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Published by the Murrumbidgee Catchment Management Committee, c/- Agricultural Research Institute, PMB Pine Gully Road, Wagga Wagga NSW 2650

ISBN 0 7310 5895 7

## Introduction

There is a common belief that Australia was a vast expanse of thick forest before the arrival of European settlers more than 200 years ago and that there has been massive clearing of that forest land ever since.

Unquestionably, the Australian landscape has changed over the past two centuries. But what was it like before then and how has it changed? It is becoming more evident that before European settlement most parts of Australia burnt more or less on an annual basis producing vegetation communities markedly different to that of common belief.

In his book *The Future Eaters* Tim Flannery (1994) comments that:

*'As a result of the extensive Aboriginal use of fire, the plant communities seen and recorded by Banks and other explorers were very different from those that exist at the same location today. Curiously, although substantially reported upon in the early literature, this fact is not well-recognised today, even among biologists and those responsible for land management. Perhaps this is because the works of Banks and others are no longer widely read. There is also a tendency to believe that early landscape painters did not render scenes accurately, but instead tended to paint them as English landscapes.'*

*The lack of recognition of this change has critical implications for the management of national parks and wilderness areas today.'*

The vegetation changes that have occurred also have implications for catchment management. The Murrumbidgee Catchment Management Committee believes consideration of these matters can help to minimise our impact on and improve our management of the environment.

The following work includes extracts from letters, diaries and journals of early European settlers,

explorers and government officials regarding vegetation in eastern Australia at the time of European settlement and some of the changes that occurred with settlement. Some of this information dates back to 1642.

There is remarkable consistency in the extracts in their description of an Australian landscape; a description very different from the picture most of us have of that time.

## Definitions

Some terminology relating to vegetation cover has changed with time. Governor King writing to Earl Camden (1 November 1805) gave the following definitions:

**'Brush** - is a dark impenetrable Thicket consisting of plants and herbaceous Shrubs. This kind of land is oftentimes found of a good quality owing to its being a vegetable mould.

**A Scrub** - Consists of Shrubs of low growth, Soils of a bad quality with small iron gravel Stones, in general Rocky Scrub and Brush may with propriety be called the Underwood of the Forest, but it is not infrequent on the Sea Coast for Scrubs to be void of Trees.

**Forest Land** - is such as abounds with Grass and is the only Ground which is fit to Graze; according to the local distinction the Grass is the discriminating Character and not the Trees for by making use of the Former it is clearly understood as different from a Brush or Scrub.'

Governor King's 'Brush' is clearly rainforest. Of note is that when early 19th century writers referred to 'forest' they were writing about what today would be considered woodland - dominated by grass. Apart from the 'Brush' there are no references to closed forests.

## Fire regime

Nearly every early navigator or explorer mentions fire or comments on the amount of smoke seen. The letters, diaries and journals all indicate that Aborigines always carried a lighted fire-stick and never put a fire out. Consequently, the Aborigines did not just burn now and again, or only in autumn, or when the birds were not nesting. They burnt all the time. Many thousands of fires were lit across the countryside on a daily basis. In addition there was nothing to stop these fires from spreading when conditions were suitable.

To Aborigines fire was seen as necessary to clean up the country. They regarded unburnt forest or grassland as being neglected. Apparently for most, if not all groups, every part of grassland, savanna and eucalypt woodland of their territory would be burnt regularly, annually, or at least once every three or four years. It was seen as doing duty by their land.

**Abel Janz Tasman** in December 1642 at the north end of Storm Bay, Tasmania, observed:

*'Amongst the trees, two were remarked whose thickness was two, or two and a half fathoms, and the first branches from sixty to sixty-five feet above the ground ... the country was covered with trees; but so thinly scattered, that one might see every where to a great distance amongst them ... Several of the trees were much burnt at the foot ...'*

The next day, after leaving Storm Bay:

*'... and during the whole day smokes were visible along the coast...'*

In the introduction to his book *A Voyage to Terra Australis.... in ... The Investigator*, **Matthew Flinders**, referring to the great amount of smoke that came from the land, notes that **Pieterz Pietersen** (a Dutch commander on the yacht *Wesel*, during 1636):

*'...discovered the coast of Arnhem land ... and sailed along the shore for 123 miles without seeing any people, but many signs of smoke.'*

And:

**William de Vlamingh**, commander of the Dutch ship *Nijptang*, during January 1697 at the Swan River:

*'No men were seen but they observed many smokes...'*

A few days later south of the Geraldton area:

*'Fires upon the land were seen from all the ships...'*

On 21 April 1770 **Captain James Cook** - one day's sailing north of Cape Howe (NSW/Victorian border):

*'In the afternoon we saw smoke in several places by which we knew the country to be inhabited'*

**Joseph Banks** between 13 and 17 May 1770 notes fires burning from Smokey Cape to the Glasshouse Mountains, including one probably on Mt Coramba near Coffs Harbour.

Europeans had problems with fire from the very early days. Off the Tasmanian coast on the day the First Fleet sighted Australia (7 January 1788) **John White**, Surgeon, could not see clearly because:

*'... large smoke was seen close to the innermost height.'*

That same evening:

*'...we saw a large fire on the east point of land which forms this bay (Storm Bay), made by the natives ...nor did we perceive any other indication of it being inhabited but this fire, and the smoke mentioned to be seen on our first falling in the land.'*

**Governor Phillip** wrote regularly to the Colonial Secretary, Lord Sydney. During 1788 he stated:

*'...and they (the Aborigines) are seldom seen without fire, or a piece of wood on fire, which they carry with them from place to place, and in their canoes...'*

Also:

*'The natives always make their fire, if not before their own huts, at the root of a gumtree, which burns very freely and they never put a fire out when they leave the place.'*

During September 1790:

*'The weather now being very dry, the natives were employed in burning the grass on the north shore opposite Sydney, in order to catch rats and other animals, whilst the women were employed in fishing: this is their constant practice in dry weather.'*

On 16 November 1791:

*'The natives so very frequently setting the country on fire...'*

**Captain John Hunter** in 1788 had similar stories to tell:

(the Aborigines)'... set the country on fire for several miles extent; this, we have generally understood, is for the purpose of disturbing such animals as may be within reach of the conflagration ... We have also had much reason to believe, that those fires were intended to clear that part of the country through which they have frequent occasion to travel; of the brush and underwood, from which they, being naked, suffer very great inconvenience...'

The Aborigines did not burn only in summer. During July 1788 **Hunter** noted:

*'Large fires were frequently seen in this season upon some of the hills, and...we then conjectured that these fires were made for the purpose of clearing the ground of the shrub and underwood, by which means they might with greater ease get*

*at those roots which appear to be the greater part of their subsistence during the winter. We had observed that they generally took advantage of windy weather for making such fires, which would of course occasion their spreading over a greater extent of ground.'*

In summer, during February 1791:

*'The weather was very close and sultry, and the natives having fired the country for several miles around, the wind, which blew strong on the 12th, was heated to a very extraordinary degree, particularly at Rose Hill (Parramatta), where the country was on fire for several miles to the northward and southward.'*

**George Bouchier Worgon**, First Fleet surgeon on the *Sirius*, giving further evidence of regular burning and utilising windy conditions, recorded at North Head in 1788 (28 May?):

*'The wind was blowing very fresh today and perhaps this might favour their designs ... Indeed we have remarked that, whenever the wind blows strong, there are a number of these kinds of fires about the country.'*

**David Collins** (Judge Advocate) records urban interface problems in 1792:

*'The weather during this month was very hot. The 5th (December) was a day most excessively sultry. The wind blew strong from the northward of west; the country, to add to the intense heat of the atmosphere, was every where on fire. At Sydney, the grass at the back of the hill on the west side of the cove, having either been caught or been set on fire by the natives, the flames, aided by the wind which at time blew violently, spread and raged with incredible fury. One house was burnt down, several gardens with their fences were destroyed; and the whole face of the hill was on fire, threatening every thatched hut with destruction...'*

Annual bush fire warnings have a long history in NSW. During December 1798:

'... and the country, as happened generally at this season of the year, (was) every where on fire, those who were engaged in farming were reminded of the necessity of their exerting themselves by every practicable means to secure their crops ... against accident by fire.'

And in January 1799:

'The country was now in flames; the wind northerly and parching; and some showers of rain, which fell on the 7th, were of no advantage, being immediately taken up again by the excessive heat of the sun.'

**Watkin Tench** (Captain of Marines) noted how it all started:

'Their method of procuring fire is this: They take a reed, and shave one side of the surface flat; in this they make a small incision to reach the pith, and introducing a stick, purposely blunted at the end, into it, turn it round between the hands (as Chocolate is milled) as swiftly as possible, until flame be produced. As this operation is not only laborious, but the effect tedious, they frequently relieve each other at the exercise. And to avoid being often reduced to the necessity of putting it in practice, they always, if possible, carry a lighted stick with them, whether in their canoes or moving from place to place on land.'

Flannery (1994) reports that the Tasmanian Aborigines lacked the ability to make fire. If a fire was accidentally extinguished, that group of Aborigines had no alternative but to eat raw meat while they walked in search of another group.

In NSW the burning activity was not confined to the Sydney area. It was carried out on the mountains, further to the west and up and down the coast.

Most early travellers over the Blue Mountains commented on fire, and some had to contend with bushfires. **Gregory Blaxland** noted fires once he saw the Megalong Valley and the open country to the west of the mountains.

**George Evans** (Assistant-Surveyor) on his return journey on 29 December 1813:

'...at the (western) foot of the mountains ... The Natives seem to be numerous; there are fires in many parts not far from us.'

And on the 3 January 1814, 19 miles further east in scrub country:

'The Mountains have been fired; had we been on them we could not have escaped; the Flames rage with violence through thick underwood, which they are covered with...The marks in the Trees (from the outward journey) are burnt out; therefore am obliged to go over them again...'

The next day:

'The Mountains are as yesterday; fired in all directions;...all objects eastward are obscured by thick smoke...'

And on the 6th:

'...the flames have consumed the foliage from the highest Trees. The Ridges continue as usual until the latter part of my journey which is forest land for 1/2 a mile (Springwood)... there are small patches of grass left that the fire missed.'

The next day:

'The forest land continues a mile farther; afterwards the brushy Ridge commences again, the thickest of it is consumed...'

Evans reached Emu Plains the next day, 8 January 1814.

On 25 April 1817 **Allan Cunningham**, with **Oxley's** first expedition, stood beside a swollen Lachlan River near Forbes and beckoned to a group of 13 natives on the opposite bank:

'Although they swam across the river, in which they had to contend with a strong current, they had brought fire in their hands...'

During 1824, on burning at Tuggeranong, south of Canberra:

'These interesting downs had been burnt in patches about two months since...It was common practice of the aborigines, to fire the country in dry seasons where it was wooded and brushy; to oblige game of the kangaroo kind to quit their cover and subject themselves to be speared...'

**Charles Sturt**, during his journeys though western NSW, mentions fire almost on a daily basis. Eucalypt woodlands, open plains, acacia scrubs or the marshes had been burnt or were being burnt. On 31 December 1828, north of Warren:

'I had observed a dense smoke arising...Passing through a wood, at the extremity of the plain, I found myself at the out-skirts of an open space of great extent, almost wholly enveloped in flames. The fire was running with incredible rapidity through the rhagodia shrubs with which it was covered.'

On the return journey:

'...the natives continued to fire the great (Macquarie) marshes, and as the element raged amongst them, large bodies of smoke rose over the horizon like storm clouds...'

On his first journey in 1831/32 **Thomas Mitchell** (Surveyor-General) also had to deal with fire almost on a daily basis (for about two months) even though seemingly conditions were generally calm.

On 28 November 1831 at Blaxland's property, Lower Wollombi :

'...the lower country being open, and lightly wooded...The grass was every where yellow, or burnt up, and in many parts on fire, so that the smoke which arose from it obscured the sun...'

A number of explorers, including **Mitchell**, commented that surprisingly the fires apparently burnt into the wind. On the 30 November 1831 near Muswellbrook:

'...we camped on a small water-course near Mussle Brook...In the evening the burning grass became rather alarming, especially as we had a small stock of ammunition in one of the carts. I had established our camp to the windward of the burning grass, but soon discovered that the progress of the fire was against the wind, especially where the grass was highest.'

On 9 December 1831 north of Willow Tree:

'During the last three days of our journey, the woods were burning before us, but fortunately the fire was one day's march in advance of our party (note that it was not moving all that quickly), and thus the flames had cleared everything away before our arrival, so our camp was not exposed to danger. This evening, however, the country seemed on fire all around us. The weather was calm and sultry, particularly when the day closed in, and a very heavy storm...broke over us in the night.'

The next day:

'...the rain...soon checked the progress of the flames...it afforded providential relief to us, for the hills we were about to cross had been all in a blaze during the night.'

On 17 December 1831, south of Boggabri:

'The whole country was on fire...The country smoked around us on all sides...'

Six days later, still in the Boggabri area:

'All the country beyond the river (towards the pilliga scrub) was in flames, and indeed, from the time of our arrival in these parts (eight days), the atmosphere had been so obscured by smoke, that I could never obtain a distinct view of the horizon. The smoke darkened the air at night, so as to hide the stars, and thus prevented us from ascertaining our latitude...Fires prevailed fully as extensively, at great distance in the interior, and the sultry air seemed heated by the general conflagration.'

On 7 January 1832, well north of Narrabri:

*'...this incessant high temperature...nourished the fires, that covered the country with smoke...'*

There have been comments by others that all the country, from the mallee in the south west to the northern tablelands, might have been burnt fairly regularly, more or less by one fire.

Flannery (1994) writes that:

*'But it was that most poetic of explorers, Ernest Giles who, during his travels in Central Australia, gave us the most vivid image of the inseparability of fire and Aborigines:*

*The natives were about, burning, burning, ever burning; one would think they were of the fabled salamander race, and lived on fire instead of water'*

## Forest land

It seems that much of the tall mixed eucalypt forest with a developed understory that is a common occurrence these days did not exist at the time of European settlement. Contrary to what is often stated, dense forests did not cover large areas of Australia and the first settlers did not set to and ringbark huge areas. There was no need to. Most of the country was woodland, grassland, savannah or open forest. Grazing was plentiful and there for the taking. Many areas could be readily ploughed.

Flannery (1994) comments that:

*'Among the most striking changes that I could detect had occurred near Bulli. On 27 April 1770 the Endeavour passed close by the shore near modern-day Bulli just north of Wollongong. Although Banks could not land, he came within a*

*few hundred metres of the shore and left a good description of the vegetation. He wrote:*

*The country today again made in slopes to the sea... The trees were not very large and stood separate from each other without the least underwood; among them we could discern many cabbage trees (the cabbage palm *Livistona australis*) but nothing else which we could call by any name. In the course of the night many fires were seen'*

Flannery goes on:

*'I had this description in mind when I stood, on a hot February day, atop the lookout at Bulli Pass. Below me stood a magnificent patch of temperate rainforest which stretched for several hundred metres out from the escarpment edge, towered over by magnificent cabbage palms. Beyond it stood a dense and tall forest of eucalypts.'*

Flannery concludes:

*'As remarkable as it seems, the altered fire regime of the last 200 years had seen rainforest and dense eucalypt forest establish on what in Banks' time was clearly an open woodland.'*

**Captain James Cook** on 1 May 1770 gives the following description of the vegetation on Botany Bay's southern shore:

*'After this we made an excursion into the country which we found diversified with woods, lawns and marshes; the woods are free from under wood of every kind and the trees are at such a distance from one another that the whole Country or at least part of it might be cultivated without being oblig'd to cut down a single tree; we found the soil every where except in the marshes to be light white sand and produceth a quantity of good grass which grows in little tufts about as big as one can hold in ones hand and pretty close to one another, in this manner the surface of the ground is coated in the woods between the trees.'*

Two days later, on 3 May 1770 at Botany Bay, Cook records:

*'In the AM I went in the Pinnacle to the head of the Bay (near Sans Souci?)... We found the face of the country much the same as I have before described but the land much richer, for instead of sand I found many places a deep black soil which we thought capable of producing any kind of grain, at present it produceth besides timber as fine meadow as ever was seen.'*

**Joseph Banks** noted in his journal while at Botany Bay:

*'...very barren place without wood ... very few tree species, but every place was covered with vast quantities of grass...the trees were not very large and stood separate from each other without the least underwood.'*

Many of the early accounts and journals of the first settlers in NSW made comment, similar to Cook. Only scattered trees and very little shrub understory existed beneath the tall forests along with grass and fern. White gives an example at Port Jackson (5 April 1788):

*'We rounded this lagoon (Dee Why), and proceeded four or five miles west-ward, along the banks of a small fresh-water river, which emptied itself into it and had for its source only a swamp or boggy ground. After we had passed this swamp we got into an immense wood (Frenchs Forest) the trees of which were very high and large, and a considerable distance apart, with little under or brush wood. The ground was not very good, although it produced a luxuriant coat of a kind of sour grass growing in tufts or bushes, which, at some distance, had the appearance of meadow land, and might be mistaken for it by superficial examiners.'*

On 22 April 1788, at the head of the harbour (south west of Homebush Bay?):

*'... we proceeded for a mile or two, through a part covered with enormous trees, free of underwood.*

*We then reached a thicket of Brush-wood, which we found so impervious as to oblige us to return...'*

And on the 24th, probably in the Parramatta area, they discovered what was to become known as the distinctive Australian woodland, (the 'open forest') which could be grazed and, more importantly, ploughed without the need to clear:

*'The banks of it were now pleasant, the trees immensely large, and at a considerable distance from each other; and the land around us flat and rather low, but well covered with the kind of grass just mentioned.'*

**Captain John Hunter** in 1788 commented on the time required to remove a single tree:

*'...we were here in the middle of a wood, in which were trees from the size of a man's arm to twenty-eight feet in circumference ...The wood is so exceedingly heavy, that when a large tree was cut down, in order to clear a piece of ground, it would sometimes take a party of men three or four days to dispose of it.'*

But clearing was not necessary:

*'...and at the head of the harbour, there is a very considerable extent of tolerable land, and which may be cultivated without waiting for its being cleared of wood; for the trees stand very wide of each other, and have no underwood; in short, the woods on the spot I am speaking of resemble a deer park, as much as if they had been intended for such a purpose...The grass upon it is about three feet high, very close and thick...'*

**Henry Antill** (ADC to Governor Macquarie) at Campbell River in May 1815:

*'...the country we rode over this day ...was beautiful and open, large tracts of land, without timber or underwood ... At present we saw it to great disadvantage, the greatest part of the herbage of the plains having been destroyed by fire...'*

This description fits a sketch 'Campbell's River, New South Wales' by JW Levin reproduced in *Geographical Memories on New South Wales* (Barron Field, 1825).

**Jean Quoy, Charles Gaudichaud and Alphonse Pellion** (of Freycinet's expedition) during 1819 commented on the results of regular burning:

*'In the neighbourhood of the second military depot (Spring-wood), grow the most beautiful trees that we had seen in these parts (a wet sclerophyll forest). The road to it opens in the midst of vast forests where you walk beneath very pleasant domes of verdure. We noticed that all these were blackened right up, a circumstance due to the fact that, the natives liking to set alight the grasses and brushwood obstructing their way, the fire often catches the fibrous bark of the largest trees, which then burn without their trunk being in any way damaged by it and without injuring the vegetation of their tops.'*

**John Oxley** at the Hastings River on 29 September 1818:

*The country we passed is what is generally known in New South Wales as open forest land...The whole face of the country was abundantly covered with good grass, which, having been burnt sometime, now bore the appearance of young wheat. Six miles down the river it was joined by a fine stream from the southward, apparently watering a spacious valley. We crossed this, and named it Ellenborough River... We proceeded about three miles farther before we halted at the edge of a thick detached brush...'*

**Allan Cunningham** in describing the country between Bathurst and Liverpool Plains in 1823 (Barron Field, 1825) makes frequent references to:

'Grazing forest land'

'Grazing land'

'Fine grazing vallies'

'Open forest country.'

These are summarised on the map showing the route of that tour between April and June 1823 (see back cover).

A plan of the lower reaches of the Brisbane River in the same publication indicates that the land on either side of the river was also open country.

**Peter Cunningham** - 1827 describes the Upper Hunter Valley:

*'...one of the richest natural prospects that can well be witnessed presents itself, the flat alluvial lands spread out before you being matted with luxuriant herbage; branching evergreens scattered singly or in irregular clumps; the river winding through the midst; whilst dark-foliage swamp-oaks, bordering with a deep-green fringe its steep and grassy banks, and the gently rising hills beyond, thinly clothed with wide-spreading forest-trees, extend in diversified magnificence as far as eye can reach...In all these luxuriant plains there is scarcely a superfluous tree to be seen, not often above a dozen to the acre; and patches of acres are here and there met with destitute even of one, and only requiring the instrumentality of the plough to produce an abundant crop. It is this freedom from superfluous timber which among other things, gives so decided a preference to New South Wales over America, where your capital is often exhausted in making the land fit for the plough...'*

In the Hastings Valley:

*'The soil on the margin (of the river) is, generally, rich alluvial, thickly timbered with cedar-trees, and matted with vine brushes, while the hills behind partake of the open forest description of country in other parts of New South Wales.'*

And in the Macleay Valley to the north:

*'A great extent of open pastoral forest hills, with alluvial untimbered plains; were found to lie along its banks...'*

In the Brisbane River Valley:

*'The country on either side consists of rich brushy thick-wooded flat, toward the river, with open hilly forest land extending backwards, rather stony but well coated with grass.'*

And in summary:

*'The grass here seems all to grow in detached tufts, without any of that continuity we observe in the pastures at home (England) ... The old withered grasses are usually burnt off in the spring and often at other periods of the year... and it is astonishing to see how quickly and how luxuriantly the new grasses will push up after these burnings, if a shower of rain should happen to follow them.'*

**Charles Sturt**, in the introduction to his book, comments on the lack of accumulated vegetable matter on the Australian ground:

*'There is no part of the world in which fires create such havoc as in New South Wales, and indeed in Australia generally. The climate, on the one hand, which dries up vegetation, and the wandering habits of the natives on the other, which induce them to clear the country before them by conflagration, operate equally against the growth of timber and underwood... it has been obvious to me...that in New South Wales, the fall of leaves and the decay of timber, so far from adding to the richness of its soil, actually destroy minor vegetation...Thus it would appear, that it is not less to the character of its woods than to the ravages of fire that New South Wales owes its general sterility.'*

**Dr John Lhotsky** in his journey from Sydney to the Australian Alps (via Goulburn, Gunning, Canberra and Cooma and then on to Omeo) between January and March 1834 made a general observation that:

*'Australian bushes are (so far as I am acquainted with them) all nearly destitute of shade, the trees of which they are universally composed (I mean the Eucalyptus), growing in the first place only solitary, never in combined tufts'*

On 30 January 1834 while staying at Mr Campbell's cottage of Limestone (present site of Duntroon Royal Military College) he noted:

*'I ascended a fine hill to the W. of the cottage ... about 200 feet above the plain, and covered slightly with gum trees.'*

A William Buckle Bunn sketch made in 1845 from the Queanbeyan road looking towards Mt. Ainslie agrees with Lhotsky's description some 11 years earlier.

On 8 February 1834 at Mikelego (Michelago), Lhotsky noted:

*'We crossed with some difficulty a hill, which encompasses on that side the plain, and successively the high range to the left receded, and that to the right, became more prominent. ... However, it is obvious, that the axis of this great chain of plains, which follow each other at the south eastern side of the Australian Continent, is altogether in the direction of the meridian. It is besides, a most remarkable, but not very easily explicable fact, that they are altogether destitute of trees of any kind, and only on the secondary hills or banks, which divide their plications, are some gum-trees thinly scattered, whereas large timber covers the main ranges'*

Between Ingelara and Gungoandra Gap, he commented that:

*'Beyond Jungelera (Ingelara) Valley, the road turns to the S.E., and we passed all the way forests of blue and white gum, but remarkably destitute of any underwood.'*

Travelling between Gundoandra Gap and Bredbo, Lhotsky noted:

*'We passed thro' dry barren plains, the herbage of which, literally scorched by the heat of the summer, presented a yellow autumnal appearance, at length we arrived at a Creek, which, running in a W. N. W. direction into the Murrumbidgee, is considered the northern limits of Menero. As Menero will constitute ere long, some of the most*

important counties or dukedoms of Australia, I named this Creek 'Earl Grey's Creek' (the Bredbo River).

A sketch made by Stewart Rylie in 1840 from a hill just west of Bredbo and looking upstream along the Bredbo River agrees with Lhotsky's description.

On 6 March 1841 **Clement Hodgkinson**, a government surveyor, left his property at Yarra-Bandini north of Kempsey late in the day and travelled north on an excursion to the unexplored upper portions of the Bellinger Valley:

The sketch reproduced on the front cover and titled 'A halt near a fern-tree Scrubs' depicts Hodgkinson's camp site for the night of 6 March 1841 or a halt (a meal stop) the next day. The site was located in the Eungai Creek catchment in the south of the Nambucca Valley on the north coast of NSW.

Hodgkinson states that the camp was at a 'brushy water-course' - a creek with a strip of rainforest along it. The next day Hodgkinson comments on the large ferns in the area's brushes. A dense rainforest strip with ferns is shown in the sketch.

Of real interest is the moist hardwood forest beside the rainforest. It has no understory.

Descriptions of the Macleay, Clarence and Richmond Valleys extracted from a book by Clement Hodgkinson (1844) are set out below.

#### Macleay Valley

*'In ascending the MacLeay river, from its entrance, the first objects which meet the eye on both banks are extensive mangrove flats, with thickets of myrtle, palm, and swamp oak, which, a few miles further on, are superseded by dense alluvial brushes, rising like gigantic green walls on both sides of the river.'*

*I must here make a digression to attempt to convey to the English reader some idea of the very*

*peculiar vegetation to which the colonists have assigned the unmeaning name of brush. It grows on the richest alluvial land, and consists of trees of almost endless variety, and very large dimensions, totally differing in appearance from the ordinary Eucalypti and Casuarina, which grow on the common open forests of Australia, for the brush trees in general possess a rich umbrageous foliage of bright shining green... But the peculiar appearance of the brush is principally caused by the countless species of creepers, wild vines, and parasitical plants of singular confusion, which interlace and entwined in inextricable confusion, bind and weave together the trees almost to their summits and hang in rich and elegant flowering festoons from the highest branches...*

*The reaches of the river are long and straight, averaging about a quarter of a mile in width, and flanked on both sides by huge walls of dense brush I have just now described. These borders of alluvial brush land on the banks of the river, are generally half a mile, or a mile wide, and are then backed by extensive swamps of many thousands of acres in extent, whose verdant sea, of high waving reeds and sedges stretches away to the base of the distance forest ranges. There are several lagoons in these swamps, and stagnant water is very generally diffused over their surface...*

*Directly the tide loses its influence in the river it ceases to be navigable any further...The alluvial brushes on its banks are now frequently superseded by park-like forest ground, verdant rocky eminences and luxuriant grassy flats of great richness, light timbered with Apple trees (Angophora lanceolata)... The first (creek) we meet, on the south side is Dongal Creek. In the narrow valley of this stream, the land is of the richest quality possible, consisting of a narrow border of alluvial flats, covered with broad-bladed grass, growing breast high, and with a few large blue gum trees scattered so far apart as to offer no impediment to immediate tillage... Dongal Creek is hemmed in on both sides by fertile ranges, well clothed with grass, and lightly wooded apple trees being the predominant trees on their lower*

*slopes. The clay-slate ranges rise in smooth, round, waving summits, they are not in general thickly wooded..'*

#### Clarence Valley

*'The Clarence... is the next important river north of the MacLeay... its natural features, and the nature of the country on its banks, are so very similar to those of the MacLeay, that a brief notice of it will suffice... A few miles above the entrance of this river is a large island, and which, when first discovered, abounded in emus (Harwood Island was relatively open country)...The brushes near the mouth of the Clarence are interspersed with the beautiful variety of pine (Hoop) I have already described, and which I found not to extend south of Coohali creek, near Nambucca river.'*

*The country available for grazing at this river is of excellent quality, and much more extensive than that at the MacLeay; for the country bordering the Clarence and its tributaries is generally level, and the mountains do not attain any great elevation, except at the sources of the streams...'*

#### Richmond Valley

*'The Richmond river, a little further along the coast... very much resembles the MacLeay in general appearance, and the character of its scenery: mangrove scrubs, tea-tree, and swamp oak thickets, cover the low flats near its mouth; and the alluvial land, higher up the river, is diversified by brush, abounding in cedar and pine, clumps of bangolo palms, reedy swamps, small rich plains, and lightly wooded forest flats of great richness. The rest of the country is very lightly wooded grassy forest, of the greatest fertility: in fact, there are few rivers where so much good available land exists, unbroken by densely wooded ranges and ravines...'*

**Charles Darwin** (of the *Beagle*) in 1836:

*'The extreme uniformity of the vegetation is the most remarkable feature in the landscape of the greater part of New South Wales. Everywhere we*

*have an open woodland; the ground being partially covered with a very thin pasture.'*

And:

*'In the whole country I scarcely saw a place without the marks of fire; whether these had been more or less recent - whether the stumps were more or less black, was the greatest change which varied the uniformity, so wearisome to the traveller's eye.'*

The open forest or woodland, with its abundant grass, that covered vast areas, was easily traversed. The occasional scrub area or brush or rainforest patch was not.

**Ludwig Leichhardt**, in a letter dated 26 October 1842:

*'During my excursions in the bush my interest in bush fires has often been aroused ...Others ascribe them entirely to the blacks...who light fires all over the place to cook their food but leave them unextinguished. During the hot summer the grass dries out and becomes highly inflammable, and the leaves of the mytaceous plants, which are full of essential oils, also get very dry. The consequence is that bushfires quickly spread over enormous areas, though without becoming a danger to human beings...'*

In 1842 Leichhardt defines 'forest', 'bush', 'brush' and 'scrub' and describes part of the New South Wales north coast:

*'...Bush generally means the uncultivated country in general, the natural, virgin world; but they (the local settlers) also distinguish between forest land, scrub\* and brush, according to the character of the vegetation. The last consists of low bushes that reach a man's height. The (true) bush (forest land), on the contrary, consists of tall, strong trees with low undergrowth between them. I have never seen dense forests like those in the Harz and in*

\* A marginal note defines scrub as 'a rich thicket on alluvial ground'.

Switzerland here, and I don't think that there are any. The trees (here) stand far apart, like they do in many of the oak forests in northern Germany. All the same, where shade and moisture of narrow valleys and ravines favour the vegetation, vines cling to the trees and creep from one to another, forming a dense, almost impenetrable network...'

Of the Brisbane River/Mary River area, in a letter dated 8 November 1843:

'The forest ground resembles at present one uninterrupted oat or rye field in harvest time ... (Kangaroo grass) is almost the only predominant grass...grows here about three to four feet high...In a few weeks it will be burnt, to have fresh shoots...'

In 1844, of the Moreton Bay district, Leichhardt observes:

'When you consider how few different kinds of trees go to make up our German woods and indigenous forests, you'll no doubt be astonished when I say that about 120 of these trees are to be found within a radius of a quarter of a mile. 100 of these belong to the dense, rich mountain and river brushes, whilst 20-25 form open forests...The ground under the trees, which would be covered with blueberry and whortleberry bushes in our oak forests, is mostly covered with kangaroo grass here...This grass ripens in October and November, when the ground under the trees looks like an even, sweeping field of oats. In November and December the weather gets dry and bushfires break out...It starts where the blacks have been camping for the night, as all they do when moving on is to pull a burning stick out (of the fire) and keep it smouldering against a piece of bark, so that they can light a fire at the next camp...The blacks know how to produce a fire by friction...but it takes too much trouble, so they prefer always to carry fire sticks with them.'

## Regrowth

Mitchell in 1848 gives the first reference to the regeneration that occurred over much of the country during the latter part of the 1800s:

'Fire, grass, kangaroos, and human inhabitants, seem all dependent on each other for existence in Australia; for anyone of these being wanting, the others could no longer continue. Fire is necessary to burn the grass, and from those open forests, in which we find the large forest-kangaroo; the native applies that fire to the grass at certain seasons, in order that a young green crop may subsequently spring up, and so attract and enable him to kill or take the kangaroo with nets.'

In summer, the burning of long grass also discloses vermin, birds' nests, etc, on which the females and children, who chiefly burn the grass, feed. But for this simple process, the Australian woods had probably contained as thick a jungle as those of New Zealand or America, instead of the open forests in which the white men now find grass for their cattle...

The omission of the annual periodical burning by natives, of the grass and young saplings, has already produced in the open forest lands nearest to Sydney, thick forests of young trees, where formerly a man might gallop without impediment, and see whole miles before him. Kangaroos are no longer to be seen there; the grass is choked by underwood; neither are there natives to burn the grass, nor is fire longer desirable there amongst the fences of the settler.'

EM Curr (a Victorian squatter) noted about the same time:

'Turning to the vegetable kingdom, we find the changes more marked than in the animal. As regards the grasses for instance. In the greater portion of Australia, indeed nearly all over it, the grass originally grew in large tussocks, standing from two to twenty feet apart, according to circumstances. It bore no resemblance to a sward,

and when we drive over it in a dog-cart, a succession of bumps was experienced from its lumpy way of growing...Then again throughout the continent the most nutritious grasses were originally the most common; but in consequence of constant over-stocking and scouring the pastures, these, where not eradicated, have very much decreased, their places being taken by inferior sorts and weeds introduced from Europe and Africa...'

Curr goes on to state:

'...it seems to me that its (Australia's) condition, when we took possession of it, was largely attributable to the customs of its aboriginal inhabitants. Small in numbers - a few hundred thousands - their existence, at first glance, would seem to have been most inconsequential. Mere hunters, who absolutely cultivated nothing - the spear, the net and the tomahawk - could have produced no appreciable effect on the natural products of a large continent. Nor did they; but there was another instrument in the hands of these savages which must be credited with results which it would be difficult to over-estimate. I refer to the fire-stick; for the blackfellow was constantly setting fire to the grass and trees, both accidentally and systematically for hunting purposes. Living principally on wild roots and animals he tilled his land and cultivated his pastures with fire; and we shall not, perhaps, be far from the truth if we conclude that almost every part of New Holland was swept over by a fierce fire, on an average, once in every five years...'

In his publication *The Eucalypts of Gippsland* AW Howitt (1890) describes the regeneration process:

'It dates from the very day when the first hardy pioneers drove their flocks and herds down the mountains from New South Wales into the rich pastures of Gippsland.'

Before this time the graminivorous marsupials had been so few in comparative number, that they could not materially affect the annual crop of grass which covered the country, and which was more or less burnt off by the aborigines, either

accidentally or intentionally, when travelling, or for the purpose of hunting game.

These annual bush fires tended to keep the forests open, and to prevent the open country from being overgrown, for they not only consumed much of the standing or fallen timber, but in great measure destroyed the seedlings which had sprung up since former conflagrations...

The increasing number of sheep and cattle in Gippsland, and the extended settlement of the district, lessened the annual crop of grass, and it was to the interest of the settlers to lessen and keep within bounds bush fires which might otherwise be very destructive to their improvements.

The results were twofold. Young seedlings had now a chance of life, and a severe check was removed from insect pests. The consequences of these and other co-operating causes may be traced throughout the district, and a few instances will illustrate my meaning.

The valley of the Snowy River, when the early settlers came down from Maneroo to occupy it...was very open and free from forests...

...After some years of occupation, whole tracks of country became covered with forests of young saplings... and at present time these have so much increased, and grown so much, that it is difficult to ride over parts which one can see by the few scattered old giants were at one time open grassy country.

Within the last twenty five years many parts of the Tambo valley, from Ensay up to Tongio, have likewise become overgrown by a young forest, principally of *E.hemiphloia* and *macrorhyncha*, which extend up the mountains on either side of the valley...

Similar observations may be made in the Omeo district, namely, that young forests of various kinds of Eucalypts are growing where a quarter of a century ago the hills were open and park like. In the mountains, from Mount Wellington to Castle



Hill, in which sources of the Avon River take their rise, the increase in the Eucalyptus forests has been very marked. Since the settlement of the country, ranges, which were then only covered by an open forest, are now grown up with saplings of *E. obliqua*, *E. sieberiana*, and others...

In the upper valley of the Moroka River, which takes its rise at Mount Wellington ...I observe one range, upon which stood scattered giants trees of *E. sieberiana*, now all dead, while a forest of young trees of the same species...which may probably be twelve years, growing so densely that it would not be easy to force a passage through on horseback. Again at the Caledonia River, as at the Moroka, the ranges are in many parts quite overgrown with forests not more than twenty years old. The valleys of the Wellington and Macalister Rivers also afford most instructive examples of the manner in which the Eucalypt forests have increased in the mountains of east Gippsland since the country was settled...

Such observations may also be made in Western and Southern Gippsland, but, of course with reference to different species of Eucalypts...

I might go on giving many more instances of this growth of the Eucalyptus forests within the last quarter of a century, but those I have given will serve to show how widespread this re-forestation of the country has been since the time of when the white man appeared in Gippsland...

Bush fires, which swept the country more or less annually, kept down the enormous multiplication of insects life, destroying myriads of grasshoppers and caterpillars, which now devastate parts of the Gippsland district, spoiling the oat crops, and eating the grass down to the ground..'

A sketch of the Bendoc River Valley by Stewart Ryrle in 1840 lends support to the comments made by Howitt.

Of the hardwood forests of the Bellinger Valley EHF Swain, District Forester (1912) states:

'The original forest, according to the Bellinger pioneers, was almost park-like in its growth, and low lateral branching was thereby permitted...

Since the advent of settlement, however, several agencies have operated to clear the forest floor of its dominating carpet of native grasses, and allow of the upspringing of hardwood seedlings, many of which are now in the spar stages, and because of greater density are of much better timber quality than was produced by the primeval forest. The boles average 60 feet in length, and are straight, non-tapering, and generally free from white-ant unsoundness.'

## Historians' comments

Josephine Flood writes:

'Regular, light burning was the pattern all over Australia at the time of first European contact. The fires were of low intensity, which meant that they consumed the litter of leaves and branches on the forest floors but did not burn down the trees. Without such regular burning, forest litter accumulates at a fast rate. This litter accumulation leads to disastrous wild fires, such as that of 7 February 1967, which threatened Hobart.'

It is ironic that the Australian parklands and open woodlands so admired by the early settlers should have been created by the Aborigines they regarded as ignorant nomads. Yet when Aborigines were driven off their land and the regular, light burning ceased, the old grass turned sour, scrub invaded the parkland, and the settlers' fine houses, fences and sheep became the victims of occasional uncontrollable bush fires. It has taken over a century for the European settler to learn from such mistakes, and now a system of controlled, regular burning has been instituted...'

In *Triumph of the Nomads* Geoffrey Blainey reviews the use of fire by Aborigines and states:

'Fire was central to their way of life, affecting nearly every activity. Fire should be ranked as the greatest of man's conquests, and in the way of life of the aborigines fire had no rival. It was the core of their technology though, like the core of our advanced technologies, it was sometimes master as well as servant.'

Blainey adds:

'The variety of uses of fire possibly explains more than any other reason, why aborigines carried it everywhere as if it were their prized possession...'

And:

'In Australia every day for millions of days countless fires had been lit or enlarged for countless purposes...The practice of carrying fire sticks on journeys increased the amount of unintended burning. When the firestick seemed likely to stop smouldering it was placed against inflammable grass or bark in order to create a flame from which the firestick could be lit again. The fire so started was left to burn itself out...

There was rarely a reason why the nomads should have put out a fire. They had few possessions. What they owned was portable, and in an emergency could be carried away...

The burning of large areas of Australia at least once in every few years was not simply the result of breakaway fires. In many regions the hunters seem to have set fire to grasslands for the same reason the farmers plough and fertilise the soil. They were cultivators, using fire in the hope of producing lush grass for the game when the next showers fell.'

## Conclusion

The extracts from letters, diaries and journals of early European settlers, explorers and government officials describe a parklike landscape of grasslands and grassed open forest lands with very few areas of thick forest. The cessation of regular burning following European settlement allowed the growth of a thick forest of young trees that, together with an increasing shrub understory, choked out the grasses. The widespread ringbarking that was carried out around the turn of the century was mostly of this regrowth. The landowners were attempting to re-establish the original grazing capacity.

The following quotation from Blainey is the most appropriate conclusion to be drawn about changes to the Australian landscape:

'Thousands of years of burning could not fail to affect the landscape and all that lived on it. The sheep-owners who came from Britain did not have the faintest idea of how long the aborigines had occupied the land but they had a sound idea of the botanical effects that came within a few years of the cessation of burning. If five or ten years that experienced few fires could alter the vegetation of Australian forests and grasslands, it would not be surprising if thousands of years of fires had also altered the previous vegetation...

Without those fires the grassy woodlands that occupied much of the fertile crescent in south-eastern Australia would have been scrubland or forest. A period of fifty years was probably sufficient to change the character of that savannah country if no fires burned...

...Fire was also an emblem of the collapse of their (Aboriginal) society. By helping to create many of the grasslands of the south-east, fire indirectly attracted the Europeans and their sheep and cattle to the interior and so quickly led to the extinction of a way of life which was essentially pastoral.'

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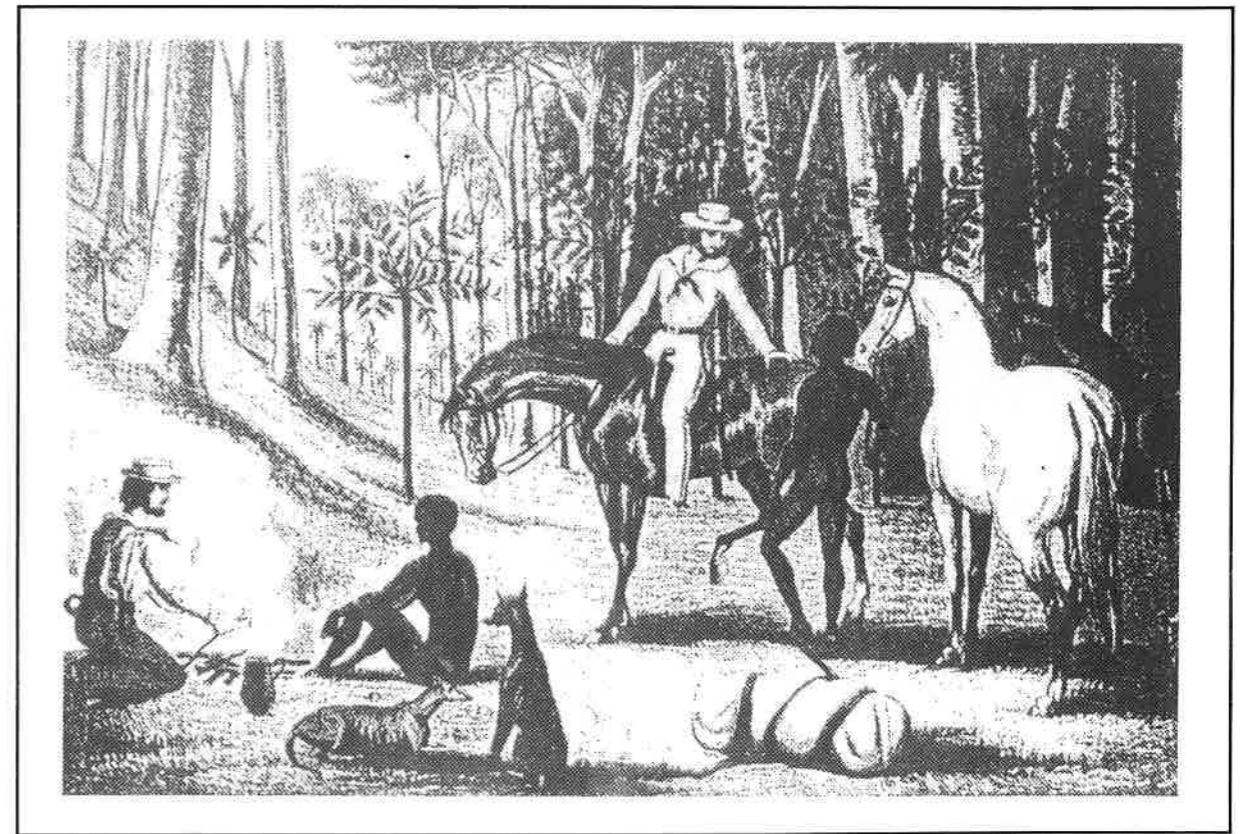
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BACK COVER: This map shows route taken by Allan Cunningham who describes the country between Bathurst and Liverpool Plains in 1823 (see page 8).



*Published as the act directs Feb 26 1825 by John Murray, delineator Street London*

# THE AUSTRALIAN LANDSCAPE - OBSERVATIONS OF EXPLORERS AND EARLY SETTLERS



*DG Ryan, JE Ryan and BJ Starr*