Australia's Ever-Changing Forests II

Proceedings of the Second National Conference on Australian forest history

Edited by
John Dargavel and Sue Feary

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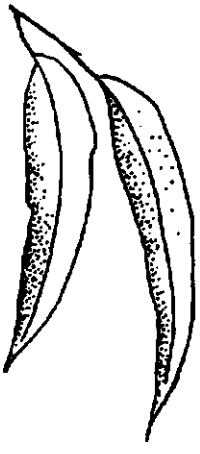

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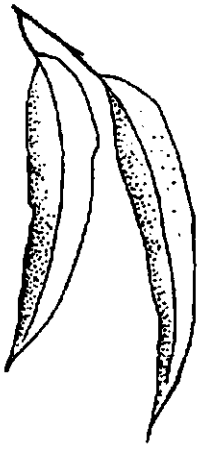

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PREFACE

Much has happened since the inaugural conference on forest history was held in 1988 and the Forest History Society was formed. As the Society's newsletters show, both State and Federal heritage bodies have directed considerable funds towards forest based research, in an attempt to resolve the on-going conflict between conservationists and the timber industry over the management of hardwood forests. The Society provides a forum for bringing together this research and giving it an historical perspective. Stimulated by the expanding body of information on forests and the success of the first conference, several Society members formed a committee and began planning a second. Because of the multi-disciplinary nature of forest history, soliciting papers was not difficult and by mid-1992 it was apparent that the second conference would be as interesting as the first.

This volume presents the proceeding of the conference which was held on 3-5 December 1992 at the Victorian School of Forestry in Creswick, Victoria. The conference objectives were to facilitate information exchange and develop a holistic outlook across a broad range of forest related disciplines. The emphasis on bringing together the diverse approaches used to investigate the natural and cultural environments of forests can provide a valuable framework for developing management practices which take account of past natural and cultural events. The discerning reader will notice some differences when comparing the scope of papers from the two conferences. This volume is more focussed on *forestry* history rather than *forest* history, illustrating perhaps the difficulties of maintaining a nexus between the natural sciences and culture history.

In his opening address Frank Moulds described the historical significance of the School which has trained foresters since 1910. He noted that the forests surrounding Creswick have been a major economic, cultural, social and environmental factor in the evolution of the district. The town and surrounds have produced some famous people such as the Lindsay family (Norman, Lionel, Percy and Ruby), Sir Alexander Peacock, three times Victorian Premier - John Curtin, Sir Marcus Oliphant, Leach (of Leach's bird books), and Professor Laby, noted physicist, who were all born here. The locality has become a major force in developing skills in land management, especially forests - both hardwood and softwood - which are of substantial and continuing benefit not only to Victoria, but Australia-wide and even overseas. Many graduates of the School have made significant contributions well beyond the boundaries of Victoria.

Dr Moulds quoted from a recent lecture given by historian Michael Howard to demonstrate the need for historians to be impartial when studying the past:

> Our agenda is set by current controversies whether we wish it or not. If we take part in them, we have no right to claim that our historical studies provide a kind of inner light denied to lesser mortals. Historians are as prone as anyone else unconsciously to formulate conclusions on the basis of temperament, prejudice and habit and then collect the evidence to justify them. It would be dishonest to pretend otherwise.

He ended his address with a salutary warning, that forest historians must not become antiquarians, studying the past for its own sake, but should learn lessons from the past to seek a philosophy for the future.

Eighteen papers covering a range of topics were presented over the two days. In one way or another, all the papers reflected a common thread, that today's forests are the result of a long history of complex interaction of human beings with their environment, whether it be with a spear or a chain saw. For example, Anita Brady showed how archival research of land titles, fire and logging histories were used to identify the remaining patches of old growth forest in East Gippsland. Tom Griffiths in his elegant description of Victoria's mountain ash forests pointed out the need for historians to see forests as being part of the historic process and not just a backdrop to it. There were some interesting international links; Michael Roche, et al enlightened us about the connections between New Zealand Kauri and Western Australian Karri and Sue Feary illustrated a more tenuous link between forest management practices in 9th Century Europe and those on the NSW south coast in the 1960s. One session was devoted to a series of short 'work in progress' presentations. These will appear in subsequent issues of the newsletter.

Three field trips complemented the papers. There was a guided tour of the Forestry School by Simon Walley, and Jane Lennon led us through the adjacent demonstration forest. This contains evidence of the various silvicultural practices that are taught at the School, as well as some excellent examples of alluvial gold diggings and water races from the nineteenth century. Most of us took to the bush on the last day for a trip through Wombat State Forest, where we were shown modern silvicultural practices and a range of historic sites. Visits to Boase's and Black Forest sawmills demonstrated the massive technological differences between the more traditional (at the former) and the ultra modern.

The Society held its meeting on 4 December, when it agreed to continue as a non-aligned organisation run by its convenors. Les Carron, John Dargavel, Sue Feary and Kevin Frawley, the first convenors, passed over the reins of the Society to Anita Brady and Stephen Legge. Enquiries about the Society should

be directed to Anita Brady, Historic Places Branch, Department of Conservation and Natural Resources, 240 Victoria Parade, East Melbourne 3002.

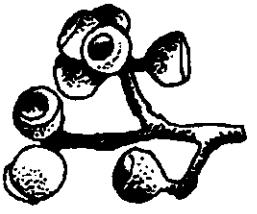
Ettie Oakman and Fay Goddard of the Centre for Resource and Environmental Studies transformed the varied conference papers into these proceedings with care, great skill and much hard work. We thank them sincerely.

We hope that readers of these proceedings will gain some appreciation of the importance of conferences such as this, which bring together practitioners from the natural sciences and human history. The meeting of these disciplines is essential for the long term protection and management of our precious forest legacy.

John Dargavel and Sue Feary

August 1993.

Early Perceptions



CHAPTER 1

NINETEENTH CENTURY PERCEPTIONS OF VICTORIAN FORESTS: IDEAS AND CONCERNS OF FERDINAND MUELLER

Linden Gillbank

> I regard the forest as an heritage given to us by nature, not for spoil or to devastate, but to be wisely used, reverently honoured, and carefully maintained. I regard the forests as a gift, intrusted [*sic*] to any of us only for transient care during a short space of time, to be surrendered to posterity again as an unimpaired property, with increased riches and augmented blessings, to pass as a sacred patrimony from generation to generation (Mueller 1871b: 96).

From 1853 until his death in 1896, Dr Ferdinand Mueller was Victoria's first Government Botanist. From 1857 to 1873 he was also Director of Melbourne's Botanic Gardens and National Herbarium. In 1870 he became Baron Ferdinand von Mueller. He spent almost half a century exploring, cataloguing, and considering uses for Australia's indigenous flora, including the forest flora. Via his contact with scientists, collectors and saw millers, his involvement in international exhibitions and royal commissions, and his stream of botanical speeches and publications, Mueller shaped scientific and public perceptions of the flora. During his time as Government Botanist he was often involved in discussions about the use and management of forests. This paper examines Mueller's ideas and perceptions of Victorian forests, forest products and forest practices.

As many papers in this volume demonstrate, an understanding of the forested landscape is enhanced by a knowledge of the history of that landscape. Likewise for ideas and practices. An understanding of past forest practices and perceptions allows us to examine those currently in vogue with greater wisdom. Only with an understanding of the past can we appreciate to what extent our ideas, practices and concerns are novel - to what extent they are born of our times. Mueller's was an authoritative and influential nineteenth century botanical voice. As such his ideas about forests are of both historical and comparative interest.

To what extent did his ideas presage current attitudes and concerns?

It is easy to read the words which Mueller spoke and wrote regarding forests in the second half of the nineteenth century. However to fully understand the meanings he wished to convey via those words, we in the late twentieth century must relinquish, must erase from our minds, certain ideas and attitudes appropriate to the present but quite inappropriate to the previous century. We must turn back our mindset by a century and a half to pre-ecological and pre-petrochemical times. Then the world was overtly and directly dependant on its flora to satisfy many human needs - food, drugs, clothing, shelter, transport, and power. The chemical plant had not yet gained its ascendancy over the botanical plant. Forests were recognised as important sources of various plant products, including timber, oil, and resin.

In the mid-nineteenth century Nature was appreciated for its generous provision of a grand diversity of botanical resources around the world. However, it was widely argued that the distribution of those resources could and should be improved. To enhance human survival and comfort, exotic plants should be introduced into regions not adequately blessed by Nature. By the mid-nineteenth century the science of plant taxonomy was sufficiently developed to allow the accurate recognition and description of plants in the wild, and the selection and transfer of known species to new landscapes. Magazines and newspapers kept readers informed of the discovery and naming of new species, and of their introduction into alien lands. Botanical information and material were speeding round the world. Forest species, with known requirements for cultivation and with known characteristics, eg. timber type or drug production, could now be successfully sought for introduction. An adequate plant taxonomy underpinned a flourishing forest industry.

By the 1860s the term 'ecology' had been coined and defined. However, not until the beginning of the next century, was the science of ecology emerging as a respected sister discipline to plant taxonomy. An awareness of the environmental disasters - soil erosion, drought and disease - which had followed deforestation in the wake of European exploitation of such verdant places as Mauritius, St Helena, Jamaica and Barbados had lead to the widespread perception that forests increased rainfall and prevented soil erosion. In 1764 on the Caribbean island of Tobago about 20 per cent of the island was 'reserved in wood for rain' (Grove 1992). Following horrific droughts in India and South Africa in the early and mid-nineteenth century, the desiccation theory was widely espoused. Many scientists were convinced that deforestation was responsible for aridification and temperature change on a global scale (Grove 1988, 1992). The links between forests and rainfall and soil conservation were firmly etched in many mid-nineteenth century minds. Even in these pre-ecological times

Ferdinand von Mueller c.1875
(National Herbarium)

interactions between plants, soil and climate were recognised. Following the permanent demise of the dodo in its only home - Mauritius - in the seventeenth century, and other creatures elsewhere, there was also an awareness that species could become extinct. This was the climate of ideas in which Ferdinand Mueller thought and worked in Victoria in the second half of the nineteenth century.

Ferdinand Mueller was the epitome of the nineteenth century botanist. His ideas reflected those of his times and covered a very broad spectrum of botanical wisdom. He attempted to communicate with as many botanical institutions and individuals as possible, and kept up to date with the latest published and unpublished word on forests and forest plants. He could see the precious wood (and other forest values) for the trees. Mueller's understanding of plants and of forests allowed him to simultaneously recognise and intelligently integrate several important visions of a forest - reverential, environmental, biological, and economic.

His biological perception of a forest was of a group of plants with specific biological needs, eg. conditions required for regeneration or increased productivity. His economic vision was of the useful products which could be extracted from the forest and of the forest industries which could thereby be developed. Mueller also recognised ways in which forests exerted a beneficial influence on various aspects of the environment. But forests were more than useful types of vegetation. As beautiful parts of the Creator's work, they were also to be revered and marvelled at.

Mueller shared a not uncommon nineteenth century philosophy that information and resources should be made available to the public. Science and plants were for the people. Mueller saw his duty as Government Botanist to provide his fellow colonists with botanical information and plants and to ensure the continued colonial provision of the widest possible range of botanical products from farm and forest. In the small community and tiny scientific community of Melbourne it was not difficult for Mueller to make his arguments heard. He spoke on forestry matters at scientific and public meetings, with some of these speeches being reported in newspapers and other publications. He wrote reports, articles, chapters and books. He prepared exhibits of forest products for Melbourne's National Herbarium, and various exhibitions, and acted as commissioner and juror for some of them. He participated in Boards of Inquiry and Royal Commissions on forestry matters. Some of Mueller's forest-focussed activities are listed in Table 1. His 1871 museum lecture provides the main focus of this paper, with some discussion of the 1861 exhibition and the 1885 Royal Commission.

Mueller's imprint on Australian forests endures in the names he gave to many forest trees. Victorian eucalypts which still bear Mueller's names include *Eucalyptus behriana*, *E. fasciculosa*, *E. gracilis*, *E. largiflorens*, and *E. leucoxylon*, which he named in 1855, *E. regnans* (1871) and *E. bosistoana* (1895). Mueller is commemorated in the forests of Gippsland by *E. muelleriana*, which Alfred Howitt named after him in 1891.

Table 1 Some Victorian forestry activities of Ferdinand Mueller

1854	Exhibition
1861	Exhibition
1866	Exhibition
1867	State Forests Inquiry
1870	Industrial and Technological Museum Lecture
1871	Industrial and technological museum Lecture
1871	Foreign industries and forests Inquiry
1876	Wattle Bark Inquiry
1880	Social Science Congress Lecture
1885-92	Vegetable Products Inquiry
1890	Australasian Association for the Advancement of Science Lecture
1895	Australasian Association for the Advancement of Science Lecture

1861 Victorian Exhibition

One important exhibition in which Mueller was involved and was responsible for a strong forestry presence was held in Melbourne in 1861. In preparation for the International Exhibition of Agricultural and Industrial Products to be held in London in 1862, an exhibition was held in Melbourne in 1861 to select Victoria's agricultural and industrial exhibits for the London Exhibition. Ferdinand Mueller, MD, PhD, FRS joined the group of illustrious gentlemen Commissioners of the Exhibition, and was one of seven authors of prefatory essays on the 'Progress, Resources, and Physical Characteristics of the Colony' for the Exhibition Catalogue. With information about the colony never before put together in a single volume, the catalogue was heralded as 'a history of the past, a record of the present, and a prophecy of the future'.

Mueller's essay 'The Vegetation of the Colony, especially in reference to its resources' contained the primordium of his visions of Victoria's forests, ideas which he would develop more fully in future decades. It mentioned various forest products - eucalyptus oil, kino resin, roofing bark and tanners' bark, as well as timber. Mueller (1861) was hopeful for Victoria's forestry future:

> The timber resources of our colony are almost unbounded, although our forests are devoid of the larger coniferous trees. Eucalypti, often of colossal size and of great durability, including

> vast quantities of the blue gum tree (Eucalyptus globulus), will yield in future their timber also for foreign markets, whenever the ramifications of the railway system will have brought the forests more widely into contact with the harbors.

Mueller's influence on the Melbourne Exhibition was formidable. He was on the three-man committee for Class III exhibits - 'indigenous vegetable products, and the manufactures and processes connected therewith' - in which timber featured prominently. About 90 of the then known 120 species of forest trees were represented, the botanical accuracy of whose names was Mueller's responsibility. Half of the 140 timber exhibits were from 'The Commissioners', which included Mueller. Mueller was named as the exhibitor of six other timber specimens - *Acacia Riceana* and *Callistemon salignus* (stonewood) from Wilson's Promontory, *Melaleuca squarrosa* and *Elaeocarpus cyaneus* from Gippsland, *Eucalyptus viminalis* (manna gum) from Port Phillip, and *Eremophila Mitchellii* from the Murray desert. Mueller also provided exhibits of other vegetable products - resin from *Xanthorrhoea Australis* (grass tree), gum from two wattles, *Acacia mollissima* and *A. pycnantha*, bark from *Atherosperma moschatum* (sassafras), and fibres from *Pimelea axiflora* and *Sida pulchella*. As a Commissioner for the 1854 Victorian Industrial Exhibition which preceded the first Paris Exhibition, Mueller had induced his friend, Joseph Bosisto, to distil the oil of a single species of eucalypt. In the 1861 exhibition, Mueller prompted Messrs Bosisto and Johnson to extract volatile oils, this time from dozens of species, and supplied the leaves for the oil exhibits, to remove any uncertainty about the botanical names of the parent plants. 'For services rendered in collecting Specimens of the Timber Trees of Victoria' Dr Mueller received a Supplementary Award - a First Class Certificate. In their report on the vegetable products (class III), the three jurors acknowledged their indebtedness to Dr Mueller for his invaluable botanical information.

1871 Museum Lecture

A decade later Baron Ferdinand von Mueller, CMG, MD, PhD, FRS discussed his ideas and concerns about forestry in a lecture delivered in Melbourne's Industrial and Technological Museum. His lecture was titled 'Forest Culture in its Relation to Industrial Pursuits'. Mueller (1871b) began his talk with his concerns:

> Strange as it may appear, an impression seems to be prevailing in these communities, that our forests have to serve no other purposes, but to provide wood for our immediate and present wants, be it fuel or timber. For even after the warning of climatic changes, and after the commencing scarcity of wood, no forest administration - at least, none adequate, or regularly organised -

> has been initiated in any portion of Australia; and thus the forests, even in districts already very populous, remain almost unguarded, become extensively reduced, and in some localities are already annihilated; indeed, the requirements of the current time alone are kept in view. Under such circumstances it cannot be surprising, that neither an universal forest supervision, not a judicious restraint of consumption, nor an ample utilisation of all the various collateral resources of our woodlands, received that serious attention to which such measures became more and more entitled.

It was the 22nd of June 1871, and Mueller was speaking on the strength of almost two decades of experience as Government Botanist and resident of Victoria - two decades in which he had featured forest products in exhibitions and discussed forest management in government reports and public lectures, and had observed the demise of many forests to satisfy the goldmining industry's voracious appetite for fuel and timber. Mueller used images and objects to impress his museum audience. His lecture was illustrated by pictures of Californian and Himalayan pines, by various young trees which he recommended for forest culture and samples of their timber, by 'numerous technologic forest products and phytochemic preparations', and by nets and baskets prepared from forest grasses.

Mueller's ideas in 'Forest Culture in its Relation to Industrial Pursuits' reached beyond the museum lecture room and the 22 of June 1871. His lecture was later published by the Museum and extracts also appeared in *The Gardeners' Chronicle and Agricultural Gazette* in December 1871 and January 1872, and in *The Pharmaceutical Journal* in January and February 1872. His lecture was even read on the other side of the Pacific ocean. In 1875, as President of the Santa Barbara College, California, Ellwood Cooper addressed the College Association on a subject dear to his heart - 'Forest culture and the Australian gum tree'. He was so concerned about the need to protect forests and so impressed with Mueller's ideas, that the following year, in front of the fifth annual catalogue of his college, he published the text of his own forest talk and four of Baron von Mueller's (Cooper 1876). Included was 'Forest Culture in Relation to Industrial Pursuits'.

Mueller's 1871 museum lecture encapsulated his forestry ideas, many of which he maintained for much of his botanical life. It was, as Mueller's talks often were, long and information-laden. As the above introduction to his talk shows, Mueller was concerned to recognise the importance of forests beyond their provision of the colony's immediate wood requirements. While timber and other forest products were crucial for colonial economic and social progress, other forest values also deserved recognition. He discussed environmental and para-

disic as well as biological and economic aspects of the forest.

Mueller (1871b) described some of the ways in which forests beneficially affect the environment. They arrest passing miasmata (noxious exhalations) and limit the spread of corn rust spores, while their feathered singers obstruct the march of armies of locusts and other insect pests. They moderate the temperature and increase humidity. They increase the rainfall, and soil moisture and humus, create and conserve soil, and maintain the sources of water flow. Thus, although an ecological framework was not available to Mueller to examine the forest vegetation, like other botanists, he recognised relationships between forests and certain environmental factors. Mueller was keenly aware of the place of the forest in Nature's great economy.

Mueller (1871b) expressed his determination as Government Botanist to best serve his fellow colonists in all matters botanical, which included the creation, regeneration, enrichment and maintenance of forests. In order to ensure adequate forest management to perpetuate and enhance forest resources, Mueller suggested that forest administration should be carried out by local Forest Boards, whose honorary local members would have some forestry knowledge as well as a commitment to the present and future welfare of the locality. Mueller (1871b:53) argued that:

> Each forest district, thus guarded by local administrators, will be able to produce a far larger income than now is raised from any of our wood areas; while the removal of timber will be bought within more reasonable bounds, and the wants of the future no longer be disregarded.

Each forest district should also have some fertile, sheltered valleys reserved for forest nurseries to provide the millions of indigenous and exotic tree seedlings needed for forest creation, regeneration and enrichment. Mueller's arguments for forest management were strengthened by his knowledge of environmental disasters following the demise of forests in other countries, and the conservation efforts of other botanists. He recommended that one quarter of Victoria be kept forested, which he calculated would contain 1,568,000,000 trees. This he thought would be adequate for the extraction of the colony's timber and other forest products and the 'timely restoration in proportion to their removal or natural loss'. Mueller was keen to have the colony able to satisfy its own timber requirements.

Mueller was constantly balancing his biological and economic perceptions of the forest. Mueller (1871b) combined his understanding of the biology of forest plants, both indigenous and exotic, with his knowledge of local and colonial requirements for forest products. Despite the length of his talk, Mueller explained that time did not allow a comprehensive discussion of the value of

indigenous timber, which, he said, could fill a volume, nor of exotic trees which were suitable for introduction to enrich Victoria's forests. The Acclimatisation Society of Victoria had just published Mueller's list of such trees (Mueller 1871a), a list which he would later develop into a much sought-after volume, *Select Extra-tropical Plants readily eligible for Industrial Culture or Naturalisation*, which would be enlarged in numerous successive editions.

Mueller (1871b) did manage to mention a range of non-timber plants capable of 'enriching the resources of our woods': China and Assam tea, cork oak, saffron, opium poppy, hops, various fruit and nut trees, strawberries, raspberries and blackberries, truffles, cinchona (quinine) tree, and pea-nut. Many of these Mueller had already successfully grown in Melbourne's Botanic Gardens or elsewhere, and opium and hops were already in production in Gippsland. While not considering forest timber, Mueller (1871b) spent some time discussing a range of collateral forest products. His suggested technologic products included charcoal, tar, vinegar, acetic acid, alcohol, paraffin, potash, eucalyptus oil, gum-resin, and tannin. He also suggested the collection of tree-seed and fern-trees. He emphasized that he definitely did not advocate 'an indiscriminate sacrifice of our forest-trees for any solitary one of its [non-timber] products', nor 'the vandalism of denuding every one of our fern-glens of its pride'. His suggestions for forest industries were informed by his knowledge of useful plants from around the world. Mueller saw it as his duty as government botanist to make available to his fellow Victorians as much of the world's wealth of botanical resources as was geographically and economically possible. Victoria's forests must be enriched with those desirable exotic plants which Nature had not managed to incorporate into them. Since Victorian forests were deficient in softwood trees, Mueller was particularly keen to introduce a wide range of pines to the alps. He mentioned the Norway spruce, silver fir, larch, Weymouth fir, Douglas pine, and the pitch pines of North America.

Mueller (1871b) provided a welter of statistics to substantiate his arguments for the careful and less wasteful management of forests and their enrichment with desirable exotic plants. He provided detailed figures for annual domestic, gold-mining and railway timber requirements and the annual cost of imported timber, most of which was softwood. He also questioned the reliability and permanence of the sources of Victoria's imported timber. Although he did not use the terms, Mueller sought to encourage the long term sustainable development of forest industries and colonial self-sufficiency in the production of timber and other forest products.

Mueller's perceptions were farsighted. Forests must be managed, not just to satisfy the needs of the present generation, but for posterity. Mueller was persistent in his argument for the control of forest exploitation and the concomitant development of forest industries to satisfy colonial needs. Since forest

industries were only as lasting as the forest plants on which they were based, control was essential for the continuing survival of both the forest and its industries.

Mueller (1871b:94) ended his talk with a discussion of non- utilitarian forest values:

> Beyond the plainly utilitarian purposes of our forests (some of which I endeavoured briefly to explain), and beyond all the important functions which the woods have to perform in the great economy of nature, they possess still other claims on our consideration, such as ought to evoke some feeling of piety towards them.
>
> The silent grandeur and solitude of a virgin forest inspires us almost with awe, much more so than even the broad expanse of the ocean. It conveys also involuntarily to our mind a feeling as if we were brought more closely before that Divine Power by whom the worlds without end were created, and before whom the proudest human work must sink into utter insignificance.

Mueller was impressed with the 'almost paradisic features of sylvan scenery'. He ended his museum lecture with the mind- and soul-generated summary of his perceptions of the forest which heads this paper.

A month after his museum lecture, Mueller was appointed to a Commission to report on the introduction into Victoria of rural industries then common and profitable in Europe.

> And to further consider and report on the best means of promoting the culture, extension, and preservation of State forests in Victoria, and the introduction of such foreign trees as may be suitable for the climate and useful for industrial purposes (Duffy 1871).

The Commission's Progress Report included many of the suggestions Mueller had made in his museum talk - to stop wasteful practices associated with tree felling and bark stripping, to increase the number of State Forests, the establishment of forest nurseries, the establishment of forest reserves in unwooded districts, and the formation of local Forest Boards. It also recommended many of the various collateral forest products which Mueller had suggested in his museum lecture (Bindon et al 1871).

1885 Royal Commission

A decade and a half later, Sir Ferdinand von Mueller, KCMG, was invited to present evidence to the Royal Commission on Vegetable Products. Mueller (1885) had already prepared, specially for the Commission, the sixth English language edition of his *Select Extra-Tropical Plants*, all of whose 1,000 copies had been sold in seven months. Mueller (1887) was asked to give his views:

> with reference to forest conservation, the replanting of forests, and generally as to the subject, in order that it may be taken up in a more satisfactory way in the future than it has been in the past.

The Commissioners thought it right that, as a special expert, Mueller should be the first witness. In his evidence, both verbal and written, Mueller (1887) reiterated many of the ideas and concerns which he had expressed in his 1871 museum lecture, and referred to that lecture as one of four of his reports on which a system for the management of Victoria's forests could be based.

Victorian forests still deserve the care and concern that Ferdinand Mueller expressed last century. With an ecological understanding of forest vegetation, we can ensure that Mueller's hopes are realised. Into the 21st century we must determine the extent to which we can exploit without destroying our forests.

Acknowledgments

I thank Sara Maroske of the Mueller Correspondence Project for valuable information and discussions during the preparation of this paper.

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CHAPTER 2

TALL STORIES AND TALL TREES

Frank R Moulds

Damage done recently, either accidental or deliberate, to a large mountain ash (*Eucalyptus regnans*) tree in the Powelltown locality has drawn attention to the once prevalent very tall trees of Victoria. The discovery and recording of these is an interesting story. Their subsequent demise is unfortunately one of the prices of progress and the inevitable result of massive wildfires such as those of 'Black Friday' January 13th 1939, 'Ash Wednesday' February 16th 1983, and numerous other somewhat less disastrous outbreaks in earlier years. None of the very tall mountain ash trees which exceeded 300 feet (91.4 metres) referred to in the literature of the nineteenth century and the early part of the present century are still standing. However as a result of forest fires especially those of 1919, 1926, 1932 and particularly 1939, significant areas of mountain ash regrowth now contain trees of up to 250 feet in height which are still in vigorous growing condition. The time has probably now arrived for a search for a new generation of tall trees approaching the previous magical figure of 300 feet. Possibly by now the 300 foot tree is again becoming a part of our forest history.

Public interest in large trees dates from the early 1860s. The late K.J. Simpfendorfer of the Forests Commission, Victoria, gathered together much of the information on this subject in 1982. His work followed on and included a summation of years of records of tall trees accurately kept by A.D. Hardy of the Forests Commission from about 1918 to 1940. Baron Ferdinand von Mueller wrote in 1866:

> The marvellous height of some of the Australian, and especially Victorian trees, has become the subject of closer investigation since of late, particularly through the miners' tracks, easier access has been afforded to the back-gullies of our mountain system. Some astounding data, supported by actual measurements are now on record. The highest tree previously known was a Karri-Eucalyptus (*Eucalyptus colossea*), measured by Mr Pemberton Walcott, in one of the delightful glens of the Warren River of Western Australia, where it rises to approximately 400 feet high.

> Into the hollow trunk of this Karri three riders, with an additional packhorse, could enter and turn in it without dismounting. On the desire of the writer of these papers, Mr D Boyle measured a fallen tree of Eucalyptus amygdalina, in the deep recesses of Dandenong, and obtained for it the length of 420 feet, ... while Mr G Klein took the measurement of a eucalyptus on the Black Spur, ten miles distant from Healesville, 480 feet high!
>
> Mr E.B. Heyne obtained at Dandenong measurements of the height of a tree of Eucalyptus amygdalina. Length of stem from the base to the first branch, 295 feet; diameter of the stem at the first branch, 4 feet; length of stem from first branch to where its top portion was broken off, 70 feet; diameter of the stem where broken off, 3 feet; total length of stem up to place of fracture, 365 feet; girth of stem three feet from the surface, 41 feet. .... Mr George W. Robinson ascertained in the back-ranges of Berwick the circumference of a tree of *Eucalyptus amygdalina* to be 81 feet at a distance of four feet from the ground, and supposes this eucalypt, towards the sources of the Yarra and Latrobe rivers, to attain height of half a thousand feet ... A standard of comparison we possess is the spire of the Munster of Strassburg, the highest of any cathedral of the globe, which sends its lofty pinnacle to the height of 466 feet, or in the great pyramid of Cheops, 480 feet high, which if raised in our ranges would be over-shadowed probably by eucalyptus trees.

It is interesting to note the standards of comparison which were chosen by von Mueller in 1866 before skyscrapers and the Eiffel Tower were created. Also interesting, as will be seen later, is that almost all of the great heights claimed by von Mueller, largely on anecdotal evidence, have been shown to be considerably exaggerated, in some cases by 100 per cent.

Brough Smith in 1869 referring to the forested areas of Victoria wrote:

> In the lofty ranges bordering the basin of the River Yarra, where rains are frequent, the climate moist, and the soils rich, there are very large trees ... In one instance I measured with the tape line one huge specimen that lay prostrate across a tributary of the Watts, and found it be 435 feet from its roots to the top of the trunk. This tree has been much burnt by fire, and I fully believe that before it fell it must have been more than 500 feet high. As it now lies, it forms a complete bridge across a deep ravine.

The Melbourne *Age* newspaper of Thursday, February 22, 1872 published the following article:

STATE FORESTS OF THE WATTS RIVER

The Assistant-Commissioner of Lands and Survey having instructed Mr Ferguson to make an inspection of the timbered ranges in the watershed of the Watts River, with a view to the proclamation of a State forest, that gentleman has forwarded to the Assistant-Commissioner the following interesting report relative to such inspection (Melbourne Botanic Garden, 21 February, 1872).

To Clement Hodgkinson, Esq., Assistant-Commissioner of Lands and Survey.

Sir, - Referring to your suggestion of the 12th inst., I took the earliest opportunity of acting upon them, and accordingly, on the 15th inst., I proceeded to the Watts River, and carefully inspected the heavily-timbered country, extending from Mount Monda to Mount Juliet, also the various spurs and tributaries of the Watts, extending as high up as the crest of the dividing range and the watershed of the Goulburn River.

I have now the honour to report that a very large extent of the above country is densely timbered with various species of Eucalypti, consisting principally of Eucalyptus obliqua, E.amygdalina, and E.goniocalyx.

In many places I observed large areas where the axe of the splitter is yet unknown, and where the timber averages from 100 to 150 trees per acre, with a diameter of from 2 feet to 6 feet and from 250 feet to 300 feet in height, the most of which is as straight as an arrow, with very few branches.

Seeing that such large quantities of valuable timber abound in the valley of the Watts and on the Spurs adjacent, I would respectfully beg to recommend the reservation of every acre, wherever it would not interfere with settlement, for, as a whole, the timber in the locality of the Watts, and ranges adjacent, is of far more value than the land, and is rare to find such forests of sound timber in any other part of Victoria.

I have the honour to be, Sir, your most obedient servant, William Ferguson, Inspector of State Forests.

Extracts of this report were published in *Victoria and Tasmania*, by Anthony Trollope, published by Chapman and Hall, London in 1874.

Interest in large trees continued unabated, and was further stimulated by the display of a large stump at the 1888 Centennial Exhibition in Melbourne. Measurements and photographs were taken of some of the larger trees and were reproduced in *The Giant Trees of Victoria*, published by the Victorian Government, but undated and with no reference to the author. The introductory page however gives some information and indication of the public interest in large trees:

THE GIANT TREES OF VICTORIA

> The existence in Victoria of trees, of the Eucalyptus species, some hundreds of feet in height had been known for many years prior to the holding of the Centennial International Exhibition in Melbourne during 1888. Rumours were current that trees had been seen towering to a height of over five hundred feet, with circumferences ranging from seventy-five to one hundred feet. Up to that time, however, no systematic endeavour appears to have been made to obtain accurate measurements or photographs of these giants of the forests ...
>
> It would appear that Mr N.J. Caire, Photographer, of Toorak Road, South Yarra, was the only person who had attempted to obtain negatives of some of the well-known specimens. Dr Dobson therefore communicated with him on the subject, with the result that Mr Caire, in August 1887, wrote a letter to the Executive Commissioners for the Centennial Exhibition, making certain suggestions with regard to obtaining such photographs, and offering to supply them under certain conditions duly set forth therein. No active steps were taken, however, until March, 1888, when the matter was brought before a meeting of the Vegetable Products Committee of the Exhibition Commissioners.
>
> In the meantime Dr Dobson had laid his views before his colleagues the Trustees of the Public Library, and the Honourable J.L. Dow, Minister of Lands. Contributions were promised in each case towards the necessary expenditure. The Honourable James Munro, Executive Commissioner of the Centennial Exhibition, and Chairman of the Vegetable Products Committee, was requested to complete all requisite arrangements; and, after an interview with the above-named gentlemen, it was finally decided that the Lands Department should contribute £400, the Trustees of the Public Library £100, and the Exhibition Commissioners £100

- in all £600 - for the purpose of obtaining a series of photographs of the highest known trees, together with reliable measurements. The Lands Department further undertook to supply, by the photo-lithographic process, any number of copies that might be required, the negatives to become the property of that Department at the close of the work. In June 1888 advertisements were inserted in the public press, intimating that any person having knowledge of the locale of a tree four hundred feet in height would receive £20 upon pointing out the same, and an extra amount of £3 for every additional five feet. Following upon this Mr Joseph Harris, MLA a member of the Vegetable Products Committee, obtained through the kindness of Mr S Willis of Prahran, the hollow butt of a tree which had been for convenience of transport sawn into thirteen vertical sections, and which was fitted together and placed in the Exhibition grounds. This butt was fifteen feet in height and was described as follows:-

> Species *Eucalyptus amygdalina*, var. *regnans* (White Gum). This specimen before being felled measured seventy-two feet in circumference at the base, was four hundred feet in height, and came from the Menzies' Creek, near Ferntree Gully, Dandenong Ranges.

The Government Surveyors also furnished all the information they possessed, and the Honourable James Munro personally offered a reward of £100 to any one who could point out a tree four hundred feet in height. The reports of the surveyors tended to show that the largest trees were to be found in the Otway Ranges, south Gippsland and near Healesville.

As time was pressing, it was considered desirable to divide the work of obtaining the desired photographs, and Mr N.J. Caire, and Mr J Duncan Peirce, of East St. Kilda, were requested to undertake it. After some delay Mr Caire declined to co-operate, and the whole work devolved upon Mr J Duncan Peirce, who in addition to being an excellent photographer was also a civil engineer, and therefore specially fitted to take accurate measurements. He was assisted by Mr C.R. Cunningham, a surveyor of Queen Street Melbourne, whose bush experience was found to be extremely valuable. The trees inspected were carefully measured with theodolite, clinometer, and chain, but in so far as reaching four hundred and fifty and even five hundred feet, *the highest specimen found measured only three hundred and twenty-six feet one inch.*

Table 1. Giant trees of Victoria

TREE No. OR MARK	CIRCUM-FERENCE ft. in.	HEIGHT FROM GROUND ft. in.	HEIGHT OF TREE ft. in.	DISTRICT AND COLONY	GENUS & SPECIES OF TREES
	TREES MEASURED BY VARIOUS PERSONS PRIOR TO 1888 IN VICTORIA				
1.	40 0	5 0	300 0	Sasafras Cr.Vic (a felled tree)	Blackbut
2.	52 0	5 0	280 0	Black Spur, Dividing Range	Blackbut
3.	46 0	5 0	302 0	Black Spur	Blackbut
4.	-	-	470 0	Mt Baw Baw	Blackbut
5.	-	-	410 0	South Slope, Yarragon Rg., Gippsland	E.*amygdalina* var.*regnans*
6.	-	-	302 0	Two miles N.of Fernshaw (C Walter)	E.*amygdalina* var.*regnans*
7.	45 0	-	416 0	Cape Otway Range (C Walter)	"
8.	-	-	480 0	Mr Ferguson	-
9.	69 0	1 0	336 0	Mr Corrawmabool Dandenong	E.*amygdalina*
	TREES MEASURED IN 1889 BY SURVEYOR AT HEAD OF YEA RIVER				
10.	22 6	5 6	297 0	North side of Yea River	E.*amygdalina* var.*regnans*
11.	30 0	1 0	268 6	"	"
12.	23 3	6 0	296 6		"
13.	32 5	1 0	294 0		"
	23 3	6 0	-		
14.	-	-	226 0	Fisher's Creek	"
	TREES IN SASSAFRAS GULLY DANDENONG STATE FOREST				
	Measured on May 17, 1889, by Messrs Geo S Perrin, RW Fuller and D Boyle				
15.	35 8	6 0	-	Dandenong Street	E.*amygdalina*
16.	34 0	8 0	267 3	Forest E.Side	E.*regnans*
17.	32 8	6 0	271 0	of Sassafras Ck.	"
18.	40 6	6 0	-	and on N. Slope	"
19.	41 6	6 0	-	of range running	"
20.	28 6	9 0	248 6	parallel to creek	"
Baron	43 5	6 0	219 9	and from 20 to 160	"
22.	24 10	4 6	-	yards from the stream	
23.	20 6	5 0	-		
24.	21 10	6 0	253 2 243 0	"	"

Table 1 Notes

Tree

1. Dandenong Forest. Measured with careful pacing by Professor WC Kernot.
2. A healthy specimen and vigorous. Measured with a clinometer and chain by Professor WC Kernot.
3. Measured with a theodolite and chain by Professor WC Kernot.
4. Supposed to be E.*amygdalina*. Measured by Professor WC Kernot.
5. Reported to Baron von Mueller by AW Howitt as being felled and burnt by a selector named T. Rolls and a splitter named Dickenson. Noted in *Eucalyptographic Decade V.*
6. Felled by a splitter named Hutchinson.
8. Lockhart Morton, "The Argus", May 25, 1889.
9. Fallen tree measured by Mr Clemont Hodgkinson (mentioned in a letter in "The Argus", May 26, 1889, by RB Smyth).
10. Fallen tree measured by Mr RW Fuller, engineer, head works, Melbourne Water Supply.
11. Fallen tree Mr RW Fuller, engineer, head works, Melbourne Water Supply.
13. 10,000 palings split from this fallen tree.
14. Young live tree, half-grown, close to J Bell's garden fence, four miles from Narbethong.
15. Height not measured about 280 feet estimate.
18. Height not measured.
19. Height not measured.
21. Baron. On the lower side towards the creek the tape was held in position by a stick at 10 feet from the ground.
22. Height not measured .
23. Height not measured.
24. A tree felled and dead; accurately measured.

Table 1 was prepared by G.S. Perrin, the Conservator of Forests and describes the 24 large trees known in (1888) with some notes on their origin.

Mueller (1885) in 'Select Extra Tropical Plants' comments further as follows:

> The former species or variety, which has been called Eucalyptus regnans, represents probably the loftiest tree on the globe. Mr J. Rollo of Yarragon measured a tree, which was 410 feet high. Another tree in the Cape Otway-ranges was found to be 415 feet high and 15 feet in diameter where cut in felling, at a considerable height above the ground .... Professor Wilson and Colonel Ellery

> obtained at Mount Sabine a measurement of 21 feet 8 inches in diameter of a stem where cut, the length being 380 feet.

G W Robinson, a civil engineer, who apparently had frequent contact with the Dandenongs during the second half of the 1800s, in a paper presented to the Field Naturalists Club of Victoria (*Victorian Naturalist*, June 1911) reminisced on conditions of sixty years ago. It is important to remember that these are the memories of long ago by a man who must have been then well into his 80s:

> During the early years of this State - say from 1854 to 1862 the period I was best acquainted with the Dandenong Ranges - palings and shingles were in great demand for building and roofing purposes, galvanized iron being at that time almost unknown.
>
> When staying in 1854 at a farm-house about seven or eight miles from the locality known as Emerald, I well remember a paling-splitter coming to the farm and giving an account of some immensely tall trees. I was greatly interested in his story, and wanted there and then to go and see them, but was informed that the place was so inaccessible and remote from any habitation that it would not be safe for me to make the attempt alone. However, three years later I had an opportunity of visiting the spot.
>
> Referring back to my note-book for the measurements made by me at the time on the ground I find that all those measured were over 300 feet in length. The longest that I met with was 342 feet to the commencement of the "die-back" portion of the tree, and as the stem there was from six to seven inches in diameter, I estimated the "die-back" portion to have been from 15 to 25 feet in length, thus giving an approximate length of 360 feet. (Note - there is no record either of the notes or the note-book referred to by Mr Robinson).

As mentioned earlier the name A.D. Hardy appears often in connection with big trees in Victoria. During the period 1918 - 1940 he published several articles in the *Gum Tree*, the *Victorian Naturalist* and other journals. These references are now one of the main sources of information on tall trees. Alfred Douglas Hardy was born on 1 August 1870, a son of John Hardy, then the Government Surveyor for Victoria. He was appointed to the Public Service of Victoria on 1 July 1883, when less than 13 years old. (In those days general education was complete when the Qualifying Certificate was acquired at the end of year six). In the latter part of his career he worked for the Forests Commission, and upon retirement in 1935 was Chief Draughtsman for the Commission. After retirement he continued his life-long interest in Victoria's tall trees. In 1918 he wrote:

Trees of over 300 feet are not plentiful, but while we have unexplored forests in inaccessible places it would be unwise to say that finality has been reached with our present best record.

Although accounts in scientific prints are not necessarily perfect, those of popular journals, *judging by some that we have read, should be accepted with caution. Here are some height figures given at various times, some of which have been referred to without enthusiasm by Mr Maiden:-*

420 feet	Dandenongs	D. Boyle, 1862
420 feet	Blacks' Spur	Reported by H. Heaton as measured by F v M
415 feet	Cape Otway	F v M, "Select Extra-Tropical Plants"
521 feet	D. Boyle	
480 feet	Blacks' Spur	Klein, quoted by F v M, Jour.Bot.
471 feet	Baw Baw	"G.W. Robertson" (F v M in "Extra-Tropical Plants")
500 feet		"W.g.G Robinson (F v M)

The last two probably refer to the same tree, and the name of the surveyor, should be G W Robinson".

Random references occur in many publications particularly in the 1900-1925 period. Owen Jones, Forests Commission Chairman in a lecture to the Melbourne University Science Club in 1921 was reported as follows:

> It remained a moot point whether *E.regnans* the Mountain Ash of Victoria was not the tallest tree in the world. Early settlers spoke of specimens 300 to 400 feet high and a giant in the Baw Baws reported to be 470 feet. At the time of the Melbourne Exhibition generous rewards were offered by the State Government and private interests to elicit definite information of trees over 300 feet and the tallest tree then located was 326 feet 1 inch. Subsequently an E.*regnans* was found at Colac measuring 347 feet above ground.
>
> Whether trees over 400 feet ever existed must be regarded as doubtful although the general agreement between the stories of bushmen, cattlemen, surveyors, fossickers, timber splitters etc.

> suggests that the search for tall trees, particularly the 1888 one, was some years too late as the tallest had already been felled.

One of the first general warnings against the case for taller trees was by Professor Ewart, Professor of Botany at the University of Melbourne, in his the Ascent of Water in Trees, in 1908, and referred to in *Forest Trees for Victorian Foresters*, in which he adds:

> The supposed records of 400 feet and over were exaggerations not based on exact measurement .... Few trees now exceed 200 feet to 250 feet. The maximum heights ranged from 270 feet to 326 feet. A record of 302 feet, due to the late Professor Kernot (CE) was of a tree accurately measured in the Dandenong Ranges, but later destroyed by fire.

In the Royal Society *Transactions*, after discrediting the old account which gave heights ranging from 350 feet up to as much as 500 feet, he stated that 'the tallest Australian tree, therefore, hitherto, accurately measured barely exceeds 300 feet'.

There then seems to be a break in discussions for some years about tall trees and their location until an article appeared in the *Sydney Morning Herald*, written by noted botanist J H Maiden about 1920:

> The greatest claims to possess the tallest trees of the world have been made on behalf of Victoria, most of them from Gippsland. In 1862 Mueller wrote to Seemann's Journal of Botany that Mr D. Boyle, of Nunawading near Melbourne, has measured a fallen tree in the recesses of the Dandenong, and found it to be 420 feet. About the same time he wrote to the Australian giving more details about this tree, which was stated to be 392 feet long. He added 30 feet as a fair estimate of the length of the top, which had broken off, and thus we have 420 feet as the height of this tree.
>
> Henniker Heaton states that on the Blacks' Spur were two trees, one, alive, measuring 420 feet in height, and the other (prostrate) 480 feet high. He adds that Baron Mueller is the authority for these measurements. One version, therefore, states that the 420 feet tree is prostrate, and the other that it is alive. If these statements are correct, then two trees of this stupendous height are referred to.
>
> On another occasion, he continues to limit the height to about 400 feet. "In our sheltered springy forest glens attaining not rarely a height of over 400 feet". In 1862, he, in Seemann's Journal of

Botany, stated that Mr E B Heyne measured a tree at the Dandenong 295 feet to first branch, diameter at first branch, 4 feet. To the point where broken off, 70 feet; total, 365 feet. Diameter at fracture, 3 feet, girth of stem 3 feet from the ground, 41 feet. Although not up the 400 feet from the ground, is a very big tree, and I am sorry that we have not evidence which would warrant our accepting it. *In fact, these old records are simply unreliable, in spite of their apparent attention to details.*

We will go a step higher. In 1889, the Hon. F Stanley Dobson, of Melbourne, quoted Mueller as having stated in his "Botanical Teachings", that our gum trees attain a height of 500 feet. I cannot trace this particular reference, but I have other references of such a height to which Mueller gave currency. For example, in Seemann's Journal of Botany, he states that Mr George W Robinson, in the back ranges of Berwick, found a tree 81 feet in girth 4 feet from the ground, and supposes that towards the sources of the Yarra and Latrobe Rivers it attains 500 feet.

Another contemporary account says that Mr WG Robinson, of Berwick, Victoria, in a journey form Gippsland to Mount Baw Baw, saw and measured a tree 500 feet high. Later on, in an edition of the "Select Extra Tropical Plants", the name of the finder and the height are varied. "Mr GW Robertson, surveyor, measured a tree at the foot of Mount Baw Baw 471 feet high".

But we have not reached high-water mark yet. Mr David Boyle, who for twenty-seven years had been identified with big trees, in 1889 wrote to the Melbourne Argus, giving 525 feet as the height of a tree known to him some years previously. As this was considered to be rather "tall", and is, I believe, the greatest height in or out of Australia claimed for a tree, Mr Boyle replied to inquiries; "I determined to have it photographed and measured, ten years having elasped since I measured it before ... I found it. The tree was healthy, the only change in it since I saw it last being that a portion of the top was blown away. The measurement now is 466 feet high, and its circumference 4 feet from the ground, 81 feet; base, 114 feet.

An Inspector of Forests and a Government surveyor subsequently measured this tree accurately, and found it to be 219 feet 9 inches. Here was a come-down. "No tree in the neighbourhood reached 300 feet". *The tree, of which a specific measurement was given, was found on actual measurement, to be less than half its reputed*

> *height*. The Hon. James Munro, Premier of Victoria, thereupon offered a reward of £100 out of his own pocket for any Victorian tree 400 feet in height, *and the reward has remained unclaimed to this day*.
>
> It turned out that Mr Boyle's tree and Mr Caire's tree were identical, so that the 525 feet tree shrank over 300 feet. The public interest aroused at the time brought a crop of other guesses and measurements.
>
> Mr Stanley Dobson, who spent much time trying to get at the truth in regard to these trees, writing to the Royal Society of Tasmania, "believed" that the highest found by a Government surveyor was near Neerim, in Gippsland, and was 325 feet. Even this was excessive, as the Sydney Morning Herald of January 21, 1889, gives the height as "227 feet with the top broken off, and a girth 6 feet from the ground of 55 feet 7 inches". Another tree on the Blacks' Spur, at Fernshaw, had a height of 237 feet 6 inches, the top being broken off, the girth 6 feet from the ground being 50 feet. A still loftier tree was reported, that on Mount Monda, with a height of 307 feet, and a girth 6 feet from the ground of 22 feet 8 inches. The height given of a tree on Mount Baw Baw is 326 feet 1 inch, with a girth 6 feet from the ground of 25 feet 7 inches.
>
> I am sorry I am unable to quote the authorities for these figures, and therefore my readers may take them for what they are worth. They were given a few months before the "shrinkage" of the height of the Baron, and before the challenge to have all heights verified by a surveyor.

This is a revealing summary of the situation as reported in 1920 by a well known and highly respected botanist.

Measurements of many individual trees occur in the records. Some can be accepted as reliable but others are sometimes little short of speculation. Records of the trees which follow are from AD Hardy's notes and all are *Eucalyptus regnans* unless otherwise indicated. His report about the Cambarville Sample Acre in the Cumberland Valley states:

> So long ago as 1896, Mr D Ingle, then a local forester (later one of the Forests Commissioners of Victoria), repeatedly referred to the tall forest in the Cumberland Valley, easterly from Mt Arnold. Trees in that forest, he claimed, were well over 300 feet. So to him may be credited the finding of one just exceeding that, since

one in his tall forest is the Cumberland Tree, 301½ feet, accurately measured. That in preparation for the visit of the British Empire Forestry Conference in 1928, the Forests Commission of Victoria cleared the dense undergrowth of Pomaderris, Tree-ferns, Senecio, Hedycarya, Olearia, etc, from an acre, which the Commission has labelled "Sample Acre". The measurements made by Mr Ferguson, of the Commission's service, gave the following results:- Total number of trees 27. Height measured with Abney level (clinometer), average of 266 feet, tallest of the group, 293 feet. Girth at 10 feet; average 13.5 feet; largest girth, 17 feet 4 inches. A mean of more measurements might have increased Mr Ferguson's average. My own mean, using two Abney levels, was 303 feet. Subsequent theodolite measurement by Mr Mervyn S Bill, Forests Surveyor, being 301½ feet. The girth of this tallest Australian tree is 20½ feet at above 5 feet 6 inches and about 17 feet at 10 feet from the ground.

Measurements made in 1955 of the seven tallest trees in the Cumberland "Sample Acre", (Forests Commission Records) are:-

Height (Feet Inches)	Girth at 10 feet (Feet Inches)
285	14
283	16 6
301 6	16 5
285	13 6
295	13 6
279	16
271	13 9
283	22 7

In 1947 the heights of the 27 trees on the plot ranged from a minimum of 232 feet to a maximum of 301 feet 6 inches. The plots have suffered severe storm damage on at least two occasions in the last twenty or so years so some of these trees have been reduced in height. Hardy also mentioned at various times individual mountain ash trees including the Thorpdale tree, claimed to have been 375 feet tall, the Baw Baw tree (326 feet and 1 inch), the Olangolah tree (329 feet), the Dandenong Ranges trees, including the Baron (219 feet), Neerim Township Reserve tree (227 feet), the Mueller Tree (287 feet) sometimes known as the Farnston tree, Uncle Sam and Big Ben, the Tooranga Plateau Tree, the Gembrook Tree and the Tanjil Oven Tree (*E.nitens*).

Conversion factors

1 foot = 0.3048 metre; 1 inch = 0.0254 metre.

Regional and Environmental Studies

CHAPTER 3

CULTURAL SIGNIFICANCE OF EAST GIPPSLAND FORESTS

Anita Brady

The Department of Conservation and Natural Resources in Victoria recently completed a survey of old growth forests in East Gippsland (Ritman et al. 1992). Part of the project was to compile a history of 150 years of human-induced disturbance in the forests, together with a set of related databases. The historical information gathered during the survey is now being applied to the assessment of national estate values in the region (as per an agreement between the Department and the Australian Heritage Commission in February 1991). The Register of the National Estate is concerned with cultural as well as natural significance. The paper represents an attempt to define the cultural values of a forested region, which is otherwise celebrated for its high natural and environmental qualities and is chiefly concerned with European cultural places, or those representative of the past 150 years in East Gippsland.

For a proven and widely accepted definition of cultural significance, heritage professionals frequently reach for the Burra Charter. Since its adoption in 1979, the Charter's principles have been well tested on the built, or man-made environment. An early emphasis on the architecturally outstanding or extraordinary structures of our past, has given way to increased recognition of those buildings, relics and places that reflect a greater range of historic themes in Australia. But for the essentially natural environment, we have only recently begun to define our cultural values. As Ken Taylor found when he considered what might be culturally significant in the Australian Alps: 'The problem ... is not what to talk about, but how to precis the subject and specifically where to begin?' (Taylor 1992:55).

The natural environment is not easily divested of its cultural imprints. The history of our interaction with nature is diverse and changing, and a case for cultural significance can be made for many aspects of human endeavour. It can be found in our efforts to exploit and extract natural resources, to win control over inhospitable country, to admire and protect wild places. Moreover, the cultural values of forests are represented not only by those relics and sites that

remain or which can be identified, but also in the less tangible manifestation of our attitudes to, and experiences in forested environments.

Background

The Department of Conservation and Natural Resources (CNR) is responsible for more than one million hectares of public land in East Gippsland, much of which it has designated the 'East Gippsland Forest Management Area'. In recent years the Department has made studies of flora and fauna, water catchments and timber production in forests of the region. A growing number and variety of 'natural' databases have been compiled for the Department's Geographic Information Systems (GIS) which contain information on forest ecology, vegetation and floristic communities, hydrology and stream systems.

The Department recently supported a study of old growth forests in East Gippsland, with an environmental history component. This approach attempted to redress the inadequate representation of history in departmental databases. Research was focused on the human history of the forests, specifically on human-induced disturbances of the forest environment such as mining, logging, grazing and early agricultural clearing. Historical data contained in archival records of the former Victorian Departments of Crown Lands and Survey, Minerals and Energy, and Forests Commission was systematically extracted and built up into thematic layers of geographically-based information.

Most 'cultural' surveys of forested regions in Australia have been driven by the need to identify and record sites. This reflects not only our desire to document the relics and remains of human endeavour in natural environments, but also a growing awareness that both the natural and cultural resources of forests are finite. As timber extraction techniques improve, the rich heritage of forests is increasingly threatened (McConnell 1988). All too often cultural resource managers are but one step ahead of logging activity in forest coupes, struggling to document and record historic sites before they are destroyed.

The East Gippsland survey however was archives-based, or even archives-driven, to meet the thematic data collection requirements of the old growth study. This gave the East Gippsland project a different emphasis to those surveys which are chiefly concerned with the identification and recording of sites. We now have a broad overview of the land-use history of the region and identified patterns and trends in the occupation of the forests. The data-sets provide a sound historical basis in which to assess cultural significance and perhaps even a unique perspective on what might be significant.

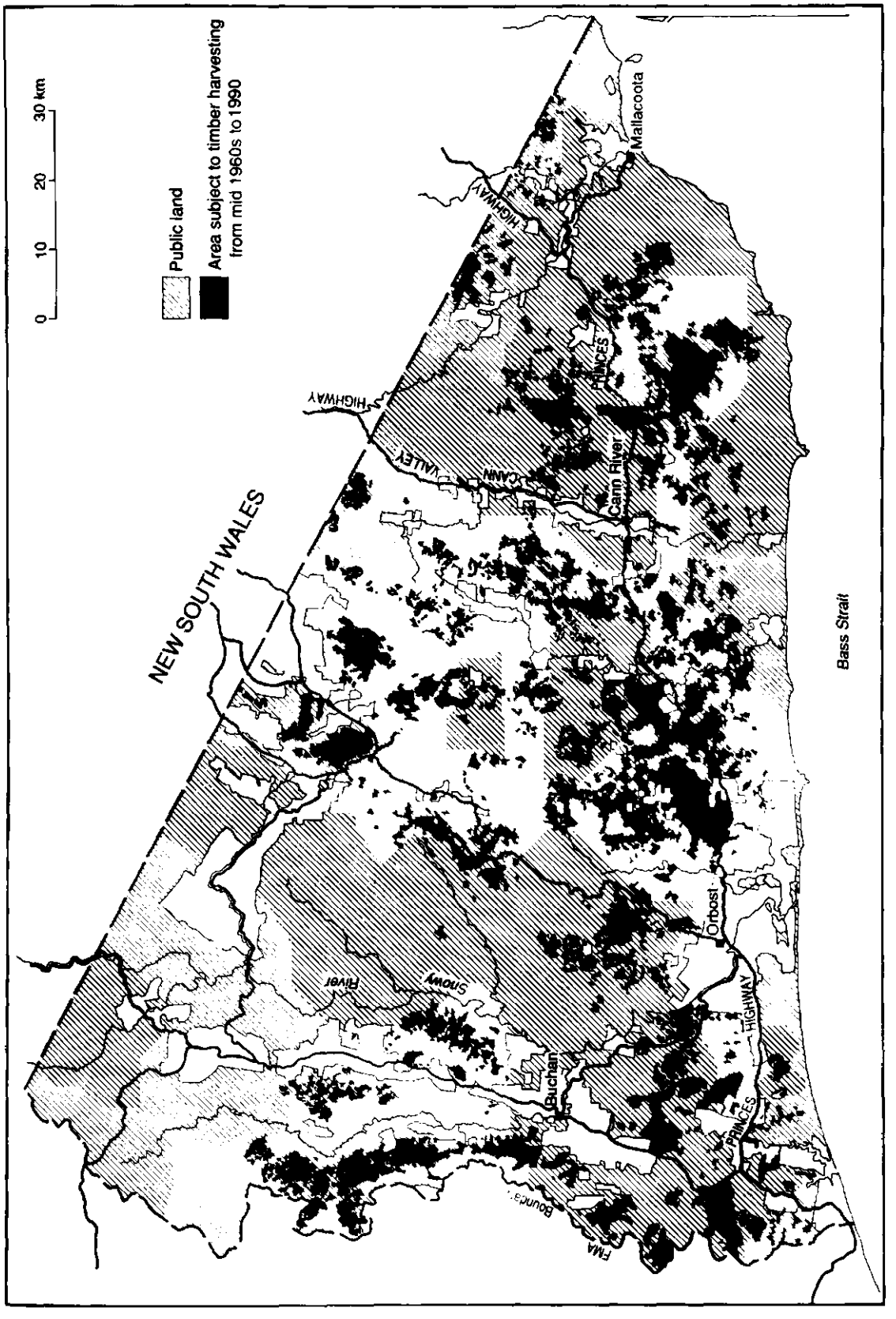

Figure 1: East Gippsland Forest Management Area

Environment

East Gippsland occupies the predominantly mountainous and thickly forested south-eastern corner of the Australian continent. Rivers cross the region from north to south, and wind down to Bass Strait through the deeply dissected Great Dividing Range and lowland plains and foothills. The Mediterranean-style climate of southern Australia, together with the sub-tropical conditions of east coast New South Wales, bring mild winters, temperate summers and high rainfall to the region. Overlapping biogeographic zones, from coastal eastern Australia, including southern Victoria and Tasmania, result in an unusual blend of flora and fauna with many species in East Gippsland existing at the outer limits of their natural range. Though the region occupies only four per cent of the land area of Victoria, it has 45 percent of the State's native plant species, 60 percent of native terrestrial mammal species, 40 percent of birds, 21 percent of reptiles and 60 percent of amphibians (CFL 1985).

In the north-east rain shadow, snow gum, montane sclerophyll woodlands and riparian forest are dominant, with mixed dry and wet sclerophyll forests covering the large 'middle' zone below the sub-alpine districts and above the coastal woodlands and river plains. Mountain ash, messmate, blue gum, shining gum and brown barrel, or 'cut-tail', are found in the wet sclerophyll forests of the middle zone. The south of the region is distinguished by lowland sclerophyll forest, which is the most extensive vegetation type on public land. White and yellow stringybark, messmate, mountain grey gum, yertchuk and silvertop ash are found in lowland sclerophyll communities. Pockets of banksia and coastal heathland are also located in the south of the region (Forbes et al. 1981, and Parkes et al. 1985).

More than 80 percent of East Gippsland is public land, with 30 percent located within National Parks and other reserves. The remaining 50 percent is State forest, which is managed and conserved for a range of uses including hardwood production, water, landscape values, historic sites, Aboriginal sites and natural conservation areas. The forests of East Gippsland, like those elsewhere in Victoria including the Otways, Central Highlands and South Gippsland, are remnants of the great expanse of forests and woodlands which once covered nearly 90 per cent of the State (Woodgate and Black 1988).

Many current forest stands, cut down and destroyed in earlier and less aware times, have been nurtured and encouraged back by forest managers. In other places forests have returned after a period of clearing or exploitation, perhaps through local indifference or neglect. In this sense they are cultural artefacts in their own right. Rare patches of forest may even predate the onslaught of land settlement and natural resource exploitation in Victoria, if they were in non-auriferous or recognised poor agricultural country, or set aside in early recognition of the need to protect their high natural or water catchment values.

Cultural places in forests

The Burra Charter defines cultural significance as having aesthetic, historic, scientific or social value for past, present or future generations. Cultural significance can '...help in identifying and assessing the attributes which make a place of value to us and to our society' (Kerr 1990:3), or as put by the Heritage Commission:

> Historic sites provide evidence of changing demography, ethnic diversity, economy and landuse, political structures, social organisation and intellectual or aesthetic developments ... Historic sites also contribute to an understanding of the pattern of settlement in Australia ... providing insights into aspects of Australian history together with technological, architectural and other cultural information, that may otherwise be lost. (AHC 1990b:8)

It is self evident that the range of places in forests very much reflects the nature of our activity there. In Victoria much of this history is tied up with the history of forest management and land utilisation. Most forests have traditionally been in public ownership, and we have gained or been denied access to them and their resources through the complex bureaucratic processes of leases and licences, the sale or alienation of Crown lands, and the reservation or protection of special or resource-rich areas.

Cultural sites exist within forests because of the trees and timber products, the minerals and water, and the native flora, fauna and scenery. Sawmills, timber transportation networks, sleeper cutting areas, mining and quarry sites, hydro power stations and dams, fire towers, charcoal pits, tourist facilities, lookouts and scientific research sites reflect our attraction to the forest resources. Other places are incidental to the environment, or exist because the forest formed a natural barrier through which people had to pass. Rail and road routes, bridges and cuttings, and stopovers are some of these places. Still more sites reflect the use of forests as marginal agricultural land, the focus of well-intentioned but misguided land managers. Typically these sites include the remains of temporary settlement or abandoned farms, salt licks, orchards, dairies, and cleared and ringbarked areas (AHC 1992). Cultural places can also reveal the environmental effects of forest based activities, and demonstrate past mistakes and achievements. Abandoned farms remind us of doomed attempts at an often inappropriate land use. Huge sawdust heaps in healthy regrowth stands point to extensive timber exploitation in the past. Rusty boilers, engines, water wheels and elaborate race systems, left behind and sometimes intact after mineral extraction ceased, emphasize the capital costs of mining and the additional expense of moving machinery out of remote forest areas.

The forests of East Gippsland

During a century and a half of European occupation, the forests of East Gippsland have been explored, grazed, logged, ringbarked, fossicked and dug over for gold and other minerals, cleared for cultivation and pasture, and regularly set fire to. The search for grazing runs began in the 1830s, and gold prospecting and botanical exploration followed in the 1850s. Agricultural settlement of the forests was underway before the turn of the century. Local hardwoods, including red ironbark, red box, southern mahogany and the famous Gippsland grey box, soon won recognition for construction and engineering purposes. Sleeper hewers regularly found employment in the lowland forests, and mining interests were drawn to the silver and copper deposits. Settlements grew up in association with these activities and sometimes disappeared, when the gold ran out or the crops failed to pay or the struggle against the returning forest was lost. Some mining relics remain, huts and fences have decayed, forest clearings have quickly reverted to bracken and scrub. Log and sleeper landings are grown over, and splitters' camps have disappeared.

Freehold land in East Gippsland was hard-won. Human incursions into the forests over the last 150 years, both short-lived and permanent, have made only a moderate impact. Small farming and timber communities cling to their isolated clearings within the forests, joined by a network of roads through the overwhelmingly green landscape. The region failed to become more closely settled because of the historical problems of distance from urban centres and markets, difficult access and lack of roads, and the tenacious return of the forest vegetation. Settlement is now thinly spread along the river flats and valleys, at points on major and minor transport routes, and at river crossings.

Very few of East Gippsland's individual historic sites stand out in terms of excellence, innovation or rarity. It is the connections, or patterns, which matter in this region, adding up to form networks of sites in the forests which, when viewed in their totality, have cultural significance. 'Associational links' between places and to important, identified themes, usually require long-term investigation and documentation (Kerr 1990:10). This has mostly been achieved for East Gippsland, through archival research on a 'micro' level and the accumulation of data according to important historical themes.

Early Europeans

Sailors, explorers and graziers were among the first Europeans in East Gippsland, and their interchanging roles are a feature of the history of this region. Captain Stevenson was a whaler operating in the seas off south-eastern Australia in the early nineteenth century. He eventually settled in the Mallacoota district in the 1840s, establishing one of the first pastoral stations in Victoria. Angus McMillan was a grazier who was also an overlander and explorer of the

hinterland. Shipwrecked sailors became unwitting explorers of the coast, while struggling back to civilisation.

Cape Everard was the first Australian landfall sighted by James Cook on his voyage of discovery in 1770. This must surely rank it as a place of high cultural significance for European Australians. Other sailors in the region, on official business of the British Admiralty, included Mathew Flinders in 1801-2 and Commander J.L. Stokes in 1841. Charts were required for the East Gippsland coastline, which eventually became one of Australia's busiest sailing routes as ships plied the waters between the colonies of New South Wales, Van Diemen's Land and Port Phillip. The survivors of the wreck of the Sydney Cove in the Furneaux group of islands, were washed up on the shore in 1797 and walked back along the coast to Sydney, with only three surviving this journey. Their descriptions of the straits off East Gippsland, and the local seal populations, brought a vital early industry to the East Gippsland waters and official explorers, such as George Bass. For sealers and whalers of this period, protected bays and islands along the coast may have provided shelter and water, or bases from which to exploit the local maritime resources. Several likely bases are located between Point Hicks and Cape Howe, including Gabo and Tullaberga islands (Thompson 1985:17).

Few explorers pushed into East Gippsland for altruistic reasons. They were more likely motivated by financial gain or career enhancement. The search for grazing country, gold and minerals, and even rare or unusual plants, eventually sent people out into the far corners of the region. Among the first were the grazier/explorers, most of whom skirted around the great mass of East Gippsland forests. They clung to the fringes, coming down the coast from south-eastern New South Wales and along to the mouth of the Snowy River or Gippsland Lakes; or they came over the mountain ranges in the north-west of the region, their easterly views from the Alps revealing a huge extent of green and seemingly impenetrable forests. Count Paul Strzelecki named Gippsland after Sir George Gipps, then Governor General of New South Wales, while on an exploratory journey in 1840. The Count ventured only as far east as the Tambo River and Omeo. Angus McMillan won the title of 'discoverer' of East Gippsland because of his travels through the region in 1839-41, while searching for grazing country. McMillan worked his way through the mountains in the north, crossed the Snowy and Tambo rivers, and explored the country around Omeo and Ensay through to the Gippsland Lakes and eventually on to Port Albert.

Other early Europeans very likely preceded the recognised explorers into East Gippsland. Cattlemen from the increasingly crowded Monaro Plains of southern New South Wales were driven southwards in the mid-1830s by a run of dry seasons. They followed the natural routes into East Gippsland, along the valleys and water courses and across the mountain ridges. After laying claim to the

fertile plains, they later returned with their cattle to what effectively became a regional outpost of the Monaro pastoral industry. George McKillop in 1835, Andrew Hutton and Edward Bayliss in 1838, and Thomas Moore in 1839 were among these first graziers.

The natural diversity of the region quickly attracted another kind of explorer. Ferdinand Mueller, of the Melbourne Botanic Gardens, began the tradition of botanist/explorer by undertaking several journeys in East Gippsland in the 1850s, and again in 1860. During these botanical expeditions Mueller explored the valleys of the Tambo and Buchan rivers, roamed over the coastal plains between Lake King and Cabbage Tree Creek, climbed the Cobberas and Nungatta ranges and travelled down from Eden to the Genoa River and Cape Howe (Gillbank 1991). He was later followed by Alfred Howitt and Walter Baldwin-Spencer, and in our own century by Norman Wakefield.

Boundaries and borders

East Gippsland is equally remote from the urban centres of Melbourne and Sydney. During the 1830s and 1840s the roving cattlemen of the region looked northwards to the Monaro Plains for their instructions and wages. In the 1850s when the colonies separated, and East Gippsland was officially attached to Victoria, the newly established border still counted for little in the local fledgling communities. Its location on the ground was open to interpretation. Cape Howe in the east was 'very indefinite' for at least two miles, while the source of the Murray in the west was an assortment of minor creeks and tributaries (Treloar 1984:8). Settlers in the far north of East Gippsland were sometimes in doubt as to which colony they resided in, and problems relating to Crown land rents and postal services were common.

The ruler straight border across the 'top end' of East Gippsland was not set down until the early 1870s, by surveyors representing the two governments. The border followed no natural boundary but effectively dissected the great mass of south-eastern Australian forests. It introduced an arbitrary administrative division that today, in places, can be seen from space. Cleared farming land in southern New South Wales comes right down to the top edge of East Gippsland, while on the Victorian side the forests have largely been left alone. This contrasting landscape feature is stark evidence, if such is required, of the omnipresent nature of the Monaro pastoral industry. Border cairns and trig stations can be found at regular intervals along the straight line, in some of Australia's most rugged and inaccessible locations.

The western boundary of East Gippsland varied from time to time, with no inter-colonial dispute nor coastline to fix it. The Snowy River may be regarded as a natural barrier, but more likely western borders include the Mitchell River at Bairnsdale, the Omeo Highway (Parkes et al. 1985), or the 148 degrees E

meridian (Forbes et al. 1981). The East Gippsland Forest Management Area of the Department of Conservation and Natural Resources defines the western margin by the Timbarra River, Nunniong Plateau and the Great Dividing Range east of Limestone Creek (Ritman et al. 1992:2).

Settlement

Early pastoral stations at Tubbut, Suggan Buggan, Buchan and Wulgulmerang in the north and west of the region; and at Wangarabell, Genoa, Maramingo and Mallacoota in the east, were sites of some of the first European settlement in Victoria. The archival history of the grazing industry, in all its various categories and forms of administration, underlines the enduring nature of pastoral land-use in East Gippsland. One hundred and fifty years of forest grazing has generated countless licences, leases and administrative records, and a strong and continuing tradition of depasturing stock on Crown lands. Runs were frequently held by the same family for generations, and the traditions of 'bush cattle grazing' passed down over the years. Leases in the northern reaches of the Cann River, for example, were in such rough and inaccessible country that only those graziers schooled in the customs and vagaries of the terrain were successful (Thompson 1952:9).

The relics and remains of this historic forest use can be found in the broken stockyards and pens, in the fences, huts and outbuildings. Less immediately obvious are the tracks carved through the forests, along which stock were driven to markets and herded in 'night paddocks' en route. The Ingeegoodbee Track was an important historic stock route between north-eastern Victoria and the Monaro district. The track went north from Suggan Buggan, over the 4000 feet high range near the border and on to Jacob's River and Jindabyne in New South Wales. It was still being used by Monaro stockmen well into this century, bringing cattle down to the market at Bairnsdale, and only fell into disuse after the opening of the Buchan-Jindabyne Road in the early 1960s (Stephenson 1980:54-56).

The oral traditions of grazing are also very strong. Good horsemanship and bush-skills are lauded, along with the knowledge acquired over generations of running forest leases. The cultural significance of long-term grazing leaseholds is therefore found not only in the tangible remains of buildings and other forest infrastructure, but in the stories and the folklore. The Sellers family of Lower Bendoc for many years held a grazing lease which covered Mt Delegate. Jack Mustard, in his published memoirs, recounts how the mountain presented no problem to the Sellers brothers. They merely circled the hill with a cattle-proof fence, put in a gate at the bottom, and easily mustered their stock in autumn when the time came to bring the animals down for winter (Thomas 1991:121).

Archival research has also revealed the network of abandoned farms in some

forests of the region. These sites, like those of other marginal agricultural country in forested areas of Victoria, are the legacy of late nineteenth century land settlement legislation. Through an array of Land Acts and amendments, various Victorian governments strove to transform the unoccupied Crown lands of the State into productive agricultural districts. The attempts to settle the more remote, mountainous and thickly forested areas, such as East Gippsland, which began in the 1880s and continued into the present century, ultimately failed. The sources of failure were inexperience, lack of capital, inadequate size of holdings, and the inability of governments to provide even basic roads in some areas.

The reminders of settlement can sometimes be found in the layout of farms and ringbarked paddocks, and in the broken fencelines and neglected fruit trees. In forests '...the first signature of private ownership was a clearing' (Griffiths 1992:16). It was also one of the first cultural imprints on a natural area, along with fencing - both conditions to be met on all Crown land selections. The will to 'improve' natural areas, to tame forest environments and make them more 'productive' by introducing agriculture, led to the rise of a veritable industry in forest clearance. Ringbarking (or 'ringing') proved the most enduring method and Australians may have cleared between 24 and 40 million hectares of woodlands and forests in this manner (Williams 1988:122). To ringbark a thickly forested block sometimes took more than one generation of back-breaking work. Fertile river flats returned the greatest reward for the effort of clearing, with the creation of good pasture or flat areas ready for cultivation. The same treatment of hillsides however denuded them of vegetation and very often caused soil erosion.

In Victoria, Crown land allotments taken up in the historic period and later reverted to the Crown, are supported by numerous extant correspondence files - the result of meticulous record keeping by Lands Department bureaucrats. Many of these allotments now fall within National Parks and State forests. These archival records have enabled us to identify the locations of the failed farms and settlements. They have also added to our knowledge of this phase in our land settlement history. The stories of those who lived, worked and sometimes died on these struggling farms make poignant comparison with the mostly reforested sites of their early endeavours.

Fire

East Gippsland is a fire prone region in a fire prone State. Lightning strikes, graziers' fires, careless tourists and out-of-control fuel reduction burns have all taken their toll on the natural environment. Extensive tracts of forest are still relatively inaccessible and unbroken, litter accumulates on the forest floor, and small outbreaks can quickly build to disastrous fires in extreme summer conditions.

In a cultural context fire has many faces in East Gippsland. Though wildfire is a menace and a threat to life and property, local settlers have traditionally used fire as a tool in land management. D.M. Thompson was the District Forester at Cann River in the 1940s. He observed a 'tradition of fire' among local people, handed down over three or four generations (Thompson 1952). 'Cattlemens' burns', on freehold and leased Crown land, were common in the region for more than a century. Graziers set fire to the bush to encourage the growth of the 'green pick' preferred by wandering cattle, and to maintain access through the dense undergrowth. Restrictions on fire lighting after 1939 have made an impact on forest structure. In the Errinundra district constraints on deliberate burning resulted in a build up of forest bracken and thickening undergrowth, and increasingly difficult passage through forests (Griffin 1962).

Official vigilance in regard to fires has seen the development of a network of roads, fire-spotting towers, water storage dams and radio communication points throughout the forests. The Victorian Forests Commission invested a great deal of time and money over many years in educating local people about the need to modify their burning habits. Despite these efforts, and the introduction of more severe penalties and restrictions in the post-1939 period, deliberate fires were still being started on forest leaseholds in East Gippsland in the last decade. Anthropogenic fire is a major factor in cultural impacts on forests of the region.

Mining

Gold fever broke out in East Gippsland at Bendoc in the 1850s and flared again in later decades, when prospectors found alluvial flecks at the heads of many river and stream systems throughout the region. Most fields proved to be relatively shortlived and unproductive though good returns were had from quartz reefs at Bendoc, Bonang, Club Terrace and Clarkeville. The latter settlement was one of the many temporary gold mining communities of nineteenth century Victoria, that briefly burst into life in auriferous areas within forests. Clarkeville prospered, even bustled for a time, with stores, a school and a hotel; then the community dispersed and the settlement disappeared when the gold ran out after less than ten years. Today it is difficult to find any traces of Clarkeville.

Gold mining left relatively few of its signature scars on the East Gippsland landscape. This environmentally destructive industry, which decimated the forests of Central Victoria, appears not to have had the same extensive impact in East Gippsland. Historic records indicate that mining related forest clearance tended to be localised in the region, where mines were generally short lived. Several townships, including Club Terrace and Cabbage Tree Creek, began life as gold mining settlements but were eventually transformed into conversion centres for the expanding East Gippsland timber industry after the Second World War.

Forest resources and forest management

Trees have been cut down and their timber used for fuel and building purposes since the first graziers moved across the East Gippsland landscape in the middle of last century. The coastal forests were a source of durable construction timbers for Melbourne engineering works from the 1880s. As the railway spread eastwards in the late nineteenth century, greater areas of East Gippsland's forests were opened up to exploitation.

Victoria's hardwood sawmilling industry moved into East Gippsland after the decimation of the ash forests of the Central Highlands in 1939. Before that time timber extraction in the region was not systematic and generally restricted to accessible forests near roads and settlements. Hence there are few early twentieth century sawmill sites to compare with the outstanding timber transportation networks of Victoria's central and south-western forests. But this is not to undermine the significance of other forms of timber extraction which have left less recognisable remains in the East Gippsland environment.

Railway sleepers have been hewn and taken out of the lower middle and coastal forests of the region from the last decades of the nineteenth century. Until relatively recently sleeper hewers worked independently in the bush, felling box and ironbark trees and, after these became scarce, moving on to the stringybark species and later again to mountain grey gum and blue gum. Hewers dragged their timbers to sleeper landings from where they were carted to the 'passer' at railway stations. There is little evidence remaining in forests to indicate the past presence of this industry. Yet it was so widespread and enduring that the removal of suitable trees over the last 100 or so years is likely to have severely altered the ratio of these species within the local forest structure. In the 1920s and 1930s Forests Commission records indicate that sleeper trees were completely 'cut out' in some areas of East Gippsland. Wattlebarking, that great standby of impecunious selectors from Bairnsdale through to Mallacoota, has also left a minimal cultural imprint on the forests unless we recognise that countless young wattles were stripped and left to die over many summers in East Gippsland.

Public land/protected land

Agriculture has largely failed to make a lasting impression on the East Gippsland landscape, resulting in a legacy of huge tracts of essentially natural public land. In the course of this century growing recognition of the need to protect and retain some areas of outstanding natural significance has seen the expansion of the national parks system. Some of Victoria's first parks are located in East Gippsland, including turn-of-the-century Alfred and Lind National Parks, as well as the former Mallacoota Inlet Park, reserved in 1909.

State forests and National Parks are the cultural manifestation of current attitudes to forested public land. In other times natural areas of Crown land were classified as timber reserves, unoccupied Crown land, protected forest, game reserves and so on. Vast expanses of publicly owned Victoria waited upon the decisions of bureaucrats within the former Department of Crown Lands and Survey, before being set aside for selection or sale ('alienation'), or withheld for a variety of public purposes.

Today, in the wake of the 1986 recommendations of the Land Conservation Council, more than one quarter of East Gippsland is designated National Park. Increased acceptance of the need to protect and conserve natural areas has been a cultural process, 'an expression of the relationship between Western man and nature' (Bardwell 1974:xii). The reservation of suitable public land in East Gippsland represents our attempts to reconcile non-economic uses of natural areas with a growing conservation ethos. State, regional and coastal parks together with scenic or wildlife reserves account for another four percent of the region (LCC 1986:2).

The Register of the National Estate lists some 25 areas in the region, including the Croajingolong, Snowy River and Cobberas-Tingaringy National Parks, the Errinundra, Rodger River and Coopracambra areas, several rainforest and wilderness zones, and a variety of coastal and riverine environments. Some cultural places, significant for their pre-historic and Aboriginal values, are also listed, notably the Buchan and New Guinea cave areas, shell midden complexes at Mallacoota and the Wroxham grinding grooves. Lake Tyers Aboriginal Mission, lightstations at Point Hicks and Gabo Island, a significant railway trestle bridge at Nowa Nowa, and the former RAAF operations area at Mallacoota are listed for their historical values (AHC 1991).

Conclusion

This paper has described some of the principle themes in the history of the forests of East Gippsland, and has attempted to outline how these themes are represented in significant sites and places. There is very much more that is 'cultural' that has not been described here. Silvicultural treatment of forests, for example, has left its own cultural imprint on the East Gippsland environment, since at least the early decades of this century. In recent times a new level of significance has been added to the forests, with the increasing focus of the 'Greens', or environmental movement. The protracted struggle of the 1980s to save rainforests of the region has resulted in an education centre in Orbost, several guided rainforest walks, and the naming of 'Blockade Track' in the Errinundra National Park.

The heritage of these forests is therefore found not only in the relics and physical remains of human occupation and activity, but in the stories and hopes and

attitudes of those who moved into and through these sometimes inhospitable environments. The relics are one aspect of our time in the forests - they are also what we left behind. The documentation of our reasons for being there is a whole other story. Cultural significance encompasses all this and more.

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CHAPTER 4

SECRETS OF THE FOREST: WRITING ENVIRONMENTAL HISTORY

Tom Griffiths

Black Friday was Friday the 13th. It was Friday the 13th of January, 1939. I knew 1939 as the year of the great fire well before I knew it as the beginning of the Second World War.

In January 1939, 1.4 million hectares of Victoria burned, whole settlements were incinerated, and seventy-one people died. Most of Victoria's mountain forests were destroyed. In the environmental history of European Victoria, there is perhaps no more significant date.

There was a long hot summer followed by a dry winter. During 1938, rainfall across Victoria was well down and rivers and creeks were at their lowest levels in 80 years. In the forests, the eucalypts dumped their leaves and bark in massive quantities. The ground crunched ominously beneath the boots of bush workers. Temperatures persistently reached 100 degrees Fahrenheit. In early January, a ridge of high pressure built up in central Australia that drove hot northerlies down across Victoria. Hundreds of little fires that had been smouldering and burning for weeks were given new and furious life. They surged together into a giant conflagration (Noble 1973, Stretton 1939).

In 1939, Australia's forests were homes to thousands of workers. Sawmills were established deep in the bush, because it was easier to transport sawn timber than it was to cart huge logs. These sawmills were also settlements, homes for men, women and children, and some of the residents escaped the forest only at Christmas.

In a eucalyptus forest on a hot summer day, with the bush tinder dry, a vicious northerly whipping the tree tops, and the smell of flames in the air, there was only one way to go - and that was down. Dugouts should have been provided at sawmills. These were holes in the ground or in the side of embankments, supported with corrugated iron sheeting and timber props heaped over with earth. All too often, no dugouts were provided for workers and their families at

sawmills. They were the sawmiller's responsibility. They were to be built and stocked at the sawmiller's expense. Many didn't bother.

So when the fire bore down upon them, timberworkers buried their belongings and tried to bury themselves. Some made makeshift dugouts which became death-traps. Some burrowed into sawdust heaps and made themselves an awful, suffocating tomb. Some jumped into water tanks and were boiled. The few who did survive without well-equipped dugouts were near big, broad creeks in which they could immerse themselves. Or else they were able to find a large cleared area, in the centre of which they lay down, wrapped themselves in wet blankets and kept their nerve. When the survivors tried to walk out to civilisation after the fire had passed, they found themselves lost. It was a different landscape. All familiar things had gone. The matchstick trees were no guide to where they were.

It is hard to write fire history without being melodramatic, without dwelling on fire as a tragedy. I have just written a history of the mountain forests north and east of Melbourne, forests that were ravaged by Black Friday (Griffiths 1992). My work was undertaken with the Historic Places Branch of the Department of Conservation and Environment and also with the Monash Public History Group, and began as a commissioned report to the Land Conservation Council on the cultural values of these forests. They are Melbourne's day-trip forests - the forests of Mt Disappointment, Healesville, Marysville, Warburton, Powelltown, Gembrook, Noojee. They are forests of mainly mountain ash (*Eucalyptus regnans*) that were reduced to burnt ash in the 1939 fires. But fire creates as well as destroys, and the forest we know today is largely one to which Black Friday gave birth.

I am going to use Black Friday, and my attempts to write about it, as a way of reflecting upon the practice of forest history. My first draft of the history of these forests was a story of settlement, it was a story of what humans did to the forest. It told of how people had perceived, lived in and used the forests. It offered a history of farming, mining, sawmilling, tourism, and water and forest conservation. It recounted a human history of fire. It imagined all the drama and horror of Black Friday. It recognised Black Friday as a European creation, an awful consequence of a century of white settlement and environmental practice. That was indeed the finding of the Royal Commission into the 1939 fires. 'These fires', thundered Judge Stretton, `were lit by the hand of man' (Stretton 1939:5). It was society and not nature that was under trial at the Royal Commission, and so too in my history. The forest remained the backdrop to my story, a picturesque setting, a valued resource, something that was exploited, used, protected and acted upon, but which was rarely allowed a dynamic of its own.

That is the way in which historians usually include the natural world in their narratives, by making it into an artefact, by drawing it within the sphere of human influence and diminishing its natural dimensions. Hence we often talk of 'impact' or 'land-use' or 'conquest', words that describe a one-way relationship. 'Environmental history', if it does indeed represent a new approach, aims to recognise nature in our narratives as a resiliently independent and equally historical agent. Only then can we talk properly of human interaction with the environment.

In the words of American historian Roderick Nash, environmental history goes 'beyond the human dimension to embrace all life'. Nash suggests 'that the environmental historian, like the ecologist, would think in terms of wholes, of communities, of interrelationships, and of balances'. 'This would indeed be history "from the bottom up"', wrote Nash, 'except that here the exploited element would be the biota and the land itself' (Nash 1972). The biota is no mere passive servant, however - no more than are those other exploited groups being written into history: the working classes, blacks, women. The revisionist histories giving voice to the experiences of these groups recognise the strength and subversity of their underworlds. So too do environmental historians seek to describe a natural world that has rhythms and histories of its own.

I began, then, to look at the forest itself more closely; I began to realise that it was a community of trees. The trees had names and life histories, too. And fire in this forest was different to fire in other forests. Why? Was Black Friday entirely a European creation, or was it part of an ancient cycle essential to the maintenance of this natural community? How could I know unless I extended my enquiry backwards and sideways, backwards through time and sideways across disciplines? I could not write this forest's history without understanding, at least in a rudimentary way, its nature. I began reading about fire ecology, and I started talking to ecologists. I quickly realised what good historians they are.

One ecologist in particular was helpful to me - David Ashton, a Melbourne University botanist who has spent his life, as he puts it, 'prying into the personal life of *Eucalyptus regnans*' (mountain ash) (Ashton 1987, 1990, 1991). He opened my eyes to another history of the forest that was essential to any understanding of its human dimensions. Ashton's own enquiry began in the late 1940s when he began to study an ancient forest of mountain ash in the Wallaby Creek water catchment area, less than 50 kilometres north of Melbourne. It is perhaps 300 years old and has escaped logging and massive fire. Hume and Hovell passed through it in 1824, paling splitters raided it in mid century, water resource managers protected it in 1872, bullockies burnt its understorey repeatedly in the early twentieth century, but it was 1949 before anyone really looked at it. David Ashton wished then that those earlier observers had recorded

more of what they saw, and he yearned to return to 1850 with a botanist's eye.

His task was to find out why this ancient forest was not regenerating, why it was not renewing itself. The forests that colonists had once considered limitless, 'virgin' and 'over-ripe', were now in many places denuded and destroyed as a result of frequent fires and intensive logging. Victorians had to urgently discover how to regenerate mountain ash. It was going to be a long experiment. Ashton needed to research the whole biology of the plant, its 'autecology', every thing about the organism that he could discover. How fast did it grow? How deep are its roots at various stages? How often does it flower? How viable are the seeds? What happens to them? The secrets of the forest - the key to its future - were to be unearthed by this myriad of questions about the life of one organism.

Ashton pieced together the story with patience and care (Ashton 1956, 1981). That word 'ash' hints at the Faustian bargain struck between the tree and its dominant environmental influence: fire. Ash-type species are different from most other eucalypts in their means of regeneration. They do not develop lignotubers under the ground from which they can renew themselves, and mountain ash and alpine ash do not coppice (grow new shoots) from the trunk. For their survival they are unusually dependent on their seed supply. Mountain ash dies out unless fire periodically sweeps the forest, for it is fire alone that releases the seed from the tree's hard capsules. However, the tree is also unusually sensitive to fire. Its bark is thin, and mature trees are easily killed by fire. Furthermore, if a second fire comes before the regrowth has developed its own viable seed, a whole forest can be wiped out.

Although very sensitive to light surface fires, mountain ash seeds prolifically in intense crown fires. In fact it possesses features that seem to promote such fires: a heavy fall of inflammable leaf litter particularly in dry seasons, hanging streamers of bark that take the flames up to the forest canopy, and open crowns whose pendulous foliage encourages updrafts. And how do these precious seeds survive the intense heat that they indubitably need? Ashton suggests that perhaps it is the very flammability of the crown that protects the seed in its capsule - just long enough. In the crown of the tree ahead of the fire front, the heat is brief and explosive and, some observers say, is followed by cool updrafts of air before the arrival of the surface fire. Ashton calls this fragile and complex circumstance a 'miracle of timing'. The fire also opens up the regrowth to the sun; it prepares and dries the soil, making it especially fertile so that the seeds can flourish.

Ashton's research revealed that mountain ash forests perversely need a catastrophe to survive. They need Black Fridays. But they need them at long intervals, every few hundred years. Black Friday was, then, not entirely a European

creation; it was part of an ancient natural cycle essential to this community of trees. The very existence of the mature even-aged ash forests admired by European colonists was evidence of earlier Black Fridays. In the wet mountain forests, it was the frequency - not so much the intensity - of fires that was a result of European settlement.

I began to realise that the wet, tall mountain ash forests defy many of the generalisations about Australian forest history. Eric Rolls' classic study, *A million wild acres*, is the history of a dry forest, the Pillaga Scrub in New South Wales, much of which grows on what were once good pastures (Rolls 1981). It is his staggering and reasonable contention that there are more trees in Australia now than at the time of European settlement. 'Australia', writes Rolls, 'was not a timbered land that has been cleared' (Rolls 1985:2). Aborigines kept the forests open with their light and regular burning. The prolific germination that always follows fire in Australia was kept in check by the plentiful wallabies, possums, bandicoots and rat kangaroos, which ate the seedlings. In the absence of Aborigines and small marsupials, forests thickened, and long-lived colonists remembered playing and working where trees and scrub later grew. Without Aboriginal fire management, wildfires erupted in these dry forests, and there they were very much a product of European occupation. Today's forests, argued Rolls, are not remnants of a primeval jungle : 'they do not display the past as it was, they have concentrated it' (Rolls 1981:399). They are different and new; they are exaggerated communities of plants and animals; they are especially vulnerable.

But what of the mountain ash forests? Rolls acknowledges that, along with the tracts and patches of rainforest on the eastern face of the Great Divide from Queensland almost to Victoria, they are among the few exceptions to this narrative (Rolls 1981:401). They have no resistance to fire. Their regeneration is precarious. They were not burnt lightly and regularly by Aborigines. Holocaust fires like Black Friday are endemic. Vast areas of mountain ash were cleared by settlers, and other areas were denuded by repeated fire. When Europeans first entered the tall forests, their testimony varied as to its density because of the variety and localised nature of fire regimes. In places they recalled riding a horse through the scant undergrowth; in others they had to fight through thick scrub to make a pathway. Where they did find an open forest floor, it was not due to regular burning but to the long absence of fire. The mature mountain ash forests excited them, and the few stands that survive today can be called remnants. Perhaps they do display the past as it was.

Investigating the nature of ash enabled me to go beyond a simple appreciation of them as tall trees to a realisation that their ecology was the key to many of the region's cultural patterns - its dramatic fire history, the chronology and sequence of forest utilisation, the placement of bush sawmills, the professional anxieties of

foresters, the imperatives of water supply managers. Ecology is not entirely a separate realm of specialist study; it is a systematic distillation of the sort of knowledge or bush lore that anyone who lives or works in a forest has to have. So ecology helped me plumb not just natural systems but cultural understandings.

Environmental history, then, demands that we go beyond a description of how humans perceive or interact with their environment over time. That might be very good historical geography or settlement history. We need to broaden the cast of historical actors to include plants and animals, whole ecosystems, even the elements. Such an approach challenges many of the conventions of history. One historian friend said to me recently: 'why are you talking so much about nature, about plants and animals? History is about chaps!' - thereby managing to be sexist and speciesist in the one phrase. Poet Les Murray welcomed Eric Rolls' pioneering environmental history, *A million wild acres*, for its democratic and ecological vision. 'In Rolls' presentation', he wrote, 'things human and non-human are all happening interrelatedly, and the humans barely stand out.' Murray reflected that this was a new kind of synthesis, a new kind of literature. 'There is something anti-ecological about the novel', wrote Murray, and one could add 'about history', for both assign all of agency to humans (Murray 1984:161, 167).

Environmental history demands that we incorporate the environmental sciences into our historical discourse, mining them - as we do the social sciences - for explanatory tools. And we can draw on the sciences as much as the humanities for our metaphors of description. Stephen J Pyne's recent fire history of Australia, *Burning bush*, offers an example of this imaginative approach (Pyne 1991, Griffiths 1993). We need more histories that are bound intimately to place and that also embrace the natural world, histories that are deeply attentive to human and biological parochialism. Environmental history makes best sense on a regional scale, and rarely on a national one. Historians will have to reach for boundaries other than national, state or shire ones. It is no surprise, then, that forest historians have led the field of environmental history - they are, as a matter of course, studying bio-regions, and within them they find that nature and culture are almost indistinguishable.

In much western thought, the natural world is seen as separate, as something there for humans to exploit or protect, but not to live with. Therefore we tend to see nature either as an artefact or as a wilderness - as something we have made ourselves and that is in our control, or as something from which we are absent. Good environmental history will, I think, integrate the human and natural worlds. The challenge for me in writing a forest history has been to describe an area that is neither natural wilderness nor human artefact; it is much richer and more exciting, it is something in between.

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CHAPTER 5

EFFECT OF SETTLEMENT ON THE FORESTS OF THE CENTRAL PLATEAU, TASMANIA

R. C. Ellis

Introduction

The southern portion of Tasmania's Central Plateau originally supported a forest of generally mixed age on upland areas, interspersed with open plains of varying size on level or concave topographic positions. Fire has been a major influence on the development of these, as of probably all, eucalypt forests and extensive cohorts of the principal species, gum-topped stringy bark (*Eucalyptus delegatensis)* and mountain white gum *(Eucalyptus dalrympleana*) have arisen following such fires. The plains were probably maintained in part by Aboriginal burning practices but of equal or greater importance have been infrequent severe frosts that cut back invading forest.

To a casual observer, much of the forested land may still present an aspect of more or less primaeval aspect, but the frequency with which, even in remote areas, one encounters the remains of fences, evidence of ringbarking on burned and long-dead veteran trees and remains of huts and other structures indicates a surprising intensity of past agricultural activity in this climatically inhospitable area. In the course of a study aimed at formulating silvicultural practices for *E. delegatensis* it became clear that an elucidation of the effect on the forest of past human activity was necessary to an appreciation of the effects of present practices.

Land settlement procedures

Extensive grazing of cattle and sheep in grassy highland forests had been practised from the early days of European settlement, but alienation of the more heavily forested land to private ownership dates mainly from early this century; by that time most of the good-quality agricultural land in the State had been sold and the Government doubtless appreciated a new source of revenue. However, extension of agriculture to the stony soil and harsh climate of the plateau was not a great success, although diligent farming of the better, less stony soils can produce good results.

Up until 1903 grantees of agricultural land were required to clear it completely before they could gain full title to it, but the cost of felling timber, grubbing stumps and ploughing could be 10 to 15 times the cost of the land. This, together with the requirement that grantees live on their grant, discouraged settlement on any but the best land. The *Crown Lands Act* of 1903, and its subsequent amendments in 1905 and 1911, required only that bush land be brought into use in a comparatively rough condition and it abolished the requirement for residence other than on the best land. This promoted the sale of much poorer agricultural land than hitherto.

Crown land was divided into Town Lands and Rural Lands. Upon the assessment of a surveyor, Rural Lands were further subdivided into first, second and third class land. First class land was valued at less or more than one pound per acre; second class land at between ten shillings and one pound per acre, and third class land at between five shillings and ten shillings per acre. These prices prevailed at least until World War I.

The intent of the Government was that land should be cleared and farmed. To this end, land was sold by purchase grant and only on credit, either directly at the minimum price for the class of land, or by auction with the minimum price as reserve. One third of the purchase price was added to service the credit. A purchaser paid one-fortieth of this credit price immediately and contracted to pay the balance over 14 years, with instalments that increased year by year to reflect the notional improving profitability of the enterprise; an elegant if complex scheme. Each year the purchaser was required to undertake improvements to the land at a minimum rate of two shillings and sixpence per acre (0.4 hectare) for first class land to an aggregate of one pound per acre and one shilling per acre, for second and third class land to an aggregate of five shillings per acre: eg. he had to expend on improvements the equivalent of the purchase price. Purchase grants could be resold at any time but the land became forfeit to the Crown if there was default in either payment of instalments or in expenditure on improvements. Title to the land was granted only when both requirements had been fulfilled. In practice, forfeiture for non-payment of instalments was usually acted upon but forfeiture for failure to improve the property was not, although title was withheld. Thus for several decades much unimproved land was bought and sold without either party gaining title to it. This anomaly was resolved only in 1976 when an Act of parliament waived the requirement for improvements before title could be granted.

Any person over 18 years of age could purchase land as follows, according to the Land Act of 1911:

1. one lot of first class land not exceeding 200 acres (81 hectares) or less than 15 acres (6 hectares) (in 1905 not exceeding 200 acres), and

2. one lot of second class land not exceeding 300 acres (121 hectares) or less than 30 acres (12 hectares) (in 1905 not exceeding 250 acres - 101 hectares), and

3. one lot of third-class land not exceeding 600 acres (243 hectares) or less than 60 acres (24 hectares) (in 1905 not exceeding 500 acres - 202 hectares).

Thus an individual could purchase about 1000 acres (405 hectares) of land of assorted quality. The purchaser paid all survey fees: one-fifth at the time the application for a purchase grant was made, and the balance in four equal annual instalments. Further purchases from the Crown could not be made until title to existing purchases had been gained.

In order to gain title a purchaser had to sign a statutory declaration and answer the following questions inter alia:

> Are you residing on the land?
> If not, does any other person reside on it?
> What is the nature of dwelling house and any other buildings?
> How many acres have been ringed (give date and cost of ringing)?
> How many acres in cultivation and cost per acre?
> What extent of fencing has been erected and nature and cost thereof?
> What is the nature and cost of any other improvements?

A purchase could be discharged ahead of time only if all the improvements required during the life of the repayment schedule had been effected, in which case the cost of credit was adjusted down accordingly.

Initially, virtually all land was open to purchase, although extensive areas were leased for grazing as well. The requirements for purchase allowed the government some degree of control over the use to which the land was put and to some degree safeguarded against the concentration of large areas of land in only a few hands. Thus, in an area of highland forest which became known as the Clyde Run, 10 000 acres (4048 hectares) was surveyed in 1904 and divided into 41 purchase grants. All were third-class land and none was adequate to support a farming enterprise. Most were purchased, some were leased and all were used only for summer agistment of cattle and sheep from the lowlands.

Much of the southern highlands carried what we would today regard as splendid stands of timber. In the 1911 revision of the *Lands Act* provision was made for the Governor to appoint a Conservator of Forests who would report to the Minister for Lands. The Minister, as the Commissioner for the disposal of Crown Lands, was empowered to decline an application for sale of land that was likely to be required as a timber reserve. In officialese, the Governor in Council

could 'by proclamation in the Gazette except from sale and reserve to His Majesty such land as he sees fit for the preservation and growth of timber.' At that time, recognised eucalypt timbers were blue gum (*E. globulus*), stringy bark (*E. obliqua*) and swamp gum (*E. regnans*). Today *E. delegatensis* provides the bulk of sawn timber from eucalypt forest, but in 1911 virtually all *E. delegatensis* forest was in highland areas that were inaccessible by tramway, remote from market or port, and the timber itself presented difficulties in seasoning that were not solved until much later. So on thousands of hectares, magnificent stands of trees up to 35 or 40 metres tall and 60 to 150 centimetres diameter were dismissed in survey reports as 'gum and (white topped) stringy bark, of no commercial value'.

It seems paradoxical in view of the present emphasis on private forestry, that land was sold only for clearing and farming, whereas forested land could not be sold for the purpose of being managed as forest. The State reserved the ownership of all wood-producing areas to itself and granted leases of limited duration for timber harvesting. Only by destroying the forest could rural land be obtained freehold. The following examples are typical of a widespread practice that prevailed for 50 years!

Figure 1 Ringbarked tree dating from 1905-1910, surrounded by 70-year old regrowth.

Figure 2 Weatherboard cottage, stockyards and 30 acres of cleared land. In 1927 these 'improvements' were valued at £427.

Purchase grants

The Clyde Run was surveyed in 1905. In July of that year Adam Turnbull Gibson of Epping applied to purchase a block of 302 hectares. The Surveyor's report was perfunctory and recorded that it was basalt country (dolerite in fact) with a clay loam gravel soil and carrying gum and (white topped) stringy bark. It was 104 kilometres from market, 51 kilometres from the nearest railway and 5 kilometres from the nearest road. It was third-class land with very little water and a value of five shillings per acre. Three sides of the lot had been fenced with dead wood fences erected by adjacent owners, value £25.14s.0d. The report might have added that the soil was very rocky, with extensive areas of rock pavement or scree.

The purchase price was £249, of which £6.4s.6d. was paid forthwith on 27 July 1905 (one-fortieth of the purchase price plus credit) with the balance to be paid by 1919. The purchaser also paid half the assessed value of existing boundary fences. This requirement provided a basis for strong disagreements among neighbours and between purchasers and former lessees or owners.

The lot was soon bought from Adam Gibson by Thomas Muirhead, also of Epping, who paid out the balance owing the Crown in 1911 and claimed improvements of:

Ringbarking 550 acres in 1905 at 1/3d per acre	£34.7s.6d.
Ringbarking 197 acres in 1911 at 1/4d per acre	£13.2s.0d.
An unspecified area was claimed as scrubbed, burnt and grassed 'spread over lease cost....' (almost certainly they were natural plains)	£25.0s.0d.
471 chains of fencing, boundary and internal	£50.6s.0d.
Total	£122.15s.6d

The area of the lot (302 hectares) was far above the maximum of 202 hectares that applied in 1905 and the expenditure on improvements fell far short of the basic requirement of five shillings per acre. Treasury was asked to advise on the claim for title and agreed to grant it. Perhaps Muirhead had influence in high places. The whole area of the lot had been ringbarked and charcoal on the ringed trees shows that subsequently it was heavily burnt. Sheep and cattle were grazed for many years but they tended to concentrate on the moister swales and wetlands, which thus were converted to pasture, and they probably used the upland mainly for shelter. On the upland, seed shed from the ringbarked trees soon re-established a dense forest of regrowth eucalypts. On third-class land such as the Clyde Run, clearing and cultivating for grass, let alone for crops, was not feasible, and so fencing and ringbarking were virtually the only two activities that could be costed to satisfy the improvement provision of the purchase grant. As a result, the whole 4048 hectares of the Clyde Run was ringbarked. Once title had been gained, or hope of gaining it abandoned, then little or no follow-up work was done.

Near Waddamana, a more determined attempt was made to establish a grazing property. The area was surveyed in 1904. In 1905 an application to purchase a lot of 259 hectares was made by Henry Albert Stacey of Jericho. The surveyor's report recorded that it was basalt country (dolerite again) with loam gravel soil carrying gum and (white topped) stringy bark. It was 105 kilometres from the nearest market, 47 kilometres from the nearest railway station and 6 kilometres from the nearest constructed road. It was watered by a well and was third-class land worth five shillings an acre.

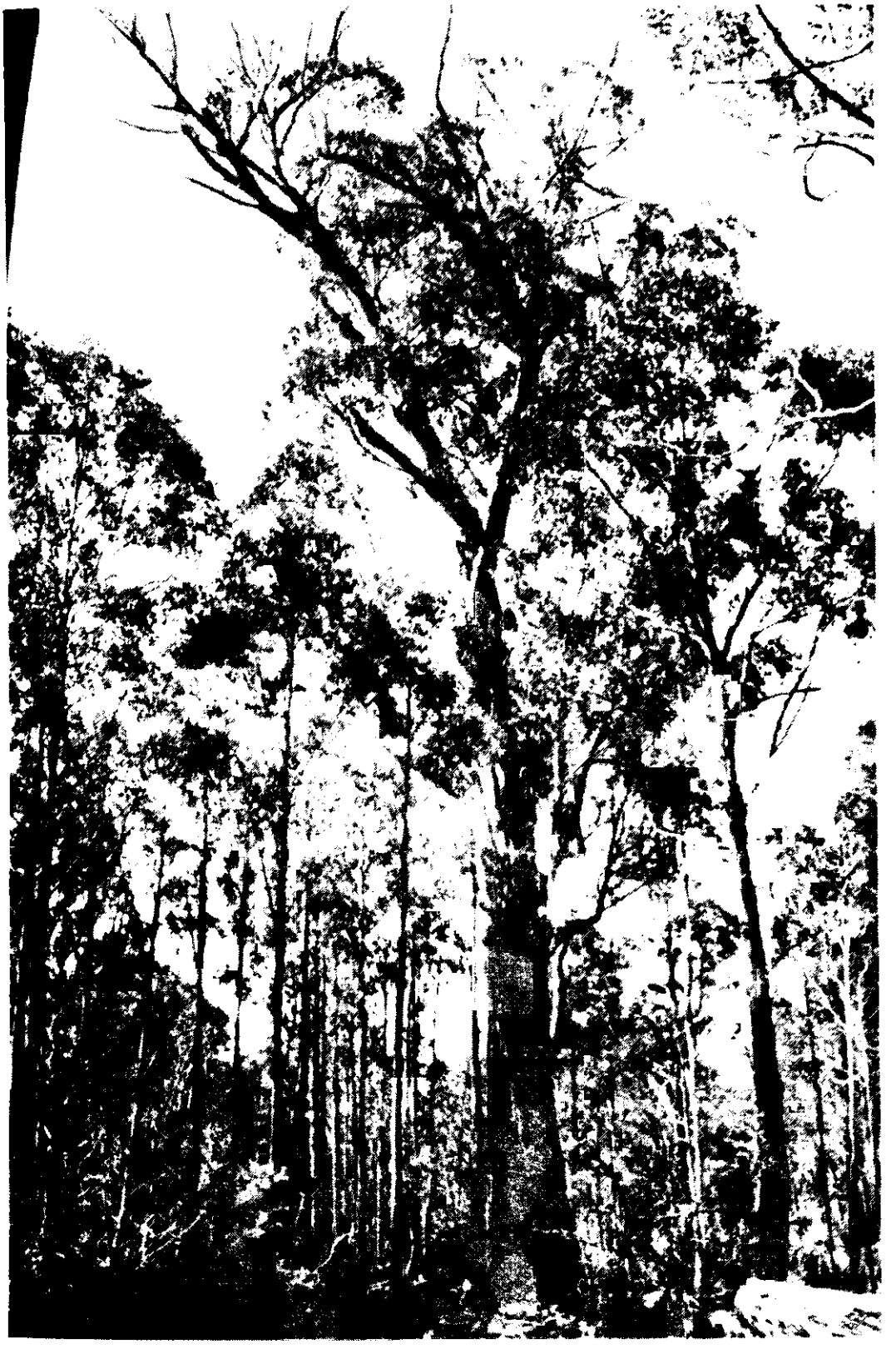

Figure 3 Seed from this veteran survivor of ringbarking has regenerated the area following several fires. The present regrowth is 58 years old.

Between 1905 and 1927 the lot passed through the hands of Henry Stacey, Louisa Rogers and John Jones and Henry Oscar Jones. Finally Edward Knight the Younger of Jericho bought the lot in 1922 and in 1927 gained title to it after making the statutory improvements and by paying out the balance of the original credit purchase of £211, which had remained unchanged since 1905 (he actually paid £1500 for the lot). The improvements that Knight listed as having been made to the lot were:

> The erection of a weatherboard cottage of 4 rooms with match lining and shingle roof, at a cost of £400.
>
> A 2-stall stable of wood, cost of £20.
>
> 600 acres (243 hectares) of forest had been ringbarked: 500 (202 hectares) at 1/9d per acre and 100 acres (40 hectares) at 2 shillings per acre. A cost of £53.7s.6d.
>
> 30 (12 hectares) had been scrubbed, burnt and grassed at 8 shillings per acre - £12.
>
> 3 miles (4.8 kilometres) of boundary fence at ½-cost of £50 per mile - £75.
>
> Erection of sheep and cattle yards at a cost of £15.

In 1927 these improvements were considered to be worth £750 or £1.3s.4d per acre, which was well above the minimum requirement. The weatherboard cottage was occupied for 40 years but is now vandalised and derelict. Between 1919 and 1930, Knight bought out several of his less able or less fortunate neighbours and worked the lots for raising sheep and cattle. This trend towards consolidation of lots was common in both the Waddamana area and the Clyde Run. As on the Clyde Run, on this and the other lots of the 1416 hectare Waddamana forest, little or no 'improvement' was effected once a purchase grant had been paid off. Other than on the 30 acres that had been cleared around Knight's cottage, regrowth of forest became established over most of the ring-barked area by 1935. Damaging fires in 1957 and again in 1966 killed some of this regrowth and established younger cohorts, so that today an uneven-aged and potentially very productive forest is in place.

Hydro-electric power development

Construction activities associated with hydro-electric power developments have affected many areas of the highland forest including the Waddamana forest. Although much of the forest was ringbarked early to waste, a market for timber developed with the commencement, in 1909, of work on the Waddamana Hydro

Electric Power Station. In 1905 Professor Alex McAuley of the University of Tasmania wrote a paper in which he described the potential of the Great Lake basin for generating hydro electric power. This came to the attention of a local engineer and the developer of a new electrolytic metal refining process who was seeking a large source of cheap power. In 1909 the Tasmanian Government granted a concession to the newly formed Complex Ores Co Ltd to use water from the Great Lake to produce electricity. Work began in 1910. The history of the building of the Waddamana power station is a topic in itself. It brought a large number of people to live in this remote area, in construction camps and in more permanent settlements centred on the two generating stations.

Large quantities of timber were required for the construction work, amongst which was the building of a wooden-railed tramway 27 kilometres long to connect Waddamana with the nearest trafficable road. All supplies for this large project were conveyed by horse-drawn trams over this route. In 1912 a devastating fire that originated most probably at a construction site, swept the surrounding forest and necessitating the rebuilding of much of the tramway. This fire is recorded in tree rings and appears to have been the first serious disturbance of the forest since the great frost and/or fire of 1837. The first stage of the Waddamana Power Station was opened in 1916 and the Station was completed in 1922. The demand for timber for the project created what was probably the first substantial market for timber in the highlands and may have assisted some grantees in clearing their lots. Stumps from this early felling are prominent in the Waddamana forest.

Recent events

The Clyde Run was subjected to what one might call blanket ringbarking, but the Waddamana forest has had a more complex history. The most rugged areas were not ringbarked but were grazed, burned and picked over for sawlogs until they carried largely degraded forest. In the ringbarked areas veteran trees often were left, possibly for shelter or for a supply of fence posts, and served as seed trees to regenerate the area. The area has suffered more damaging fires than the Clyde Run, probably because of its more ready accessibility since the power station was built, and so has a range of age classes of regeneration from (now) 26-60 years old. In the 1950s many lots were acquired by a sawmiller and they supported several spot sawmills for about 10 years until the fire of 1966 destroyed them.

Since 1977, when about 1416 hectares of the Waddamana forest, composed of 7 lots was acquired by the Waddamana Forests Pty Ltd, logging for pulpwood and sawlog has sought to remove veteran and fire-damaged younger trees in order to release vigorous regrowth, and to retain potential sawlogs. Thinning of the older cohorts of regrowth has also been carried out to salvage pulpwood that would

Figure 4 Construction of the Waddamana hydro-electric power station provided a market for timber. This stump dates from about 1912.

have succumbed to natural thinning and possibly to improve substantially the growth of retained trees.

In 1987, when Waddamana Forest Pty Ltd acquired the 41 lots of the Clyde Run, nearly all of them carried good regrowth forests of *E. delegatensis* up to 70 years old, with poorer stands of black peppermint (*E. amygdalina*) and Tasmanian snowgum (*E. coccifera*) on ridges and of cider gum (*E. gunnii*) and mountain white gum around open plains. These stands are being thinned and the best trees are left to grow on. In 1990, 54 hectares of Muirhead's original lot yielded 126 tonnes per hectare of pulpwood and 5.4 cubic metres per hectare of sawlogs during a partial harvesting operation, whilst 80 cubic metres per hectare of actual and potential sawlogs were left to grow on. The Company is growing trees: an activity that would not have been permitted in 1911.

This account was started with the suggestion that an elucidation of the history of

these forests could aid our appreciation of the effects of present practices. It has presented us with a nice conundrum. The Government's policy of issuing purchase grants of poor agricultural land generated a period of ringbarking and burning that amounted to a major catastrophe for the forest of the highlands. Yet that and subsequent fires generated a splendid new forest of diverse age: such is the nature of the genus *Eucalyptus* and especially of the 'ash type' eucalypts. Despite historical evidence such as this, many people continue to campaign against extensive forestry and particularly against the silvicultural use of fire to obtain regeneration, and instead advocate selective cutting of single trees or small groups. Selective cutting certainly has a place in the tending of existing stands, in the release of suppressed regrowth and the retention of small trees with the potential to grow into good sawlogs. But such practices in the highlands frequently produce little regeneration from seedlings and such as does occur usually fails to develop into a thrifty stand. On the other hand we can be confident that a heavy partial cut or a shelterwood cut followed by a hot and damaging fire will be very successful in regenerating the forest - just as was ringbarking and burning. But hot damaging fires waste and degrade existing trees. The challenge will be to meld the extensive and usually severe treatments necessary to obtain successful regeneration of the forest with the intensive treatments appropriate to the tending of existing stands.

Acknowledgment

I am indebted to Mr Barry Ford of the Department of Environment and Planning in Tasmania for researching the case histories of lots in the Clyde Run and Waddemana Forest.

CHAPTER 6

PENDERS PERPETUAL FOREST PLANTATION

Sue Feary

Introduction

This paper presents the findings of preliminary research into a timber processing plant and associated hardwood plantations near Tanja on the south coast of New South Wales. Although a small scale operation, Penders has a fascinating history which has been visibly influenced by European perceptions of the values of forests.

Despite beginning only thirty years ago, the plantations represent one of the earliest attempts in south-east New South Wales to utilise otherwise useless timber for economic gain. The success of the operation is the result of the vision and determination of a few people who were brought together by chance events. Following their purchase of Penders land, Sir Roy Grounds and Kenneth Myer joined up with German born John Cremerius. With advice from noted botanist Lindsay Pryor they transformed degraded native forests and cleared lands into carefully managed plantations. The technique of coppicing is used to improve yield and the unmilled timbers are pressure treated by an infusion method normally restricted to softwoods. The resultant product fills a niche in the market for round logs or 'bush timbers'. These are popular for garden landscaping, fence posts and in constructing dwellings with a distinctive architectural style.

All of the land that had been purchased by Myer and Grounds was donated to the New South Wales National Parks and Wildlife Service in 1976. With the recent tragic death of Kenneth Myer, another parcel of land has been bequeathed to the Service and is to be gazetted as part of Mimosa Rocks National Park (Figure 1). The future of the timber processing plant and the plantations is now being considered by the Service. The historical significance of Penders operation is one of the factors that will be taken into account, creating a situation whereby the objectives of nature conservation must be balanced against those of conserving our cultural heritage. On the other hand consideration must be given to the desirability of having a timber processing plant and native species not local to the area, within a National Park. Harvesting trees is an activity not normally associated with nature conservation and the maintenance of the plantation landscape will require a substantial injection of funds.

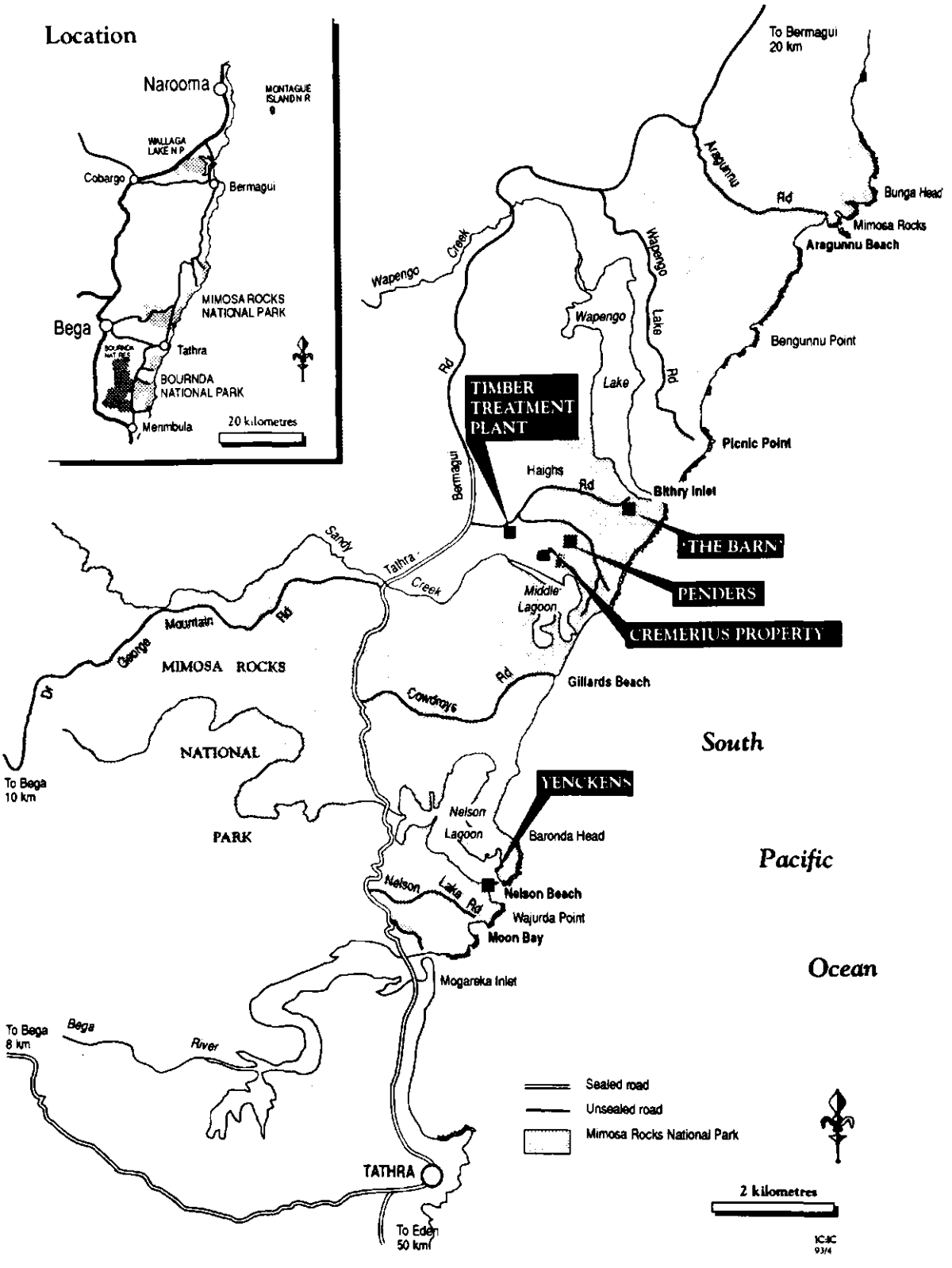

Figure 1 Map showing location of treatment plant, 'The Barn' and other places mentioned in text.

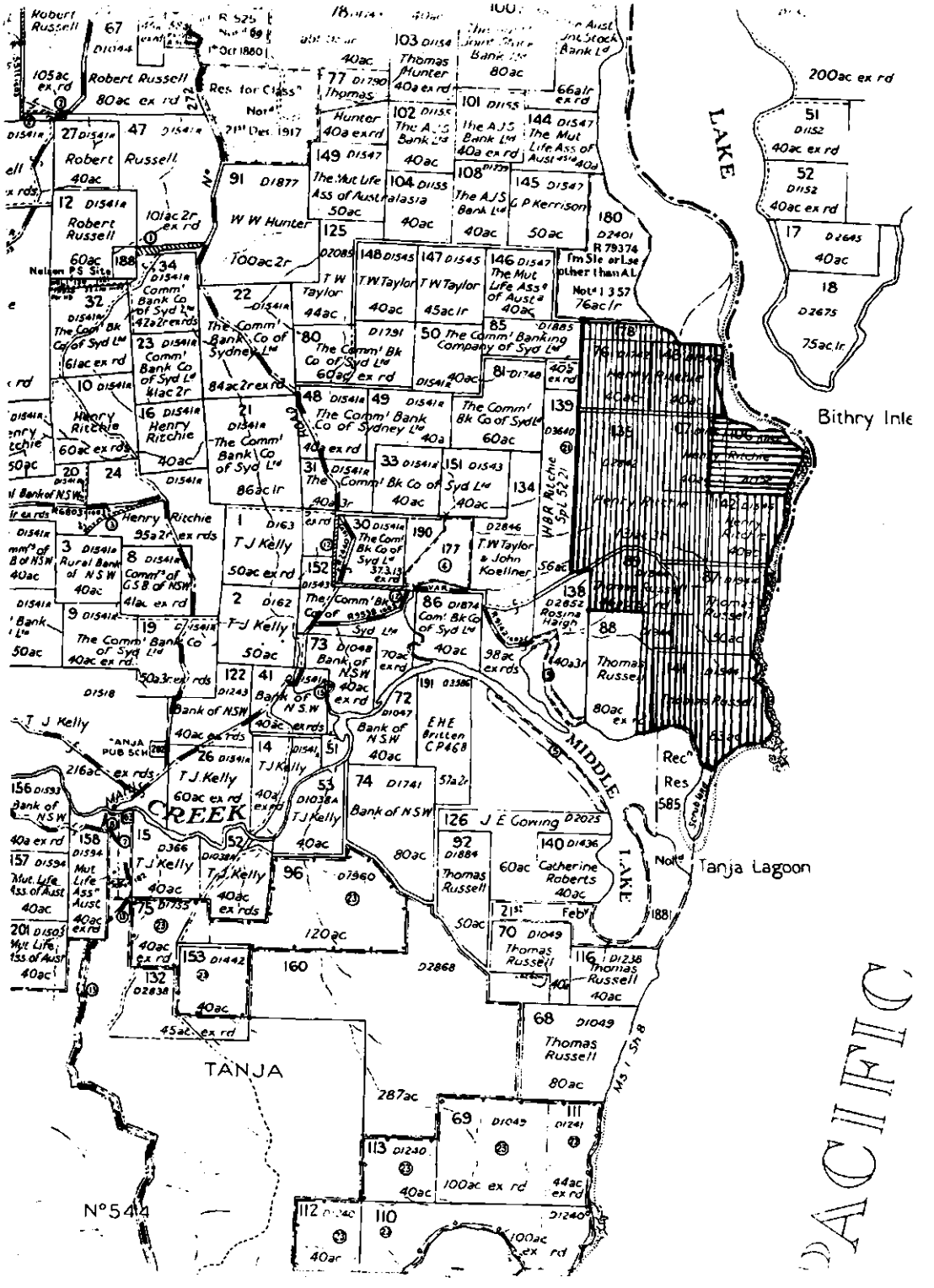

Figure 2 Parish of Tanja map (c. 1950s) showing extent of Penders land donated to NPWS in 1976 (vertical hatching). Location of current lease shown as horizontal hatching.

This paper attempts to demonstrate that the plantations are significant as an early example of their type. They are also associated with influential Australians; provide a glimpse of European perceptions of forests; and demonstrate an unusual suite of silvicultural techniques.

From Aachen to Tanja

The European connection was crucial to the history of Penders. John Cremerius, who was later to play such an important role in Penders, and his wife Mary, came to Australia in 1957. He brought with him over 1000 years of cultural traditions about the forests of Europe which combine a deep love for their natural beauty with a fervour to manage and utilise their products in an economically viable manner. Much of the development of these cultural traditions can be attributed to the influence of the illustrious Roman Emperor Charlemagne who played a pivotal role in bringing Europe out of the Dark Ages.

It is pure coincidence that Cremerius hailed from Aachen, the same city that Charlemagne had chosen for his capital during his great reign in the 8 and 9th centuries. Aachen is situated on the borders of Germany, Belgium and Holland and is best known for its magnificent cathedral where Charlemagne is buried. I have used this coincidence to reflect on the antiquity of the relationship between forests and people and on its global nature. Forest clearance and management was an important part of Charlemagne's strategy to unify and civilise Europe and a very brief digression into the history of forest practices in Medieval Europe may assist the reader to appreciate how these practices are manifest in a small corner of Australia.

Medieval forest practices in Western Europe

Forests were closely affiliated with both the secular and sacred lives of the people of Western Europe from at least the 8th century. Their clearance and management was seen by Charlemagne as essential to the advance of civilisation and rise of Christianity (Bainton 1964). At the time of Charlemagne's reign, Europe was thinly populated and covered with vast tracts of mostly broadleaved species forests, broken only occasionally by small settlements (Winston 1968:144). Christianity was still in its formative stages and a tribal lifestyle prevailed amongst the pagans. The Saxons were seemingly the most difficult to convert and to subdue them Charlemagne eventually resorted to massacre and desecration of their material culture (Winston 1968:37).

Forests were vital to the Saxons and other pagan cultures; for their resources, as a place to live and hide and as a part of their complex mythology. They were a source of firewood, timber and many types of food (Glacken 1967). The Saxons also practiced a guerilla type warfare for which forests were the backdrop for hiding them and their livestock.

The role of the forests in the religion and mythology of the pagans was perhaps the impetus for the widely held beliefs about the symbolic association between evil and forests. Saxon mythology included the worshipping of gods at sacred groves hidden deep in the forests, and one of their gods is thought to be represented by an ancient tree trunk (Winston 1968:37). Thomas (1984) writes at length of this association. He notes that the word 'savage' is derived from *silva*, meaning a wood. Woods or forests were evil places, inhabited by animals, not men. Thus any men who lived in the woods were rough and barbarous. Untamed woods were obstacles to human progress and their clearance and control were seen as synonymous with the triumph of civilization. Although there are some who do not agree with this view (see Darby 1956), history has shown that clearance of forests has gone hand in hand with development since Europe emerged from the Dark Ages. The frequent association of wild woods and danger in the fairy tales and folk lore of Hans Christian Anderson and other story tellers is a reminder of the attitudes of the time.

Part of Charlemagne's strategy to bring Western Europe under his control was to encourage the resettlement of lands which had been abandoned and reverted to forest after the downfall of the Roman Empire. As a great admirer of the Catholic church he also supported the growth of monasticism. As well as being places of prayer and intellectualism, monasteries were centres for the advancement of the skills of agriculture. The monasteries were self-supporting and the ability to till the soil and clear the forests was second in importance to prayer. Monks were put to the task of clearing the wilderness and bringing the surrounding land into cultivation (Bainton 1964). Figure 3 depicts monks employed in the Christian task of cutting down trees.

Figure 3 Artist's impression of 9th century monks clearing forests. Reproduced from Bainton (1964:136).

Forest clearance began in earnest in the 10th century when the dramatic population increases demanded clearance of forests and marshes on a huge scale, enabling an agricultural boom that was to be the turning point in the rise of civilisation (Russell 1968). Feudalism began to be obsolete with the rise of townships from the eleventh century. The towns weakened the power of the fuedal manor by providing a place of refuge for runaway serfs and opportunities for employment. Russell (1968) suggests that rising populations in towns and the consumer excesses arising from improved techniques in agriculture were made possible by these earlier periods of deforestation.

By the thirteenth century most of today's human settlement had been established in Europe and what was left of the forests was being carefully managed as a resource. By the sixteenth century, the growing mining industry was placing huge demands on the forests for wood to make pit props and as a fuel (Darby 1956). Ship building was a heavy and continuous drain on the English oak and it would be true to say that many 'ships sailed in the forests' of western and central Europe (cf Chapter 16).

Increased demands for construction timber and pulpwood led to extensive plantings of conifers in Belgium and Germany in the nineteenth century thus transforming the landscape. A thousand years of clearing and replanting has produced forests which bear the mark of long exploitation and are markedly different from those which covered almost the whole area in Charlemagne's time (Darby 1956).

Tanja

Armed with these long cultural traditions of forest utilization, the German ethic for work and order and an aversion to waste, it is not surprising that John Cremerius quickly realised the economic potential of Australia's forests. After working for three years for the Belgium Embassy, the Cremerius family moved to the south coast. As lovers of the European forests and landscape they had been searching for an equivalent setting in the vastly different character of the Australian bush. By 1960 they had purchased the property 'Middle Lake Farm' at Middle Lagoon on a beautiful and unspoiled section of the south coast about 10 kilometres north of Tathra. The sixteen hectare property had been partially cleared by previous owners and like much of the surrounding area, its forests had been logged for decades. Most of the coastal forest between Bermagui and Tathra is now within Mimosa Rocks National Park or State Forest but it was once much more extensive. Despite an outward appearance of stability and age the forests had been subjected to a long period of modification and use, possibly pre-dating the arrival of Europeans.

The first white families arrived in 1846 and settled at Nelson Lake where they

grazed cattle. According to archival sources, at this time there 'was fairly open country covered with kangaroo grass.' (Russell 1978:1). The apparent absence of a shrub understorey suggests either the presence of a tall open forest at its climactic stage or deliberate burning by Aborigines. Aboriginal use of fire as a tool to maintain open vegetation and promote green pick for grazing macropods is well documented (Jones 1969). The presence of many Aboriginal archaeological sites in the area attests to their presence from at least 5,000 years ago and both ethnohistoric and archaeological evidence demonstrate that forests were important as a source of food, medicine and raw materials to make shelters and tools (Feary 1988). It is not unreasonable to assume that Aborigines burnt the forest as part of their subsistence activities and that the grassy understore may be the result of thousands of years of repeated firing. Whatever the reason, the dense undergrowth that now characterises the forests can be attributed to mid-nineteenth century clearing.

Following the Robertson *Land Act* of 1861, selectors purchased land for one pound an acre (0.4 hectare) and began the task of clearing the forests by ring barking, logging and burning. However, trees were not just an impediment to the development of the agricultural and pastoral industries; they were used by the selectors for many purposes. Spotted gum provided an excellent timber for building houses and fences and making roof shingles. Stringy bark provided roofing material for simple shelters and there was also a burgeoning wattle bark industry. Sleeper cutting was established around 1900.

From about the 1880s, the timber industry was a major employer and Tanja became well known for the variety and quality of its timber. Numerous sawmills sprang up in the area, the first being at Sandy Creek in 1877 (see Figure 2). Around 1915, Ike and Charles Innes established a sawmill near Bega, destined to be the last in the area. This was larger than the other mills, capable of handling logs up to 30 metres long (Russell 1978). Its closure in 1936 marked the end of an era of frenetic forest clearing and exploitation.

At Moon Bay, about 7 kilometres south of Penders, rusty mooring pins attached to the rocks show where Sydney-bound steamers received their loads of timber from sawmills in the surrounding area. The wood was transported to a punt by way of wooden chutes dug into the steep sea cliffs and then taken out to the waiting steamers (Freeman *et al* 1992).

By the time the Cremerius' arrived most of the area had been logged out and all of the local sawmills has closed down. Much of the land was degraded and the local community thought of the forests as 'dirty bush'. The Cremerius' established a small dairy farm, improving the pasture on the flats and lower slopes but leaving native forest on the steeper slopes and ridges.

The meeting of minds

Around the same time that the Cremerius family was building up their dairy farm, two leading Australian businessmen were searching the south coast for suitable land to purchase. Architect Sir Roy Grounds and businessman Kenneth Myer sought a bush hideaway far distant from their hectic city lives where they could relax and enjoy nature. In 1964 they purchased Penders from Mrs Innes of Bega, a descendant of the Innes brothers who operated one of the local sawmills earlier this century (Figure 2). The origin of the name 'Penders' has been difficult to establish as it does not appear on Land Title maps. Oral tradition suggests that the Penders owned the property prior to Mrs Innes. By the mid 1960s the area comprised cleared pasture and native forest dominated by spotted gum *(Eucalyptus maculata)*. Early photographs show the property as rather degraded as a result of weed infestation and uncontrolled logging.

Penders is located adjacent to the Cremerius property and at the time of purchase, John Cremerius had it leased to run his herd of dairy cows. Grounds and Myer took him on as manager and it was not long before the collective minds saw ways of managing the forest to restore its beauty and at the same time make it productive. Cremerius and Myer both had a sound botanical knowledge and this combined with the considerable entrepreneurial and business skills of Grounds provided the impetus for the establishment of plantations and the tanolith treatment plant. Well known Canberra botanist, Lyndsay Pryor, was called in to give advice on which species were best suited to the climate and a number of experimental plots were set up. Mary Cremerius still has many packets of seeds of *Acacia* species that had been provided by Professor Pryor.

Each of these people has left his own distinctive mark at Penders. Sydney blue gum, turpentine and spotted gum march across the landscape in neat, carefully tended rows. Every second or third tree has been coppiced, a testimony to the age old technique of improving timber yield. Amongst the park-like setting created by Myer are several tea houses where Myer and his Japanese wife took refreshment and enjoyed the scenery.

At Bithry Inlet, and a far cry from the Victorian Arts Centre is 'The Barn', designed by Sir Roy Grounds and built by local builders using timber from the treatment plant (Figure 4). 'The Barn' is described by some as one of the twenty best buildings in Australia because it combines the innocence of protective shelter with a deep natural simplicity engendered by the site (Taylor 1985).

Management of the forests

Sir Roy Grounds and Kenneth Myer originally intended to purchase about 16 hectares of Penders land. After negotiations with the owner, they ended up with

Figure 4 'The Barn' at Penders during its construction in the 1960s.

the entire 240 hectares. Part of the property was planned for subdivision but according to National Parks and Wildlife Service records, the land was sold on the condition that it not be developed. The subdivision never went ahead and the new owners began the task of restoring the forests to their former glory.

The main silvicultural techniques used in managing Pender's land included; preserving the existing forests, coppicing, clearing timbered areas considered to have no economic or conservation value, and establishing eucalypt plantations. The scheme was ambitious and judging by the number of newspaper articles it generated, was eagerly received by the local community.

Preserving existing forests

As a first step in restoring the forests, all weak and diseased trees were removed and burnt. Rotted timber and other forest floor litter was cleared, together with much of the understorey. This reduced risks from wild fire and the spread of diseases carried by fungal spores. A regular maintenance programme was carried out to keep the area under the canopy free of scrub and young trees.

Coppicing

At the recommendation of Professor Pryor, the technique of coppicing was introduced at Penders. Coppicing is commonly practiced in Europe but is relatively rare in Australia, being limited to small scale firewood production. Although labour intensive, coppicing is an effective approach for improving timber yields where large logs are not required.

When felled, the trees are cut about eight inches from the ground. All but the lowest of the epicormic shoots are removed and this is nurtured by the parent tree until it develops its own root system (Figure 5). Most coppicing is done on

Figure 5 Three year old tree showing coppicing technique.

spotted gum which is a vigorous grower producing strong stems up to 3 metres high in 12 months. At Penders every third or fourth tree in about 120 hectares has been coppiced, resulting in a landscape with a very distinctive character.

The success of coppicing depends on a rigidly adhered to cutting cycle and retention of cleared open areas between the coppiced trees. This allows up to seven trees to be obtained from the same stump. A recent article (Anon 1992) describes conservation measures applied to 400 year old trees in Burnham Beeches in England. The beeches and oaks are relics of a medieval practice of pollarding where branches are repeatedly removed at around head height to provide firewood and poles. The number of trees has fallen from 3000 in the fifteenth century to 500 in 1992 because pollarding had ceased and grazing had been removed. Using advice from a fifteenth century textbook experimental pollarding has recommenced, to stimulate regrowth and maintain this striking cultural landscape (Figure 6).

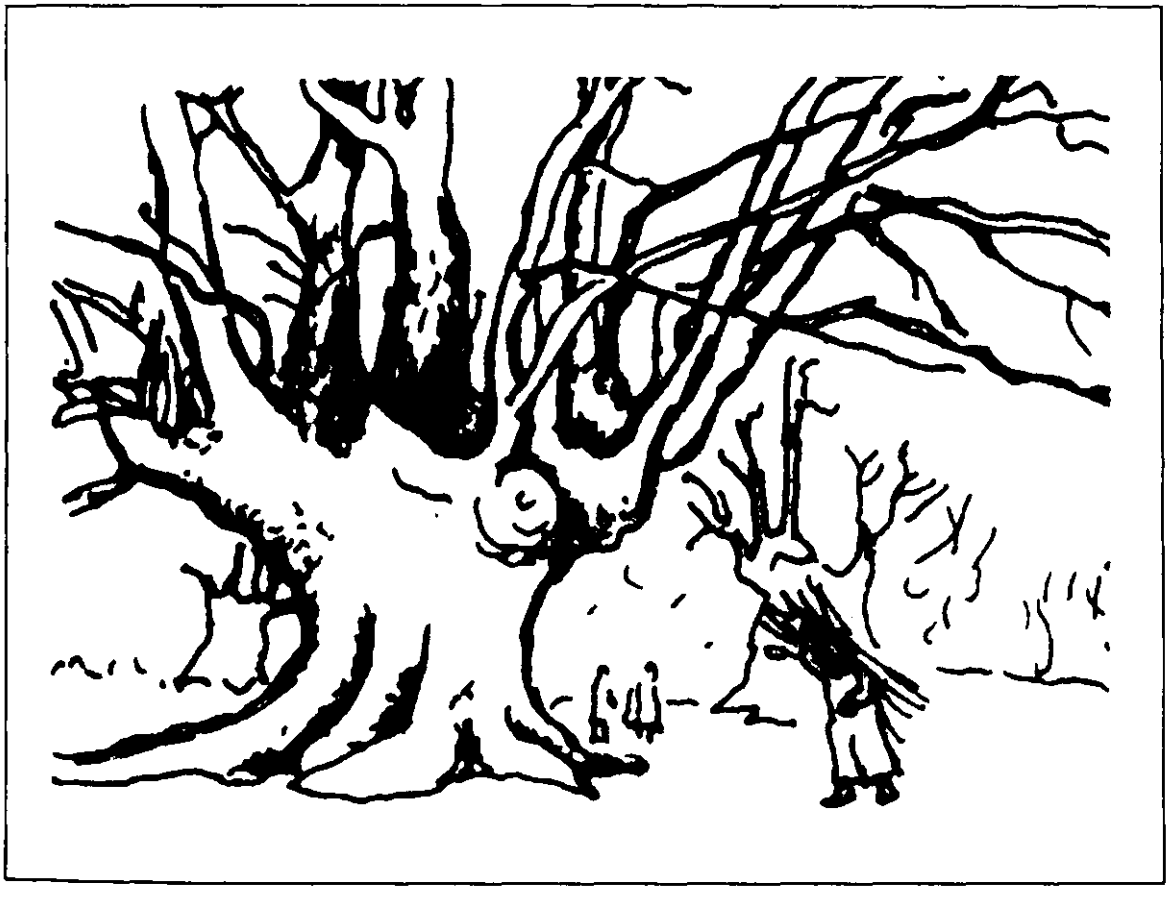

Figure 6 Tree pollarding in Great Britain. Burnham Beeches, Buckinghamshire as they were in 1860 (top) and as they are today (bottom). Redrawn from *New Scientist* (1992:6).

Plantations

Over about a decade from 1964 eucalypt plantations were established on about a third of the property. Cremerius and a team of up to seven experienced woodsmen from the local area planted thousands of seedlings, mostly on land that had been cleared by previous owners. Some of the most degraded spotted gum forests were cleared to expand the area available for planting. Not all of the cleared timber was wasted, as some was salvaged for processing.

As well as spotted gum, a number of species not native to the area were planted. On the advice of Professor Pryor, these included Sydney blue gum, turpentine, flooded gum and forest red gum. The plantations were experimental in the sense that at the time it was not known which species were best suited to the light, deep soils and an annual rainfall of up to 660 millimetres.

Several techniques were trialed to determine the best survival and growth rates of seedlings. Planting of seedlings directly into the forest was the least successful, with growth varying from a few centimetres to about 30 centimetres per year. Much better results were obtained by propagating seedlings in a nursery and planting them out when three months old. The nursery was originally set up on Cremerius land because Penders had no water supply. In later years a dam was built and a pump installed to irrigate the seedlings.

Prior to transplanting, the forest floor was prepared by ripping to remove weeds and aerate the soil. After several months the seedlings are fertilised with superphosphate. This intensive and careful method of cultivation produces saplings over one metre high in seven months. In 1969 a newspaper article reported that the saplings from the earliest plantations of turpentine had grown five to eight metres in less than three years. The article describes the plantations as 'Beautiful to look on, each tree being healthy and well proportioned' (*The Land* 20 Feb. 1969).

The process is one of continuously tending and replanting trees as they are harvested. By 1982, 1050 trees were being planted to the hectare and Penders contained about 60,000 trees in various stages of growth (*Times of Bega* 18 Aug. 1982). Figure 7 illustrates a portion of the Sydney blue gum plantations in 1982. The straight rows of trees with a grassy understorey are a testimony to years of diligence by a man who was committed to what must be a pioneering attempt at ecologically sustainable development. John Cremerius died in June 1990 and his obituary encapsulates his philosophy which combined a love of the forest with a knowledge of what it could provide (*Bega and District Times* 15 Aug. 1990).

Figure 7 Penders Plantation of Sydney Blue Gums, 1982.

The end product

The result of the silvicultural methods is round logs of varying diameters. Any wood that could be cut into 600 millimetre lengths was considered to have commercial potential. However any potential market for round logs of hardwood has to compete with the softwoods which are fast growing, light and easy to handle. Development of techniques to make eucalypts grow fast and an emphasis on harvesting of young trees can overcome this competition. Add to this a tanolith treatment process to prolong the life of the wood for up to 20 years and there is a viable economic concern, albeit on a small scale (Figure 8).

The treatment of the timber involves a simple but effective process which was devised by Grounds, Myer and Cremerius with advice from CSIRO and Mr Jim Ryan. The latter owned a timber treatment plant in Queanbeyan, near Canberra and obtained timber from the Bega area for his business. Part of the impetus to have a local timber treatment plant came from Sir Roy Grounds. He had his heart set on building an architectural whimsey at Bithry Inlet using Penders round logs but balked at the expense of sending untreated wood to Queanbeyan and then bringing it back again. The first treatment plant was thus stationed at Bithry Inlet where it was powered by a wooden windmill, now a ruin. The plant was subsequently moved because of the detrimental effect of the salt laden air on the untreated wood.

Figure 8 Penders Tanolith treatment plant in earlier years.

The process involves replacement of the sap in the wood with a chemical mixture of copper, chromium and arsenic under pressure of about 8 kilo Pascalls and is generally used with softwoods. This process replaces earlier more dangerous ones of soaking logs in baths of creosote (never used at Penders). After harvesting the logs are cut to the required length and sun dried on pallets. They are then bundled up and fed into a long metal cylinder which is sealed. A vacuum pump removes all the moisture and sap and the chemical mixture is forced into the heartwood under pressure. The replacement takes about an hour depending on the size of the logs and results in a distinctive but not unattractive green tinge to the wood. Today, this is a two man operation at Penders, overseen by Mary Cremerius who carries on her husband's love of the forests. The process is almost entirely manual, the only concession to reduce heavy labour being a trolley to assist in placing larger logs in the cylinder.

During the formative years of Penders the young, small saplings provided an unexpected source of revenue. Oyster growing was and still is an important industry on the far south coast and oyster growers once used mangroves as a substrata for the shellfish. Many mangrove beds were destroyed by reclamation and pollution and no other wood was available that could resist the marine borer. Penders treated saplings proved to be highly valuable as oyster stakes and were readily procurable at reasonable prices (*Australian Country* 1968). In later years as the trees grew larger, the treated fence posts were very popular with Monaro farmers who found them to be more resilient than pine fence posts. There is a wide variety of other uses including telegraph poles, pergolas, garden landscaping, bush furniture and structural framework for farm outbuildings.

A number of houses around Mimosa Rocks National Park have utilized the timbers from Penders. 'The Barn', discussed earlier was built almost entirely with Penders round logs. The nine sloping poles which provide the main framework are now badly rotted at their bases. Evidently this is due to the absence of a vacuum pump in the early design of the sap replacement process such that timber preservation was not complete. This was apparently rectified by a local plumber who modified CSIRO's original design. Other buildings utilising Penders products include Professor David Yenken's house at Nelson Lagoon, which was designed by another noted Architect, Graeme Gunn, and 'Ness' at Wapengo Lake, the home of the late Professor Manning Clark.

Conclusion

In this paper I have attempted to show that the history of Penders comprises disparate storylines that have been woven together. The story is most significant in the context of local history but some of the strands have wider management and philosophical implications.

In the first instance, it picks up on the subject of Griffith's paper (Chapter 4) of the forests as historical artefacts in their own right, rather than merely backdrops to historical events. The dramatic effect of straight rows of eucalypt trees, the coppiced trees and the park-like setting are very visible reminders of the influences of human beings. The individuals involved were all highly influential in their chosen fields and Penders provided the stimulus for their collective vision to be realised.

Secondly, it places current issues about forestry management practices into an historical context. The last two decades have witnessed the rise of sometimes bitter conflict over management of Australia's old growth forests. The planting of hardwoods to provide timber has been advanced by conservation groups as a way of conserving the natural values of forests. There has been some opposition to this course of action, particularly by the timber industry, on the grounds that plantations would not be economically viable (South East Forests Regional Consultative Committee 1991).

Penders operation demonstrates that hardwood plantations are not beyond the realms of possibility providing they are carefully managed. The philosophy of minimizing waste and maximizing returns which has existed in Europe for centuries is encapsulated in the following quote from a Bega newspaper:

> In an age where waste is too commonplace for comment and in a country where waste of timber resources in particular has become a tradition since the days of the cedar-cutters it is indeed to be hoped that the fast regeneration methods and economical use of resources being employed at 'Penders' will become the practice in Australian forests in the future (*The Bega News* 20 Feb. 1970.)

Acknowledgements

My thanks go to Mary Cremerius for access to her extensive archival collection and for sharing with me her love and enthusiasm for Penders. Stephen Legge directed me to useful references on forest management in Medieval Europe and Paul Packard and Kieran Hotchin provided stimulating discussion on the same subject. Stephen Deck, NPWS, researched office files and commented on early drafts of the paper.

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CHAPTER 7

LAND USE HISTORY OF THE WHITE CYPRESS PINE FORESTS IN THE SNOWY VALLEY, KOSCIUSKO NATIONAL PARK

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Introduction

The lower reaches of the Snowy River in NSW (known locally as the Lower Snowy River Valley) lie in the southern part of Kosciusko National Park, the area adjoining Victoria's Alpine National Park. In developing a management strategy, the NSW National Parks and Wildlife Service reviewed the area in 1983 and found that the condition of this ecosystem posed serious and significant problems for the management of the Snowy River catchment. These problems were identified as widespread sheet and gully erosion, the apparent lack of continuous white cypress pine seedling recruitment, the lack of ground cover in many areas, the periodic occurrence of large numbers of rabbits and the invasion of large numbers of introduced plants.

Effective and efficient modern land management ideally requires a socio-economic input in addition to detailed knowledge of the ecosystem processes and the history of past land uses. This means that today's land managers need information on environmental history, and the rates, direction, and magnitude of ecological changes in order to establish meaningful management objectives, for only then is it possible to make ecologically sound decisions. Simple decision making during the short work experience of a manager is of necessity essential for day to day management, but is often inadequate for understanding and predicting trends or the outcomes of management actions (Clark 1990). An example of short-sighted and inadequate decision making is to be seen in the history of land management in Yellowstone National Park, USA. This is filled with examples of *ad hoc* and politically driven land management philosophies and practices which resulted in gross and inappropriate changes to the park's ecosystems due to the ignorance by park management of the interrelationships of crucial components of the ecosystem in natural ecological processes (Chase 1987). It is to be hoped that the lessons learnt here will be carried into park management elsewhere.

This paper is based on a major study into the environmental history of the Lower Snowy River Valley that lies in Kosciusko National Park (Figure 1; Pulsford 1991). It focuses on changes since European settlement to the white cypress pine forest which extends along the lower valley slopes, and it seeks the causes of major ecological changes and their chronology in order to better understand the past and present condition of this ecosystem.

The forests are dominated today by a native conifer, white cypress pine *(Callitris glaucophylla)* which occurs in dense stands in association with white box *(Eucalyptus albens)* and in part of the white box - white cypress pine alliance first described by Costin (1954). This alliance extends along the deeply incised middle section of the Snowy River Valley in the Kosciusko National Park and downstream into Victoria's Alpine National Park. Curiously it includes components of plant communities typically found today in the semi-arid lands west of the Great Dividing Range. It is an eastern outlier trapped in the rain shadow of the Snowy River Valley. On the valley slopes above the white box - white cypress pine zone, the forest grades rapidly through dry sclerophyll forest to wet sclerophyll forest, subalpine woodlands and forests and finally into alpine herb fields over a short distance of 30 kilometres. This truncated vegetation sequence reflects the steep altitudinal and climatic gradients in this part of the Kosciusko National Park. The white cypress pine forest extends over some 7,000 hectares or approximately 1 per cent of the Park. It is surrounded on all sides by mountains which create a deep rain shadow in the lee of the progression of a predominantly north-easterly air stream which passes over the Great Dividing Range. The mean annual rainfall is only 583 millimetres (Clayton-Greene 1981) with a slight peak in early summer months, this summer rain typically coming in intense local storms. Monthly temperatures range from a mid-summer mean of 24°C and a mid-winter mean of 7°C (Costin 1954), which illustrates the strongly seasonal character of the climate with warm to hot and usually dry summers and cool winters with frequent frosts along the valley floor. Geologically the area consists predominantly of intrusive granitoids such as late Silurian biotite granodiorite and tonalite (Brown *et al* 1959). These rocks are overlain unconformably by highly folded Ordovician sedimentary rocks.

White cypress pine grows on coarse grained soils derived from the decomposition of low fertility granodiorites, these sites being too dry to support eucalypt dominated forests. Over extensive slope areas, particularly on the hot dry north-westerly aspects sheet erosion has occurred on a large scale (Clayton-Greene 1981; Costin 1954; Worboys 1982). Here most of the A and B horizons have been lost often leaving a boulder strewn surface. Erosion is less severe on gentle slopes and on the cooler aspects which often retain a good soil depth with the A horizon intact. Much of this erosion is likely to have occurred in the recent past, that is since European settlement. The nature of the original tree cover and the

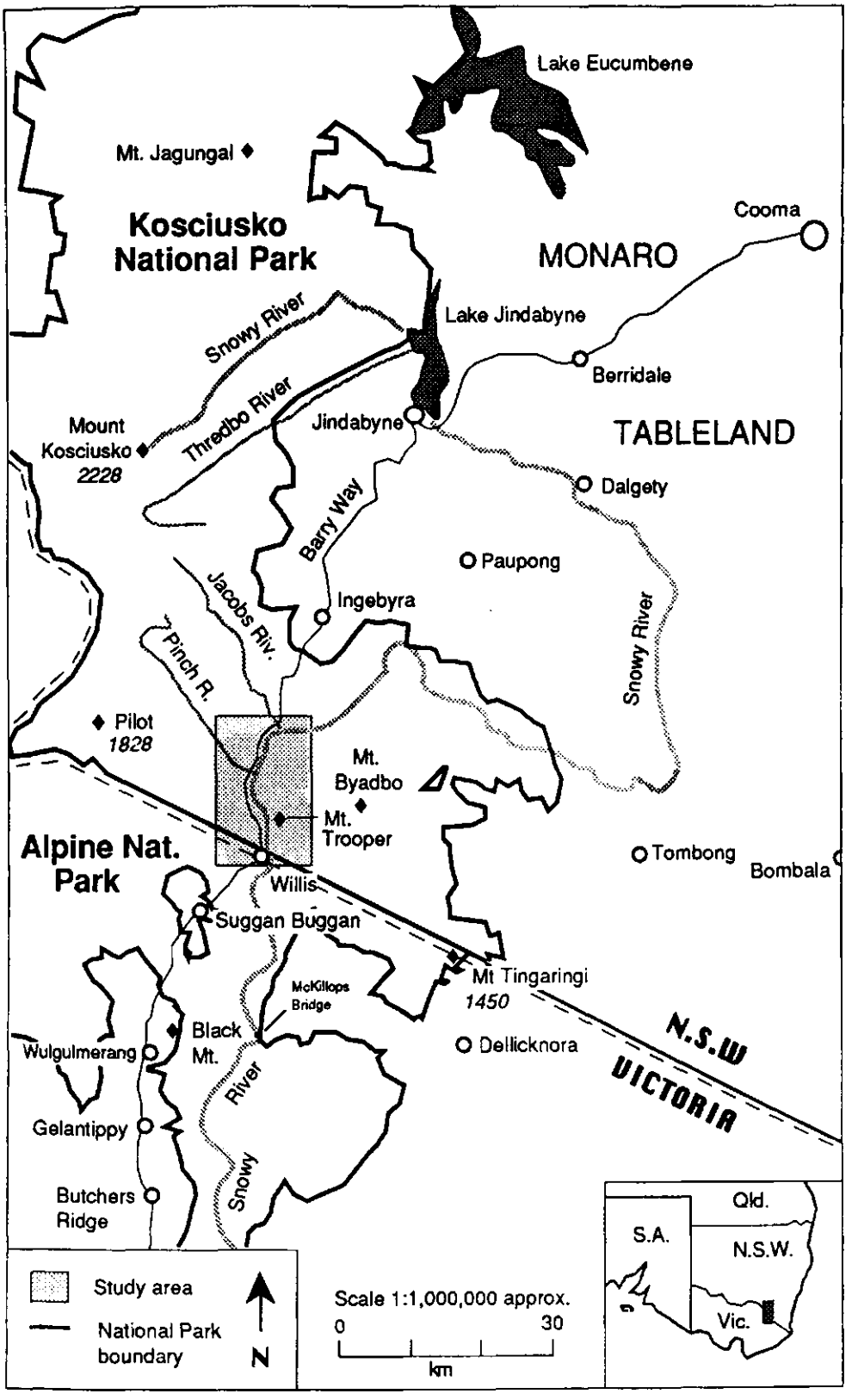

Figure 1 Location of study area within Kosciusko National Park.

sequence of events that brought about change had not been determined and this provided a challenge to develop an environmental history which would help to place these changes in perspective.

The historical record

The study focused on the history of these conifer forests and was undertaken in three parts. The first comprised review of the literature and oral anecdotal material. It sought scientific and historical evidence of the pre-European condition of the valley and the nature and impact of subsequent land uses, the sequence of major disturbances such as grazing, the arrival of rabbits, fire, droughts, and erosion periods, and the decline and eventual loss of the old growth woodlands and the regeneration of the regrowth forest. The second part attempted to establish a profile of the pre-European woodlands and the subsequent changes to the woodland since European arrival. Dendrochronology provided tree ages and fire dates establishing a time frame for these changes. Finally a synthesis of all the evidence provided an environmental history for the valley forests.

Prior to European settlement the central and southern parts of the Monaro tableland including the study area were occupied by the Aboriginal peoples of the Ngarigo linguistic group (Hancock 1972). Archaeological surveys of Aboriginal relics (Flood 1973; Flood 1980; Lewis 1976; Margus 1970) have revealed that in the southern highlands including the Australian Alps, Aboriginal communities were concentrated in the comparatively frost free, low elevation valleys such as the Snowy River Valley (Geering 1981) particularly during cold winter months. From this interpretation the Snowy River was an important corridor providing access to and from the high country and the coastal plain. Thus the impact of Aborigines on the valley ecosystems could have been considerable but the nature and extent of this impact remain a matter of conjecture for the present. Nevertheless the condition of the area prior to and in the early days of European settlement was very different to that of today and this is reflected in an early description made by Robinson in 1844, shortly after the first Europeans entered the valley :

> Callitriss [*sic*] from four to five feet in circumference grew amid shrubs of every variety of tint. The Country is well grassed and abounds with Cattle, the Soil varies from a rich black mould to a chocolate. (Mackaness 1941).

This is in marked contrast to Costin's report of the early 1950s that the condition of the area was characterised by dense regenerating thickets of white cypress pine and bare eroded soils (Costin 1954).