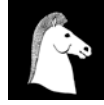




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# European Farming, Australian Pests: Agricultural Settlement and Environmental Disruption in Australia, 1800–1920<sup>1</sup>

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## SUMMARY

Generally studies of European settlement in Australia have focused on exotic pests. Such an approach has tended to characterise Australian flora and fauna as weak and unable to cope with the environmental disruption resulting from the introduction of European farming. However, in this article, which considers the settlement of the high-rainfall forests of Eastern Australia, it is argued that the main pests were indigenous not exotic. In the crucial first few years the settlers encountered unexpected higher costs due to forest regrowth, insect plagues, crop-eating birds and marsupials and native predators.

In 1920 the South Gippsland Pioneers Association published *The Land of the Lyre Bird*, a collection of essays, reminiscences and photos concerning the settlement between 1875 and 1900 of ‘The Great Forest of South Gippsland’.<sup>2</sup> Its 53 contributors (7 were women) were mostly selectors; small scale, family farmers, who purchased their land from the Victorian Government, paying in small annual instalments over decades. In putting together this early ancestor of oral history, these farmers produced one of the best and most detailed studies of farming and environmental change in late nineteenth century Australia.

The Great Forest was 60 to 70 miles long by 30 to 40 miles wide, covering about 1.2 million acres. The country was very hilly and broken, rising up to over 2,000 feet high and some gullies were 400 feet deep. The forest consisted of tall eucalypts, often over 200 feet high, and underneath a very dense ‘scrub’ or understorey of small trees, shrubs and ferns (South Gippsland 1972: 17-20, see figure 1). Between 1875 and 1900 selectors occupied and nearly completely cleared this forest, developing a successful dairying industry.<sup>3</sup>

In telling their stories the selectors of the Great Forest concentrated on the difficulties and hardships they encountered in the early years of settlement. Common themes were plagues of pests, the destruction they caused and the cost of dealing with them. These pests included regrowth of the forest, insects, birds,



FIGURE 1. The Great Forest. Scrub-cutting has commenced in the foreground allowing this photo to be taken (South Gippsland 1972: 55).

mammals and predators. What is particularly notable is that nearly all these pests were indigenous. There is some mention of exotics, but they were less important in the early years (South Gippsland 1972: 197, 314). It was eucalypts, wallabies and dingoes, not rabbits and Scotch thistles which caused the greater difficulties for the struggling selectors.

Until recently, studies of the environmental disruption caused by European settlement in Australia have concentrated almost entirely on exotic pests. Two influential works stand out. The first is Eric Rolls, *They all Ran Wild: the Animals and Plants that Plague Australia* (1969). Widely read in Australia, it concentrates on the story of the introduction of rabbits, the chaos they caused and attempts to control them. The second is Alfred Crosby, *Ecological Imperialism: the Biological Expansion of Europe, 900-1900* (1986). This wide ranging study documents how the Europeanisation of the Americas, Australia and New Zealand was achieved through the rapid acclimatisation and often uncontrollable spread of aggressive European plants and animals. Both authors stress that exotic pests flourished in the new environment created by European farming due to a lack of competitors and predators.

However, as well as the rapid multiplication of exotic pests covered by Rolls and Crosby, the introduction of European farming to Australia also led to similar plagues of indigenous pests. Indeed in some regions, such as the Great Forest, farmers found Australian pests were far more damaging than exotics. Yet the spread and impact of native pests has been largely ignored. It is only recently that a small number of studies of environmental change in dry grassland areas have acknowledged them (see Barr and Cary 1992 in particular, also Rolls 1994). Despite this, the literature of European settlement of Australia has generally presented indigenous plants and animals as weak and unable to cope with change.

The aims of this article are to further examine first, the response of Australian plants and animals to the introduction of European farming and second, how European farming was affected by Australian pests. Its geographical focus is the dense high-rainfall forests of Australia's east coast, where settlement led to severe environmental destruction. Between 1870 and 1910 large areas of these forests were cleared and converted to pasture for dairying.<sup>4</sup>

The pattern of European settlement in these forests was very different to that on the lightly treed drier grasslands. The early settlers were fortunate in that the grasslands were ideally suited for European farming. Sheep in particular thrived on the native pasture. In stark contrast no agricultural activity could take place in the grassless forests. The forest environment had to be destroyed before livestock could be grazed or crops planted. European settlers in these forests intended rapidly to sweep away the native flora and fauna and replace them with ordered European style fields and dairy cattle. Instead they often found the forest biota more resilient than they expected.

## THE FORESTS AND THEIR CLEARANCE

Though Australia is often described as the world's driest continent, at the beginning of European settlement its economically attractive east coast included large areas of dense high-rainfall forest. These extended in an almost unbroken line from Northern Queensland to Victoria and occupied much of Tasmania.<sup>5</sup> The high-rainfall forests occurred in regions which were often hilly to mountainous, usually within 150 miles of the coast, and which received stable annual rainfall of at least 35 inches (and in some cases as high as 100 inches). The high-rainfall forests fell into two broad botanical groupings: eucalypt forests and rainforests. The eucalypt forests were further subdivided into mixed eucalypt and mountain ash (*Eucalyptus regnans*) forests, the rainforests into tropical, subtropical and temperate.<sup>6</sup> Despite this wide variety of forest types, some common features were notable. The high-rainfall forests were dense and lush, in marked contrast to the far more open, 'park-like' forests of the drier plains. In the high-rainfall forests the tightly packed trees were tall, generally 100 to 300 feet, enormous in bulk and sometimes threw out massive buttress roots.<sup>7</sup> Beneath the main trees grew a very dense understorey (or scrub) of small trees, shrubs, ferns and vines, but no useful grasses. In South Gippsland, 'the scrub itself', was described as, 'tremendous jungle forty to sixty feet in height which filled in the spaces between the great trees, [containing] a wonderful variety of flora' (South Gippsland 1972: 21).<sup>8</sup>

Initially European settlement had little impact on these forests, for the drier plains, with their abundant and valuable grasses, light tree coverage and absence of dense understorey were preferred. However, from the 1870s onwards European settlement began to push into the high-rainfall forests, spurred on by a boom in dairying and the attractions of stable rainfall. Between 1890 and 1910 expansion into this new 'Wet Frontier' reached its peak, with 'rushes' of settlers into what were believed (sometimes erroneously) to be fertile forests (for a more detailed coverage of this expansion see Frost 1997 and Frost and Harvey 1997).

Settlement required immediate clearance of the dense forests. European farming, whether the growing of crops or pasture, could not take place in a forest. Trees shaded out European farm plants, got in the way of ploughs and livestock and harboured pests. Efficient, commercial farming required the removal of the forest environment. The Selection Acts also encouraged the rapid destruction of forests. In framing the Acts, colonial governments were keen to encourage cultivation, which they regarded as true farming, and were wary of speculators, graziers and timber-cutters. Accordingly they demanded settlers live on their selections, cultivate a reasonable proportion and make improvements. Rigidly enforced, these conditions encouraged the rapid clearance of forests. Indeed clearance (and the planting of exotic trees) was counted and valued as part of the compulsory improvements.



Economics and government policy required settlers to destroy the forest cover quickly and cheaply. This was achieved through the use of fire, using a slash and burn method very similar to that developed in North American forests in the seventeenth and eighteenth centuries.<sup>9</sup> In the wetter months<sup>10</sup> the dense understorey was slashed with axes and brush-hooks. Small trees were chopped down, but not the larger ones, these were killed by ringbarking. By not cutting down large trees or removing stumps a large area could be quickly cleared. Skilled axemen could rapidly clear large areas of small trees and understorey by using the 'drive' or 'nicking'. The small trees were partially cut, then a large tree at the top of a slope was felled so it drove into the smaller trees, breaking them off at the cuts.

The roughly slashed forest was left to dry for a few months. Falling leaves, bark and branches from the dying ring-barked trees added to the slashed understorey. Towards the end of the drier months the dried vegetation was set alight. Settlers hoped for a 'good burn' which would destroy as much of the timber, foliage and stumps as possible (see figure 2). Unfortunately sometimes a 'bad burn' due to insufficient drying or the onset of early rains, resulted in too little destruction. After the burn varying quantities of timber still remained. These were laboriously 'picked up', cut into smaller pieces, restacked and burnt, a process which could take weeks, even months.



FIGURE 2. A very rare photograph taken just after a burn. Compare the figure in the centre foreground to the size of the remaining trees (South Gippsland 1972: 69).



FIGURE 3. Farm established amongst dead ringbarked trees. Probably taken 5 to 10 years after the initial clearance and burn. Eventually storms and fires would reduce the standing trees. Such spectacular photos were quite common (South Gippsland 1972: 354).

After the burns all that remained of the forest were the dead trunks and stumps of the larger trees and thick beds of ash. European farming could now commence (see figure 3). Grass or maize seed was sown directly into the mineral-rich ash, livestock were introduced, houses, sheds and fencing erected. However, the progress of the newly created farm, especially in the first few years, was greatly affected by the environmental disturbance caused by the farm-making process. Rainfall decreased, while floods, erosion, frosts and pests all increased. It is the pests that I am concerned with here, and these can be divided into four groupings: forest regrowth, insects, plant-eating mammals and birds, and predators.

### FOREST REGROWTH

The high-rainfall forests were well adapted to disturbance and fire. The eucalypt forests were prone to regular large-scale fires and some eucalypts, such as the mountain ash would only reproduce after a severe fire. The rainforests were less prone and less resilient to major fires, but had developed to cope with localised disturbances in their canopies due to storms or the collapse of aged trees. In all

the high-rainfall forests, ecological disturbance, whether small or large, was quickly repaired by very fast growing 'pioneer plants'. Triggered by the heat of a bushfire or increased light levels, the seed of the pioneer plants, which may have lain dormant for decades, germinated and grew rapidly, forming a new canopy. Typically pioneer plants were short-lived, perhaps 20 to 40 years, but in that time the more slowly growing trees could become established under their protection.

In destroying the forests with fire, the settlers were unknowingly mimicking a natural process which the forests were well adapted to recovering from. In the Great Forest of South Gippsland, 'the undergrowth flourished after the first fire' (Holland 1929: 158). Dogwood (*Cassinia aculeata*), was an 'unsightly stick that sprawled around aimlessly ... though not much in evidence in the virgin scrub, it came up sometimes after a burn almost like a crop of wheat' (South Gippsland 1972: 24). Other prolific pioneer plants in the Great Forest included hazel pomaderris, blanketwood, blackwood wattle, pencilwood, wiregrass, bracken, wild ivy and swordgrass (South Gippsland 1972: 24-30, 111). Clearance led to similar regrowth elsewhere in Gippsland (Collett 1994: 139; Legg 1992: 160; Wilde 1988: 47), the Otways (Houghton 1984: 10; Victoria, Royal Commission 1899-1901: 7), Tasmania (Skemp 1952: 70, 82; Stokes 1969: 132), Northern NSW (Henderson 1980: 449; McFarlane 1980: 4) and the Atherton Tableland (Birtles 1978: 25, 34).

The pioneer plants became a problem two or three years after clearance, just as the farms were starting to produce (McFarlane 1980: 4; South Gippsland 1972: 111). The need for what I term 'secondary clearance' greatly increased the cost of farm establishment. In South Gippsland,

After two or three years, a great deal of the scrub began to come again, especially on clearings that had been lightly stocked. The swordgrass was the worst trouble, and it might cost anything from five to thirty shillings an acre to hack it out with mattocks. On well-stocked clearings the second growth did not trouble much at first, but practically the whole of the land had to be gone over again sooner or later for this purpose (South Gippsland 1972: 111).

In South Gippsland the initial clearing cost 25 to 40 shillings per acre, secondary clearance could cost nearly as much. The high cost was because secondary clearance was often more difficult and time-consuming than the first clearance. There were no large trees to drive into the new growth, nor were there large masses of tinder dry vegetation to aid in burning. Some pioneer plants had to be dug out rather than burnt or cut. Not surprisingly many pioneer plants had developed defence mechanisms against further disturbances. Dogwood leaves contained a powerful toxic irritant and swordgrass leaves caused severe cuts (South Gippsland 1972: 24-5). On the Atherton Tableland selectors complained, 'every damn thing has spikes on it' (Bryde 1921: 59). In Tasmania stinkwood regrowth poisoned grazing cattle (Skemp 1952: 82).



The burden of secondary clearance fell heavily on those selectors with little capital. They were less likely to have sufficient livestock to keep regrowth manageable, or to afford to pay for the additional labour. Many worked elsewhere as seasonal workers in order to make payments on their selection. In their absence the forest reclaimed their clearings. On marginal farming land, secondary clearance costs tipped the balance towards abandonment. One estimate for South Gippsland was that of 450,000 acres cleared by the 1920s, 150,000 acres were abandoned and a further 160,000 acres neglected and overgrown (Webb 1966: 183). In the valleys of East Gippsland 135 selections covering 50,000 acres were abandoned and only those selectors on the fertile river flats survived (Woodgate et al. 1994: 46).<sup>11</sup> In the early twentieth century governments reallocated abandoned lands for Closer, Empire and Soldier Settlement schemes creating a second round of clearance, regrowth and failure (Legg 1992: 168-70).

In some regions land was saved from abandonment by the use of 'clearing leases'. The term is misleading, for the land had often already been cleared, perhaps 'maintenance lease' is more accurate. Newcomers were leased farms at generous rates, often paying little or no rent for the first four or five years. In turn they were required to control regrowth and perhaps even continue clearing. While such arrangements provided little income to the landowners, it did prevent their assets from reverting to forest (Birtles 1982: 39-41, 53; Fenton 1964: 58, Wilde 1988: 65).

## INSECTS

The high-rainfall forests were home to enormous numbers of insects. Indeed, trees and plants had developed efficient methods of regeneration in order to survive amongst the huge numbers of seed and leaf eating insects. Clearance and the planting of European crops did not destroy these insects, rather it provided a new food supply and reduced natural predators. In a pattern repeated throughout the newly established settlements in the high-rainfall forests, within two or three years of clearance, crops were attacked by plagues of insects and in particular, caterpillars.

In the Great Forest of South Gippsland, 'the grasshopper ... regularly every Autumn devoured and laid bare the grass paddocks' (South Gippsland 1972: 38). One settler recorded how he had purchased and sown the finest quality seed of English rye-grass. Within three months it was eight inches high, 'but later on the caterpillars came in millions, and not a green blade of grass was to be seen after them' (South Gippsland 1972: 96 and for similar stories see Hartnell 1974: 48-9). Another found that after nine months of farming the destruction of pasture by caterpillars forced him to sell all his cattle for less than he had paid for them (South Gippsland 1972: 136). And another recalled,

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the scourge of caterpillars was very bad, recurring for several years, just at the season when the cattle should be topped off [fattened]. I have seen a beautifully green paddock eaten out and left bare in 48 hours. And I have seen the caterpillars so thick against a big log that had stopped their march, that you could easily have taken a shovel and filled a barrow in short time. After these came the Winter grubs that ate off the grass below the ground, necessitating sowing most of the land again (South Gippsland 1972: 114-5).

In West Gippsland one family suffered from caterpillar plagues for six consecutive years (Wilde 1988: 62). On the Atherton Tableland selection commenced in 1882 and in 1884 and 1886 maize crops were destroyed by caterpillars (Birtles 1982: 42). Similar attacks were recorded in the Heytesbury Forest in Western Victoria (Fletcher 1985: 148), North-West Tasmania (Stokes 1969: 132, 136) and Central Gippsland (Adams 1978: 56).

In the short-term the settlers were helpless against insect plagues. Generally insect damage abated after five to ten years, as more and more forest was cleared and new insect predators, such as starlings, moved into the new environment.

## CROP-EATING BIRDS AND MAMMALS

New clearings and their crops also provided a tempting food supply for forest birds and mammals. In South Gippsland, 'the scrub surrounding the little clearings was alive with wallabies that wrought great damage to the selectors' grass' (Holland 1929: 158). 'In a small clearing they would eat the grass out. At dusk they would emerge from the scrub on all sides and feed there till daylight, then disappear into the bush' (South Gippsland 1972: 34). Three trappers caught 1,500 wallabies in one winter (Hartnell 1974: 48) and in Central Gippsland selectors combined to kill large numbers of wallabies in special drives (Adams 1978: 20).

In the Otways the native bush rat was a major destroyer of crops (*Colac Herald* 1886) In the nearby Heytesbury Forest, wallaby damage led farmers to build wire-netting fences, combine in shooting drives, keep dogs, set snares, and employ children to chase them off (Fletcher 1985: 277). In Northern Tasmania settlers were limited to growing potatoes,

for there was little hope of doing much in the way of wheat and oat growing, on small patches of land surrounded by scrub which harboured opossums, wallabies, bandicoots, and other vermin, that ate down the cereals as fast as they grew (Fenton 1964: 57).

In Northern NSW and Southern Queensland, clearance led to plagues of birds (cockatoo, parrot and lorikeet) and mammals (bandicoot, flying fox, wallaby and

brushpossum) feasting on newly planted crops (Frith 1977: 12; Pfeffer 1991: 45). In the Clarence River Valley of NSW,

The maize that was planted in the day would be visited by bandicoots at night ... When the plants appeared above ground the paddymelons [wallabies] and native companions [large birds] came on the scene. The former devoured the growing maize like cattle and as their visits were at night they were difficult customers to deal with. The native companions ... were very destructive and one of those birds would soon destroy an acre of maize. ... [When] the maize began to cob ... the cockatoos, parrots, redbills and opossums took up the running. ... The cockatoos preferred the maize when the grain was soft and one bite from their strong bills was sufficient to leave the grain exposed. With some hundreds in a field it is easy to understand what destruction would take place even in a couple of minutes as once the husk protecting the grain is cut through the first showers of rain will speedily destroy the whole cob or ear (McFarlane 1980: 46-7).

On the Atherton Tableland, an experimental Village Settlement, where selectors lived close together in a village and walked to their holdings, was abandoned due to crop losses which forced farmers to spend the night in their fields (Allen 1990: 4). One selector recorded in his diary,

Bandicoots brought [dug] the seed up and wallabies would eat off the young grass. All paddocks had to be wire-netted in ... When the corn [maize] was about ripe the white cockatoos would come in flocks to eat it. They took a lot of your time keeping off it. One year we had a plague of white tail rats. You could go around of a night with a hurricane lamp and a stick knocking them off the corn cobs (Allen 1990: 20; see also Birtles 1982: 52).

These settlers quickly realised that as these pests lived in the scrub, clearing as much of the scrub as possible was an effective way of reducing their damage. This is probably one of the major reasons why settlers did not leave patches of forest undisturbed to protect watercourses or as woodlots. Settlers also lobbied strongly for government State Forests and reserves to be opened for settlement on the grounds that they harboured animals which ate their crops (Adams 1978: 111; Collett 1994: 129; Henderson 1980: 449; NSW, Royal Commission 1908: 679).

## PREDATORS

The introduction of European livestock provided an increased food supply for native predators which lurked in the uncleared forest. In South Gippsland eagles and dingoes indirectly forced farmers to abandon sheep. Sheep, especially the lambs, could only be protected at night by being locked in high-fenced yards. However, in the wet climate the yards were perpetually muddy and the sheep

contacted foot rot (South Gippsland 1972: 114, 261). In Central Gippsland in the 1880s the selectors made a concerted effort to kill all dingoes, only to find that without any predators, wombat and rabbit numbers soared (Legg 1992: 165-8). In Southern Queensland dingoes, hawks and tiger cats (spotted tail quolls) feasted on introduced poultry (Pfeffer 1991: 45).

While Tasmania had no dingoes, it had a wide range of native carnivores, including the Thylacine (Tasmanian tiger or marsupial wolf), Tasmanian devil and native cats (quolls).<sup>12</sup> All of these lived in dense scrub, but tended to hunt nocturnally in lightly treed clearings. When Europeans first arrived in Tasmania the carnivores were scarce. However, as settlers cleared forests and introduced livestock they increased the hunting habitat and food supply of these animals and their numbers multiplied. Most damaging was the elusive, wolf-like thylacine, which quickly developed a taste for sheep. In 1886 it was claimed that they killed 50,000 sheep a year and on one property 700 out of 2,000 sheep were taken in one year. The Van Diemen's Land Company offered a bounty for thylacines which was twice that for wild dogs and between 1840 and 1910 employed a special thylacine trapper, known as the 'tiger man'. At its Woolnorth property on 10 out of 35 days in winter 1897 all work was abandoned as all hands were sent out into the scrub to capture or scare away thylacines stalking the flocks (Guiler 1985: 15-28, 95-7).

Secondary clearance of the thylacines was very difficult and expensive. Nocturnal and adept at using the scrub as cover, thylacines were rarely seen. Shooting parties and drives were ineffective. Thylacines were large enough to kill or frighten off most dogs. Poisoned baits failed as the thylacine only eats what it has killed. Only skilled trappers could hope to catch them and their efforts had little effect on numbers. Rather trappers probably just 'harvested' surplus numbers without reducing the core population (in much the same way as rabbit trapping had little effect). Instead the disappearance of the thylacine came about without human intervention. Around 1905 their numbers were devastated by a distemper-like epidemic (Guiler 1985: 28).

## CONCLUSION

Studies of European settlement in Australia have tended to focus on exotic pests. These have been characterised as opportunists. The processes of settlement, particularly clearing, ploughing and the introduction of hooved grazing animals, disrupted the Australian environment. Exotic plants and animals, it has been widely held, seized the opportunities created by this disruption and established themselves. Lacking predators and supposedly superior to Australian competitors, a wide variety of these newcomers multiplied rapidly and some became very costly pests.

However, when the high-rainfall forests were settled this story does not hold true. In these regions the introduction of European farming required the total destruction of the natural heavily forested environment. Here there should have been many opportunities in the first few years for exotics to establish themselves and thrive. Instead, a different pattern occurred. The settlers were beset by pests taking advantage of the opportunities provided by forest clearance. However, these pests tended to be indigenous rather than exotic.

Slashing the scrub, ringbarking the tall trees and burning the dried vegetation, mimicked natural disturbances which forest plants had developed effective strategies to recover from. Clearance was immediately followed by regrowth and further (or secondary) clearance by further regrowth. Disruption of bird populations and new food sources encouraged plagues of destructive insects. European crops were devoured by indigenous marsupials and birds. Native predators feasted on introduced animals.

The secondary clearance of these Australian pests imposed heavy costs on the struggling selectors. Labour and capital was diverted from farm building to just maintaining what had already been established. Regrowth had to be continually slashed and burnt. Crops eaten by insects, birds or marsupials had to be resown. Valuable stock killed by predators had to be replaced and strong fences erected to minimise further losses. Important tasks had to be postponed while pests were chased off or hunted. In some regions these costs were too high and farms were abandoned.

The resilience of the forest spurred farmers on to clear as much as possible. Forest remnants were hated as harbourers of pests. Australian pests could only be defeated by total Europeanisation of the landscape.

After ten to twenty years farmers in some regions had succeeded in replacing the forests with European-style pasture. With continual clearing and secondary clearing they had tamed the environment and the threat from Australian pests had greatly receded. However, they then began to face an increasing threat from exotic pests. The new grasslands they had created were now open to rabbits, Scotch thistles and ragwort. These exotic pests were very well suited to taking advantage of opportunities in a settled farming environment.

## NOTES

<sup>1</sup> The author thanks the Australia Research Council for funding of this research.

<sup>2</sup> Work on *The Land of the Lyre Bird* commenced in 1913, but its completion was delayed by World War One. The model for its unusual format may have been T.F. Bride (ed.), *Letters from Victorian Pioneers*. This was an anthology of over 50 accounts of settlement, originally collected by Governor Charles La Trobe in the 1840s and 1850s and eventually published by the Public Library of Victoria in 1898. I am not aware of any other similar publications from this period.



<sup>3</sup> Today virtually nothing of the 'Great Forest' remains. Indeed the most striking characteristic of this region is its steep treeless hills.

<sup>4</sup> The areas occupied and cleared were not recorded in official statistics.

<sup>5</sup> Dense high-rainfall forests also occurred in south west Western Australia. However, as their clearance for agriculture mainly took place after World War One they are not considered here.

<sup>6</sup> Botanically, eucalypt forests, no matter how wet they may be, are not classified as rainforests. Rainforests are characterised by closed canopies consisting of a wide variety of tree species. Eucalypt forests have an open canopy consisting almost entirely of eucalypts. In Australia the same high-rainfall environment suits rainforest or eucalypts. Which occupies an area is often due to the past history of bushfires, for eucalypts are much better adapted for recovering from fire. This often results in forests which are predominantly eucalypt, but with rainforest along the moist gullies (which are less likely to burn).

<sup>7</sup> Only the Californian Redwood (which also grows in high-rainfall forests) is taller than the Mountain Ash.

<sup>8</sup> New settlers were often confused by the common description of these immense forests as scrub (South Gippsland 1972: 263). At first the term scrub only applied to the understorey, but over time came to be applied to the whole forest.

<sup>9</sup> The technique may have come from America or from European island colonies in the Atlantic and Indian Oceans. It may even have been spontaneously reinvented by colonists between 1800 and 1820.

<sup>10</sup> In the temperate forests of NSW, Victoria and Tasmania, May to September were the wetter months and December to March the drier, however in the tropics of Queensland the pattern was reversed.

<sup>11</sup> Further research needs to be done into these regions where farming was almost totally abandoned. Unfortunately as settlers left, records were lost or dispersed and with little population today there is no impetus for published histories or historical societies. As always history is written by the victors.

<sup>12</sup> Thylacines and Tasmanian devils had inhabited the mainland, but at the time of European settlement were extinct. The commonly held (though entirely unconvincing) explanation of their extinction there is that they were unable to cope with the Aboriginal introduction of dingoes about 5,000 years ago. However, in Tasmania the rapid spread of feral dogs in the nineteenth century appeared to have little impact upon thylacines and devils.

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