10. CLIMATIC DESIGN

Of all the colonisers the British were the least inclined (prior to the later nineteenth century) to be influenced by indigenous cultures, but even they adapted to local materials and climatic conditions. In Australia these climatic adaptations have stylistic implications as well, and although these are not the principal concern of this chapter, it is because of them that there has been considerable discussion and even some scholarship devoted to topics like the verandah and the high-set house. By contrast there is almost universal ignorance in Australia of the more exclusively technical aspects of climatic design, and in examining those topics we will be exploring almost entirely uncharted waters, so that our conclusions must be somewhat tentative.

The Australian verandah has long attracted romantic interest. A complete coffee table book has been published on the subject,[1] and Philip Drew has subjected it to mystical interpretations.[2] However more detailed and rational accounts have been given firstly by Robert Irving[3] and secondly by James Broadbent.[4] I gladly acknowledge the extent of my dependence upon their work, but I must make three things clear in my own justification. Firstly, I myself drew attention many years ago (and I think for the first time in Australia) to the illustrations in Plaw's *Ferme Ornée,* both in my undergraduate teaching and in discussions with colleagues. Secondly, I adduce here a considerable amount of overseas material which is relevant for comparative purposes, though it does not necessarily much alter our picture of the actual roots and causes of

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1 Peter Moffitt, *The Australian Verandah* (Sydney 1976).

2 Philip Drew, 'Architecture's Soft Edge', in *Steel Profile,* 34 (December 1990), pp 18-25; Philip Drew, *Veranda* (Pymble [NSW] 1992).

3 Robert Irving, in various places, including his 'Georgian Australia', in Robert Irving [ed], *The History and Design of the Australian House* (Melbourne 1985), p 63; and as quoted in Moffitt, *The Australian Verandah,* p 5.

4 James Broadbent, 'Aspects of Domestic Architecture in New South Wales 1788-1843' (3 vols, PhD, Australian National University 1985), I, pp 1-22.

the Australian verandah. Thirdly, the rather interesting evolution of the piazza concept has not previously, to my knowledge, been discussed at all.

James Thompson commented at an early date that sufficient attention had not been paid to 'arrange a house according to the proper aspects and prevailing winds',[5] and generally speaking *bona fide* adaptations tailor-made to suit the Australian climate came much more slowly than devices like the detached kitchen, the flat roof and the verandah which were already *perceived* to be suitable to a tropical and/or colonial situation. Even these tailor-made responses were by and large copied from elsewhere, such as India, where many settlers had previously traded or served, or Cape Town, where most emigrés had called en route for Australia. Others were less specific and cannot be sourced to a particular origin, such as when James Warner advertised in the *Moreton Bay Courier,* in 1854, that he could provide designs for iron villas with verandahs all round 'expressly designed for warm climates - the rooms being lofty and capacious'.[6] In 1867 it was said that some designs for 'better class houses' were now adapted to the Australian climate rather than being recreations of English designs.[7] Conversely, a house advertised for sale in Melbourne in 1864 was described as being 'Constructed after the Edinburgh Plan, with a View to Ventilation, and consequent Health and Comfort'. What this plan may have been is unclear, though the 'noble ventilated landing' of the staircase, twenty-four by seven feet [7.2 x 2.1 m][8] may have formed a part of it.

Whilst vermin are not strictly a climatic matter, they are a major factor in the raising of buildings on steddles and stumps, as is discussed below. Likewise one reason for the use of brick nogging is to vermin-proof the frame. In meat houses, such as that at 'Monalong', New South Wales, the collar ties of the roof may be surrounded by metal flanges to prevent rodents from crawling along them and then dropping down to the hanging carcases.[9] Protection from white ants will be discussed in some detail below, but it is necessary here to mention a specifically Queensland development, the 'rat wall'. Under the *Health Act* the outer edge of a concrete floor slab was required to be bent down a depth of 200 mm to protect the building from rat burrows, a provision abolished only in the 1980s.[10]

Judge G W Paul believed that 'apart from raising house stumps to escape the ravages of white ants, little has been done towards making Queensland houses suitable for Queensland requirements', and he had been struck by the suitability of Japanese houses whilst holidaying in that country in 1887. He engaged a contractor at Kobe to prefabricate, ship and erect Japanese houses in Brisbane, and the first of these,

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5 J[ames] Thompson, letter of 10 August 1833, in *Architectural Magazine,* I (December 1834), p 377.

6 Donald Watson & Judith McKay, *Queensland Architects of the 19th Century* (Brisbane 1994), p 204, citing the *Moreton Bay Courier,* 21 January 1854.

7 *Victorian Review,* 1 February 1861, quoted in J Campbell, 'The Settlement of Melbourne 1851-1893' (MA, University of Melbourne), p 89, and in turn in George Tibbits, 'An Emanation of Lunacy, Victoria', in Trevor Howells [ed], *Towards the Dawn* (Sydney 1989), p 47.

8 *Argus,* 10 October 1864, p 2, advertising Dr Turnbull's house in Spring Street.

9 Inspected January 2000.

10 Information from Richard Allom, 1991.

'Yeddo', was put up at New Farm by Japanese tradesmen within the year. However, it failed to sell, and Paul abandoned his plans and occupied the building himself. It was later moved to Ingham .[11]

Donald Watson illustrates a delightful design which the surgeon of Townsville Hospital had drawn up by the local builders, Rooney Brothers, in 1889. He had seen no house in Townsville which he considered suited to the climate, so he developed his own:

> perchance you will have a good laugh at what I call a climatic dwelling, but fair sized rooms high with passages and a 2 foot verandah all round with good roof ventilators appear to me to be indispensable.

These features really were the least of it, for he had devised a version of Palladio's Villa Rotonda raised on stilts. There was a octagonal central dining hall with an octagonal ceiling raking in to a central lantern. Surrounding this were four large corner rooms, and between them passages in the form of a cross, so that the dining room could capture any breeze in either direction. The service rooms were in a row in a separate block linked to the verandah.[12]

Other responses to climate were those which came naturally to groups from a similar background, such as the Kanakas in Queensland, who have been mentioned above. When Major J A Ferguson proposed the introduction of Indian coolies to the Northern Territory he urged the need to treat them kindly and ensure that suitable fresh provisions were available cheaply, and also and recommended the form of housing that would best suit them.[13] Sustained efforts to design for climate in the Northern Territory mostly date from the twentieth century. A house at Hore's Lagoon on the Edith River is believed to have been one of a number in the area built by Chinese, and dating from about 1920. It is almost all verandah: that is, it is a semi-enclosed rectangle with a continuous interior space but for two small rectangular enclosures clad with vertical bamboo for most of the height, with an openwork lattice at the top.

The houses built for public servants by about the time of World War II were extremely successful. The Government Architect, Beni Burnett, had a rather surprising background, for he had worked for Atkinson & Carr in Shanghai from 1915 to 1928, and in particular claimed responsibility for all of the buildings in Tientsin [Tianjin] emanating from that office.[14] The slightly exoticised Beaux-Arts style of European Tianjin is in no way evident in his breezy tropical bungalows for the Territory. The report of the Commonwealth Housing Commission in 1944

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11 Donald Watson & Judith McKay, *Queensland Architects of the 19th Century* (Brisbane 1994), p 139, citing the *Brisbane Courier*, 21 December 1887; 4 January 1888, p 8; 10 December 1909, p 5; 'Building à la Jap', *Boomerang*, 24 December 1887, p 18; W H Carr, 'The Japanese House', *Architecture in Australia*, December 1964, pp 99-100. See also John Archer, *Building a Nation* (Sydney 1987), pp 109-110; Terence Lane & Jessie Serle, *Australians at Home* (Melbourne 1990), pp 214-5.

12 Watson, 'The Queensland House', pp 7.10-11.

13 Harriet Daly, *Digging, Squatting and Pioneering Life in the Northern Territory of South Australia* (London 1887), pp 237-8.

14 Information from Richard Peterson, 1994.

illustrates a number of house designs recommended for various situations, and amongst these the two intended for tropical conditions are unmistakably superior, and look like the work of Burnett. One is a two storey structure with a verandah and balcony, all under a rectangular gable roof, and the other a very elegant single storey design on high stumps and with a double roof, in the sense that the full length of the roof space is open at the sides under the verandahs.[15]

Prior to the building of the Hotel Darwin the owners and their architect, D K Turner, inspected hotels in Java and Singapore, and incorporated into their building what they saw as the most outstanding features.[16] Designers today, notably Troppo Architects, actively seek to continue and revive the tradition of climatically suitable housing, whereas their contemporaries elsewhere remain rather more concerned with the visual aspects of local traditions - as, for example, those Queensland architects who revive the exposed frame. Devices like ridge ventilators, discussed in an earlier section, have also been revived by present-day architects in hotter areas when seeking to develop a regionally appropriate style.

In the twentieth century the Victorian church architect Louis Williams developed a syndrome of devices to keep buildings cool, and used them even in locations where heat was not much of a problem, as in his Holy Trinity Church, Whitfield (a semi-alpine location) of 1934. He provided broad eaves; set the windows high up, so as to be protected by them; and at a lower level placed ventilation openings to provide a draught across the nave. These openings would contain a concrete or brick grille, and a fly screen, and would be closed on the outside by a pair of side-hung timber shutters.[17]

Many topics related to climate will not be considered here, whether because they are of minor importance, or because the response to them was not distinctively Australian: but it is worth remembering that they exist. Areas subject to regular flooding, for example, are relatively rare in Australia. Nevertheless this was a major problem in the settlements on the Hawkesbury until Macquarie established towns on higher ground, and thus a rather pre-industrial lifestyle in which the settlers commuted daily to their farms. On the flooding ground itself the barns had to built on high stumps, and some of these survive today. Another fairly localised problem is the saline groundwater which gives rise to 'salt damp' in South Australia. There were also very unstable clayey or 'Biscay cracking' soils near Adelaide which, E A Hallack noticed, were best resisted by the *fachwerk* cottages of the German settlers.[18] Another unstable soil is that of the Riverina, which was to be a major factor in Bishop Sydney Linton's decision to build his palace in corrugated iron. As Linton said, 'the contraction of the soil in the heat, and the expansion, when there is wet, are so great

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15 Australia, Commonwealth Housing Commission, *Final Report* ([Canberra] 1944), p 292.

16 Carol Hardwick, *Register of Significant European Cultural Sites in the Northern Territory* (2 vols [Darwin] 1984), I, p 239-240.

17 Inspection at Whitfield, January 2000, and information from Marie Moore.

18 E H Hallack, *Our Townships, Farms and Buildings* (Sydney 1908), pp 93-4, quoted in John Archer, *Building a Nation* (Sydney 1987), pp 53-5; and 'Townships, Farms and Homesteads', articles in the *Adelaide Observer*, 1892, quoted in Lothar Brasse, 'The German Contribution', *Historic Environment*, VI, 2 & 3 (1988), p 42.

that enormous cracks appear in the walls of almost all brick buildings'.[19] He had good grounds for saying so, for he was temporarily inhabiting 'Claughton House' in Hay, where the enormous cracks in the brickwork are yet to be seen today.

A Dr Marks of Brisbane, half brother of the architect Robin Dods, grappled with the problems of tropical rainfall in gutters choked with tropical vegetation by inventing a 'leak-proof gutter'. The edge of the roof sheeting curled under in a large three quarter circle, and the gutter itself was suspended a little way below it. The idea was that roof water would follow round the curve and drop off from the bottom, into the gutter, whereas leaves and debris would drop off as soon as the curve reached the vertical, and not get as far as gutter. This was actually installed in modifications to a building originally designed by Robin Dods, at 101 Wickham Terrace, Brisbane (demolished), as well as in a research station on the Barrier Reef.[20]

It seems to have been in about 1930 that acoustic design of public spaces became a serious issue, and we have seen that Celotex was used for absorbency in both the new Brisbane and the reconstructed Melbourne town halls. By 1933 James Bell Mineral Products Pty Ltd were advertising 'Sorb-Soun' acoustic tiles, and they had been used in the new Shell Building in Melbourne. They seem to have been made from a plasterboard, for a 'Sorb-Soun' plaster was also available.[21] In 1954 the Commonwealth Bank building in Sydney was proposed to have ceilings of oven-baked perforated metal, acting both as an acoustic lining and as an exhaust system for the air conditioning.[22] By now, too, verrmiculite was being promoted as a material for use in 'vermiculite acoustical plaster',[23] and Picton Hopkins were advertising 'Silenceil' acoustic tiles, consisting of a perforated plaster face and a backing of mineral wool.[24]

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19 Peter Freeman. *The Homestead: a Riverina Anthology* (Melbourne 1982), p 216, quoting *Riverine Papers*, no 6, October 1888.

20 Information from Peter Marquis-Kyle and Robert Riddell, 1991.

21 Royal Victorian Institute of Architects, *Journal*, XXI, 3 (July 1933), advertisement p vi.

22 *Cross-Section*, no 19 (1 May 1954), p 1.

23 F W Ware & W L Richardson [eds], *Ramsay's Architectural and Engineering Catalogue* (Melbourne 1954), § 11/2.

24 *Ramsay's Catalogue* [1954], § 26/4.