

**3.01 Sods or Turves****prehistory****New Zealand****Australian origins****South Australia & Victoria****later New South Wales****construction technique****fences****roofs***prehistory*

The use of sods or turves in building construction is widespread overseas, but best known in Ireland, where it is a tradition going back at least to the Bronze Age.<sup>1</sup> Sods were used for the walls of houses in Denmark in the 1st century BC,<sup>2</sup> and later were quite widely used for both walls and roofs in Scotland,<sup>3</sup> and, at least for roofing, in Scandinavia generally. They were also used as a building material by the Eskimos.<sup>4</sup> Swedish settlers in North America, as has been mentioned, brought with them a tradition of sod roofing laid over birch bark,<sup>5</sup> and in Newfoundland sods were in use for roofing before 1722 and, according to a nineteenth century description, they were also used there in combination with bark.<sup>6</sup> In Germany sods were sometimes used as infill in *fachwerkbau* or half-timbered construction, a technique known as [?] *Plaggenenpackungen*.<sup>7</sup>

Various African tribes have used sods into modern times. The Sotho, in Transvaal and Basutoland, cut turf blocks with sloping ends, and reverse the slope in each succeeding course, constructing a cylindrical wall which carries a roof of poles and thatch. Turf walls have spread in modern times to Cape Nguni, where the exterior face is made to slope inwards slightly, finished in a coating of clay, and decorated.<sup>8</sup> European settlers in South Africa also made occasional use of turf, as was the case at Bathurst in 1820,<sup>9</sup> and in 1834, after the Kaffir invasion, it was recommended that farmhouses generally in the Western

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1 Alan Gailey, *Rural Houses of the North of Ireland* (Edinburgh 1984), p 16, referring to a rectangular sod-walled house on Coney Island in Lough Neagh, from after 2,000 BC: ref Michael Herity & George Eogan, *Ireland in Prehistory* (London 1977).

2 At Borre Fen: P V Glob [translated Robert Bruce-Mitford], *The Bog People* (London 1977 [1965]), pp 121, 125.

3 See for example a shieling hut at Barvas, in Alexander Fenton & Bruce Walker, *The Rural Architecture of Scotland* (Edinburgh 1981), p 50.

4 Illustrated in Alan Van Dine, *Unconventional Building* (Chicago 1977), p 109.

5 K E Roe, *Corncribs* (Ames [Iowa] 1988), p 13.

6 Harold Kalman, *A History of Canadian Architecture* (2 vols, Toronto 1994), I, p 89, illustrating a sod-roofed house at Placentia, from Bacqueville de la Potherie, *Histoire de l'Amerique Septentrionale* (Paris 1722), I, after p 16, and quoting a description by Sir Richard Bonnycastle in 1842.

7 Josef Schepers, *Haus und Hof Westfälischer Bauern* (Münster 1977 [1960]), p 25.

8 James Walton, *African Village* (Pretoria 1956), p 142, pls 84 & 90.

9 Jeremiah Goldswain, quoted in John Hale [ed], *Settlers* (London 1950), p 243.

Cape be surrounded by six foot [1.8 m] sod walls.<sup>10</sup> Sod walls were used by the Boer settlers in Natal,<sup>11</sup> and a substantial sod wall was raised around the British military encampment at Durban in about 1842.<sup>12</sup> Some sod houses were also built by British settlers in the 1850s, but the sandy soil proved unsuitable.<sup>13</sup>

Sod buildings were common in Canada towards the end of the nineteenth century, but were quickly superseded, and those of timber were in the majority.<sup>14</sup> In the United States sod houses were most numerous in Nebraska, with some also in Dakota. Few are precisely dated, but the greatest concentration occurs around the Sandhills region of Nebraska, settled between 1870 and 1920, and they continued to be built even after the railways reached the area in the 1890s and made alternative materials more readily available. They are well documented in the photiograophs taken between 1886 and 1892 by Solomon D Butcher, in about 1500 of which sod buildings appear.<sup>15</sup>

### *New Zealand*

In New Zealand sods were used for building purposes by 1850, when Cholmondley's house at Canterbury was partly built of them,<sup>16</sup> and some other houses were built entirely of turf, but for a stone foundation.<sup>17</sup> Sods were favoured especially for chimneys, as at 'The Cuddy', Waimate, of 1854, where the chimney was of sod and stakes, but was replaced in the 1870s.<sup>18</sup> In 1861-2 B A Heywood occupied a country house with sod-built chimneys at either end.<sup>19</sup> Even the architect Benjamin Mountfort seems to have built his own two storey house of sods in about 1860.<sup>20</sup> Lady Barker described sods as usual material for farmers' homesteads in the Malvern hills in the 1860s,<sup>21</sup> and it appears that there survive many complete sod buildings in New Zealand which only await research and dating.

One quite extraordinary example which has been investigated, Longbeach sod cottage, South Canterbury, is thought to date from the 1860s. It is a single-roomed rectangular

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- 10 J E Alexander in the *Graham's Town Journal*, 20 August 1834, supplement, reproduced in Ronald Lewcock, *Early Nineteenth Century Architecture in South Africa* (Cape Town 1965), p 169.
- 11 Brian Kearney, *Architecture in Natal* (Cape Town 1973), p 4.
- 12 Kearney, *Architecture in Natal*, p 8.
- 13 Kearney, *Architecture in Natal*, p 14.
- 14 *Through the Years: Delisle* (Delisle [Saskatchewan] 1973), p 74, cited in G E Mills, *Buying Wood & Building Farms* (Ottawa 1991), p 188, note 7; Paul Voisey, 'Forging the Western Tradition: Approaches to Settlement and Agriculture in Southern Alberta Communities' (PhD, University of Toronto 1983), p 228, cited in Mills, p 187, note 1. One settler reversed the process, for having been supplied with a rudimentary timber house, he built a sod one, which was much warmer: Mills, p 55.
- 15 Tim Turner, 'Sod houses in Nebraska', *APT Bulletin*, VII, 4 (1975), pp 21-2.
- 16 *Letters from Early New Zealand written by Charlotte Godley*, quoted in John Hale, *Settlers* (London 1950), p 355.
- 17 Peter Shaw, *New Zealand Architecture* (Auckland 1991), p 16.
- 18 Martin Hill, *Restoring with Style* (Wellington 1985), p 7.
- 19 B A Heywood, *A Vacation Tour at the Antipodes in 1861-1862* (London 1863), quoted by Northcote-Bade, *Colonial Furniture in New Zealand*, p 23.
- 20 J W F Cattell, 'Domestic Architecture in Christchurch and Districts, 1850-1938' (MArch, University of Auckland 1981), p 14: however, some query as to whether the building was of sods or of cob is raised in Ian Lochhead, 'The Early Works of Benjamin Woolfield Mountfort 1850-1865' (MA, University of Auckland, 1975), p 106.
- 21 F N Barker, *Station Life in New Zealand* (Auckland 1923 [1883]), p 110.

structure, measuring 9.2 by 5 metres, with a hipped roof, a window and a door in one of the long sides, and a fireplace at one end. The remarkable aspect is that the wall is of cavity construction, consisting of two leaves of turves measuring about 190-280 mm long by 260-280 mm broad by 180-230 mm deep (though uniform within each course). The cavity is about 60 mm and the overall thickness about 630 mm. The sods have been cut with the ends on a slight angle, so that the nominally vertical joints slope slightly, all one way in one course, and the opposite way in the next. Slips of flax are placed lengthwise along the course, and also transversely to tie across the cavity. A timber plate on top of the wall provides bearing for the rafters, and there is a thatched roof over chicken wire and what is reported to be 'malthoid'<sup>22</sup> (which is a twentieth century material, but not unlike some nineteenth century roofing felts).

### *Australian origins*

There is no doubt that Irish settlers were prominent amongst the sod builders of Australia, but there is also an interesting hint of possible Aboriginal influence, for sods were used in their dwellings at Hutt River, Western Australia, and near Mount Napier in Victoria there were domical huts of various shapes, measuring up to 3 by 4.5 metres, clad in turf with the grassy side inwards. There were rather similar structures at Port Fairy.<sup>23</sup> This would not necessarily have had any effect upon European practice, but William Buckley, after his escape from the Sorrento settlement in Port Phillip, stayed in 1804 in a turf hut built by the natives near Mount Defiance. He later built a hut largely of turves for his own use,<sup>24</sup> and, as he undertook bricklaying and other work for settlers at Melbourne, he may have played a role in disseminating the techniques of sod construction. The question is something of an academic one, for sod construction was already known in the other Australian settlements, and John Batman's party had used it at Port Phillip even before contact with Buckley was established.

Tasmanian settlers were more familiar with sod construction than those in New South Wales, who were inclined to describe any primitive structure as wattle and daub, in accordance with general English practice.<sup>25</sup> Sod huts had been built at Hobart Town after Collins had abandoned the Sorrento settlement,<sup>26</sup> or chimneys at least had been of turf and stone.<sup>27</sup> In 1817 William Thornley's servants built a sod hut at his property on the Clyde,<sup>28</sup>

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22 Chris Cochran, *Longbeach Sod Cottage, South Canterbury: Conservation Report* (extracts sighted: (place and date unknown to me), and other information from M Pamela Wilson, Regional Officer of the Historic Buildings Trust, 1996.

23 N W Thomas, *Natives of Australia* (Melbourne 1906), p 51, quoted in John Archer, *Building a Nation* (Sydney 1987).

24 John Morgan [ed C E Sayers], *The Life and Adventures of William Buckley* (Melbourne 1967 [Hobart 1852]), pp 16, 65.

25 C F Innocent, *The Development of English Building Construction* (Cambridge 1916), p 155, describes walls of turves as a peculiarly northern type, quoting especially the Antonine Wall built by the Romans from Forth to Clyde, and more recently the 'spetched' walls of Northumberland (mentioned below), and of turf walls faced in stone in some Celtic areas. *Mann's Emigrant's Guide*, loc cit, also mentions turf houses as a possibility for settlers in New South Wales, though wattle and daub was apparently thought better.

26 John Shillinglaw [ed], *Historical Records of Port Phillip: the First Annals of the Colony of Victoria* (Melbourne 1879), p 13, quoting James Hobbs of Melbourne, who was present at both settlements.

27 J B Walker, *Early Tasmania* (Hobart 1963), p 71, cited in Archer, *Building a Nation*, p 32.

and in about 1821-2 one of the Amos brothers, Adam or John, built the turf hut at Waterloo Point (later Swansea) on the east coast, which was to be occupied by George and Louisa Meredith.<sup>29</sup> At 'Dennistoun' on the Clyde, Captain Woods built turf huts with earthen floors and thatched roofs in 1822, and these were occupied by the Reid family for a time while Alexander Reid built another turf hut at 'Ratho' which was to be their dwelling for three years.<sup>30</sup> Near the present town of Ross, W T Parramore built a round turf hut in 1823,<sup>31</sup> and at about the same time it seems that John Powell may have built a sod hut at Macquarie Plains.<sup>32</sup> In 1826 Henry Hellyer, surveyor to the Van Diemen's Land Company, noted in his field book the completion of a sod hut near Port Sorell, and gave a thumbnail sketch of it. It seems to have been a single room measuring 12 x 18 feet [3.6 x 4.5 m], plus a large fireplace extending beyond one end. The external wall surfaces were battered.<sup>33</sup>

One of the first identifiable sod buildings in Sydney was the house of Paddy Welch at Potts Point, which he had ready abandoned by the time Alexander Macleay acquired the estate in 1828.<sup>34</sup> Inland, Barron Field noted in 1822 that because of the scarcity of wood the buildings at Bathurst were of turf, and were thatched rather than shingled<sup>35</sup>. Though sod construction was almost unknown in Sydney, it was fairly widespread in rural New South Wales. Louisa Meredith is said to have noticed wretched hovels built of heaped turf,<sup>36</sup> but there are much earlier references on the other side of the Blue Mountains. When the Reverend Thomas Hassall obtained a land grant at O'Connell Plains, he built a house 'after the usual fashion in the Bathurst district then' of sod walls with a grass thatched roof.<sup>37</sup>

The sods were cut with a spade in squares, at right angles to the surface, and laid upon one another with the grass side downwards. The soil was a black clay. When the walls were up, the outside was smoothed down and stuccoed with lime, so that it looked as if built with brick or stone.

His son, J S Hassall, reported that he found the building in good condition thirty years later. Another of the sort was built on the Bathurst road for the use of the troopers, and gave rise to the name of the place as 'The Sod Walls'. At Queen Charlotte's Vale in the same

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- 28 William Thornley [ed J S Mills], *The Adventures of an Emigrant in Van Diemen's Land* (Adelaide 1973 [1840s]), pp 39, 41.
- 29 Vivienne Rae-Ellis, *Louisa Anne Meredith: a Tigress in Exile* (Hobart 1990 [1979]), pp 53-4.
- 30 E G Robertson, *Early Buildings of Southern Tasmania* (2 vols, Middle Park [Victoria] 1970), II, p 295. See also P L Brown [ed], *Clyde Company Papers, I, Prologue 1821-35* (London 1941), p 67.
- 31 K R von Steiglitz, *A Short History of Ross with some Tales of the Pioneers* (Evandale [Tasmania] 1949), pp 34-5.
- 32 Anne McKay [ed], *Journals of the Land Commissioners of Van Diemen's Land 1826-28* (Hobart 1962), p 23.
- 33 VDL 3/41, Henry Hellyer field notebook, 17 May - 15 July 1826, Tasmanian Archives, sv 8 June 1826.
- 34 Obed West, *Old and New Sydney* (Sydney 1822), part 3, pp 3-4, cited in Barrie Dyster, *Servant and Master* (Kensington [NSW] 1989), p 35.
- 35 Barron Field, 'Journal of an Excursion Across the Blue Mountains of New South Wales, October 1822 ...', in George Mackaness [ed], *Fourteen Journeys over the Blue Mountains of New South Wales 1813-1841* (Sydney 1965), p 132.
- 36 Rae-Ellis, *Louisa Anne Meredith*, p 79.
- 37 J S Hassall, *In Old Australia* (Brisbane 1902), p 187.

district, J D Lang found a recently settled Scottish woman occupying a cottage built of turf and roofed in thatch, plastered with mud and whitewashed inside and outside.<sup>38</sup>

Alexander Harris used sods for the chimney of his hut only,<sup>39</sup> and Peter Cunningham in 1827 mentioned that houses in New South Wales were sometimes built of layers of turf and stones.<sup>40</sup> This would have been a version of the 'spetched' walls of Northumberland, which contained alternate courses of undressed stone and turves,<sup>41</sup> or of similar walls in Scotland, first reported in print in 1629.<sup>42</sup> This was a type of construction mentioned, but by no means recommended, by Abraham Rees in 1819 as a means of constructing farm fences.<sup>43</sup> Thomas Jones, who worked intermittently from 1825 to 1887 on the Ginninderra Station, in what is now the Australian Capital Territory, recalled sod walls set within a frame of poles as being a common early on, but subsequently ousted by slab and bark buildings. He knew of sod chimneys, however, constructed as late as 1862.<sup>44</sup>

### *South Australia & Victoria*

Turf was also recommended in 1837 as a building material for emigrants to South Australia, most of the houses in the first temporary settlement beside Adelaide being of turf, mud and reeds,<sup>45</sup> while in the later 1840s the South Australian Company records occasionally refer to the turf huts occupied by its tenants.<sup>46</sup> Ben Boyce, who jumped ship in 1839, took refuge in such a building:<sup>47</sup>

Fancy this we liv in a little hut bilt of sods and covered over with bark of wich we got of the trees such a house that you would not put your pigs in such a place a tome, it was betwixt too very large hills down in a deap valle that we was thear for six munths before aney oun found out whear we liv.

The remains survive of a sod hut hotel in the district of Burra Burra, and a sod hut at Freeling in the district of Light, both said to date from before 1854.<sup>48</sup> Turf might also be

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38 Lang, *Historical and Descriptive Account of New South Wales* (1834), II, p 148, quoted in A L Green, 'Unfired Earth Walls. The Promotion and Use of Sod, Sun-Dried Brick, Cob and Pisé Walling in New South Wales from 1788 to 1960' (MBltEnv, University of New South Wales, 1989), p 85.

39 [Alexander Harris], *Settlers and Convicts* (Melbourne 1964 [1847]), p 144.

40 Peter Cunningham, *Two Years in New South Wales* (2 vols, London 1827), II, p 162.

41 Innocent, *Development of English Building Construction*, p 155

42 Fenton & Walker, *Rural Architecture of Scotland*, p 73.

43 Abraham Rees, *The Cyclopædia; or, Universal Dictionary of Arts, Sciences, and Literature* (45 vols, London 1819), XIV, sv Fence; Plates, I, sv Agriculture (Fence) pl xix fig 8 & pl xxi, fig 7.

44 S Shumack, *Tales and Legends of Canberra Pioneers* (Canberra 1967), pp 87-8, quoted in Michael Pearson, Notebook on Earth Buildings, p 35.

45 Henry Capper, *Capper's South Australia* (London 1839 [1837]), p 93; J F Bennett, *Historical and Descriptive Account of South Australia &c* (London 1843), p 15.

46 Jim Faull & Gordon Young, *People Places & Buildings* (Adelaide 1986), p 105.

47 Colin Kerr, 'An Exelent Coliney' (Adelaide 1978), p 140.

48 John Dallwitz & Susan Marsden, *Heritage of the Lower North* [South Australian Department of Environment & Planning] (no place, 1983), p 150, 196.

used for the fireplace and chimney alone, when the dwelling itself was of timber.<sup>49</sup> Sods were also used for walling in the vicinity of Harvey, Western Australia, before the 1860s.<sup>50</sup>

At Indented Head (Portarlington, Victoria) the party left by John Batman built two sod huts in 1835. The first two buildings in Melbourne were the sod storehouse and hut built by Evan Evans and others, and Lonsdale found not only George Evans but J and W (S and W?) Jackson, George Steward, W G Sams and Charles Wedge occupying buildings of this type.<sup>51</sup> Again, in December 1836 the *Sydney Gazette* reported that two of Melbourne's three public houses were of sods<sup>52</sup> and in 1837 Michael Pender had a sod public house in Flinders Lane.<sup>53</sup> Another sod building noted by Lonsdale<sup>54</sup> was the one built by Henry Batman at the corner of King and Collins Streets, which subsequently became Melbourne's first lock-up<sup>55</sup> and is probably identical with the 'police office' which Foster Fyans saw in 1837: 'a square building, or nearly so; the walls were sods, and the roof was covered in sods, without windows or a door.'<sup>56</sup>

The Jackson brothers built two further sod buildings on their station Koorakoorakup, at Sunbury,<sup>57</sup> George Evans built in sods at Emu Bottom,<sup>58</sup> and Robert von Steiglitz's hut at 'Balindyeapp', Ballan, in 1839, used sods as a non-loadbearing infill between the corner posts, the plan dimensions being only 2.4 x 3.0 metres.<sup>59</sup> But of the country areas the most important for this type of construction was to be the west of Victoria. In 1838 the Hentys used sods to line the chimneys of their Merino Downs homestead on the Wannon,<sup>60</sup> and A T Thompson erected a 'gunyah or sod hut' for himself when he settled at Fiery Creek in 1841.<sup>61</sup> In the black earth country around Port Fairy and Warrnambool sod huts are said to have become common (as were Irish settlers) and Rolf Boldrewood remarked that 'clean-cut black cubes rather larger than bricks, when new and moist, make a neat, solid wall'.<sup>62</sup> Later, according to G C Robinson, turves of grass somewhat larger than bricks were used at the Ballarat goldfields to build chimneys.<sup>63</sup>

Although sod buildings are said to have been more comfortable than those of slabs it is interesting to find that it was the split slab hut rather than the sod building which was

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49 *South Australian Register*, July 1908, quoted in John Archer, *Building a Nation* (Sydney 1987), p 71.

50 A C Staples, *They Made their Destiny* (Harvey [WA] 1979), p 226.

51 R V Billis & A S Kenyon, *Pastures New* (Melbourne 1930), pp 39-41.

52 *Sydney Gazette*, 17 December 1836.

53 Bonwick, *Discovery and Settlement of Port Phillip*, p 121.

54 Billis & Kenyon, *Pastures New*, p 38.

55 W F E Liardet [ed Susan Adams], papers (typescript transcription c 1970).

56 Fyans to La Trobe, n d, in T F Bride [ed] [re-edited C E Sayers], *Letters from Victorian Pioneers*, Melbourne 1969 [1898]), p 194.

57 N M O'Donnell, 'Some Pioneers of the Sunbury District', *Victorian Historical Magazine*, VIII, no 2 (April 1919), p 52.

58 David Moloney & Vicki Johnson, research in progress for the heritage study of the former Shire of Bulla district, 1996.

59 'Original Memoirs and Family History. The von Steiglitz Family in Australia', part IV, *Ancestor*, V, 4 (April 1967), p 137, quoted in Terence Lane & Jessie Serle, *Australians at Home* (Melbourne 1990), p 16.

60 Marnie Bassett, *The Hentys* (Melbourne 1955 [1954]), p 119.

61 Thompson to La Trobe, in Bride, *Letters from Victorian Pioneers*, p 320.

62 'Rolf Boldrewood', *Old Melbourne Memories* (Melbourne 1884), p 45.

63 H L Carnegie [ed], *G C Robinson* (Melbourne 1968), p 37.

regarded as 'the real mansion' at Boldrewood's 'Squattlesea Mere' - symptomatic, perhaps, of a social prejudice against a method used by European peasants and Australian natives. Sod houses were undoubtedly common, and in areas where the ground was suitable, like Melbourne and Belfast (Port Fairy), they were more common than those of slabs, but they tended to be occupied by labourers rather than by the more leisured and literate classes who have left so many descriptions of slab buildings. The prejudice is even more marked in the cases of pisé, cob and adobe, and all were lumped together without distinction when, for example, the *Portland Guardian* described the coastal towns as collections of 'mud huts, thatched roofs and wattle and daub hovels'.<sup>64</sup> Although there is no evidence of sod buildings in Australia after the 1880s, it is possible that 'tussock peat' continued to be used until later dates on Macquarie Island, due to the remoteness of the site, cost of transporting manufactured materials, and the disincentive for capital investment. This was a whaling, sealing and penguin base, and the timber framed structures with tussock peat infill and elephant sealskin roofs were amongst the earlier constructions, generally replaced later by timber and then corrugated iron clad huts.<sup>65</sup>

### *later New South Wales*

A sod walled building which survived until recently was Sodwalls House near Lithgow in New South Wales, which was built as an inn in 1856, with sod walls strengthened by stone quoins and chimney.<sup>66</sup> Annette Green has identified what seems to be the only authenticated sod-walled building now surviving in Australia, a two roomed kitchen and scullery near Blayney, New South Wales, of about 1883. It was built by the Ewin (or Ewien or Ewins) family, who were from County Tyrone, and presumably stems from Irish vernacular tradition. The blocks are 270-280 mm wide x 260-300 mm long by 180 mm high, and are said to have been cut from a grassed area of white loam near the adjoining creek. A brick fireplace was built first, with the edges keyed to receive the sods. The sods were laid on the ground, apparently with no foundations, and built up with fixing blocks for the joinery, rough lintels, and wire ties for the joinery, all built in. The building was altered prior to 1930, but still survives.<sup>67</sup> According to the owner of the building, the Reverend Angus Ewin, there are other sod buildings in the district which been altered in various ways or encased in brick, as for example at Evans Plain.

### *construction technique*

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64 *Portland Guardian*, 11 December 1848.

65 Karen Townrow, 'Lovely Linoleum', *Australian Society for Historical Archaeology Inc Research Bulletin*, XX, 3 (Spring 1990), no page, ref J S Cumpston, Macquarie Island (Canberra 1969), & Karen Townrow, *Survey and Excavation of Historic Sites on Macquarie Island* [occasional paper no 20, Department of Lands, Parks and Wildlife, Tasmania] (?Hobart 1989).

66 Dennis Jeans, 'The Building Industry: Materials and Styles', in Judy Birmingham, Ian Jack & Dennis Jeans, *Industrial Archaeology in Australia: Rural Industry* (Richmond, Victoria, 1983), p 95.

67 A L Green, 'Unfired Earth Walls. The Promotion and Use of Sod, Sun-Dried Brick, Cob and Pisé Walling in New South Wales from 1788 to 1960' (MBltEnv, University of New South Wales, 1989), pp 9, 30, 86-90. I must place on record that, from my own inspection I am far from certain that the building is indeed of sods. The visible material seems to be too clayey and to contain chopped grass rather than roots.

No detailed local information is available on the method of constructing sod houses, but we may get some indication from a rather later description of the erection of such buildings on the American prairies. A level area of turf was selected, free from gravel, and if the grass was high it was mown; strips were then turned up with a plough so adjusted as to cut a sod about 100 millimetres thick and as wide as would cut cleanly. These strips were then cut with a hatchet into lengths of from 400 to 600 millimetres and built into a wall of up to 1.3 metres thick, with the door and window frames built into position. The outside surface could be pared off with a hatchet to look as smooth as a brick wall, and the edges of the sods pounded to make them slope outwards and shed water.<sup>68</sup> The buildings illustrated have their walls battered slightly, just as did the house at Port Sorell illustrated by Henry Hellyer, yet no mention of this made in the written account. Nor is there any sign of this in photographs of sod buildings in Nebraska. Here, where sod buildings were most common, the settlers developed a special 'grasshopper' plough with prongs for breaking sods,<sup>69</sup> and the typical block size is said to have been 100 mm thick by between 300 and 450 mm broad, and twice as long,<sup>70</sup> but these Nebraskan examples were built after 1870, and are of limited use as a guide to the European sod building tradition which reached Australia half a century earlier. Ukrainian immigrants in Dakota sometimes built in sods, or in sods set between the posts of a timber frame, but these buildings were even later in date than those of Nebraska.<sup>71</sup>

The English *Builder* in 1848 spoke of peat being used as tiles on the estate of a Mr Wason at Corwar, having been 'cut out of the moss by an instrument for the purpose'.<sup>72</sup> The Wason family had links with New Zealand, and the now deserted village of 'Barrhill' on the south bank of the Rakaia River, between Rakaia and Methven, was developed by John Cathcart Wason to encourage the settlement of farm labourers. His own house there was called 'Corwar',<sup>73</sup> and it is impossible to doubt that he was a member of the same family as the earlier Wason. He returned to Scotland in 1900, but his village would warrant close investigation for possible remains of sod structures, though the central buildings were of concrete, as will be mentioned below.

There was indeed a special cutting instrument in New Zealand, and it seems likely that this was the very tool which had been used at Corwar in Scotland. In fact M L D Allen makes an unusual distinction between 'sod' and 'turf' on the basis that the former was cut with a conventional spade, but the latter was cut with this special turving spade. It had a handle like a shovel, but a head like a three-sided topless and bottomless box, the back of which sloped in line with the angle of the handle. The blocks that resulted were sloping parallelepipeds, and they were commonly laid with the raking joints angled in alternate directions in successive courses. According to Allen salt was sometimes sprinkled between courses to preserve the tussock stubble essential to bind them together.<sup>74</sup>

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68 D W King [ed], *Homes for Home-Builders* (New York 1886), pp 100-107.

69 Tim Turner, 'Sod houses in Nebraska', *APT Bulletin*, VII, 4 (1975), p 26.

70 Turner, 'Sod houses in Nebraska', pp 21-2.

71 Christopher Martin, 'Skeleton of Settlement', in Thomas Carter & B L Herman [eds], *Perspectives in Vernacular Architecture, III* (Columbia, Missouri, 1989), p 92.

72 *Builder*, VI, 297 (14 October 1848), p 495.

73 John Wilson, *AA Book of New Zealand Historic Places* (Auckland 1984), p 170.

74 M L D Allen, 'A Renaissance of Earth as a Building Material in New Zealand (MArch, University of Auckland, 1991), p 35.

*fences*

As in Europe, sods were used for farm walls and fences. Captain W J Dumaresq reported in 1827 that the smaller settlers near Bathurst used a 'two rail fence, and half the space underneath the fence is filled up with turf pared from the most tenacious part of the soil, and makes an excellent fence.'<sup>75</sup> Allan Willingham has discovered a contract of 1864 for building 136 chains (2.7 km) of sod fencing on Thomas Russell & Co's Barunah Plains run in Victoria.<sup>76</sup> The wall was to be 1.06 metres high and to taper from 1.67 metres at the base to 0.71 at the top. The sod was to be taken from ditches 0.3 metres deep on either side of the wall, and the capping was to consist of large sods laid along each edge, with a space between in which furze seeds could be planted.

In the local context the idea would be likely to be Scottish in origin, but one of the contractors at Barunah Plains was a Patrick Ryan, presumably an Irishman. There were Irish traditions of using both sods and furze - though not, to my knowledge, in this combination - but even English texts, like Abraham Rees's *Cyclopaedia*, illustrate walls of this general sort. Rees describes a 'mound, or Devonshire fence' consisting of a bank of earth, faced in sods though not built of them, with a row of quicks planted along the top, and willows on either side of these to protect them. He also describes a wall made entirely of turves, with more vertical faces, but with no planting on top.<sup>77</sup> The Barunah Plains fence can be seen as a combination of the two.

*roofs*

Sod roofs were traditional particularly in Ireland, where sod buildings were common and it was quite usual for the roof itself to be cut from old grassland or moory soil and laid in strips from ridge to eave, supported by small twigs or furze laid in the same direction across the purlins.<sup>78</sup> These flat sods or 'scraws' might be 0.6 m wide and long enough to overlap at the ridge, or they might be shorter, with a lap at mid-slope, or occasionally they were used as overlapping tiles, measuring 0.6 x 0.75 or 0.8 m. They were usually, but not invariably, laid with the vegetation side up.<sup>79</sup> These tile-like pieces, looking rather like doormats, are also used in Scotland.<sup>80</sup>

It was also usual to use a layer of scraws as the substrate for thatching, apparently as a hangover from the older tradition of sod roofing, rather than for any functional reason.<sup>81</sup> In the north of England and Scotland it was common to make a roof of a layer of sods (also called 'scraws' in England) and then to thatch over the top of this, securing each bunch of

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75 [W J Dumaresq], 'A Ride to Bathurst, 1827', *Australian*, 13 March 1827, et seq, quoted in George Mackaness [ed], *Fourteen Journeys over the Blue Mountains of New South Wales 1813-1841* (Sydney 1965), p 189.

76 Thomas Russell papers, ms 8825, La Trobe Library, State Library of Victoria.

77 Abraham Rees, *The Cyclopædia; or, Universal Dictionary of Arts, Sciences, and Literature* (45 vols, London 1819), XIV, sv Fence; Plates, I, sv Agriculture (Fence) pl xix fig 8 & pl xxi, fig 6.

78 A T Lucas, *Furze* (no place [Ireland] 1960), pp 133-5.

79 Gailey, *Rural Houses of the North of Ireland*, p 93.

80 Fenton & Walker, *Rural Architecture of Scotland*, p 50.

81 Fenton & Walker, *Rural Architecture of Scotland*, pp 46, 93-4.

thatch by pushing its top through or between the sods. In Aberdeenshire and Banffshire the thrusting tool was called a 'stob', in Peebleshire a 'sting',<sup>82</sup> and the method was known in Scotland as 'stob thatch'. In Northumberland there was a different method by which the straw was again laid across the turves, but was held by rods laid across it, and these in turn held by 'scoubs' or broaches driven into the turves.<sup>83</sup>

In Nebraska the sod roofs were of two basic types. The cruder consisted of a ridge pole, sloping poles or rafters, and a covering of grass to provide the base for the sods. More commonly, however, the roof was fully sheathed in wood, and the sods placed over this. The pitch was low, allegedly because a steeper slope increased the (already considerable) weight of sods, though a more serious issue may have been to prevent their sliding off. This shallow pitched caused drainage problems, and severe leakage was common.<sup>84</sup> Australian examples all exhibit low pitches, but the construction is always of the cruder type with a substrate not of grass but of gum tree boughs, placed across the rafters beneath the sods. The supporting timbers are necessarily very heavy, and the rafters are set close to each other.

I have previously reported the remains of one building roofed in ordinary sod and thatch, discovered at Parwan, near Bacchus Marsh, by Mr Neil Kenworthy.<sup>85</sup> This building was a massive one, with forked trunks serving as columns and a low pitched roof, and in plan approached 12 metres square with four bays in each direction. It was impressive even in its half collapsed state, with grass springing from the great masses of turf on the roof, but it was not necessarily early - indeed the sawn timbers and the wire-cut nails in its construction would tend to suggest a late date. That building must inevitably have disappeared, but a group of sod and thatch roofed sheds survives on a property on the Axedale Road in the Bendigo area.<sup>86</sup> Another example which I found in the same district has, most regrettably, been moved to a folk museum, presumably destroying the sod roof entirely. This was a barn at Campbell's Forest, north-west of Bendigo, which was not so heavily timbered as that at Parwan but was similarly roofed with thatch over sods, and it was precisely datable to 1910.<sup>87</sup>

A quite remarkable group of sod-roofed farm buildings, which do survive at the time of writing, are on a farm on the Goldsbrough pre-emptive right, near Dunolly. This indicates a *terminus ante quem* of about 1853, though they are in all probability very much later. The sod roofs are all covered in thatch, and one of them has broaches driven in to hold the thatch, though there is no sign of transverse rods. A sod roof on a humbler scale survives on a semi-underground dairy or cool store at Woorak West, the the Shire of Lowan, in the Wimmera of Victoria. In New South Wales, a sod-roofed farm building at Cudal is mentioned by Robert Irving, but without further elaboration.<sup>88</sup>

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82 Fenton & Walker, *Rural Architecture of Scotland*, p 68.

83 Innocent, *Development of English Building Construction*, p 201.

84 Turner, 'Sod houses in Nebraska', p 22.

85 Miles Lewis, *Victorian Primitive* (Melbourne 1977), pp 10-11, for illustrations.

86 Information and photograph from Mrs Deirdre Farfor of Malvern, 1993.

87 The property is Thomas's farm. It has remained in the family's ownership, so that the dating should be accurate even though based on oral tradition.

88 Robert Irving, 'Mostly about Walls', in Robert Irving [ed], *The History and Design of the Australian House* (Melbourne 1985), p 203.

The last sod roof in Australia must surely have been that built by the architect Sir Roy Grounds in the 1960s, at his property 'Penders' between Bega and Bermagui, New South Wales. This was a so-called 'barn', actually designed as a dwelling, and he was helped by a German-born neighbour, John Cremerini, who had a dairy farm nearby. However, the roof got too heavy when wet, and was removed and replaced with fibreglass.<sup>89</sup>

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89 Janet Hawley, 'Landed Sentries', *Good Weekend*, 4 April 1992, pp 31-7.