

10.05 Stumps, Ants and High-Set Houses.

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stumps overseas

The elevation of buildings high above the ground, especially in the case of houses, is generally seen as a specifically Queensland characteristic. However, the use of stumps in more southern states is itself alien to the British tradition, and calls for some explanation, for even the terminology is a little confusing. Loudon refers to 'posts'¹ or pillars.² Other British and some Australian sources tend to speak of 'piles', while the term 'blocks' is used occasionally in Australia, especially in Queensland. Watson quotes the specification for the Native Police Quarters in 1859: 'The foundation shall consist of rough blocks of hardwood buried at least one foot into the ground, fixed 4 feet apart and levelled for the reception of plates',³ and a house at Ipswich in 1887 was 'to be well elevated on blocks.'⁴ Jane Cannan writes in 1853 of Melbourne houses raised on piles.⁵ As early as 1854 two cottages in Queen Street, Brisbane, were described as being 'built on wooden piles in order to place them above the floodwater' regularly anticipated from the nearby creek.⁶ A reporter in 1879 speaks of piles at Gympie, Queensland, and the term was used in 1898 of a house at Somerset, said to be typical of Queensland practice.⁷ Generally however the term 'stump' has become the norm in Australia. It was used in Melbourne in 1841 by Georgiana McCrae⁸ (who had just arrived from Scotland), but was at first rare, and Watson dates it to about 1865 in Queensland.

Standard British practice in timber building tended to rely upon a masonry plinth, or upon a heavy sleeper laid directly upon the ground, as the base for a framed wall. Precisely the same was true in America, at least in Tidewater Virginia, where Paul Buchanan describes these forms as characteristic in the eighteenth century, and

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- 1 J C Loudon, *An Encyclopædia of Cottage, Farm and Villa Architecture* (London 1846 [1833]), p 255, §512; p 807, §§815,816.
 - 2 Loudon, *Cottage, Farm and Villa Architecture*, p 395, §775; p398, §782.
 - 3 Donald Watson, *The Queensland House* [typescript report] (Brisbane 1981), p 7.2.
 - 4 *Australasian Builder & Contractor's News*, 16 July 1887, p 156.
 - 5 Ian Evans et al, *The Queensland House: History and Conservation* (Mullumbimby [New South Wales] 2001), pp 28-9, quoting Watson, *The Queensland House*, p 7.3.
 - 6 Jane Cannan to Jeanette, 27 November 1853, no 10 in Cannan Family Papers, National Library of Australia, MS 401.
 - 7 Peter Bell, *Timber and Iron* (St Lucia [Queensland] 1984), p 93, quoting C H Allen, *A Visit to Queensland and Her Goldfields* (London 1870), p 162, and M E Rowan, *A Flower Hunter in Queensland and New Zealand* (Sydney 1898), p 141.
 - 8 Brenda Niall, *Georgiana* (Melbourne 1994), p 124.

somewhat surprisingly also finds 'wood posts set in the ground to carry the sill', which were more common in the previous century.⁹ There is no indication that stumps were used in Europe except in certain specialised farm structures, as will be mentioned below. In Australia they were used in a similar way, but very few travellers have occasion to mention such technical details, and it is unclear when they came into use for buildings generally.

Stumps were used in Holstein, where buildings were often located on low-lying ground, and this is particularly relevant to Australia, where German immigrants continued the practice.¹⁰ Even in Britain there were exceptions to the rule of building off plinths or sleepers, for all sorts of practical reasons, but principally for the protection of crops from vermin. In other cultures which built directly on the ground, an exception might similarly be made for granaries and storehouses, which were raised to protect them from vermin. In the Rhineland and Scandinavia there is evidence of Neolithic granaries built on posts.¹¹ G E K Smith illustrates a Swedish *härbre*, or raised log storehouse, dating from 1522, and similar storehouses and granaries were known in Norway and Finland, and were brought to North America by Swedish settlers.¹² In Africa the granaries of the Nupe were raised on monolithic stone piers, almost amounting to steddles, though they lacked the flat cap on top.¹³

The use of stumps was probably fairly widespread in tropical areas, to control vermin, to protect the structure from damp and rot, and to improve ventilation. But building on really high piles is a much more specialised development, or at least a practice which had long been forgotten in Europe. It had been done in Neolithic settlements over lakes and marshlands, and it remained and to some extent still remains common practice in similar situations elsewhere the world - especially in tropical climates where a higher building catches more breeze and avoids mosquitos, as well as being more defensible. The practice of raising buildings was relatively common in various parts of the Pacific, though it was by no means universal. Examples were to be found in the Society, the Marquesas and the Lost Islands.¹⁴ In Calcutta the better class British houses were commonly, but not universally, raised as a protection from miasma, and the undercroft used for storage and service purposes, but this elevation would not normally be achieved by the use of stumps.¹⁵

In the mid-nineteenth century stumps rose to new popularity in colonial areas. In 1852 Elizabeth Fielden described her new house in Natal as 'standing upon legs, or

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- 9 P E Buchanan, 'The Eighteenth-Century Frame Houses of Tidewater Virginia', in C E Peterson [ed], *Building Early America* (Radnor [Pennsylvania] 1976), p 58.
 - 10 Maureen Lillie, 'Kruger's Farm - a German Building in Queensland', *National Trust Journal of Queensland*, 6 (1996), pp 13-15.
 - 11 Pedro Guedes, *The Macmillan Encyclopedia of Architecture and Technological Change* (London 1979), p 17.
 - 12 K E Rose, *Corncribs* (Ames [Iowa] 1988), p 13, illustration of härbre from G E K Smith, *Sweden Builds* (Stockholm 1950).
 - 13 Susan Denyer, *African Traditional Architecture* (London 1978), p 146.
 - 14 Arthur Baessler, *Neue Südsee-Bilder* (Berlin 1900), p 95; pl xviii, facing p 216; pl xxvii, facing p 264.
 - 15 Swati Chattopadhyay, 'Blurring Boundaries', *Journal of the Society of Architectural Historians*, LIX, 2 (June 2000), p 159.

posts, we can see under it and might possibly creep under if we chose.¹⁶ This was seen as a means of keeping out ants, snakes and wind-blown sand, as well as keeping the house cooler.¹⁷ By 1859 'piers' or 'posts' were being used in the United States for barns and outbuildings, but apparently not for houses.¹⁸ In New Zealand the Sergeant Ford cottage at the village of Panmure outside Auckland, of about 1854, had a 150 x 75 mm bearer spanning about 1.3 metres between rocks placed on the ground.¹⁹ In 1866 Lady Barker was dubious about the use of 'small rough-hewn stone piles' for her homestead in the Malvern Hills, but reported that it accorded with usual practice. They were prepared in Christchurch, transported 80 kilometres inland, and placed at six to eight foot [1.8-2.4 m] intervals beneath the house.²⁰ Early in the twentieth century totara 'blocks' or stumps began to be replaced in New Zealand by octagonal earthenware blocks filled with concrete,²¹ and in about the 1920s or 1930s tapering piles came into use.²²

stumps in Australia

The portable hospital made by Samuel Wyatt and sent to Sydney in 1790, was, according to Robert Irving, raised on timber stumps or blocks,²³ and in a somewhat equivocal way the buildings at Port Essington in 1835 had high stumps. Otherwise, so far as we know, local buildings (other than barns, corn cribs and the like) were not built in this way until the mid-nineteenth century. Then the German, G Listemann, who came to South Australia in 1849, noted that 'Instead of the usual ground walls, 2 foot long stumps [*Kloetze*] are set into the round at 3 foot intervals.'²⁴

There is no indication that stumps were in common use in Britain (and the building to which McCrae referred, above, was a timber cottage imported from Singapore). Thus observers were somewhat taken aback by them in Melbourne. Jane Cannan wrote:

The wood and iron houses are generally built on piles of wood which are driven into the ground at certain distances and a strong wooden framework rests on

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- 16 Brian Kearney, *Architecture in Natal* (Cape Town 1973), p 16, ref E W Fielden, *My African Home 1852-1857* (1882), p 25.
- 17 Kearney, *Architecture in Natal*, p 17.
- 18 George Woodward, *Country Gentleman*, 14 (15 December 1859), p 381; 16 (23 August 1859), p 130; 16 (25 October 1860), p 274, quoted in P E Sprague, 'Chicago Balloon Frame', in H W Jandl, *The Technology of Historic American Buildings* (Washington 1983), p 53, n 16.
- 19 C P Murphy, 'The Fencible Cottage: Soldier Housing' (MArch, University of Auckland 1995), pp 116, 138-9.
- 20 F N Barker, *Station Life in New Zealand* (Auckland 1973 [1883]) p 49.
- 21 H C W Bates, 'The Evolution of the Dwelling' (no details given), quoted in C F Cameron, 'State Housing and State Sponsored Housing in New Zealand' (MArch, University of Auckland 1970), p 87.
- 22 Cameron, 'State Housing', p 96. Geoffrey Thornton, *Cast in Concrete* (Auckland 1996), p 96.
- 23 Robert Irving, 'The First Australian Architecture' (MArch, University of New South Wales, 1975), p 488.
- 24 G Listemann, *Meine Auswanderung nach Sued-Australien und Rueckker zum Vaterlande* (Berlin 1851), quoted & translated in Lothar Brasse, 'The German Connection', *Historic Environment*, VI, 2 & 3 (1988), p 48.

that and supports the walls - why they are not often blown away I cannot imagine - for the piles are often short and not driven in far.²⁵

We have also seen already how William Howitt, writing in 1855, saw the timber houses of Collingwood and Richmond as resting on 'surveyor's pegs'. It would seem that the stump was accepted only reluctantly in Victoria, though it was used freely as an intermediate support within the perimeter of larger rooms, where it was not practicable for the bearers to span between the walls, as when L J Flannagan specified in 1888:

5 x 5 red gum blocks for support of floors to go 2 feet into ground and to be well spiked to sole plates 9" x 3" x 2'.0" of red gum and secured to 4" x 4" red gum sleepers on top.²⁶

As early as 1854, as we have seen, two cottages in Brisbane were raised on 'piles' to avoid floods. In the Logan area of Queensland there was an inrush of German settlement in 1860s, and August von Senden built various framed structures on stumps, including the Kruger farmhouse, which survives. The practice of building on stumps to avoid flooding, as in Holstein, was directly relevant here because the Logan River floods regularly.²⁷ One of the earliest surviving illustrations of the practice is that of the Marine Officer's Quarters, Cape York, in 1866,²⁸ and in 1867 R G Suter designed the state school at Allora to be raised on low stumps.²⁹

In northern Queensland even slab buildings were raised on stumps, which is the exception elsewhere in Australia. Bell discusses the Eureka Hotel west of Townsville, a horizontal slab structure of 1865 in which the round stumps continue upwards as posts, dressed to a rectangular section. This is apparently a common practice in the area, and in this building the bearers are laid on the flat rather than on edge, in the more traditional but less logical way.³⁰ Bell cites other surviving elevated slab buildings, raised generally about 0.4 - 0.5 metres above ground.³¹ One of these, a house at Murray Upper, was successfully moved from one site to another, and it may be that it was raised on stumps to facilitate this, for it was also unusual in having diagonal bracing behind the slabs in the front and back walls.³²

A fascinating conjunction occurs in the Northern Territory of Australia, for the Macassan trepang fishermen who frequented the coasts had their own tradition of building on stilts. A trepang fishery was established at Raffles Bay in 1828. The

25 Jane Cannan to Jeanette, 27 November 1853, no 10 in Cannan Family Papers, National Library of Australia, MS 401.

26 L J Flannagan, 'Specification of a half timbered Villa Residence at North Preston for Richard Shann Esqr.' [1888], p 7: Melbourne University Architectural Collection WD HOU 172, La Trobe Collection, SLV.

27 Lillie, 'Kruger's Farm', p 14.

28 Reproduced in Evans, *The Queensland House*, p 29.

29 Illustrated in Evans, *The Queensland House*, p 38.

30 Bell, *Timber and Iron*, pp 109-11; also Peter Bell, 'Miasma, Termites and a Nice View of the Dam: the Development of the Highset House in North Queensland' (Townsville [Queensland] 1984), p 37

31 The Bowen River Hotel, c 1862; Wambiana Hut, c 1879; Leopold Stamp's 'Blechynden' homestead, Murray Upper: Bell, 'Miasma, Termites and a Nice View of the Dam', p 37.

32 Bell, *Timber and Iron*, p 112.

British settlement at the bay, Fort Wellington, was abandoned in 1829, but the trepangers remained, and an illustration of the settlement in 1839³³ shows very substantial buildings with lashed frames, resting on high stumps. One would tend to assume that the British buildings at nearby Port Essington - which were in a sense raised upon stumps - were influenced by the Macassans. However it will be argued below that these European structures were not designed to be on stumps, and indeed for the most part were not.

sheathed stumps

Stumps were not in themselves sufficient to keep out most vermin, unless some proportion of the height was clad in a material which could not be climbed. Arthur Young in 1799 recommended that rats should be kept out of corn stacks by tinning the wooden stumps 'in the common manner' with 'brass latten' (milled brass in thin sheets).³⁴ An American design published in 1873 had posts eight inches [200 mm] in diameter and thirty-four inches [850 mm] long with the top sixteen inches [400 mm] 'tinned' - presumably wrapped in sheet tin. These rested on stone blocks, and on top of them were 'saddles' of unspecified material.³⁵

A different cladding was used to exclude rats and mice in a barn at Celle, St Cloud, France, built by Morel-Vindé in 1812, and it was so successful that up to the time he published it, twelve years later, not one rodent had been seen in it. This design was then made accessible to Anglophones by way of Loudon's *Encyclopaedia* in 1833.³⁶ The structure was raised on posts 900 mm high, and was entered by steps which folded down only when required. The posts were clad around the lower 600 mm with overlapping slates, and the upper 300 mm with panes of window glass, all designed to prevent rats climbing up. Loudon's somewhat confusing description of this has been misinterpreted by Donald Watson as referring to a stack of sheets of glass on top of the post, and has led him to suggest this as one source for the antcap.³⁷

Whether Morel-Vindé's barn design had any direct impact in Australia is not known, but it *is* known that it was put into use - directly from Loudon's account - for a barn built at Massachusetts in 1833.³⁸ Although this form of barn failed to catch on in the United States, small corn cribs were also built with glass panes on the sides of stumps.³⁹

33 Macassan trepang processing site in Raffles Bay, by Louis Le Bréton, no date [?c 1839], National Library of Australia.

34 Arthur Young, in *Annals of Agriculture*, XXXIII (London 1799), p 489, a reference kindly supplied by Deborah Kemp, 1999.

35 *Annual Register of Rural Affairs* (1873), p 90, illustration reproduced in Roe, *Corncribs*, p 38.

36 Loudon, *Cottage, Farm and Villa Architecture*, pp 394-6, §775.

37 Watson, *The Queensland House*, p 6.4.

38 Eric Sloane, *An Age of Barns* (extracted edition, no place 1976 [1967], unpaginated). Sloane illustrates the design which he says was used for a barn at Bernardston, Massachusetts, and, without identifying the source of the information, states that it is an English plan of 1813. It is in fact a French design of 1813, reproduced in an English publication of 1833 (or a little earlier, as Loudon's *Encyclopedia* was issued in serial parts).

39 Sloane, *An Age of Barns*.

the steddle

The *steddle*, a stubby stone shaft or timber log with a projecting flat cap, like a mushroom, was used in most European cultures for granaries and other buildings susceptible to vermin or predators, and the concept is essentially similar to the Australian ant cap. It is found in the *horreos* or grain stores of Spain, which in Galicia are monumental structures of granite.⁴⁰ In the Midi Pyrénées region of France pigeon houses were commonly raised on stone steddles to protect the birds from predators. Out of hundreds of identified structures a large proportion have tall cylindrical steddles built up of separate drums of stone. All of these buildings seem to date from the seventeenth to the nineteenth centuries, and it is not clear whether they continue any older tradition.⁴¹ In Germany the common term seems to be *Mäusepfeiler* [mouse pillar], the upright part being a *Tragpfahl* [or *konisch Tragpfahl* if tapering], and the cap a *Steinplatte* [or stone plate]. A grid of such elements to carry a building is a *Schwellenrost*.⁴² Swiss granaries used various forms of short stump and longer steddle - *langer stützel mit Steinplatte*, *béquille longue avec dalle de pierre*, or *fungo a gambo long*.⁴³

Steddles were common in England, where the alternative terms are *staddle* and *dottle*.⁴⁴ As usual they are associated especially with granaries, which seem to appear as separate buildings in the fourteenth century, and to develop as a specialised building type in the southern part of the country by the sixteenth century, though not common until the eighteenth and nineteenth centuries. The commonest steddles were round and mushroom-shaped, but some were flat-headed or square.⁴⁵ Stone steddles were also known in the United States, but were seemingly the exception rather than the rule.⁴⁶

In Suffolk, early in the nineteenth century, it was reported that stacks of corn (if intended to be left for any time), were

40 Macassan trepang processing site in Raffles Bay, by Louis Le Bréton, no date [?c 1839], National Library of Australia.

41 Bertrand de Vivies, *Pigeon-Houses of the Midi Pyrénées Region* (Albi 1994), passim.

42 Josef Schepers, *Haus und Hof Westfälischer Bauern* (Munster 1977 [1960]), pp 25, 266, 450, 531, &c.

43 *Freistehende Speicher* [Schweizer Baudokumentation AXZ 00165/0884] (Blauern 1984), passim.

44 Wyatt Papworth, *The Dictionary of Architecture* (London 1853-92), sv *Staddel*, gives that spelling as well as the terms *stattel*, *stavel*, *stackstead*, *stackstool*, *standing stool*, *crook* and *patten*, and describes it as a short pier of brick, stone or iron. But he does not mention the mushroom top or the question of vermin protection: rather he sees the device as a means of supporting a building above ground so that it can be removed as a tenant's fixture. Also, sv *Patten*, he gives the further alternative of *straddle*, and makes the same point that the building was raised to prevent its becoming an adjunct to the freehold. He cites a village, Crakehou in Yorkshire, in which every house and barn 'stood upon crocks.' Alec Clifton-Taylor, *The Pattern of English Building* (new ed, London 1972), p 77, refers to *staddle-stones*, *steddle-stones*, or *dottles*.

45 R J Brown, *Timber-Framed Buildings of England* (London 1986), pp 307-8.

46 They occur in a corner crib from North Scituate, Rhode Island, which is now at old Sturbridge Village, Massachusetts: illustrated in K E Roe, *Corncribs* (Ames [Iowa] 1988), p 20.

built on frames, called staddles, supported by stone or iron pillars about eighteen inches from the ground, with flat caps over the pillars to prevent the access of rats and mice.⁴⁷

J C Loudon, in his *Encyclopædia of Agriculture*, similarly describes the usual construction of corn stands as being a timber frame supported on upright stones two feet [600 mm] high, with projecting flat caps. Sometimes, also, they were built on iron pillars, also with flat caps in his illustration, or on continuous stone walls with copings of stone or of oak boards projecting well beyond the face.⁴⁸ Rather remarkably, one of Loudon's illustration of one of Manning's prefabricated buildings shows it supported on what can only be regarded as steddles - short tapering posts with flat caps on top.⁴⁹ This building, however, is a model intended for domestic British use as a cottage, even to the extent of having a thatched roof, and there is no indication that Manning supplied or even recommended any such components for the buildings he exported to the Australian colonies and elsewhere.

The American design of 1873, mentioned above, with its tinned stumps and 'saddles' on top, was later published in New Zealand, with a reasonably detailed description, and due acknowledgment of its American origin.⁵⁰ Another corncrib raised on what look like steddles is illustrated in an American publication of 1890.⁵¹ Some corn cribs in the United States were fitted with 'pans' or inverted pie tins across them, to stop vermin scaling them. Eric Sloane illustrates these pans at mid stump height, and presumably the stump passed through them rather than being divided into sections above and below.⁵² Apart from this, however, they provide a close precedent for the round antcap used in Queensland.

In New Zealand there may have been some distinct influence from Maori practice. A sketch by the Reverend Richard Taylor in 1842 shows a *pataka* or storehouse at 'Mangakahia' which is supported on four tall stumps. Spanning each pair of stumps is a half log of greater diameter and with the curved face upwards, and the overhang thus created seems to have been intended to prevent the entry of vermin in just the same way as a steddle.⁵³

At Emu Plains, west of Sydney, in the 1820s, the Frenchman R P Lesson reported:⁵⁴

The wheat harvests are placed nearby in stacks built in the Scottish way. Each stack stands on a floor raised eighteen inches from the ground by stakes. The whole is made circular in shape by the straw of the wheat, the ear being in the

47 *Penny Cyclopaedia* (27 vols, London 1833-43), XXIII, p 213 (sv Suffolk).

48 J C Loudon, *An Encyclopædia of Agriculture* (London 1826), §2746, p 423.

49 Loudon, *Cottage, Farm and Villa Architecture*, p 250, §514.

50 T W Leys, *Brett's Colonist's Guide* (Auckland 1883), p 385.

51 B D Halstead, *Barn Plans and Outbuildings* (New York 1890), reproduced in Roe, *Corncribs*, p 27.

52 Sloane, *An Age of Barns*.

53 Jeremy Salmond, *Old New Zealand Houses 1800-1940* (Auckland 1986), p 20.

54 R P Lesson [translated O & W L Havard], 'Journey Across the Blue Mountains, 1824', *Journal and Proceedings of the Royal Australian Historical Society*, XXIV, part IV, quoted in George Mackaness [ed], *Fourteen Journeys over the Blue Mountains of New South Wales 1813-1841* (Sydney 1965), p 148.

centre; it is crowned by a tapering straw top, held together by a regular network of straw and mud.

Notwithstanding the reference only to 'stakes', it seems reasonable to surmise that these also were steddles with flat caps. Stone steddles had some currency in colonial Tasmania, for they were used in a undated barn at 'Brickendon', Longford,⁵⁵ and (in an unusual square version) for the granary at 'Grantham', Bothwell, thought to date from the 1850s.⁵⁶ Timber steddles were more commonly used in New South Wales, as in a barn at Numbaa, near Nowra, where they are said to be 1.8 m in diameter⁵⁷ - perhaps meaning circumference.

the rick stand and cognate forms

Loudon also describes and illustrates recently introduced cast iron stands for stacks 'with or without hollow cones or triangles', and what he illustrates is a hexagonal iron frame carried at the corners on six iron pillars or steddles, and supporting at its centre a tall slatted cone designed to circulate air up through the centre of the stack.⁵⁸ Although it is unclear in this reference, a later note in his *Encyclopædia of Cottage, Farm and Villa Architecture* shows that Loudon attributes this design to one Mitchell at Blairquhan, near Alloa, Scotland.⁵⁹ In discussing ricks he says that they 'ought to be placed upon stands or saddles [not staddles], so as to keep them dry and safe from rats and mice',⁶⁰ though in this case he does not describe their form.

By this time, the 1830s, the London ironfounders Cottam and Hallen manufactured rick stands in a form suitable for modular construction. Each was of cast iron, 750 mm high, and consisted of a flat disc top and bottom, with a solid stem in between. The discs contained four holes, into each of which could be fitted the bent-down end of a wrought iron rod. These rods were supplied in two metre lengths, which meant that a square grid could be created on a module which must have been about 2.1 metres, allowing for the rod and the additional diameter of the top disc. The rest of the floor structure, which need not concern us here, was created with a further series of standard wrought iron rods.⁶¹ After 1900 the London prefabricator William Cooper was still offering a timber grain store on steddles (albeit with minuscule caps).⁶²

Iron steddles are also found in Australia, and were probably imported from Britain, though no branded examples can be identified except in the vermin-proof stores manufactured under Springall's patent. One British manufacturer was Charles D Young & Co, whose Edinburgh works catalogue of 1850 illustrated three models of

55 Isabella Mead, 'Brickendon, Tasmania', in J McClemons et al, *Historic Homesteads of Australia* (North Melbourne 1969), p 69.

56 Frank Bolt, *Vanishing Tasmania* (Kingston [Tasmania] 1992), p 35.

57 Rachel Roxburgh & Douglass Baglin, *Colonial Farm Buildings of New South Wales* (Adelaide 1978), p 119.

58 Loudon, *Encyclopædia of Agriculture*, §2747, p 424.

59 Loudon, *Cottage, Farm and Villa Architecture*, p 405, §812.

60 Loudon, *Cottage, Farm and Villa Architecture*, §808, p 405.

61 Loudon, *Cottage, Farm and Villa Architecture*, pp 405-6, §813.

62 William Cooper Ltd, *The Gardeners' and Poultry Keepers' Guide and Illustrated Catalogue* (London, no date, c 1903), p 301.

'improved cast-iron stack stools', and also referred to an 'improved wrought-iron corn-crib stand, which was not illustrated but was based on pillars and came in diameters from twelve to twenty-one feet [3.6 to 6.3 m].⁶³ It may well have been something similar to Springall's patent.

The Springall's patent stores are circular structures in which the steddles support concentric wrought iron rings, linked with radial rods, cartwheel-fashion. On top of this base structure the circular store itself is apparently made wholly of timber, and clad in quirked weatherboarding. The sides slope outwards, probably so that the overlapping weatherboards are in a vertical plane,⁶⁴ for this means that they can be curved in plan while remaining horizontal in elevation. One of these stores at 'Mt Hesse', Victoria, is built on two rings, the inner one carried on three steddles and the outer on six, and the two linked by eighteen radial rods. A larger one at 'Ripple Vale' is on three rings with two, four and eight steddles, and linked with twelve and twenty-four spokes. The base of each steddle at Mt Hesse is square and divided into four panels, one containing a crest, and the others with wording as follows:⁶⁵

Made
By
Garrett & Son

Leiston
Works

Springall's
Patent
[?]1844

And preventative chemicals could also be used in conjunction with steddles. Steddles such as Springall's have a flat base to rest on the ground, a shaft, and a cap like an inverted dish. But they are closely related to a later product, "'Rowell's" Improved Iron Pillar for Supporting Buildings off the Ground', which was specifically designed as a protection against white ants. The difference is that in Rowell's pillar the inverted dish was midway up the shaft, so that the whole pillar could equally well be used the other way up, and the dish filled with ant poison.⁶⁶

the ant cap

63 Charles D. Young & Company, *Illustrated and Descriptive Catalogue of Ornamental Cast and Wrought Iron and Wire Work* (Edinburgh 1850), p 73.

64 It was also a European, and then a North American tradition to build corn cribs and similar stores wider at the top than the bottom, so as to reduce the opportunity for water to get in - however, this was sensible only in relation to structures designed with slots or openings for ventilation, or made in rough construction such as unchinked logs.

65 John Curtis, 'Eight Homesteads of the Winchelsea District' (history of architecture research essay, University of Melbourne, 1969), p 3.5, has the Ripple Vale brand as 'Leston Works / Pringal's Patent. made by Garrett and Son / [crest], while at Mount Hesse it is the same but with '1844' below the crest.

66 Illustrated in Edwin Johnston, 'The Tin Tradition', *RIBA Journal*, LXXXVII, 5 (May 1981), np, and in John Archer, *Building a Nation* (Sydney 1987), p 111.

The termite or white ant is a problem in many but not all parts of Australia,⁶⁷ and indeed seems to have passed unnoticed for some decades after European settlement. An early reference is in a description of many of the goods left by Robert and Harriet Gouger at Kangaroo Island, South Australia, in 1836, where 'In consequence of our not having stone or cement floors, the white ants have made sad devastation [*sic*], not only of our clothes, but various articles, occasioning great loss ...'⁶⁸ Gouger's assumption that a solid floor would provide protection was of course false. The solution was to be a more radical one, resulting from a form of technology transfer.

The ant cap undoubtedly derives from the same European tradition as the steddles and rick stands discussed above, for vermin caps are illustrated in the same sources, Morel-Vindé and Loudon. Morel-Vindé illustrated a so-called 'American' rick stand on a square base supported by five posts, each of which, according to Loudon, was 'furnished with a cone of tinned iron, in the form of an inverted basin, to prevent the ascent of vermin,' while the Dutch rick stand was supported in a similar way.⁶⁹ In 1864 the *American Agriculturist* published a design for a wooden corncrib which was raised on stumps, and these capped with what appear to be metal caps with angled-down edges.⁷⁰ The vermin in question were of course principally rodents, and an American text which was republished in Australia in 1885 showed a barn protected from rats by raising it on stone piers, with 'galvanized iron plates' between them and the floor.⁷¹ In Britain, similarly, metal might be used at the threshold of a barn door to deter rats and other vermin from entering.⁷² The thought of using the same principle as a defence against ants does not seem to have arisen for some time, and T A Britton in 1875 discussed the white ant and other pests on an international basis without so much as mentioning the antcap as a means of protection.⁷³ And yet it was already in use in Australia by this time.

While the ant cap was not necessarily an Australian invention, it certainly makes an early appearance here. It probably emerged in the same way as overseas in the form of a vermin cap, the potential of which for ant protection was recognised only later. The earliest known examples may be those of what is commonly referred to as a corn steddle at Paterson, New South Wales. As building dates from the 1860s and was reconstructed in the 1920s, it is not clear whether the present detail is original. Each stump is a round post, finishing at the top in a flat cone, on top of which rests the bearer of the superstructure, which is another piece of round timber. The top of the stump - perhaps about 300 mm - is encased in a cylinder of sheet metal, and the whole thing is capped by metal cone which projects at the edges.

Donald Watson and Ian Evans have identified the first documentary reference to what are explicitly antcaps in Queensland in 1866, when the Colonial Secretary of Queensland had instructions issued to the Colonial Architect that at St Helena 'the

67 Council for Industrial Research, Division of Forest Products, *Termites (White Ants)* [Trade Circular no 36] (Melbourne 1936).

68 Quoted in Penelope Hope [ed], *The Voyage of the Africaine* (South Yarra [Victoria]), p 129.

69 Loudon, *Cottage, Farm and Villa Architecture*, pp 407-8, §§815, 816.

70 *American Agriculturist*, December 1865, reproduced in Roe, *Corn Cribs*, p 27.

71 Jonathan Periam [adapted by R W E McIvor], *The Pictorial Home and Farm Manual* (Sydney 1885), p 423.

72 R S Burn, *Practical Architecture* (London, no date [c 1875]), pp 92-4.

73 Britton, *Dry Rot*, pp 240-261.

piles upon which the buildings are to rest [are to be] capped with a small sheet of metal with a view to prevent any injury from the white ants.⁷⁴ Next year, for a school at Clermont the upper ends of the piles are to be capped - rather more specifically - 'with pieces of tin cut circular projecting one inch at least all round.'⁷⁵ Peter Bell has established the use of the ant cap in North Queensland in a specification of 1867 for buildings at the Bustard Head Lighthouse: 'Cap with strong sheet zinc projecting 1½" all round'.⁷⁶ By 1874 school buildings at Cooktown were specified to have galvanized iron between the stumps and the plates, but the size and form were not specified, whereas by 1875 government buildings were being specified to have the stumps 'capped on top with No 11 VM brand zinc overlapping stump 3" all round'. The Australian Joint Stock Bank premises at Maytown in 1876 had the stumps capped by squares of sheet iron, roughly hammered down at the corners.⁷⁷ Only now, with the provision of the necessary downward slope, had the true or effective antcap appeared, but it was by no means generally accepted.

A government specification of 1878 required a zinc cap, but did not specify an overlap, much less a slope - 'Cap with N^o 11 zinc 18" dia^r to receive plate.'⁷⁸ In about 1880 the mass-produced dish-shaped antcap came into use, and was described in government documents as 'an approved 24 gauge galvanised iron stamped stump cap projecting from the stump at least 3" all around',⁷⁹ a specification which remained essentially unchanged for forty years or more.⁸⁰ This does not mean that the new type came into general use, for the Bowen River Hotel in Northern Queensland dates from about 1890 and was, as Janet Hogan puts it, 'crudely antcapped' with what appear to be flat plates, some of metal and some of timber, separating the round tree trunk stumps from the somewhat massive and only partly dressed bearers.⁸¹ Moreover the common practice of spiking or nailing the plate or bearer to the stump provided a route through the antcap, and this was abandoned only in about 1890.⁸² As late as 1903 the Brisbane architect W C Vollar specified sixteen inch [400 mm] stamped caps for the outside stumps only of a house, while the remainder were '16" diat. plain 24 gauge'.⁸³ In 1937 the Council for Scientific and Industrial Research reported that termite shields had been in use in Australia for a number of years, and had been

74 Watson, *The Queensland House*, p 6.5. The reference is not sourced by Watson, but it is cited in notes kindly supplied to me by Ian Evans, 1991, as: H Manning, for the Colonial Secretary, to the Secretary for Public Works, 16 August 1866, Queensland Archives, Works Department Correspondence 1866, WOR/A1, letter 19. Evans also cites letter 33/186, in which a copy of these instructions was sent to the Colonial Architect [Charles Tiffin], who annotated it to the effect that cypress pine piles were being used because they were ant-resistant.

75 Watson, *The Queensland House*, p 6.10.

76 Peter Bell, *Timber and Iron* (St Lucia [Queensland] 1984), p 164.

77 Bell, 'Miasma, Termites and a Nice View of the Dam', p 45, citing a photograph taken in about 1876-8, published in the *North Queensland Register*, 18 July 1921.

78 'Specification of Work and Material required in the erection court house St Laurence', March 1878 [held by the Historic Buildings Branch, Brisbane], no page.

79 Bell, *Timber and Iron*, p 164.

80 'Specification: Erection and Completion of a new Rural School: Boonah', 17 February 1919 [held by the Historic Buildings Branch, Brisbane], p 6.

81 Janet Hogan, *Building Queensland's Heritage* (Richmond [Victoria] 1978), pp 120-121.

82 Watson, *The Queensland House*, pp 6.5-6.6.

83 W C Vollar, 'Specification of Workmanship and Material required in the Erection of a House in Kennedy [?] Terrace, Paddington' (January 1903), p 6: in the possession of Ian Evans, Brisbane.

standardised in Queensland, as was also the case in South Africa and the Panama zone.⁸⁴

In 1866 the architect Richard Suter, who had spent time in the West Indies, gave a lecture on the design of hospitals. Although he was not yet assuming the use of antcaps, he argued that the building should be 1.8 m above ground 'to allow a free current of air all round and to afford opportunity for constant examination and cleansing of floor timbers.'⁸⁵ Even the antcap was not thought to absolutely prevent the entry of the termites, but it at least forced them to build their galleries around the projecting metal so that they could easily be seen and poisoned. This demanded regular inspection, which in turn necessitated convenient access and a sufficient elevation of the building above ground, thus tending to reinforce the emergence of the high-set house. However, had antcaps been turned down sufficiently around the perimeter this degree of access would not have been necessary. A report on the termite problem in Adelaide, published in 1939, asserted unequivocally that the termite was unable to build a gallery in the downward direction, and proposed that the edges of the cap be turned down an angle of 45°. Indeed, even more than this, it proposed an elongated version of the antcap - the termite shield - to be used in brick walls.⁸⁶ A 45° turn-down is still the recommended form today, but it is also regarded as necessary to project the horizontal plane at least 40 mm out from the stump before it is bent.⁸⁷

the high-set house

In many areas of the world buildings were raised off the ground for reasons of coolness and ventilation, but in some cases at least it was seen mainly as a protection against insect attack. Both reasons applied in the case of the vernacular Caribbean house, and by the 1820s barrack buildings designed by the Royal Engineers in the region were similarly elevated.⁸⁸

This tropical tradition of building on stumps would have been well-known, and its adoption in the tropics of Australia needs no special explanation. In 1838 at the Port Essington settlement, in what is now the Northern Territory, the buildings were raised on high stumps, with a view to subsequently building in and using the sub-floor space. This fortuitously protected them, and it was reported in 1847 that 'had they been fixed to the ground in the usual manner they must have been destroyed long since by vermin'. As it was, the blockhouse and fort were infested with white ant, and were so solidly built that the pest could not be eradicated, and the buildings would inevitably be destroyed.

84 *Termites (White Ants)* [Council for Scientific and Industrial Research. Division of Forest Products, trade circular no 36] (Melbourne 1936), p 12.

85 Watson, *The Queensland House*, p 7.5.

86 *Termite (White Ant) Proof Construction for Brick Buildings in Adelaide, South Australia* [Council for Scientific and Industrial Research. Division of Forest Products, trade circular no 44] (Melbourne 1939), pp 4-5.

87 Information from Peter Ashford, 1996.

88 John Weil, 'Colonial Connections: Royal Engineers and Building Technology Transfer in the Nineteenth Century', *Construction History*, XIII (1996), pp 13, 15.

The earliest Australian house to show the classic high-set form - enveloping verandah on cylindrical piles, and front steps rising direct to the upper level *piano nobile* - was built in Geelong, Victoria, before 1854.⁸⁹ This was still really a two storey house, but then so were some of the earliest examples in Queensland, sometimes built by Victorians such as Thomas Swallow. An early Queensland example cited by Sumner is William Stephens's house, 'The Grange', built in 1864 and probably designed by Richard Gailey, a recent arrival from Ireland. The core of the house was elevated upon a brick core, but the perimeter was carried upon what Sumner calls 'tall and solid squared timber blocks' of 1 to 4 m long.⁹⁰

The idea was probably further reinforced by the importation of prefabricated buildings designed in this way. The Cable Station at Broome, Western Australia, of 1889, is a halfway example. The stumps or piers are only 1.2 metres high and were built locally of stone, but the building was prefabricated in Singapore, and it seems that the piers were integral to the concept, for the stonemasons, as well as other artisans, arrived with the components.⁹¹

Peter Bell has shown that earlier Queensland houses were in fact on quite low stumps, and quotes the complaint of the telegraph operator at Junction Creek in 1874, that the white ants were causing great damage to his house 'and I can see no way of checking them as the blocks are too low to allow a person to get under the house'.⁹² Elsewhere, however, high stumps had made an appearance before this time, and Bell argues that stumps of two metres or more appeared quite abruptly in the coastal sugar growing areas near the Pioneer, Burdekin and Herbert rivers.⁹³ He refers especially to the lower Herbert, where at least nine examples are recorded from 1871 onwards, some of which are illustrated in Thomas Mathewson's photographs of about 1874. Similarly Archer quotes a traveller on the lower Herbert River in 1875 commenting:

The dwelling house is substantially built on high piles, a peculiarity, by-the-by, everywhere noticeable. It might be thought to be suggestive of floods, but on enquiry it appears that by building in this manner, cool and airy dining rooms and store rooms are provided.⁹⁴

The inference seems to be that high stumps were introduced specifically by sugar growers, and quite possibly based upon experience in overseas sugar plantations where conditions were similar. This is also consistent with a more specific rationale for the practice given by Arthur Neame, writing of the Lower Herbert in 1871: 'As a precaution against fever one ought to sleep 7 or 8 feet above the ground.' Bell quotes this assertion, together with a description in the same year of the Avoca plantation,

89 The house was probably built early in the 1840s, but cannot be shown to have reached this form until 1854, when it is illustrated: P L Brown [ed], *Clyde Company Papers*, III (London 1958), p 642; VI (London 1968), p 612 & plate opposite p 160.

90 R Sumner, *More Historic Homes of Brisbane* (Brisbane 1982), pp 106-9.

91 R McK Campbell, *The Broome Cable Station Courthouse: an Interim Conservation Report* (Fremantle [Western Australia] 1990), p 3.

92 Bell, *Timber and Iron*, p 98, quoting S O'Brien to Superintendent of Telegraphs, 20 November 1874, 75/119, WOR A 95, Queensland State Archives.

93 Bell, *Timber and Iron*, p 98, quoting S O'Brien to Superintendent of Telegraphs, 20 November 1874, 75/119, WOR A 95, Queensland State Archives.

94 Archer, *Building a Nation*, p 103.

where the house was on three metre piles, 'the object of which is to get the breeze and to avoid miasma.'⁹⁵ By fever Neame meant malaria, and the assumption was that this was caused by miasmas, or noxious vapours arising in stagnant areas. The reality of course was that it was spread by mosquitoes, but as these tend to stay close to the ground, the elevation of the house was - fortuitously - a useful measure. By 1884 the Colonial Architect was specifying two metre stumps for buildings in some northern areas.⁹⁶

A worker's house on Swallow's Hambledon plantation, Cairns, is often cited as an early example of a high-set house, but it was simply a two storey house with the ground floor about 700 mm above ground level, and it is only the use of great tree trunks to carry the balcony that gives the impression of pile supports and a *piano nobile* at the upper level.⁹⁷ At the same time, it has to be conceded that in such houses only the upper floor was used for normal living purposes. The mining entrepreneur John Moffat built a very similar house at Irvinebank near Cairns, also with tree trunk columns,⁹⁸ and Moffat's journal makes it clear that the ground floor rooms were used for service areas ('offices'), storerooms, &c.⁹⁹ The form of these buildings was in fact very like the taller ones at the Victoria settlement. This sequence suggests that in at least some cases the development of the high-set house was not a question of the stumps of a single-storey building getting taller, but one of the ground floor of a two storey building gradually atrophying into storage and/or unenclosed space. But this does not alter the fact that Moffat saw his own house as being one raised upon eight foot [2.4 m] stumps, with a work and storage space below, and that, as Bell has shown, stumps of two and three metres were becoming quite widespread in Queensland during the 1880s.

There were many advantages to the use of high stumps which seem to have contributed to their later popularity in Queensland, including improved ventilation, height above mosquitoes, and the creation of useful sub-floor space. These considerations, together with height above flooding, were especially important in some of the sugar-growing areas, and comparisons have been drawn with French plantation housing in Louisiana, where the main rooms were high above ground level, and opened onto a *galerie* or verandah.¹⁰⁰ There is a suggestion that the form was brought by the Kanakas (Melanesians) who worked on the canefields as indentured labourers. John Archer illustrates a fairly primitive high-set hut used to accommodate the Kanakas on a plantation and - he implies - built by them.¹⁰¹ The trouble is that the appearance of such housing in Queensland plantations is relatively late in date, so that the evolution from the two storey house carries more conviction.

95 Bell, *Timber and Iron*, p 97, quoting Arthur Neame, diary 1870-1897 (held by the Hinchinbrook Shire Council), p 32, and *Queenslander*, 5 June 1875.

96 Bell, *Timber and Iron*, p 98.

97 Illustrations held by the Cairns Historical Society, reproduced in John Archer, *Building a Nation* (Sydney 1987), p 101.

98 Views of Moffat's house, 1884 & 1886, in R S Kerr, *John Moffat's Empire* (St Lucia [Queensland] 1979), pp 18, 23.

99 John Moffat's letterbook, 1883-4, p 82, quoted in Bell, *Timber and Iron*, pp 197-8.

100 Ray Sumner, 'The Queensland Style', in Robert Irving [ed], *The History and Design of the Australian House* (Melbourne 1985), p 309.

101 Archer, *Building a Nation*, p 96: illustration from the Oxley Library.

Once the practice of using stumps was accepted at all, it was inevitable that very long stumps should be used on steeply sloping sites such as occurred in parts of Brisbane. By about 1890 high stumps were already characteristic of most houses in Townsville.¹⁰² In the twentieth century the practice has given rise to the remarkable phenomenon of brick veneer houses perched upon stumps of from 0.3 to 1.5 metres high: this occurs in public housing at Ipswich, of the late 1960s and early 1970s, where the bottom two courses of bricks are ingeniously formed in a channel or U-section. The lowest course has the channel facing upwards while the one above faces downwards, creating a space which is used to take reinforcing rods and mortar, and thus to create an invisible beam which spans between the stumps.¹⁰³

masonry and concrete stumps

The use here of masonry piers rather than timber stumps (as previously at Port Essington) may or may not be a specific response to the white ant problem, but it soon became a standard practice. The Wesleyan Church at Darwin of 1876 seems to have been raised on piers made of cement blocks.¹⁰⁴ In 1897 concrete piers were used for the new prefabricated Wesleyan Church in Darwin, using blocks possibly recycled from the previous building.¹⁰⁵

A specification for light keepers' cottages in Queensland in 1878 called for concrete 'piers' tapering from 450 mm square at the base to 300 mm at the top, 1.2 metres long, and sunk halfway into the ground, a practice subsequently followed in some other government building in termite areas.¹⁰⁶ In 1889 the Collector of Customs at Normanton advised that all new buildings there should be placed on concrete blocks. In Townsville brick piers were commonly used from the mid-1890s, and Peter Bell reports two houses built in 1890 with 300 mm diameter cylindrical concrete piers, followed by occasional examples thenceforward.¹⁰⁷

In Western Australia as late as 1882 R R Jewell had designed the Roebourne Lock-up to be built on bearers, apparently resting directly on the ground. However the Gin Gin Police Station of 1885 is shown raised on what may be concrete piers.¹⁰⁸ G T Poole's Police Office and Quarters at Hamelin of 1897 (post-dating the Cable Station) were built on masonry piers, reflecting the fact that Poole was conscious of the

102 Gilbert Parker, *Round the Compass in Australia* (London 1892), pp 232-5, quoted by Geoffrey Bolton, *A Thousand Miles Away* (Canberra 1972), p 167.

103 Information from David Beauchamp, 1994.

104 Miles Lewis, *Former Wesleyan Church, 57 Knuckey Street, Darwin* (typescript report, Melbourne 1988), p 8.

105 A W Grant, 'Palmerston, The Northern Territory of Australia. 1873-1899' (typescript, 28 June 1983, unpaginated), pp [3-4].

106 Bell, 'Miasma, Termites and a Nice View of the Dam', p 43, quoting Specification 1878 in WOR P2, Queensland State Archives; also Bell, *Timber and Iron*, p 162.

107 Bell, *Timber and Iron*, pp 162-3.

108 J S Kerr, *Out of Sight, Out of Mind* (Sydney 1988), p 97.

termite problem. In fact by 1897 timber stumps were being superseded in Western Australia by concrete piers.¹⁰⁹

In Australia by the mid-twentieth century precast concrete stumps became increasingly common, not only because they were durable, but because they saved labour. The bearer could be temporarily propped in the correct position and the stump suspended from it (by passing the central steel rod which projected from its top up through a hole drilled in the bearer). The stump would be hanging into a previously prepared hole, in which concrete could be packed around it without any adjustment or cutting to size.

109 Ingrid van Bremen, 'The New Architecture of the Gold Boom in Western Australia' (PhD, University of Western Australia, 1990), pp 142-3.