granted to Edwin G Charlebois of Watertown, New York, for a metal cladding of clapboard [weatherboard] form, but made up in pieces like individual boards.<sup>159</sup> Although nothing significant came of this at the time, it was followed by other patents in the 1920s and 1930s, and then the quite sudden development of aluminium siding in the United States after World War II. By 1954 a weatherboard profile aluminium profile was being produced in Australia by Econo-Steel,<sup>160</sup> and in 1956 it was used on two prefabricated buildings supplied to Mount Isa Mines in Queensland.<sup>161</sup>

An odd example - apparently not a Wunderlich product - is an external sheeting which evokes horizontal boarding, found on a shed of 1930 or later at the Herborn house, 88 Pleasant Rd, Hawthorn.<sup>162</sup> The sheet is essentially a flat vertical surface from which horizontal mouldings project at six inch [150 mm] intervals. The mouldings are somewhat bottom heavy in profile, and do not seem to represent any specific cladding system. The corner is finished with a 55 mm angle, beaded at either edge. A somewhat similar product, 'beaded sheet', ribbed at three inch [975 mm] intervals had been advertised in the US by the Scully Steel & Iron Co in 1903.<sup>163</sup> Another twentieth century material was 'dovetail steel sheeting', which was available by 1934 and consisted of flat steel sheets, of various gauges, crimped to form dovetail grooves.<sup>164</sup>

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<sup>156</sup> Information from Peter Bell, 1991.

<sup>157</sup> M U Beasley, 'With Glint of Gold. Western Australia', in Trevor Howells [ed], *Towards the Dawn* (Sydney 1989), p 145.

<sup>158</sup> Information from Trevor Westmore, 1996. However a photograph of what I take to be the same building, on the outskirts of Mansfield on the Main Bulla Road, shows imitation brick cladding on at least the front portion: photo supplied by Kerry Jordan, 2002.

<sup>159</sup> US Patent 720,893 to E G Charlebois, 17 February 1903, illustrated in John Lauber, 'And it never needs Painting: the Development of Residential Aluminium Siding', *APT Bulletin*, XXXI, 2-3, p 18.

<sup>160</sup> F W Ware & W L Richardson [eds], *Ramsay's Architectural and Engineering Catalogue* (Melbourne 1954), § 16/11.

<sup>161</sup> *Cross-Section*, no 42 (April 1956), p 3.

<sup>162</sup> The shed necessarily postdates the house, built in 1930 to the design of Eric Nicholls.

<sup>163</sup> Scully Steel & Iron, *Stock List*, p 27.

<sup>164</sup> W L Richardson [ed], *Ramsay's Architectural and Engineering Specifications [Volume 1]* (no date [1934]), p 111.

*g. metal roofing*

At later dates attempts have been made to imitate not merely fishscale and other small tile patterns, but also Marseilles and other large roofing tiles. Charlton speaks of the 'Salvus' iron roofs, 'crimped to resemble tiles' which were used in Canberra by the Federal Capital Commission in 1926,<sup>165</sup> and Wunderlichs were producing an imitation tile pattern in 1938.<sup>166</sup> In about 1948 Wunderlichs produced a more literal imitation of tile roofing, allegedly to relieve the acute roofing shortage at the time and to enable unfinished houses to be completed. The standard sheet equated to sixteen tiles, and was stamped from 24 gauge zincanneal with a stove baked enamel finish of russet red.<sup>167</sup> This was soon being claimed 'to boldly simulate French (Marseilles) pattern Roofing Tiles' and the baked enamel finish was in green as well as russet red,<sup>168</sup> which was indeed a bold simulation, and by 1953 the Melbourne branch of Wunderlichs had reverted to offering the russet red only.<sup>169</sup>

In 1949 the Econo Steel Co of Sydney produced sheets in what seem to have been a simplified version of the Marseilles pattern, each unit representing three tiles, and pre-drilled for fixing. They were available in green, russet red, teal blue and aluminium colours, and stove enamelled if required, though the company recommended 'field-enamelling' the finished roof. They were produced in 24 gauge zincanneal, aluminium, copper, or any desired sheeting.<sup>170</sup> In the 1960s Wunderlichs were still producing precisely the same sheets except that they were of 23 gauge [0.643 mm] rather than 24 gauge zincanneal.<sup>171</sup> They also made a roughcast pattern and a shingle pattern, both in 26 gauge galvanised steel, and apparently still used for gable ends and balcony balustrades.<sup>172</sup> Nothing is known in Australia of the non-corrugated non-galvanised iron roofing types sometimes found overseas, such as the American ones already discussed under galvanised iron,

Sheet metal roofing laid on boarding, and with timber rolls at the joints, was a standard British type which was used in Australia only to a limited extent. Zinc roofing in both this and other forms did achieve some currency, as is discussed below, and later there was to be some use made of copper, lead and tin. Aluminium for roofing and cladding is generally a later development in Australia, but has already been mentioned above, as has the much more ubiquitous steel decking.

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<sup>165</sup> Ken Charlton, *Federal Capital Architecture* (Canberra 1984), p 23.

<sup>166</sup> C E Mayes, *The Australian Builders' and Contractors' Price Book* (10th ed, Sydney 1938), advertisement p i.

<sup>167</sup> Wunderlich Limited, *Wunderlich Metal Tile Roofing* [brochure] (Sydney 1948), Wunderlich Collection, Powerhouse Museum, Sydney, A7437-9/45, including a drawing of fixing details. See also the advertisement of that year in Associated General Publications Pty Ltd, *Sixty Home Plans* (Sydney 1948 [1946]), p 26.

<sup>168</sup> F W Ware & W L Richardson [eds], *Ramsay's Architectural and Engineering Catalogue* (Melbourne 1949), § 15/2. See also Phillip Mayes, *The Australian Architects, Builders and Contractors Price Book and Guide* (11th ed, Glebe [NSW] 1951), pp 444-5 & inside front cover.

<sup>169</sup> Wunderlich Ltd, *Wunderlich Limited, Melbourne Branch, Trade Price List* (Melbourne 1953), p 17.

<sup>170</sup> Ware & Richardson, *Ramsay's Catalogue*, § 15/1.

<sup>171</sup> *Wunderlich Limited Melbourne Branch Trade Price List* (Melbourne 1964), p 33.

<sup>172</sup> *Wunderlich Limited, Melbourne Branch, Trades Price List* (Melbourne 1964), pp 30-33.

### *h. porcelain enamel*

Porcelain enamel, or vitreous enamel, has played a limited role in Australia. It consists of a thin coating of glass fused to the surface of a metal - most commonly iron, steel, stainless steel or aluminium - at a temperature above 430°C. Selby, Johns & Co of Birmingham obtained a British patent in 1853 for the glass enamelling of iron, which was said to come in a variety of colours and to be unaffected by heat and cold.<sup>173</sup> But there is no evidence that this was put into commercial use, and the material was effectively rediscovered decades later. Its first architectural use was by a German manufacturer, Theodor Bergman, in about 1890, and much of the subsequent development of the technology in the United States was by Germans.<sup>174</sup> Architectural uses were developed in America in the 1920s, but it was only in the 1930s that the material came into general commercial use.<sup>175</sup> The Porcelain Steel Buildings Company had begun the development of construction methods in this material in 1925, and made its first steel framed and porcelain steel clad building in 1928.<sup>176</sup> The most important manufacturer was the Ferro-Enamel Corporation, which in 1932 built a house clad in enamelled shingles in a rather naive way,<sup>177</sup> but in the same year its product was used more convincingly as sheet cladding on the Armco House of the American Rolled Metal Company.<sup>178</sup> Nothing came of either of these initiatives, but the more visionary 'Lustron' house was to follow in the late 1940s, using enamelled steel panels attached to a structural steel frame.<sup>179</sup>

Shortly before World War II Claude Neon Ltd introduced 'Claudite Architectural Porcelain' to the Australian market. This consisted of panels of 16 or 18 gauge [1.2 or 1.0 mm] iron with flanges to which fixing lugs were welded, and which were surfaced with successive coats of sprayed vitreous enamel, fused at high temperature. This finish, according to the company, was the same as was used on baths and basins, and not to be confused with baked enamel. An early example used in publicity was the port cochère of the King George V Memorial Hospital, Sydney, of 1941, where bright blue Claudite was used to clad the cylindrical columns.<sup>180</sup> Although it was claimed that almost any shape could be produced, it seems likely that it was only the simpler forms of modern architecture which made it feasible for the material to compete - so far as it did so - with architectural terra cotta. One example, the Egg & Pulp Marketing building in Port Melbourne, of about 1953, appears to have had square panels of the material, with a slight embossed projection.<sup>181</sup> Vitreous enamel was

<sup>173</sup> *Builder*, XI, 538 (28 May 1853), p 339.

<sup>174</sup> Ware & Richardson, *Ramsay's Catalogue*, § 19.4.

<sup>175</sup> T C Jester, 'Porcelain Enamel', in T C Jester [ed], *Twentieth-Century Building Materials* (Washington [DC] 1995), p 255.

<sup>176</sup> John Burchard, 'Survey of Efforts to Modernize Housing Structure', in A F Bemis [ed], *The Evolving House*, vol III, *Rational Design*, pp 502-3, ref *Architectural Record*, August 1935.

<sup>177</sup> Burchard, 'Efforts to Modernize Housing Structure'.

<sup>178</sup> Burchard, 'Efforts to Modernize Housing Structure', pp 343-5.

<sup>179</sup> Tom Wolfe & Leonard Garfield, "'A New Standard of Living": the Lustron House, 1946-1950', in Thomas Carter & B L Herman, *Perspectives in Vernacular Architecture*, III (Columbia [Missouri] 1989), p 51 ff.

<sup>180</sup> *Ramsay's Catalogue* [1949], § 19/4. See also *Ramsay's Catalogue* [1949], § 19/1; John Shaw, *Sir Arthur Stephenson Australian Architect* (Sydney 1987), pp 106-9.

<sup>181</sup> *Cross-Section*, no 17 (March 1954), p 2.

also used in the façade of Bebarfeld's store, Parramatta, in 1954,<sup>182</sup> 'red porcelain-metal tiles' in the cladding of the E S & A Bank in Bourke Street, Melbourne, in 1956,<sup>183</sup> and blue porcelain enamel spandrels at the IBM Centre, Sydney, of 1962-4.<sup>184</sup> In the latter the architects, Stephenson & Turner, returned to the material which they had introduced at the King George V Hospital more than twenty years earlier.

### *i. shanties*

The use of kerosene tins for humpies and farm sheds reached a creative peak by the 1920s. The tradition was presumably as old in Australia as in New Zealand, where a dwelling of beaten-out biscuit tins was reported in Otago in 1863.<sup>185</sup> Kerosene was available in Sydney from 1865,<sup>186</sup> and its use as fuel developed rapidly in the 1870s, while kerosene tins were almost immediately pressed into service as rough furniture.<sup>187</sup> By 1878 they had become an established building material, for a visitor to Charters Towers saw dwellings which he described as 'battered wrecks of places, built of bark and kerosine tins'.<sup>188</sup>

By the 1920s there was a distinctive school of creatively constructed kerosene tin furniture,<sup>189</sup> and it was then that the two storeyed Horatio Jones house at Tecoma, Victoria, was built, a veritable palace amongst humpies. It uses Shell cans branded 'Tin Made in Australia [shell emblem] B I O Ltd' and others with the same wording but the emblem replaced with a circle containing a Maltese cross, with the word 'cross' inside it. By this time there were even special tools for cutting kerosene tins. The ceiling of the Milparinka Commercial Bank in Central Australia is likewise made of cans labelled '[shell] B.I.O. Co. Ltd.' and 'Plume Benzene'.<sup>190</sup>

In the Shepparton area of Victoria there seems to have been a little sub-school of kerosene tin architecture in which the cans were cut into shingles, each comprising one face of a can plus a triangle each from the top and the base, creating a sort of elongated hexagon. Humpies clad in these shingles were illustrated in the report of the Housing Investigation and Slum Abolition Board of 1937.<sup>191</sup> In South Australia, Danvers reports a surviving shed of kerosene tins at Keith, while pioneer families at Coonalpyn downs and Tatiara can remember the huts of kerosene tins and other scrap

<sup>182</sup> *Cross-Section*, no 23 (1 September 1954), p 2.

<sup>183</sup> *Cross-Section*, no 41 (1 March 1956), p 1.

<sup>184</sup> Philip Goad, Rowan Wilken & Julie Willis *Australian Modern: the Architecture of Stephenson & Turner* (Melbourne 2004), p 47.

<sup>185</sup> *Otago Witness* [Dunedin], 4 September 1863, quoted in C F Cameron, 'State housing and State Sponsored Housing in New Zealand' (MArch, University of Auckland, 1970), p 58.

<sup>186</sup> Rosemary Broomham, *First Light* (Sydney 1987), p 65.

<sup>187</sup> See the 1880s photograph of a timber cutter's house in a hollow tree, with a packing case and kerosene tins as furniture, Graham Cornall, *Memories* (Perth 1990), p 45.

<sup>188</sup> *Queenslander*, 8 November 1878, quoted in Peter Bell, *Timber and Iron* (St Lucia [Queensland] 1984), p 105.

<sup>189</sup> See the kerosene tin box, musical instrument and washing basin, *ibid*, p 80, and the chests of kerosene tin drawers, pp 98-9.

<sup>190</sup> Howard Pearce, *Homesteads of the Stony Desert* (Adelaide 1978), between pp 64,65.

<sup>191</sup> Victoria, Housing Investigation and Slum Abolition Board, *First (Progress) Report* (Melbourne 1937), p 86.

material, now demolished.<sup>192</sup> Such structures were also found in Western Australia, where 'Tinned Dog Hut' on the Norseman goldfield had walls and roof of flattened bully beef cans<sup>193</sup> (tinned meat, on the West Australian goldfields, always being referred to as 'tinned dog'<sup>194</sup>).

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<sup>192</sup> Danvers Architects, *Heritage of the South-East* (Adelaide 1984), pp 116-7.

<sup>193</sup> Battye Library 25041P. Another illustration of this building from the Battye Library is reproduced in John Archer, *Building a Nation* (Sydney 1987), p 151.

<sup>194</sup> Charles Deland to his parents, 17 March 1896, in M R Best [ed], *A Lost Glitter* (Netley [South Australia]), p 78. This usage is confirmed by a reference in C R Johnson, *The Trader* (London 1909), p 79 - a novel about Australians and others in New Guinea.