Chapter 1
AGRICULTURE

The use of the word 'agriculture' in relation to Australian Aboriginal people is not something many Australians would have heard. However, if we go back to the country's very first records of European occupation we discover some extraordinary observations which provide a picture of what the Australian explorers and pioneers witnessed and how that contests the notion that Aboriginal people were hunter-gatherers.

When Europeans began their classification of eras and the peoples of the world they decided that five things signified the development of agriculture: selection of seed, preparation of the soil, harvest of the crop, storage of the surpluses, and large populations and permanent housing.[10]

Rupert Gerritsen outlined the various theories on the preconditions for incipient agriculture but concluded that Australia may have gone well beyond the incipient stage.

'People farmed in 1788, but were not farmers,' Bill Gammage declared, and went on to say:

> *These are not the same: one is an activity, the other a lifestyle. An estate may include a farm, but this does not make an estate*

10 Gerritsen, 2008, pp39–41 and 62

> *manager a farmer … In 1788 similarly, people never depended on farming. Mobility was much more important. It let people tend plants and animals in regions impossible for farmers today, and manage Australia more sustainably than their dispossessors. It was the critical difference between them and farmers … Europeans think farming explains the difference between them and Aborigines. There must be a way of exploring those differences and their momentous consequences.*[11]

We need to know more. We need more people to know it so let us have another look at what the first Europeans saw.

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Imagine you are riding beside the explorer and surveyor Major Thomas Mitchell (1792–1855). He's an educated and sensitive man and would have been great company, if a little eccentric. He's a great bushman, and a poet and painter, but also a hot head. Under some circumstances he is obstinate and difficult and is credited with fighting the last duel in Australia, although he only succeeded in shooting a hole in his opponent's hat.

As he crosses the Australian frontier, he describes what he sees: '… the grass is pulled … and piled in hayricks, so that the aspect of the desert was softened into the agreeable semblance of a hay-field … we found the ricks or hay-cocks extending for miles.'[12]

And later:

> *the seed is made by the natives into a kind of paste or bread. Dry heaps of this grass, that has been pulled expressly for this purpose of gathering the seed, lay along our path for many miles. I counted nine miles along the river, in which we rode through this grass only, reaching to our saddle-girths, and the same grass seemed to grow back from the river, at least as far as the eye could reach through a very open forest.*[13]

11 Gammage, 2011, p281
12 Mitchell, 1848/1969, p90
13 Mitchell, 1839, Vol. 1, pp237–38

Mitchell also records his astonishment at the size of the villages. He noticed:

> *some huts... being large, circular; and made of straight rods meeting at an upright pole in the centre; the outside had first been covered with bark and grass, and the entirety coated over with clay. The fire appeared to have been made nearly in the centre; and a hole at the top had been left as a chimney.*[14]

He counts the houses and estimates a population of over one thousand. He's disappointed that nobody's home, it's obvious they have only just left and the evidence is everywhere that they have used the place for a very long time.

One of Mitchell's party comments that the buildings were, 'of very large dimensions, one capable of containing at least 40 persons and of very superior construction.'[15]

If you had been with explorer George Grey in Western Australia in 1839 you might have wondered about the wisdom of your decision. Grey had no bush experience other than schoolboy idolatry of British explorers and his Kimberley adventure was a disaster. The whale boats, overloaded and ill designed for the assignment, were wrecked on the beach at Gantheaume Bay and the party had to walk the remaining distance to Perth.

Thankfully Grey was a prolific diarist and, despite his predicament, he recorded all that he saw. He was surprised to find a village on the Gascoyne River where the houses were, 'built of large-sized logs, much higher, and altogether of a very superior description to those made by the natives of the south-western coast.'[16]

He was even more surprised to find land that appeared to have been cultivated. He wrote:

> *(fell) in with the native path we quitted yesterday; but now became quite wide, well beaten and differing altogether by its permanent character, from any I had seen in the southern part of this continent ... And as we wound along the native path my*

14 Mitchell, 1839, Vol. 2, p194
15 Andrews, 1986, p146
16 Grey, 2009, pp6–7

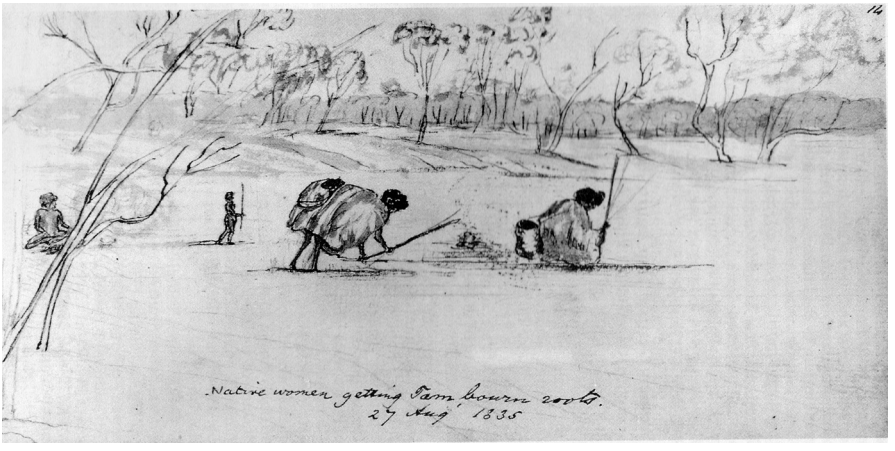
wonder augmented; the path increased in breadth and its beaten appearance, whilst along the side we found frequent wells, some of which were ten and twelve feet [3–4 metres] deep, and were altogether executed in a superior manner. We now crossed the dry bed of a stream, and from that emerged upon a tract of light fertile soil quite overrun with warran plants [the yam plant, Dioscorea hastifolia], the root of which is a favourite article of food with the natives. This was the first time we had seen this plant on our journey and now for three and a half consecutive miles [5.6 kilometres] traversed a piece of land, literally perforated with holes the natives made to dig this root; indeed we could with difficulty walk across it on that account whilst the tract extended east and west as far as we could see. It is now evident that we had entered the most thickly populated district of Australia that I had yet observed, and ... more had been done to secure provision from the ground by hard manual labour than I could believe it in the power of uncivilized man to accomplish. After crossing a low limestone range we came upon another equally fertile warran ground ... and (next day) passed two native villages, or as the men termed them, towns — the huts of which they composed differed from those in the southern districts, in being built, and very nicely plastered over the outside with clay, and clods of turf, so that although now uninhabited they were evidently intended for fixed places of residence.[17]

When John Batman, one of the founders of Melbourne and the colony of Victoria, left one of his men, Andrew Todd to guard the stores at the first landing at Indented Head, Victoria, in June 1835, Todd whiled away the time with the local Wathaurong people, talking to them and sketching.

One of these sketches shows a line of women digging for yam daisy, or Murnong [*Microseris lanceolata*] tubers — a little sweet potato that was a staple vegetable of the Wathaurong. The area the women were working is

17 Gerritsen, 2008, p33

perfectly clear because they have made it so in order to most efficiently harvest their crop.



Yam diggers at Indented Head, Victoria, 1835. Yams were a staple of the First People's diet.
Illustration JH Wedge

In 1841, Chief Aboriginal Protector of the Port Phillip District (1839–49), George Augustus Robinson, recorded:

> *the native women were spread out over the plain as far as the eye could see, collecting Murnong, or in this language pannin, a privilege they would not be permitted except under my protection. I inspected their bags and baskets on return and each had a load as much as she could carry.*[18]

When Mitchell arrived at the Victorian Grampians in 1836 he saw 'a vast extent of open downs … quite yellow with Murnong' and 'natives spread over the field, digging for roots'.[19] Captain John Hunter, captain on the First Fleet, reported in 1788 that the people around Sydney were dependent on their yam gardens.[20] In Sunbury, Victoria, in 1836 settlers, including Isaac Batay and Edward Page, observed that people had worked their gardens so well and for so long that large earthen mounds were created during the process — but so little

18 Robinson, 1841/1988, p326
19 Mitchell, 1839, (from Gott, 2005, p1204)
20 Hunter, 1793/1968

consideration was given to this land management that only a few years later Europeans couldn't say who or what had created these prominent terraces.

This last observation is evidence of a deliberate farming technique, one which any modern farmer would recognise as good soil management. The fact that explorers and settlers report seeing such activity in so many different parts of the country is an indication that it wasn't an isolated technique. Cultivation was a feature of Aboriginal land use.[21]

The Assistant Protector of Aborigines of the Port Phillip District (1839–42), before it became the colony of Victoria, Charles Sievwright, decided to introduce the European theory of farming to the Aboriginals assembled at his Lake Keilambete Protectorate. They took one look at his English ploughing technique and immediately hoed the soil across the slope of the land and broke down all the larger clods. They'd been farming this land for thousands of years and weren't about to allow erosion to ruin the land.

Similarly, Robinson, when entering the Mumbuller Valley near Pambula, New South Wales, was informed by a local Elder, Yow.e.ge, that all the land thereabouts was his farm. The Yuin man was aware of the word Europeans used for their food production sites and this comment indicates that he was trying to impress on Robinson that his people were also cultivators.

Colonist, Isaac Batey, when commenting on the disappearance of the yam daisy, remembers the women harvesting and washing the tubers in vast quantities. However, soon after his arrival in 1846 he notes:

> *Where once abundant they have become quite extinct for the district where the writer was raised in this 1909 might be searched without discovering a solitary example ... Elsewhere it has been intimated that our domestic animals had eaten them out, yet there was another factor of destruction in the soil becoming hardened with the continuous tramping of sheep cattle or horses. In proof of that Mr Edward Page said "'when we first came here I started a vegetable garden, the soil dug like ashes." It has to be added it was a spot free of timber or scrub of any description, the soil a reddish loam of great depth.*[22]

21 Arkley, 2000, p317
22 Batey, quoted in Frankel, 1982, p44

Dr Beth Gott, a renowned ethnobotanist from the School of Biological Sciences at Monash University, has established a garden at the university with examples of plants eaten and used by Aboriginals before colonisation. In 'Ecology of Root Use by the Aborigines of Southern Australia' Gott explains that the effect of the systematic and repetitive tilling process aerated the soil, loosened it for seed germination and root penetration, and incorporated ash and compost material with the plants. She said it, 'bore sufficient resemblance to agriculture/horticulture to be regarded as a sort of natural gardening'.[23]

Archaeologist, Emeritus Professor David Frankel, quotes the early observations of Batey:

> *the soil (on a sloping ridge) is rich in basaltic clay, evidently well fitted for the production of myrnongs* [*Murnong*, Microseris lanceolata]. *On the spot are numerous mounds with short spaces between each, and as all these are at right angles to the ridge's slope it is conclusive evidence that they were the work of human hands extending over a long series of years. This uprooting of the soil, to apply the best term, was accidental gardening, still it is reasonable to assume that the aboriginals were quite aware of the fact that turning the earth over in search of yams, instead of diminishing that form of food supply, would have a tendency to increase it. On arriving in 1846 and thereafter myrnong digging was unknown to us, for the all sufficient reason that livestock seemingly had eaten out that form of vegetation.*[24]

This is a description of terracing. So pronounced were the features that Batey was convinced they would endure for one hundred years.

The unusual quality and friability of the soil was reported by many colonists in the first years of settlement. The kangaroo grass in the Colac region of Western Victoria was so high it concealed the flocks of the first settler, GT Lloyd. Orchids, lilies and mosses flourished among the grain crop and: 'The ground had been so protected by mosses and lichens so thick that it was difficult to ride across the country at any pace exceeding the "farmers" jog trot.'[25] Lloyd

23 Gott, 1982, p65
24 Frankel, 1982, p43–44
25 Le Griffon, 2006, p51

says his horses sank to the fetlock into the soil as if it were sponge. 'With the onslaught of the sharp little hooves and teeth of herbivore sheep, goats, pigs and cattle driven in by the settlers, the ground covers were destroyed and the dews ceased.'[26] Once the soil hardened, rains ran off the compacted surfaces and rivers flooded higher than the Aboriginals had ever seen. This created a new management problem for the soils of this district and others.

The persistent frequency of such colonial reports inspired Gott to conduct her own experiment.[27] The Nodding Greenhood (*Pterostylis nutans*) was another significant tuberous food source for Aboriginal people and the harvesting would have continually disturbed the soil as well as incorporating ash and compost below the surface. Gott found that after harvesting the greenhoods 75% of the pre-harvest density was restored within fourteen months. Harvesting on a cyclical mosaic over two to three years would see no diminution of supply, but would instead fertilise and enhance the crop.

These management practices created anomalous vegetation distributions. As Bill Gammage explained in *The Biggest Estate*, European settlers were surprised to find that the best Australian soils were virtually devoid of trees.

Aboriginal farmers had used fire to clear areas of land, which they were careful to separate with belts of timber. Like our contemporary farmers, Aboriginals left the forest on poorer soils and cleared the best soils so they could create pastures and croplands. Gammage quotes the memory of an early settler:

> *With the exception of alluvial land, good timber is very seldom found on good land. The fertile plains in the interior are wholly destitute of it* ... [around Sydney] *the best forest lands are invariably thinnest of trees; and in general it will be found that the best lands are least encumbered with timber.*[28]

There is still much to be learnt about Australian soils and how they were managed, but the explorers' journals suggest that colonial settlers ignored the Aboriginal methods and contemporary Australians still suffer from the result.

The Aboriginal methods of land management were not just practical but aesthetically pleasing. Mitchell noticed the beauty of the country but considered

26 ibid.
27 Gott, 2005, p1205
28 Gammage, 2011, p190

it an accident: 'We crossed a beautiful plain; covered with shining verdure, and ornamented with trees, which, although "dropt in nature's careless haste", gave the country the appearance of an extensive park.'[29]

In a more pragmatic passage Mitchell reported from the Belyando River, Central Queensland:

> *We crossed some patches of dry swamp where the clods had been extensively turned up by the natives ... These clods were so very large and hard that we were obliged to throw them aside, and clear the way for our carts to pass. The whole resembled ground broken with the hoe ... There might be about two acres in the patch we crossed and we perceived at a distance other portions of the ground in a similar state.*[30]

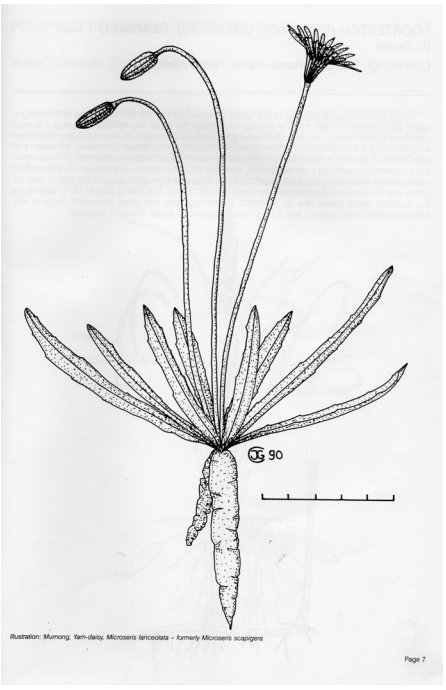
Near the Hunter River, New South Wales, Mitchell noticed the peculiar furrowed appearance of the land and pondered the cause of this feature.[31] In *A Million Wild Acres*, Rolls noted that settlers and surveyors of the district commented that, ' the hills have a look of a park and Grounds laid out.' Others saw what they considered 'ploughed land.'[32]

The yam has virtually disappeared from the land but a large field of this tuber has been discovered along the Bundian Way, near Delegate in New South Wales.By chance, sheep have never been grazed there and supherphosphate has never been distributed, so these unusual conditions allow us to study the yam in conditions similar to those in which traditional Aboriginals would have cultivated the tuber.

The yam was a crucial plant in the economy of pre-colonial Aboriginal Australia but few have examined this productive tuber. Surely we can no longer ignore such a valuable plant or the commercial opportunities it offers.

It is heartening, therefore that some members of the East Gippsland Aboriginal community, encouraged by Beth Gott's research, are conducting experiments in yam cultivation. Seven plots on different soils and under

29 Mitchell, 1839, Vol. 1, p90
30 Mitchell, 1848/1969, p274
31 Mitchell, 1839, Vol.1, p14
32 Rolls, 1981, p37



Above: Seed head of the yam daisy.
Photograph Beth Gott
Right: Drawing of the yam and tuber.
Illustration John Conran

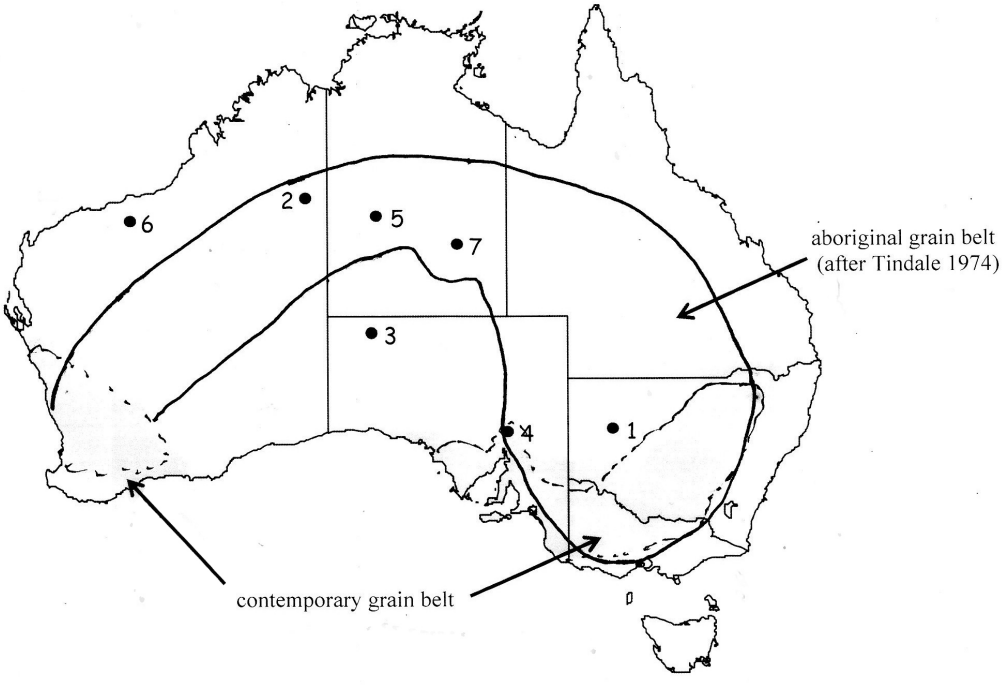
different management regimes have been established and scientific testing of the results is underway.

Grains

Even though it was convenient for many European settlers not to acknowledge the evidence of an Aboriginal agricultural economy, there were some who recorded their impressions and some of those speculated on what circumstances had produced this 'gentleman's park'. Records of the land's cultivated appearance are common in the early records and are spread across the continent. These early records were so persistent in their description of grain harvests from all parts of the country that Norman Tindale was able to draw a map of Indigenous grain areas.

Areas beyond the high rainfall zones of the coastal regions favoured grain as the staple crop whereas in wetter areas yam production took over.

Tindale discovered that the people who harvested grain in these areas saw their methods as so central to their identity that they referred to themselves as 'grass people' by using the word 'panara' or similar forms of that word.



Aboriginal grain belt:The Aboriginal grain harvest map is based on the research compiled by Norman Tindale 1974 and shows the extent of the harvest compared to the current Australian grain belt.*

** 1. Allen, 1974; 2. Cane, 1989; 3. Cleland and Johnston, 1936; 4. Cleland and Johnston, 1939a; 5. Cleland and Johnston, 1939b; 6. Maggiore, 1985; 7. O'Connell 1983*

RG Kimber, contemporary researcher and ethnographer, compiled an enormous body of evidence from people who observed Central Australian Aboriginals engaged in seed propagation, irrigation, harvest, storage and the trade of seed across the region. One of Kimber's informants was the bush worker and cameleer, Walter Smith.

Smith, who was proud of both his Welsh and Arabana Aboriginal heritage, told Kimber how seed was broadcast by hand, covered lightly with soil and irrigated:

> *They chuck a bit there [at a favourable locality]. Not much, you know, wouldn't be a handful. [They] chuck a little bit, spread it [broadcasting fashion] you see — one seed there, one seed there, ...*

> *[of] course they chuck a little bit of dirt on, not too much though. And soon as first rain comes ... it will grow then.*[33]

Smith is describing the method of taking seed into other areas where it didn't occur naturally and trading it for other goods or giving it as simple gifts of reciprocity.

The idea of agriculture was so well advanced that seed was traded as a cultural item.[34] Several explorers and commentators witnessed grain in small sealed parcels being traded to distant relatives. This selection and trade of seed over such a wide area and such a long period gradually changed the morphology of the grains and other Aboriginal food sources — and produced the qualities which agriculturalists recognise as being the result of domestication.

The science of baking developed alongside the seed harvests. Richard Fullagar, Australian Museum, and Judith Furby, University of New South Wales, found grindstones at Cuddie Springs, near Walgett, western New South Wales, which had been used to grind seeds more than 30,000 years ago, making these people the world's oldest bakers by almost 15,000 years, as the Eygyptians, the next earliest, didn't bake until 17,000 BC.[35]

And it wasn't a one-off occurrence. Archaeologists found a 25,000-year-old grindstone at distant Kakadu in the Northern Territory. The bakers of antiquity. Why don't our hearts fill with wonder and pride?[36]

Alice Duncan-Kemp, who grew up with Aboriginal people on her father's station, Mooraberry, near Bidourie in Queensland around 1910, described the Katoora ceremony where:

> *From their woven dilly bags the gins sprinkled seed food over the ground ... Katoora or barley grass seed lay in little hillocks, already swelling and creeping to repeated applications of water which the gins poured on them to make "'wunjee aal the same walkabout (grass to grow)"'.*[37]

33 Kimber, 1984, p16
34 Gerritsen, 2008, p60
35 Rolls, 2009, Ch. 7, p7
36 ibid.
37 Duncan-Kemp 1934, pp146–47

The explorer, Hamilton Hume, in frank conversation with Robinson, said that he had been on the exploration parties of Captain Charles Sturt (1795–1869) and that, 'on the Darling the Natives gather grain from the wild oats (a round grain) and grind it between two stones and make a paste and eat it, the same is done by the Natives to the northward.'[38]

Typical of the jealousy prevalent among the explorers, Sturt said that, 'Mitchell says nothing of this, indeed knows but little of their customs.'[39] It's true, however, that when Mitchell observed haycocks extending for miles over a stubble paddock where every stalk had been cut he wondered if, 'the heaps of grass had been pulled here, for some purpose connected with the allurement of agriculture.'[40]

When in 1845 Sturt first saw the harvested grass, *Panicum laevinode*, near Lake Torrens he found it spread out to dry and ripen on the sloping banks of a stream. It's significant that the people were engaged in a harvest while Sturt and his party were struggling to stay alive. 'The heat during the day had been terrific … we were unable to keep our feet in the stirrups, and the horses perspired greatly.'[41] One of the party, Poole, suffered so badly from the heat and scurvy that his muscles stiffened and the roof of his mouth fell away. He was sent back to the base but died on the way.

In this land of extreme heat and aridity the Aboriginal inhabitants had built comfortable houses and produced grain surplus to their immediate requirements. This is an important social and economic achievement — surplus food production is one of the acknowledged characteristics of sedentary agriculture.

Even further to the north Sturt saw, 'grassy plains spreading out like a boundless stubble field, the grass being of the kind from which the natives collect seed for subsistence at this season of the year … large heaps that had been thrashed out by the natives were piled up like haycocks.'[42] A boundless field of stubble? Haycocks? Sturt was observing a major harvest that must have provided a great surplus for the large number of people known to inhabit the

38 Robinson 1841/1998, Vol. 4, p207
39 ibid. p207
40 Mitchell, 1839, p238
41 Sturt, 1849, p69
42 ibid. p71

region. Regardless of the evidence before his eyes, Sturt resorts automatically to the word 'subsistence'.

On a later expedition one of Sturt's party, Brock, recorded his impression of land near Evelyn Creek: 'here it is quite like a harvest field ... In every hollow we found the remains of the natives' labour in the shape of the straw from which they had beaten out the seed'.[43]

The party remarked on the prodigious quantities of grain harvested. This was the same grass Mitchell had seen in other areas, *Panicum decompositum*, commonly called barley grass or native millet and known to Aboriginals as cooly or parpar. In fact one of the areas Sturt visited in 1845 was called Parpir, and his journal records that they had been riding through vast and pleasant grasslands.

Sturt also noticed that, 'The grass consists of *Panicum* and several new sorts, one of which springs from the old stem. The plains were verdant indeed, the luxuriant pasturage surpassed in quality ... anything I had ever seen.'[44]

Mitchell, Sturt and others spoke of the prodigious growth of oat grass and how much their stock and horses enjoyed and prospered on the feed. Today we refer to that grass as kangaroo grass and it is the mainstay of almost every 'unimproved' pasture in the country. In the past its seed would have been a boon to the Indigenous inhabitants.

Another grass, Coopers clover (*Trigonella sauvissima*), had also been grown and harvested by Aboriginal people but was also favoured by introduced stock. Its loss impacted severely on Aboriginal economies. Mitchell first saw it in a lakebed where it was:

> *at this time covered with the richest verdure, and the perfumed gale which ... heightened the charm of a scene so novel to us. I soon discovered that this fragrance proceeded from the plant, resembling clover, which we found so excellent as a vegetable during the former journey.*[45]

The loss of this dietary component was crippling to the Aboriginal economy because, as with the oat grass, yam and nardoo, introduced stock zeroed in on

43 Brock, 1975, p133
44 Sturt, 1849, p155
45 Mitchell, 1839, Vol. 2, p65

these plants wherever they grew and as a consequence the Indigenous people lost both their habitation sites and one of their principal forms of sustenance.

Settlers were assiduous in preventing Aboriginal people from returning to these locations, the richest areas of Australia. But one Wimmera settler noted that after three or four years of grazing, 'Many of our herbaceous plants began to disappear …the silk grass began to show itself in the edge of the bush track … the long deep rooted grasses … have died out.'[46]

Nardoo (*Marsilea drummondii*) was another crucial plant because of its ability to grow on the beds of shallow lakes in otherwise inhospitable regions. As the lake dried explorers observed Aboriginals sweeping the seed into vast stockpiles and processing it into flour, the excess of which was stored in a variety of vermin-proof vessels. Many explorers, including Giles and Ashwin, survived difficult stretches of their journey only after plundering these reserves.

The grain harvest supported populations so large that many hearing of this for the first time will be amazed. This is our great desert, the dead heart of Australia — it goes against our mythology that insists on its hostility to humans. Our poets laud the emptiness as a psychological marker for all Australians.

As recently as October 2013 an article in *Australian Geographic* about Australian deserts talked about the terror at the heart of Australia's geography but managed not to mention Aboriginal use of the land at all even though, as late as 1875, Lewis saw 350 people in these regions and others had seen 500 or more.[47]

Good anecdotal evidence comes from the Australian author, Mary Gilmore, who recorded the memories of her family, some of the first settlers in the New England region of New South Wales. Her uncles recalled a similar ceremony to the Katoora (described above by Duncan-Kemp) as well as dam building, irrigation and harvests.

And on the creek where Bourke and Wills starved to death the explorer, McKinlay, noted, 'The whole country looks as if it had been carefully ploughed, harrowed, and finally rolled.'[48] Descriptions like this are common in the first

46 Morcom and Westbrooke, 1998, p286
47 Kimber, 1984, p15
48 McKinlay, 1861, p50, in Gerritson, 2008

colonial records, the settlers hardly had to fell a tree to begin grazing stock, but almost none credited these conditions to Aboriginal management.

Kate Langloh Parker was a writer from northern New South Wales and one of the first to record Aboriginal stories. (Her second husband was the author Randolph Stow). She described these harvests in great detail as late as 1905. Australia was already federated but the Yuwaaliyaay were still harvesting grain by traditional methods. The barley grass was cut and thrown into a brush-fenced compound and then set alight and stoked continuously so grain fell from the stems into a collection pit prior to threshing.[49]

When early settlers found an Aboriginal tool like a hoe it was dismissed because they had convinced themselves that there was no agriculture in Australia. If you're not looking at these tools with an open mind they are considered aberrations. Alter your perspective by a few degrees and the view is different. Robert Etheridge was palaeontologist to the geological survey of New South Wales and the Australian Museum at Sydney. In 1894 he speculated on the use of these 'hoes' and concluded that the myth that Aboriginal people had no knowledge of husbandry was a mistake based on prejudice.[50]

Many northern Australian museums display long, knife-like implements, which usually bear legends such as 'of unknown use' when in fact they are juan knives — long sharp blades of stone with fur-covered handles, which the explorer Gregory described the Aboriginal people using to cut down the grain.[51]

In 2010 I was shown a couple of stone implements found in the Colac region. They were long, pear-shaped plates almost as large as the blade of a canoe paddle. I saw a similar object at Cape Otway (near Colac) in 1998 but the purpose of these objects is not known with any certainty. However, similar objects in Queensland and New South Wales have been found to be platforms for food preparation. Are they ceremonial objects or kitchen tools? Only analysis of the surfaces can tell us definitively what they were used for and so far little analysis has been done.

49 Gerritsen, 2008, p43
50 Etheridge, 1894, p110, in Gerritsen, 2008
51 Gerritsen, 2008, p42 and 78

Domestication of Food Plants

The scholar Rupert Gerritsen assembled a large body of material about the progression of people worldwide towards sedentism and agriculture. One of the tests for this progress is the domestication of plants:

> *When plants become 'domesticated' as the result of a human induced selection regime, they undergo changes in form and structure to such an extent that they often become a new species. Genetic change takes place in this process and the subject plants become dependent on humans for the continuance of their life cycle.*[52]

Some of the changes that occur in plants after domestication are: reduced dormancy; a tendency to ripen simultaneously; and the development of a tough rachis around the seed which inhibits germination unless associated with artificial watering. Harvesting and winnowing techniques also contribute to changes in seed characteristics. Just such qualities have been found in the initial, although belated, studies of Aboriginal grains. Gerritsen brought together the work of Zohary and others to show that Aboriginal people were performing the same cropping activities as those that led to the domestication of wild wheat and barley in Europe. These researchers claim that a tough rachis developed within just twenty to thirty years of this style of cropping to the extent that it prevented germination without an artificial watering regime.[53]

Australian grains became dependent on the interventions of Aborigines and the wide grasslands, monocultures of grain, were the result of deliberate manipulation by Aboriginal people.

Similarly the desert raisin, or bush tomato (*Solanum centrale*), used by Central Desert people for thousands of years, has become dependent on people for its propagation and spread. As a favoured plant it is most commonly found near campsites and is promoted by selective burning, further strengthening the reliance of the plant on human intervention.

Such is the plant's esteem in Central Desert culture that a good person is often described by its name. Custodians celebrate the plant in ceremonies,

52 ibid. p83
53 Gerritsen, 2008, p84

dance and song, and body painting often features its image. Surplus harvests were ground to a paste and rolled into balls, which could be used more than a year later.

The dearth of research on these plants should not infer a lack of evidence but rather a lack of interest and will to explore Aboriginal interaction with the plant communities of Australia. Some of these bush fruits and seeds are becoming popular in restaurants but yams and grains have attracted very little scrutiny. The need to undertake research on the Aboriginal economy is not only necessary for the mature understanding of how Aboriginal people lived but also of how and when human families spread across the earth.

In the last ten years researchers have begun intensive study of these plants and their Aboriginal associations and we need to encourage and support this research.

As one of Australia's most senior archaeologists confided to me after struggling to gain official interest in her excavation of a sophisticated village site in the Murray River region, it is easier for Australian archaeologists to get research grants overseas than for undertaking new areas of research in Australia.

Most archaeologists believe that the move towards sedentism is always associated with some form of agriculture and is described as the period of intensification. Bill Gammage is of the opinion that both yam and grain harvests required some form of sedentism but the 'power of Aboriginal spiritual sanctions' guaranteed that crops would not be interfered with by surrounding clans.[54] This precluded the necessity to stay by crops to protect them and allowed greater opportunities to travel and engage in prolonged cultural rituals.

Stories of ancestors teaching their people about selecting seed, sowing it and building dams are common in the grain areas. Alfred Howitt, Gippsland police officer and amateur anthropologist, records that the Dieri believed in mythological ancestors who distributed five major food plants. Peter Beveridge, from his property near Swan Hill, recorded the traditional stories of the Wati Wati and most of them have food production, soil preparation and storage of the surplus harvest as a central theme.

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54 Gammage, 2008, p14

Another grain cultivated and harvested by Aboriginal people was rice. These grains tended to be utilised above the Aboriginal grain boundary mapped by Tindale (see page 29).

I heard Ian Chivers, Adjunct Professor at Southern Cross University, discussing the potential of native rices on ABC Radio National in July 2012. He stressed the importance of the genome of the Australian rice because Asian rices were losing the characteristics protecting their immunity to diseases among other deleterious changes. In the conversation Aboriginal people were not mentioned so I rang him to discuss his research. He wasn't sure how involved Aboriginal people had been with the grain. They used them but did they plant them?

Chivers was interested in the idea of Aboriginal grain management but his focus had been on the economic potential for native grains in contemporary markets.

A book referred to me by Chivers' research partner, Frances Shapter, *Australian Grasses* by Fred Turner, doesn't mention Aboriginal people at all but a more recent paper by Chivers argues that, 'in Australia we have stunning examples of very long term grain food production that had no degrading impact on the environment, that did not require expensive fertilizers or pesticides, and grew without the need for irrigation water.'[55]

Aboriginal people made changes to the genomes and habits of these plants simply through the continuous interference in the plants' growth cycle and selection of seed for harvests. This process, conducted over long periods of time, is what scientists call domestication.

In his contribution to the magazine, *The Conversation*, Chivers writes, 'These long term cereal production systems were a feature of Aboriginal-Australia farming systems for thousands of years.'[56] Furthermore he suggests we should be:

> *looking at perennial grasses for our grain types, not annuals …*
> *Can you imagine a permanent pasture that also produces a grain*

55 Chivers, 2012
56 ibid. p2

crop in those years when the rainfall amount and timing permits? It would also be the pasture that is able to survive the drought that will inevitably occur without the need to re-sow once the drought breaks … This is a perennial grain-cropping system as it was used in the long-time past but which is still there for the discovery if we are wise enough to look.[57]

On 19 October 2012 Penny Wurm and Sean Bellairs from Charles Darwin University took the discussion further on ABC Radio's *Rural Report*. They remarked that rices had been used by Aboriginal people for thousands of years and, among other advantages, some species could be grown in brackish water.

These native rices were comparable to commercial rice and had a reddish colour, which they thought might appeal to culinary experts:

Native Australian rice has been harvested and consumed by Indigenous people for thousands of years (and) may have the potential to underpin a wild rice enterprise as a 'bush tucker', 'novelty' or gourmet product (either as grains or flour) for the tourism and niche gourmet markets.[58]

Like Chivers, Wurm and Bellairs believe these wild rices are a significant genetic resource for developing cultivars and for economic development in the Asia–Pacific region.

This is good news and hopefully it means Aboriginal people will be able to take advantage of the intellectual property they have invested in this plant. Sun Rice Pty Ltd assisted in the research and, as they stand to benefit from research results, I hope they'll respect the contribution Aboriginal people made to the research over thousands of years.

Irrigation

Many explorers and pastoralists saw dams and irrigation trenches but Walter Smith also saw them being built. Kimber records a conversation with Smith:

57 ibid. p2 and p4
58 Wurm et al, 2012, p1

The people would get in a line, using their digging scoops and larger coolamons. The clay and earth was scooped into the larger coolamons, which were passed along the line. Walter commented on the speed of the operation; with a line of people working the deepening of the favoured catchment area and the building of the bank could be done at the same time. When it was satisfactorily excavated, the people would trample the clay base. If ant nest material was nearby this was carried and trampled in to give a very firm base.[59]

A dam wall discovered on the Bulloo River floodplain in the Channel Country of south-west Queensland, was 100 metres long, two metres high and six metres at the base; it required 180 cubic metres of material to construct. The clay was mixed with gibber pebbles to create an earthen embankment across the catchment of several streams and was capable of holding 700,000 litres.[60] Godfrey's Tank in the Great Western Desert was named after one of David Carnegie's men. The site is surrounded by art and carvings and was estimated to have held over 40,000 gallons.[61]

Wiradjuri people in New South Wales also built large dams and then carried fish and yabbies in coolamons over large distances to stock the new waterholes.[62]

In 1875, Giles found a dam near Ooldea, South Australia (on the eastern edge of the Nullarbor Plain); it had a bank 1.5 metres high and 1.5 metres at the base. An overflow channel to allow floodwater to spill away without damaging the wall had been built on one side. Giles thought of the works as crude but, 'for a full week it watered seven men, 22 camels and filled up enough water containers to last them on a dry stage of 500 kilometres.'[63]

An extraordinary construction was found by early explorer SG Hubbe when looking for a stock route into Western Australia.[64] A clay and granite wall of 1.8 metres was built at the base of a granite outcrop. As the soil at the base of the

59 Kimber, 1984, p19
60 Rolls, 2005, p15
61 ibid. p16
62 Gerritsen, 2011, p25,
63 Rolls, 2005, p15
64 ibid. p15

dam was friable it had been faced with granite slabs. Steps had been cut into the dam wall and the catchment was so good that even the slightest shower would result in a substantial collection of clean water.

Sturt also found a large well north of Lake Torrens, South Australia, which was:

> *22 feet deep and 8 feet broad at the top. There was a landing place ... and a recess had been made to hold the water ... Paths led from this spot to almost every point of the compass, and in walking along one came to a village consisting of nineteen huts ... Troughs and stones for grinding seed were lying about ... The fact of there being so large a well at this point (a work that must have required the united labour of a powerful tribe to complete) assured us that this distant part of the interior ... was not without inhabitants.*[65]

Archaeologist John Morieson and students from Swinburne Institute recently investigated numerous wells at Kooyoora National Park, near Bendigo, and when cleared of accumulated debris they would fill to overflowing after only a few millimetres of rain. A few were capable of holding thousands of litres.[66]

Wells at Kooyoora NationalPark, near Bendigo, Victoria.
PHOTOGRAPH LYN HARWOOD

65 Sturt, 1849, p90
66 Morieson, personal conversation/demonstration with the author, 2009

Morieson and others investigating the construction of such wells speculate that they were deepened with the aid of repeated exfoliations of stone after fires were lit in the well and then cold water applied to the hot rocks causing large flakes of stone to lift away from the sides and bottom. Others suggest even the natural decomposition of the stone and continuous scraping over thousands of years with stone trowels would contribute to the deepening.

There were numerous methods employed to take advantage of the available rainfall. In the north-west goldfields of Western Australia people sowed the seeds of kurumi (*Tetracornia arborea*) in cracks in the clay pans to ensure propagation in the wet season. They created a stone arrangement on the bank to record the story of the collection, preparation and consumption of the harvested kurumi.[67] Morieson records similar baffling stone arrangements in Victoria, which may have been created for the same purpose.

Settlers and explorers from other areas have reported large well systems, miles of stream diversion and systematic flooding to prepare the ground for sowing seed. However, as soon as such wells were discovered they were commandeered by sheep and their shepherds because they were situated close to the croplands to which the sheep gravitated with unerring accuracy. (Settlers were not droving stock into new areas so much as simply following on behind until the sheep found the next crop or garden.)

It seems plausible that scientists could examine the origins of some of these dams and water storage systems to prove the involvement of Aboriginal people. A simple probe into the banks of dams situated on old grazing properties might register different construction techniques below the surface. The science would be exciting and the change it could bring about in Australian perceptions of Aboriginal engineering and labour would be profound.

Game or farm

Game hunting employed a much more reliable procedure than opportunistic kills in the field. Some of the earliest explorers noticed various interventions carried out by Aboriginal people when hunting. They saw massive poles which had been erected on opposing banks of waterways and speculated on the use of

67 Dix and Lofgren, 1974, pp73–77

these large, robust constructions. Later explorers were present when Aboriginal people strung fine mist nets across streams from such poles to catch ducks and other fowl. The nets were only in operation for short periods so as not to interrupt the ducks from following their natural path along the waterways. Mitchell wrote that:

> *The meshes were about two inches wide, and the net hung down to within five feet of the surface of the stream ... Among the few specimens of art manufactured by the primitive inhabitants of these wilds, none come so near our own as the net, which, even in quality, as well as the mode of the knotting, can scarcely be distinguished from those made in Europe.*[68]

The pastoralist, James Dawson, and Robinson, mention game drives or 'grand battues' where people were engaged in driving game across a 32 kilometre front to a dispatch point. Dawson reports on the co-operation of several tribes involving over 2,000 participants. One settler in Queensland found a, 'Kangaroo net fifty feet long and five and a half in width, made of as good twine as any European net.'[69]

Colonists witnessed these nets used in combination with kilometres of brush fences in large-scale trapping or battue operations. Remnants of the walls, outlining wings of these battues, can still seen in some parts of the country. Near Euroa in Central Victoria a massive system of stone walls connects natural rock outcrops. Lichen growth on the rock is claimed by some botanists to indicate they were constructed well before the period of contact with early European settlers. This particular drive brought kangaroos from a huge flat area to the foot of the range and then shuted them into a series of holding pens where narrow apertures could direct animals designated for slaughter one way and those to be released in another.

The stone works and nearby housing associated with these drives represents an incredible labour investment and a move towards sedentism comparable to that represented by the fish traps at Lake Condah and Brewarrina. Sites such as these are begging for further investigation.

68 Mitchell, 1839, Vol. 2, p 153
69 Gammage, 2011, p132

One researcher claims the Garden Range Aboriginal rock art site in the Strathbogie Ranges of Central Victoria, close to the battues at Euroa, depicts the activity of herding and farming kangaroos. Nonetheless, most of the tool workshops associated with these constructions, as well as the constructions themselves, still do not appear on the archaeological register of Aboriginal Affairs Victoria.

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Michael Archer of the Australian Museum puts a case for the use of kangaroos as a food and farm species. He and other scientists speculate that the culling of kangaroos by Aboriginal Australians had little impact on their populations because adult males were targeted. In demonstrating the sustainability of the industry Archer quotes studies on Mulyungarie Station in South Australia where the harvesting of 10,000 males a year over eight years saw an increase of animals from twenty to fifty per square kilometre.[70]

Kangaroo flesh has a low fat content and is free from impurities as the animals do not require chemical drenching. They can tolerate a harsh environment and, moreover, their feet do not break up the surface of the soil — or compact it — both of which lead to erosion.

The Aboriginal battue system of kangaroo and emu harvesting suggests a way of drafting animals without the need for shooters and this method may appease those city voters with an emotional attachment to our national emblems. Interestingly, the battues were associated with constructions that appear to be designed for predicting the solstice, a knowledge that Aboriginal people involved in the cultivation of plants would have needed.

Strangely though, when Ross Garnaut, who prepared the climate change policy for the Rudd Government in 2008, championed kangaroo farming as a way of conserving the land and cutting greenhouse gasses, because cattle are greater polluters than motor cars, the press could hardly contain their contempt.

70 Archer, 2002, p20

Still Not Convinced?

The sorts of activities described above were not isolated examples. Large numbers of people engaged in various agricultural activities were observed throughout Australia. Near Cooper's Creek one settler saw women collecting seeds and roots on the flats, 'as thick as grazing sheep.'[71] Peter Latz, a central Australian botanist who grew up on Hermannsburg Mission, described the technique of women harvesting the tubers of onion grass (*Cyperus bubosus*): 'Women sometimes dig a trench at the edge of the patch then work in a line, turning over the ground as they go.'[72] Many early explorers witnessed this activity and recognised the efficacy of its cultivation process.

King, on the doomed Burke and Wills expedition, found a store of grain in an Aboriginal house, which he estimated at four tons. John Davis, a member of one of the search parties for Burke and Wills, reported on the vast quantities of nardoo seed waiting to be harvested on the dry floor of Lake Coogiecoogina in the Strzelecki Desert, reminding us that 'desert' is a term Europeans use to describe areas where they can't grow wheat and sheep.

Howitt, on another search party for Burke and Wills, also found large stores of nardoo. Early settlers on the Mulligan River in Queensland remarked on vast quantities of nardoo being harvested and the explorer/drover Ashwin, not prone to giving credit to Aboriginal people, found two granaries, 'one with about a ton of rice seed stored there in 17 large dishes'. His comment on this find of 'delicious grain' was that it was 'a pity we did not take more'.[73]

Houses, water races, harvest fields and irrigation may have been observed but within weeks, sometimes hours of observation, fire destroyed the houses, sheep and cattle destroyed the fields, and the dams were usurped for European use.

The explorers' journals are full of their surprise at finding evidence of Aboriginal utility of the land. Apart from the tubers, grains and fish as reported by Walter Smith, Bill Harney[74] and others, they also described the herding, corralling and harvest of young water birds of various species.[75]

71 Gerritsen, 2008, p50
72 Latz, 1999, p17
73 Ashwin, 1870–71 in Gammage, 2008, p5
74 Harney, 1961, p45
75 Gerritsen, 2008, p45

Innumerable commentators came across the preservation of everything from fish, game, plums, caterpillars, moths, quandong, figs, seeds and nuts among a wide variety of other foods. Preserved caterpillars were made into a kind of flour; figs and quandong were pulped and mixed to form a product that can only be likened to quince paste.

Sir Joseph Banks didn't like the fruit of the Australian banana (*Musa acuminata* ssp *banksii*) but it was the trunk the people ate after cooking it on hot stones. It tasted like green bananas and the plant immediately re-sprouted from the cut stem.[76]

Kirby and Beveridge found vast acreages of rushes which the Wati Wati were harvesting and nurturing: 'the reeds looked like large fields of ripe wheat; and nearer, where they had burnt them, it had the appearance of a splendid crop just before it comes into ear'.[77] This was a managed system and the management had produced a scene familiar to European eyes.

Kirby[78] described the meal from this compung (cumbungi) rush as very similar to flour or potato meal. Mitchell said that the cakes made from the cumbungi flour 'were lighter and sweeter than those made from common flour'.[79] Huge mounds were raised in these reed marshes near Swan Hill so that villages could be located at strategic locations within the swamp to manage the harvest of this valuable plant. During their first days in the district both Kirby and Beveridge were intrigued by these massive mounds and the fact that they were emitting steam. Upon examination the mounds proved to be gigantic ovens for the cooking of the compung rush.[80]

Mitchell noted 'the lofty ash hills of the natives, used chiefly for roasting the "balyan" (or bulrush)',[81] and recorded how astonished he was by the volume of starch produced.

The base of this plant, if used fresh, is like the freshest crunchiest salad vegetable you've ever tasted. Explorers Eyre, Kreft and George Moore all refer to the importance of bulrush starch in different parts of the continent.

76 Denham et al, 2009, p637
77 Kirby, 1897, p28
78 ibid. p34
79 Mitchell 1839, Vol. 2, p61
80 Kirby, 1897, p28
81 Mitchell, 1839, Vol. 2 p 134

In his later years Beveridge recalled many of the traditional stories of the Wati Wati and, despite his appalling hand writing and the fact that he wrote over other printed material, the striking thing about these stories is that so many have planting, husbandry, harvesting and storage as central themes. The ancestors had left instruction for the care of plants and the sharing of the produce. Some stories are so specific in their instruction that recipes are given.[82]

The instructions for mallee fowl eggs in the story, Coorongendoo Muckie, of Balaarook, near Swan Hill, goes as follows:

> *When Weitchmumble had secured all the eggs the Ngalloo Watow set to work to make fire by rubbing a narrow lathlike* (sic) *piece of saltbush across a sun crack in a pine log. A few minutes of rapid friction were sufficient to perform the operation, therefore the camp fire was soon made and half of the lowan eggs set on end in the sand before it were in a short time simmering away, being stirred the while with a thin twig, through an opening at the top, made for the purpose, and when cooked they presented the appearance and consistency of a yellow paste, and, as to the taste thereof, the adjective talke (good) conveys but a very remote idea.*[83]

Gerritsen quotes a similarly vivid recollection by the German missionary Johannes Reuther at Lake Killapaninna, South Australia, about the ancestral being Markanjankula:

> *At first he came to Aruwolkanta (wara ngankana) where he found a beautiful level plain. Here he cleared away all the weeds and stones, loosened up the soil, sowed some ngardu [nardoo], and then covered up with earth what had been sown, so that should a flood come along, the ngardu should come up.*[84]

Markanjankula is referred to in other parts of the legend as broadcasting seed and digging out and creating seed-grain pits.

82 Courtenie and Kurwie, p1, in Beveridge, 1911
83 Beveridge, 'The Story of Coorongendoo Muckie of Balaarook', 1911, p3
84 Gerritsen, 2008, p60

It seems even the name of Lake Killapaninna has within it the word for the harvest grass variously spelt as pannana or parrara. The evidence, while now difficult to find on the surface of the land, is still embedded in the language.

It may be that not all Aboriginal peoples were involved in these practices but if the testament of explorers and first witnesses is to be believed most Aboriginal Australians were, at the very least, in the early stages of an agricultural society and, it could be argued, ahead of many other parts of the world.

In an article in *Antiquity*, Denman et al say, 'If the dispersal of the greater yam occurred before the separation of New Guinea and Australia ... then horticultural experimentation occurred in northern Australia at least 10,000 years ago.'[85]

Norman Tindale, the early twentieth-century Australian anthropologist, archaeologist, entomologist and ethnologist, after examining irrigation and horticulture and the stone technology that supported them, estimated the milling techniques to be around 18,000 years old, an age which, if it is true, re-writes the history of world agriculture.[86]

When I came across Tindale's assessment of the Australian Aboriginal tool kit it seemed at odds with much of what had been written on the subject and I could find little to support it. However, opinion has changed in the last decade and Tindale's conclusions no longer seem so outrageous:

> *The ground edge axe ... has been invented, presumably in Australia ... As the antiquity of edge grinding and axe shaping techniques, such as pecking, is pushed further and further back it is apparent that their diffusion took place within the greater continent of Sahul Land rather than from across the seas to the present Australian continent.*[87]

Stone tool studies in Australia are often used to prove one theory or another but, much as we should treat Tindale's theories with caution, we must also be careful about accepting the views of some current archaeologists who maintain that Aboriginal stone tools underwent an accelerated technological

85 Denham et al, 2009, p643
86 Tindale,1978, pp345–49
87 ibid. p141

advancement, or intensification, 4,000 to 5,000 years ago. Many sophisticated Australian tools have been tested and found to be of much greater age than this and would seem to resist the idea that intensification only began in Australia 4,000 years ago.

Examination of Aboriginal tool kits shows how closely they are fitted to the economy. That is not so surprising but it is revelatory that the technology has been found to be much more closely associated with crop utilisation than previously thought. Further studies are essential to our understanding of how Aboriginal people interacted with plants and the extent to which they were in control of that interaction. Was their use of the plant opportunistic or more closely aligned to agricultural practice? Later examples in this book reveal the methods and technology that were developed to gain greater and more reliable yields.

We are at the beginning — not the end — of understanding pre-colonial history, and the most recent archaeological research suggests very old ages for Aboriginal occupation. Wade Davis, when analysing the evidence for early Aboriginal occupation, used the figure of 60,000 years for when modern people began to leave Africa. If that is so then the generally accepted figure for Aboriginal occupation of Australia of 60,000–65,000 years makes us one of the first, if not *the* first, to leave the African continent.[88]

The need for further examination of ancient Aboriginal influence on Australian plant communities and landscapes has been stressed by AP Kershaw, the environmental scientist whose survey of site 820 was designed to study the human presence in Queensland. He claims, 'The weight of available evidence points towards Aboriginal burning as the most likely cause of vegetation changes … and this implies that people have been present on the Australian continent for at least 140,000 years.'[89]

That this claim is contentious is obvious but earlier pollen core studies by palynologist, Gurdip Singh, at Lake George, near Canberra, show similar activity resulting in sudden changes in land use. Singh proposed that this dramatic change in vegetation was a result of Aboriginal fire-stick farming. Eric

88 Davis, 2009, pp8–9
89 Kershaw, 1994, pp1–11

Rolls discusses these findings and the implied potential for an early arrival of humans on the Australian continent in an unpublished manuscript.

The term 'fire-stick farming' was first proposed by archaeologist Rhys Jones in 1969 but more recent studies have increased the understanding of Aboriginal land use and support observations by the explorers. This indicates that the trajectory towards agricultural activities may have begun much earlier than we currently believe. It's interesting that Jones chose to use the word 'farming' in the term he introduced more than forty years ago.

Studies of fish traps on the lower Murray River and the Coorong Wetlands by the maritime archaeologist Peter Ross, led Jones to conclude:

> *Adaptations that had been attributed to intensification during the late Holocene have been found to occur as early as the Pleistocene in some regions ... Subsequently, archaeology in Australia is currently reconsidering regional findings that appear to be at odds with the continental narrative.*[90]

The 'continental narrative' is one in which change in the economy of peoples occurs because of external forces, such as a change in the environment, not, as is postulated by anthropologist, Harry Lourandos, as a result of social change. It is this accelerated change in technology and behaviour which archaeologists refer to as 'intensification'.

Scientists world wide believe human engineering and agricultural experiments began around 4,000 years ago and tool developments were naturally associated with that change. The evidence in Australia, however, suggests those changes may have begun here much earlier.

Lourandos says, 'the old distinction between "resourceful" agriculturalist and 'quiescent' hunter can no longer really be seen to apply'. If we examine the past it cannot support the idea of 'passive adaptation to changing natural environments, but [rather] active participation in complex interplays — among them, social, environmental and demographic'.[91] Aboriginal people were not reacting to the state of nature but directly affecting its production. 'Aboriginal culture has been changing and expanding over a long period of time. The more

90 Ross, 2009, p29
91 Lourandos, 1997, p335

recent changes of the last 206 years are simply a continuation of a tradition which goes back thousands of years.'[92]

Australian Farms of the Future

Farmers have always been crucial to land conservation and have always had a more practical approach to soil conservation than most of their critics but it is the reliance on European plant and animal domesticates which has caused them the most conflict with this continent.

What would happen if we turned away from total reliance on sheep and cattle and diversified into emu and kangaroo? Researcher, Gordon Grigg, argues that:

> *graziers already run sheep on top of kangaroos (and other herbivores) and the grazing pressure is too high. If they make money from kangaroos, and if kangaroos become accepted as an economically positive part of their mixed grazing system, they will at least have an option of maintaining economic viability with lower sheep numbers.*[93]

One of the problems that prevents acceptance of kangaroos as a resource is ownership. As Archer says: 'Conservationists are concerned about the principle of giving up ownership of wildlife to private citizens. Graziers are concerned about their lack of ownership of a resource on which I am suggesting they should become reliant.'[94] The utilisation of those animals that are already adapted to our climate and geography, and that damage it less as a result, should become the subject of serious ecological and economic debate in Australia.

Similarly, what would happen if we tried some of the Aboriginal grains instead of the thirsty and disease-prone grains of Asia and Europe? After studying Aboriginal yields from yam daisies it is easy to imagine a potato farmer turning over part of his farm to yam, thus avoiding the need to use fertiliser and herbicides.

92 Lourandos, 1994, p60
93 Grigg, 1995, Ch. 26
94 ibid. Ch. 26

The yam (*Microseris lanceolata*) is sweet and crisp and metabolises sugars in a way that is much healthier for our bodies than many current commercial crops. The juice produced during cooking — minne in Wathaurong language — is dark and sweet and you can imagine how it could complement a curry. Most of the Australian grains are gluten free and don't require heavy chemical supplements for their successful cultivation. Farmers dedicated to their sheep, cattle and wheat need do nothing, but more adventurous agriculturalists might welcome the challenge.

Rolls spruiked the virtues of *Astraleba lappacea* (Curly Mitchell grass) with six-inch long ears and filled with clean firm grain. Archer urges us to consider also *Panicum decompositum* (Mitchell's native millet) and *Themeda avanacea*, (native oatgrass) and Chivers' research encourages examination of native rices.

Mitchell grass, Brewarrina, northern New South Wales, 2010.
Photograph Lyn Harwood

There's no contemporary market for these grains but I bet a stall in any city market could sell flours from these grains at premium prices to whole foods enthusiasts. Markets are created by entrepreneurs. Set aside a few paddocks and have some fun and I'll eat my boot if it doesn't yield a profit.

Archer lists a whole series of bush fruits and plants that are ripe for enterprise. We seem to be stuck on wattle seed and lemon myrtle, but supply a few good cooks and whole foods shops with other top produce and watch as Australia transforms its diet and develops a genuine Australian cuisine.

Archer compares the land degradation of farming, which occupies 70% of the land, to mining, which takes up only 0.02%. He suggests that mining produces high yields for relatively low costs whereas farming is a high-cost low-yield enterprise. Any efforts we make to conserve our land would best be spent on encouraging farmers towards more soil- and bank-friendly activities. Australia must continue to produce food and farmers are the heart and soul of this enterprise but there have to be better ways to farm the light Australian soils.

The great advantage of Aboriginal crops is that they have been developed through seed selection, direct planting and weeding for the harsh conditions of Australia. Many of the grains grow on sand and require a minimum of irrigation. The good news is that the Rural Industries Research and Development Corporation has been studying some of these grains with a view to incorporating them in the modern agriculture of Australia.

Latz says that, 'the nutritional value of the seeds from the desert species is equal to or better than that of the cultivated grains'.[95] These indigenous plants promise a huge economic bounty for the country and our future prosperity demands they be given serious consideration.

95 Latz, 1995, pp54–55