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Landscape Histories: Mapping Environmental and Ecological Change Through the Landscape Art of the Swan River Region of Western Australia¹

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ABSTRACT

What can works of landscape art tell us about past ecologies? This article describes a pilot study in which a method for systematically recording the aesthetic, ecological and environmental content of landscape artworks was investigated. Using database software that allows for the identification and evaluation of relationships between aesthetic criteria (such as style) and environmental content (such as vegetation characteristics), we surveyed landscape artworks of the Swan River region of Western Australia created between 1827 and 1950. The database was first populated with aesthetic and ecological surveys of selected artworks, then the data was analysed in order to identify patterns of ecological change that are readily amenable to historical explanation. The veracity of such explanations was supported by a more fine-grained analysis of a specific site, for which the depiction of the environment in artworks was compared with that in written and photographic sources. Collectively, the artworks appeared to reflect probable changes in the prevalence of large trees and the broad composition of flora, with the site-specific study finding more specific correspondences between artworks and other sources. Although further research is required in order to expand and verify findings, these initial results suggest that there is scope for more extensive use of fine art in the production of the environmental histories and historical ecologies that increasingly inform ecological restoration and management projects.

KEYWORDS

Landscape art, historical ecology, Swan River, Western Australia

In 2006 we undertook a project to test the viability of landscape paintings as a source for ecological and environmental information of particular sites in the nineteenth and early twentieth centuries. This, we hoped, might increase our knowledge of past environments, and so contribute to what is increasingly recognised as an essential component of natural resource management: namely the utility of historical perspectives on the natural environment for determining the kind, extent and causes of environmental change.² As forest ecologist David Forster suggests, 'it is foolhardy to make any ecological interpretation of modern landscapes or environments or to formulate policy in conservation or natural resource management without an historical context that extends back decades, at least, but preferably centuries or millennia'.³

Knowledge of past environments informs work in both environmental history (concerned as it is with diverse past relations between land and people) and the narrower sub-field of historical ecology (which seeks to reconstruct historic ecosystems and account for the changes they have undergone).⁴ In spite of the growing recognition of the importance of historical ecological perspectives, 'century-scale vegetation dynamics are rarely studied by Australian ecologists'⁵ and those who do study them generally use field or laboratory techniques, rather than the documentary and oral sources that are the stock-in-trade of historians (let alone the visual sources that comprise the home territory of art historians). Laboratory-based techniques, such as palynology and dendrochronology, can render valuable long-run information about historical ecological conditions, though rarely can they answer all pertinent questions about past environments.⁶ For some sites a record of scientific observations are available that cover at least the past five decades, but a growing body of research points to the existence of significant changes in certain environments prior to their first scientific description.⁷ The creation of historical perspectives, therefore, often requires the use of 'non-scientific' evidence. Such perspectives can be gained in some instances from historical documents, such as written descriptions, statistical returns, and (from the 1850s) photographs, though each of these sources has limitations (for example, photographs are often undated and favour particular content and perspectives; written accounts, too, are highly selective in their coverage). Oral history, too, is increasingly recognised by ecologists and natural resource managers as a means by which information about past ecological conditions can be derived from local communities.⁸ Artworks, however, are rarely employed,⁹ and then without any systematic knowledge of such works' strengths and limitations.

While natural history illustrations of plants and animals have long played a significant role in biological science, their scant (or total lack of) background or setting provides little information about the ecological context of the plant or animal being depicted. Such 'background' information, however, is the very subject of landscape painting even when the artist may not be particularly interested in conveying precise information about the ecology of the scene being

depicted. Thus the potential of landscape painting and drawing as a source of historical ecological and environmental data is enormous. Such artworks provide a significant file of pictorial information from the past that, before the widespread use of photography, is not available (pictorially) anywhere else.

Like photographs, paintings constitute a form of evidence that can provide information (albeit mediated) about past landscapes that is different from the information contained in other sources. For example, in order to fill a canvas, landscape artists are forced to include details, such as vegetation structure, that written descriptions may omit or gloss over (though of course there are other elements, such as sounds, smells and insects, that paintings have difficulty telling us about). Because different sources (and media) have different strengths, the informed use of paintings for environmental histories may ultimately identify elements of historical ecological change that have been obscured by the nature of the source materials hitherto relied upon. Furthermore, for any given area it is likely that one or more potential source materials may not be available, and in any case it is desirable to 'triangulate' the data contained in various sources, testing whether they are verified by, or at least compatible with, evidence contained in other sources. Such a multi-pronged approach is likely to produce the most reliable approximation of past ecologies, and we believe it is an approach in which fine art could play a more prominent role.

The reason for a general lack of interest in paintings as a reliable source of empirical ecological and environmental data is all too obvious: landscape painting is fine art, not scientific observation. Using fine art as evidence for anything other than the artist's state of mind or ideological inclinations is conventionally regarded as fatally compromised by art's aesthetic and psychological functions. Art notoriously flatters and prefers the picturesque. It is self-consciously representational, aesthetically organised, often expressionistic, and invariably open to several interpretations. While to some extent this is true of all information, fine art, and especially modern art, makes a virtue of its artificiality and ambivalence, its imagination and beauty. Art historians (and many artists) have therefore shown little interest in the utility of art, least of all in writing environmental histories. Even the study of landscape art has largely evaded such concerns, despite ecology long being essential to the design and care of actual landscapes. As we have argued in a co-authored essay,¹⁰ the art historical study of landscape art almost invariably ignores natural histories, and focuses on cultural and ideological perspectives that are singularly anthropocentric.¹¹ This is even the case when past environments form a focus of investigation.

For example, in 1952 Millard Meiss argued that the severe drought of 1347, the repeat failure of crops the next year due to 'exceptionally heavy hailstorms',¹² and the devastating bubonic plague of 1348 that followed, had a profound impact on Sieneese and Florentine art styles and the subsequent development of European art. Meiss believed that this, along with the economic, social and political consequences of the plague, initiated the culture of crisis that has

characterised Western art since.¹³ This goes against the grain of standard art histories of the Italian Renaissance, which are more concerned with issues of style and iconography, and the aesthetic and intellectual ambitions of individual artists and their patrons. However, unlike these more standard interpretations, which often involved close readings of specific artworks and related documents, Meiss's history does not engage in a detailed content analysis of artworks. Thus his argument is very general and speculative, and reveals little about the actual environmental and ecological conditions depicted in Renaissance art.

A similar problem plagued Paul Shepard who, in 1957, turned a scientist's eye to the geomorphological elements depicted in nineteenth-century paintings of the New England (USA) landscape.¹⁴ He argued that apart from a nationalist impulse to furnish the landscape with suitably grand (and architectural) natural monuments, the popularity of geology turned artists' attention to rocks, which satisfied an interest in both the vastness of time connoted by the sublime, and the variation in surface textures vital to the picturesque. Shepard also asked: 'What part do the landforms and their intrinsic processes play in the painter's attitude toward nature?' His answer was somewhat tangential, referring to the specific intersections between the geomorphology of the region and the artists' interaction with the landscape as well as their culturally-shaped preferences. Shepard's work, too, comprised conjecture rather than extended analysis, and was confined to a small range of artworks by few artists in a single region in the mid-nineteenth century.

There have also been several scholars who have undertaken sustained studies of art and natural history. The art historian Bernard Smith pioneered this in the 1950s with his investigation of the art of Pacific exploration, and since then Stephen Daniels, Denis Cosgrove, Renzo Dubbini and Edward Casey¹⁵ have each made significant, wide ranging and often incisive examinations of the relationship between art, culture and the environment. However these investigations are primarily concerned with the ideological roles that natural histories have played in society and art making, rather than understanding environmental histories. The cultural formation of natural history evident in artworks is their overriding concern, even when artworks are used to illustrate particular historical landscapes or attitudes to landscape. For example, while Smith might have been keen to distinguish between the empirical veracity and stylistic distortions of particular artworks, his purpose was to write an art history, and not an environmental one.

Closer to our project are the recent works of Tim Bonyhady and Rebecca Bedell, who have produced valuable studies at the intersection of art and environmental histories.¹⁶ However, due to the lack of data they have had to rely on a small number of artworks to make their points. This also limited the extent of their analysis, with Bonyhady, for example, really writing a history of environmental law and social attitudes that used artworks as starting points and examples to illustrate an argument largely sourced in written documents.

Our concern in this pilot project is not environmental perception and attitudes, or developing theories about the intersection of art and the environment, but an empirical project that tests and measures the extent to which reliable ecological data might be extracted from art practices.

In this respect our project might be better compared to the established practice of historians using paintings and other images (especially prints and drawings) as evidence (or partial evidence) for architectural features, dress and other social practices of particular places and ages. It seems that the cultural information of artworks does not draw the same suspicions as the scientific information needed for work in environmental history and historical ecology – though in recent years, a few scientists working in diverse areas have begun to recognise and exploit this latter potential of fine art. For example, agricultural scientists Jules Janick and Harry Paris have extracted information about the genetic diversity of cucurbits in Italy in the early sixteenth century from frescoes painted at the Villa Farnesina, home of a wealthy Sienese banker.¹⁷ In a (methodologically) similar vein, British geographers Jacob Baker and John E. Thornes have analysed Monet's series of paintings of the Houses of Parliament in London. Despite the highly impressionistic and even expressionistic nature of the paintings (and Monet's oeuvre in general), Baker and Thornes concluded that the paintings 'contain elements of accurate observation and may potentially be considered as a proxy indicator for the Victorian smogs and atmospheric states they depict'.¹⁸ A singular, older example, closer to our present concern, is the use in 1961 of Eugen von Guerard's painting of the volcanic landscape of Tower Hill (*View of Tower Hill*, 1855, Warrnambool Art Gallery), on the coast of Western Victoria, in efforts to restore ecologically accurate forest vegetation to an area denuded by nineteenth century pastoralism.¹⁹

If our project is in the tradition of these latter investigations, it takes a much more systematic approach and is less isolated and limited in scope. Rather than focusing on just a few artworks, we have analysed a large number of works to produce a more comprehensive mapping of one particular environment (though with the intention that the methodology we developed can be applied to other areas). We believe that this approach will considerably enhance the potential to access ecological and environmental data from artworks.

Our focus has been on the modern European landscape tradition of painting that came to the fore in the late eighteenth century around the time Australia was first colonised, and remained prominent until recent times – not just because its subject and historical period is of most interest to ecological and environmental research in Australia but also because its art is most conducive to such analysis. This tradition of landscape painting self-consciously depicted a world shaped by the environmental interaction of natural forces and climates, rather than by divine or human decree. Its artworks are filled with the representation of things – animal, vegetable and mineral – as well as geographical, geological and climatic observations. Comprising natural rather than just spatial and

aesthetic histories, these paintings are anatomies of particular environments at particular times. Thus, as Bernard Smith pointed out over twenty years ago, 'the conceptual underpinnings' of such art is better revealed by the 'categories of the physical sciences (botany, zoology, geology, meteorology, anthropology etc.)', than the usual art historical 'cultural movements and categories (classicism, romanticism, naturalism, impressionism, etc.)'.²⁰ Further, as he also pointed out, from the very beginning, European art activity in Australia was to a large degree shaped by the demands of scientists.

The nineteenth century is particularly noteworthy for the ways in which artists turned directly to nature for their inspiration. This attitude, which began with romantic artists in the late eighteenth century, remained intact at the beginning of the twentieth. The rise of the physical sciences – among them botany, zoology, geology, meteorology – also influenced the way artists perceived and represented the landscape from this time.²¹ Where previously truth had been sought in classical art, both highly influential and more run-of-the-mill European nineteenth-century painters – from Constable and Turner to Monet, Van Gogh and Cézanne – sought truth in nature and nature alone. Cézanne, sometimes considered the father of twentieth-century abstraction, insisted that 'painters must devote themselves entirely to nature ... Talking about art is almost useless'; and urged them to 'beware of the literary spirit that so often causes the painter to deviate from his true path – the concrete study of nature'.²² Despite the heightened subjectivity that developed in nineteenth-century art after romanticism, culminating in the highly impressionistic and expressive works of artists such as Monet, Van Gogh and Cézanne, artists placed a high priority on the accuracy of their looking.

This empirical approach and openness to the natural environment is partly confirmed by the working habits of such artists. They emphasised the importance of working in the landscape, in front of their motif, and often even noted the place and time of their observations – sometimes to the hour. This, along with information from the images themselves, has allowed art historians to quite easily locate the exact sites at which they were painted. More telling, perhaps, is the widespread environmental consciousness of nineteenth-century artists, many of whom expressed their concern for the environmental degradations occurring due to development. When, over a decade ago, Bonyhady began investigating nineteenth-century art in Australia and elsewhere from an environmental perspective, he was surprised at the number of artists who had taken up 'a wide array of environmental causes'.²³ He coined the term 'environmental aesthetic' to describe what he rightly considered to have been a little-noticed and poorly-researched aspect of modern art. Bonyhady's research confirms Smith's argument (referred to above) for the importance of environmental science in nineteenth-century art, and makes it more than reasonable to expect landscape artworks in this tradition to reflect a sensitivity to ecological conditions and

processes, and therefore to comprise a significant resource for the production of environmental histories.

For these reasons, we believed it was worth testing what modern landscape paintings can tell us about the natural world in the nineteenth and early twentieth centuries and the extent to which they can be relied upon for ecological knowledge of particular places. We had three aims: firstly, to assess the general viability of using modern landscape art as evidence for writing environmental histories (including historical ecologies); secondly, to develop a methodology for analysing such evidence; and thirdly, to test this methodology through the investigation of several selected regions. The study discussed here was designed to test elements of the first two aims in order to determine whether the more substantial investigation needed to complete the multi-region study was warranted.

Our study involved two stages. The first saw us develop a FileMaker Pro database for the systematic compilation of the aesthetic, ecological and environmental information in landscape artworks. We chose as our study area the Swan River region of Western Australia, where we both live and work. This region has been occupied by Noongar people for at least 38,000 years.²⁴ Since the British colonised it in 1829, extensive ecological changes occurred across much of the area. The vegetation, in particular, has been extensively transformed by clearing, introduction of exotic plants and animals, and changes in the fire regime, prevalence of insect and bird life, and groundwater levels.²⁵ Efforts have been made to reconstruct the 'original' vegetation with reference to remnant vegetation, roadside verges, aerial photographs, and landform and soil maps.²⁶ However, such efforts have been confined to particular localised studies and large-scale maps, with the latter unable to precisely reflect the composition of the region's native vegetation, being of 'a complex, predominantly continuous population pattern, with both individual species and groups of species having dissimilar distribution patterns'.²⁷ There is significant scope, therefore, to develop further, more detailed understandings of the historical ecology of the region.

Having chosen our region, we then located landscape artworks from it that were completed between 1827 and 1950. Whilst acknowledging the complexities of the collection process, in order to avoid the intrusion of our own taste we decided to survey only readily available artworks within our region, period and genre that had been professionally catalogued. A total of 259 such artworks were located. A suitably experienced and university-trained ecologist surveyed the depiction of climate and weather, geography, environmental degradation, soils, flora, fauna, humans and infrastructure depicted in each artwork. An experienced art historian then undertook an aesthetic survey of each artwork identifying its formal characteristics (medium, mode, perspective, style, and language) according to consistently applied criteria. The distribution of art styles across our historical periods are charted in Figure 1.

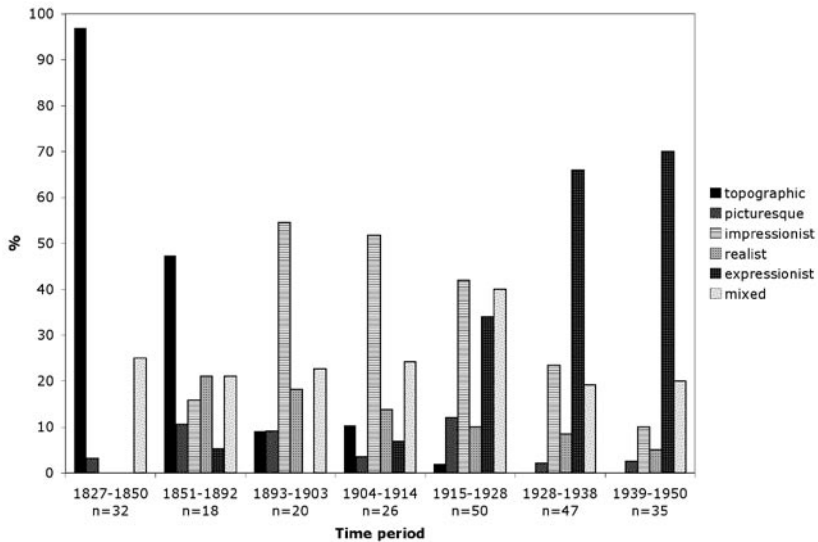


FIGURE 1. Percentage of artworks of each style, in each historical period.

In the second stage, data from the survey of the images was exported to Excel and statistical analysis conducted to determine whether the artworks reflected broad patterns of ecological change over an historical periodisation at a range of scales, and whether the kind of information varied significantly according to the style, mode, and medium of artwork. A more fine-grained analysis was also conducted, in which the representations in artworks depicting a specific site within the region were compared with other sources.

We found that when analysed together, the images pointed to some broad ecological changes that can be readily explained with reference to our present understanding of likely factors at work in historical environmental change in the region. The survey of the artworks' environmental content included the girth of the largest tree depicted, estimated with reference to other elements depicted within the artwork (girth of small trees $\leq 0.5\text{m}$; girth of medium trees $= 0.5\text{-}1.0\text{m}$; girth of large trees $\geq 1\text{m}$). Over the period 1827–1950 there was a significant decline in the depiction of trees of large girth ($r^2=0.80$), and significant increase in the depiction of trees of medium girth ($r^2=0.85$). The proportion of artworks in which the largest tree depicted was of small girth remained fairly stable across the period (Figure 2).

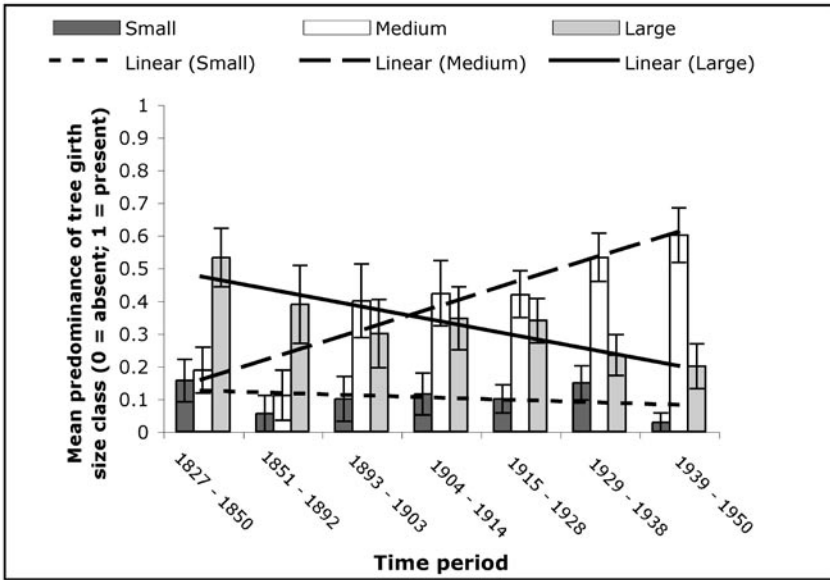


FIGURE 2. Changes over time in the proportion of Swan River landscape artworks in each period, in which the largest tree was classified as small, medium or large.

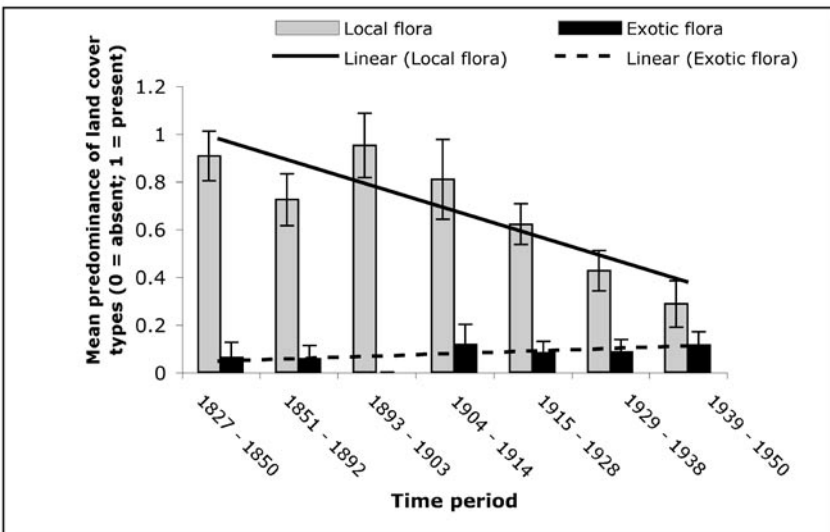


FIGURE 3. Changes over time in the mean predominance of flora type depicted in landscape artworks of the Swan River region.

Across all images there was also a significant decline in the depiction of landscapes in which locally indigenous (rather than exotic) flora predominated ($r^2=0.75$) (Figure 3). Intriguingly, there was also a significant increase in the proportion of canvas covered by forest/woodland over time ($r^2=0.5$, with the periodisation showing significant coverage in the period 1827–1850, followed by a fall in the subsequent period, from 1851–1892, and a peak in 1915–1928). There was also a significant decline in the mean number of animals depicted ($r^2=0.6$), as well as an increase in depiction of decline/dieback in vegetation over time, but the number of artworks involved was not sufficient for the latter trend to be significant.

The pattern discerned in relation to tree girth could be explained by the felling or death of the largest trees in the colonial period. The most dramatic reduction in the depiction of large trees occurred after the introduction of convicts in 1851; prior to then the population of the Swan River was very small, and trees in the town site – one of the most popular views depicted – could only be cleared with the Surveyor-general's permission. The decline in tree girth may, therefore, reflect a kind of 'shifting baseline'. Large old gum trees remained a favoured subject throughout our study period, perhaps a hangover from the romantic sentiment for old trees. However, where artists have continued over our study period to choose what they perceive to be large trees as focal points for their paintings, as the biggest old trees have died or been felled, the 'large' trees chosen by the artists are progressively smaller. On the other hand, the change may be accounted for by the shift in dominant styles – from topographic to impressionist to expressionist, and the differing ways in which artists working within these styles tend to use trees within their work. However, as the changes in tree girth do not follow changes in the prevalence of different styles, it is more likely that they are real historical phenomena picked up by artists working in a range of styles.

The changes in depiction of local and exotic flora, too, can be readily explained with reference to actual historical environmental change: on colonisation, native vegetation was cleared, and exotic vegetation introduced. Trends in the proportion of canvas covered by forest/woodland may be similarly explained with reference to both historical factors: between 1827 and 1851, the number of colonists, and the amount of clearing, was relatively small. After the introduction of convicts, the population increased, as did the amount of clearing, though trees (indigenous and exotic) were also planted, and by 1915 this 'regrowth' may well have been becoming more prominent. The presence of animals, however, appears to closely follow the popularity of the topographical style, suggesting that although topographical works may be used as an indicator of the presence of particular animals in an area, artworks are unlikely to be a useful source of long-run information on changes in animal populations.

Analysis of the database also revealed that artists working in different styles appeared to convey different kinds and levels of ecological information. For

example, the picturesque style favours woodland settings most; realist works favour it least. Most animals and humans are found in topographic works, which also contained the greatest mean number of different plants (a proxy for floristic diversity). However, topographic works did not, as might be expected, contain the clearest depictions of plants: the mean number of plant taxa identified was greatest, perhaps surprisingly, in impressionist and picturesque works (and lowest, even more surprisingly, in realist works). The mean number of different plants, and identified plant species, was greatest in oil paintings (and in studio rather than plein-air works).

The database of Swan River artworks therefore appears to confirm our supposition that different art styles and media are likely to contain different kinds and levels of ecological information. This suggests that environmental historians and historical ecologists looking for particular plant species might seek out impressionist oils rather than realist watercolours. (Furthermore, these works can be searched by genus and species in our database). More work, however, is needed to determine whether these patterns are replicated in other contexts.

The site to which artists in the region devoted most attention – a circle encompassing the eastern ridge of Mt Eliza, Mill Point and the original Perth townsite (now the city's central business district) was chosen for more in-depth examination, in order to test our hypothesis. The area includes deep yellow Karakatta sands, as well as alluvial soils on low-lying ground adjacent to the river; botanist J.S. Beard proposed that the original vegetation of the area comprised 'mixed jarrah & tuart with sheoak and banksia'.²⁸

Prior to 1827, we have only generic descriptions of the landscape in this area: for example those of Joseph Charles Bailly, a minerologist with the Baudin expedition, who climbed to the top of Mt Eliza in June 1801:

On ascending to the top of this hill we were charmed with a beautiful prospect. On one side we discovered the upper course of the river, which went up towards a range of flat mountains in the distance, and on the other we could follow its course down to the sea-shore. The banks of the river appeared almost everywhere covered with beautiful forests, which extended a considerable way into the interior of the country.²⁹

This is a credible description, but hardly detailed. The first depiction of this area in a Western artwork is Frederick Garling's 1827 watercolour, *View from Mt Eliza*³⁰ (Figure 4). Garling migrated with his English parents to Sydney when he was 8 years old; at 21 years of age he was appointed the official artist on Captain James Stirling's expedition to the Swan River.³¹ Seeking to assess the area's suitability for a new colony, the expedition included a range of observers. On 8 March 1827 a small party, including Captain Stirling, Garling, the botanist Charles Fraser, and 10 others, took the cutter and gig from their ship, HMS *Success*, and made their way up the Swan River. They stopped at several points before reaching Point Belches (now known as Mill Point), where the

party spent some time. Stirling wrote that as the party made their way up the Swan River from the coast:

the banks become extremely beautiful and picturesque. Their beauty is enhanced by the lofty trees, which occasionally adorn them, and by the bright green pendulous foliage with which the Shrubs are covered.³²

Fraser provided more detail, describing the river banks where the Perth townsite was later located as:

exceedingly barren, resembling those of Port Jackson, but producing a magnificent species of *Angophora*... *Banksia grandis* was here to be seen to attain the height of fifty feet, and its trunk frequently exceeded two feet and a half in diameter.³³

On top of Mt Eliza, Fraser observed a hakea, native broom and grass trees to 30 ft (9m) high, whilst Point Belches 'was found to produce *Banksias* and *Eucalyptas* [sic.]. The shrubs consisted of a beautiful *Isopogon*, a species of *Acacia*, and a *Jacksonia*, with crimson flowers, together with the general productions of the opposite shore.'³⁴

Whilst usefully indicating the presence of certain species, Fraser's descriptions give us little idea of their distribution. To an extent, Garling's work serves both purposes, and there are several indications that it is, with few exceptions, a faithful representation of the landscape – as expected from a topographical artist employed on such a mission. For one, it appears accurate in its depiction of the time of day. Garling presumably executed this work (or the basis of it) around the same time as Fraser had climbed to the top of Mt Eliza. It would have been mid- to late afternoon by this time, as it appears in the painting. The inlet on Mill Point that would later be known as the Mill Pond or Millers Pool is clearly visible, as is the entrance to the Canning River (in the centre of the work). Garling's shoreline closely resembles that of the present day, allowing for the effects of freeway construction (though in Garling's work, Point Heathcote and Point Dundas look rather more like islands than promontories). On Mill Point the vegetation appears in clumps rather than the more dense forest that covers the other land around. This is consistent with later depictions. The two Aboriginal figures, however, are an imaginative addition: written records indicate that the party did meet with Noongars, but not on Mt Eliza. It is not certain that the foreground vegetation reflects the actual position of the plants, but the species depicted are all consistent with the written observations of vegetation in this area – even the massive *Xanthorrhoea* (possibly *drummondii*) on the right.

On the basis of Stirling's report, Captain Fremantle was sent with HMS Challenger to annex the colony, which he did on 2 May 1829. In the same year, regulations relative to town allotments were issued, including one that stipulated: 'No trees to be cut on site of town without permission of Surveyor General'.³⁵ This directive was apparently quite effective. Visitors to Perth in the early 1830s noted that the town site was 'adorned with lofty trees'³⁶ that were



FIGURE 4. Frederick Garling, *View from Mt Eliza*, 1827. (Holmes à Court Gallery, Perth)

‘equal to any produced on British ground’.³⁷ In 1833 diplomat and horticulturalist Baron Charles von Hügel also noted the ‘huge Eucalyptus trees’³⁸ in the vicinity of Perth; two years later, Frederick Irwin, commander of the military forces at Swan River, described the town of Perth as ‘partially concealed by some fine trees which have been left standing’.³⁹ Shrubs, too, were preserved. James Backhouse, a travelling Quaker, observed in 1837 that ‘The town of Perth consists of several streets, in most of which there are but few houses ... Many beautiful, native shrubs grow in the borders of the gardens, most of which are in a neglected state.’⁴⁰

These characteristics are faithfully reproduced in lithographs after sketches by Charles Wittenoom, who arrived in the colony as a young child in 1830 and would later become a topographical draughtsman.⁴¹ In *Sketch of the Town of Perth, Western Australia*; *Sketch of the Town of Perth from Perth Water*; and *Sketch of Perth and Melville Waters with Mount Eliza, from the Main Street of Perth, Western Australia* (all completed in 1839),⁴² Wittenoom recorded the plentiful trees and shrubs for which the settlement was noted at the time. An unknown artist also recorded the dense vegetation, especially between St George’s Terrace and the River, in a view from Mt Eliza entitled *Perth – West Australia*⁴³ (1842). Although the two Aboriginal people in the foreground of that work are probably imaginative embellishments and the elevation of the hills to the northeast is somewhat exaggerated, the tree to the right of the painting is almost certainly a faithful representation, as its dead trunk was later captured in a similar view by photographer A.H. Stone.⁴⁴

A more intimate view by Alexander Taylor (*Perth from St George’s Terrace, 1850*)⁴⁵ shows diverse vegetation in the town, with Banksias, a Zamia (*Macrozamia riedlei*) and a Grass Tree (*Xanthorrhoea preissii*) all clearly visible.

The view is reminiscent of James Backhouse's observations of 1837. In 1851, however, Governor Fitzgerald's Bill for the Improvement of Towns permitted fewer trees and shrubs around residences as they were presumed to offer refuge for thieves,⁴⁶ reflecting a heightened concern over crime after Western Australia was declared a penal colony in 1850. This Bill may explain why an 1852 sketch by draughtsman Horace Sampson (*Perth Looking Across to the Narrows*)⁴⁷ of a part of St George's Terrace only a little west of that depicted by Taylor, includes less vegetation, and why William Henry Harvey, a Professor of Botany from Dublin who visited the colony in 1854, failed to mention the dense and varied vegetation in the town, as previous writers had.⁴⁸

In the era of photography, the task of establishing which ecological elements are faithfully depicted in artworks becomes somewhat easier, although photographs, too, provide selective coverage of the landscape, are often undated, and especially before the 1950s, provide no information on colour. Thus if we turn our attention (back) to Mill Point, we find a range of impressionist works from the 1890s to the 1920s that provide insights compatible with those of photographs, but arguably superior due to the use of colour.

Mill Point is not the focus of *Perth from the Swan River* (1893),⁴⁹ an impressionist work by draughtsman and artist William Herbert Gibbs, but it nevertheless appears to depict faithfully a few tall shrubs/low trees on the point, with an understorey of low shrubs or tall grasses or reeds; giving us a rough idea of vegetation structure, if not species. The beach is more prominent than Garling's image of almost 70 years prior, and the artwork itself suggests some possible explanations for this change, including a decline in shore vegetation due to the point being used – as in Gibbs's image – as a stopping point for boating parties, or the wash from the increasing amount of river traffic – like the boat Gibbs depicts – that plied the waters between Fremantle and Perth. Similar features are evident in James Ashton's *Mt Eliza, Perth, WA* (1904),⁵⁰ a later view from the other side of the point, and are consistent with the vegetation depicted in photographs of the same period.⁵¹

James Walter Robert Linton's 1910 oil painting, *Mill Pond, Swan River*,⁵² takes us down onto the point itself, where we can see that the water level of the pond is very low – as we would expect, given the particularly dry summer of 1909–10. Although not containing the level of detail of topographical works, Linton's painting provides apparently accurate information on the structure of the vegetation, as well as some information on species: sedges in clumps fringe the sandy shores of the partly-dry pond; a small paperbark melaleuca (readily identifiable from the colour of the bark) stands a little further from the edge of the pond; the background is dominated by medium-sized trees, with the form and colour of one taller tree suggesting a remnant Tuart (*Eucalyptus gomphocephala*). Tuart trees are now rare, and in decline, in this area. Another impressionist work by Linton, *Mill Point from Kings Park* (1927),⁵³ skillfully uses watercolours to depict salient features of the landscape: we see jetties,

breakwaters and even trees evident in contemporaneous photographs, and red tile roofs clearly indicate the extent of the suburban development heading out along the point.

This more detailed comparison of artworks with other sources depicting specific sites (Perth and Mill Point), suggests that although the amount of information to be derived from individual artworks varies, and they contain some artistic license (for example, in the addition of figures, or arrangement of foreground vegetation), on the whole they reflect and often add to the information contained in other sources. This provides grounds for confidence in the database results, particularly with respect to the amount, genera and distribution of vegetation.

An expansion of the database and further detailed case studies in other regions are needed in order to draw more firm conclusions about the utility of artworks for ecological histories, but this study indicates that artworks might play a more prominent role in efforts to trace ecological change at a range of scales. However, although artworks appear to hold out the promise of transporting us back into past landscapes in full colour, and can potentially act as inspirational models for ecological restoration projects, their limitations must be recognised, and single artworks should be interpreted with reference to a range of other historical sources, and to contemporary scientific knowledge.

NOTES

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² Frances M. Hayashida, 'Archaeology, Ecological History, and Conservation', *Annual Review of Anthropology* 34 (2005): 43–4, doi: 10.1146/annurev.anthro.34.081804.120515; Jeremy B.C. Jackson et al., 'Historical Overfishing and the Recent Collapse of Coastal Ecosystems', *Science* 293 (2001): 629–38, doi: 10.1126/science.1059199.

³ David R. Forster, 'From Bobolinks to Bears: Interjecting Geographical History into Ecological Studies, Environmental Interpretation, and Conservation Planning', *Journal of Biogeography* 27 (2000): 27, doi: 10.1046/j.1365-2699.2000.00376.x.

⁴ Dave Egan and Evelyn A. Howell, 'Introduction', in Dave Egan and Evelyn A. Howell (eds.), *The Historical Ecology Handbook: A Restorationist's Guide to Reference Ecosystems*, Island Press, Washington, pp. 1–17. For the sake of brevity, we have tended to use the broader, umbrella term 'environmental history' to include works that draw on historical ecological data, and may be characterised as environmental histories or historical ecologies.

⁵ Ian D. Lunt, 'Grazed, Burnt and Cleared: How Ecologists Have Studied Century-Scale Vegetation Changes in Australia', *Australian Journal of Botany* 50 (2002): 391–407, doi: 10.1071/BT01044. Lunt's own work constitutes a high-quality exception to this general

observation: Ian D. Lunt, 'Two Hundred Years of Land Use and Vegetation Change in a Remnant Coastal Woodland in Southern Australia', *Australian Journal of Botany* 46 (1998): 629–47, doi: 10.1071/BT97052; for an example from animal population dynamics see I. Abbott, 'Origin and Spread of the Cat, *Felis catus*, on Mainland Australia, with a Discussion of the Magnitude of its Early Impact on Native Fauna', *Wildlife Research* 29, 1 (2002): 51–74, doi: 10.1071/WR01011 (from a scientist), and A. Gaynor, 'Report on the History of the Arrival of the Feral Cat Population in Western Australia', *CALMScience* 3, 2 (2000): 149–79 (from an historian).

⁶ See for example the strengths and limitations of dendrochronological analysis described in J. C. G. Banks, 'A Review of the Use of Tree Rings for the Quantification of Forest Disturbances', *Dendrochronologia* 9 (1991): 51–70.

⁷ P. Holm, 'History of Marine Animal Populations: A Global Research Program of the Census of Marine Life', *Oceanologica Acta* 25 (2003): 208.

⁸ J. Roberts and G. Sainty, 'Oral History, Ecological Knowledge and River Management', in *Environmental History and Policy: Still Settling Australia*, ed. S. Dovers (South Melbourne: Oxford University Press, 2000), 118–44; M. Robertson, P. Nichols, P. Horwitz, K. Bradby, and D. MacKintosh, 'Environmental Narratives and the Need for Multiple Perspectives to Restore Degraded Landscapes in Australia', *Ecosystem Health* 6, 2 (2000): 119–33, doi: 10.1046/j.1526-0992.2000.00013.x; Robert E. Johannes, Milton M. R. Freeman and Richard J. Hamilton, 'Ignore Fishers' Knowledge and Miss the Boat', *Fish and Fisheries*, 1 (2000): 257–71.

⁹ Though for one Australian example see John Cary and Neil Barr, 'The Semantics of 'Forest Cover': How Green Was Australia?' in *Agriculture, Environment and Society: Contemporary Issues for Australia*, ed. G. Lawrence, F. Vanclay and B. Furze (South Melbourne: Macmillan, 1992): 61–74.

¹⁰ A. Gaynor and I. McLean, 'The Limits of Art History: Towards an Ecological History of Landscape Art', *Landscape Review* 11, 1 (2005): 4–14.

¹¹ For example, in one of the earliest studies of landscape art, Max Friedlander argued that the whole genre was symptomatic of an historically specific bourgeois subjectivity that, in order to heal its alienation, transformed the world into pictures and thus nature into landscape. See Max J. Friedlander, *Landscape, Portrait, Still-Life: Their Origin and Development*, trans. R.F.C. Hull (Oxford: Bruno Cassirer, 1949), 12–22.

¹² Millard Meiss, *Painting in Florence and Siena after the Black Death* (Princeton: Princeton University Press, 1978), 64.

¹³ Meiss, *Painting in Florence and Siena after the Black Death*, 165.

¹⁴ Reprinted in Paul Shepard, *Where We Belong: Beyond Abstraction in Perceiving Nature* (Athens: University of Georgia Press, 2003), 3–19.

¹⁵ Denis Cosgrove, *The Palladian Landscape* (Leicester: Leicester University Press, 1993); Denis Cosgrove, *Social Formation and Symbolic Landscape* (London: Croon Helm, 1984); Stephen Daniels, *Fields of Vision* (Cambridge: Polity Press, 1993); Stephen Daniels, *Humphry Repton* (New Haven: Yale University Press, 1999); Denis Cosgrove and Stephen Daniels (eds), *The Iconography of Landscape* (Cambridge: Cambridge University Press, 1988); Edward Casey, *Representing Place* (Minneapolis: University of Minnesota Press, 2002); Renzo Dubbini, *Geography of the Gaze*, trans. Lydia G. Cochrane (Chicago: University of Chicago Press, 2002).

- ¹⁶ See for example Tim Bonyhady, *The Colonial Earth* (Carlton, Miegunyah, 2000); Rebecca Bedell, *The Anatomy of Nature: Geology and American Landscape Painting, 1825–1875* (Princeton: Princeton University Press, 2001).
- ¹⁷ Jules Janick and Harry Paris, 'The Cucurbit Images (1515–1518) of the Villa Farnesina, Rome', *Annals of Botany* 97 (2006): 165–76, doi: 10.1093/aob/mcj025.
- ¹⁸ Jacob Baker and John E. Thornes, 'Solar Position within Monet's Houses of Parliament', *Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences* 462, 2076 (2006): 3775–88.
- ¹⁹ Ranald Anderson, 'The Tower Hill Experience', *Australian Plants Online*, 2 (1996), <<http://asgap.org.au/APOL2/jun96-2.html>>.
- ²⁰ Bernard Smith, *European Vision and the South Pacific 1768–1850*, 2nd edn (Oxford: Oxford University Press, 1984), ix–x.
- ²¹ Smith, *European Vision and the South Pacific*, ix–x.
- ²² Paul Cézanne, *Letters*, trans. John Rewald (New York: Hacker ArtBooks, 1976).
- ²³ Bonyhady, *The Colonial Earth*, 1.
- ²⁴ R. Pearce and M. Barbetti, 'A 38,000 year old site at Upper Swan, Western Australia' *Archaeology in Oceania* 16 (1981): 173–8.
- ²⁵ George Seddon, *Sense of Place: A Response to an Environment, the Swan Coastal Plain Western Australia*, (Melbourne: Bloomings Books, 2004 [1972]), 173–4.
- ²⁶ E.M. Heddle, 'Mapping the Vegetation of the Perth Region', in *Western Landscapes*, ed. J. Gentill (Nedlands: University of Western Australia Press for the Education Committee of the 150th Anniversary Celebrations, 1979), 156.
- ²⁷ Heddle, 'Mapping the Vegetation of the Perth Region', 153.
- ²⁸ J.S. Beard, *The Vegetation of the Perth Area, Western Australia: Map and Explanatory Memoir, 1:250,000 Series* (Perth, Vegmap Publications, 1979).
- ²⁹ Quoted in M.F. Peron, *A voyage of discovery to the southern hemisphere, performed by order of the Emperor Napoleon during the years 1801, 1802, 1803 and 1804*, Vol. 1, (North Melbourne: Marsh Walsh, 1975 [1809]), 143.
- ³⁰ Held by Holmes à Court Gallery; Roderick Anderson, *Western Australian Art: A Selection of Early Works from the Robert Holmes à Court Collection* (Perth, Heytesbury Holdings, 1986), 10.
- ³¹ Anderson, *Western Australian Art*, 10.
- ³² Joanne Shoobert (principal ed.), *Western Australian Exploration*, Vol. 1. December 1826–December 1835 (Perth: Hesperian Press in conjunction with the Department of Land Information, 2005), 23.
- ³³ Shoobert, *Western Australian Exploration*, 51. The 'Angophora' referred to here was almost certainly the marri, *Corymbia calophylla*.
- ³⁴ Shoobert, *Western Australian Exploration*, 50.
- ³⁵ George Seddon and David Ravine, *A City and its Setting: Images of Perth, Western Australia* (Fremantle: Fremantle Arts Centre Press, 1986), 78.
- ³⁶ T.B. Wilson, *Narrative of a Voyage Round the World...* (London: Dawson's of Pall Mall, 1968 [1835]), 188.

- ³⁷ Bruce Devenish, *Man of Energy and Compassion: The Life, Letters and Times of Henry Trigg, Swan River Pioneer and Church Founder* (South Perth: Wongaburra Enterprises, 1996) 91 (letter dated 6 Oct 1830).
- ³⁸ Baron Charles von Hügel, *New Holland Journal, November 1833–October 1834* (Carlton: Melbourne University Press, 1994), 36.
- ³⁹ F.C. Irwin, *The State and Position of Western Australia; Commonly Called the Swan River Settlement* (London: Simpkin, Marshall, 1835), 49.
- ⁴⁰ James Backhouse, *A Narrative of a Visit to the Australian Colonies* (London: Hamilton, Adams & Co., 1843), 531.
- ⁴¹ Barbara Chapman, *The Colonial Eye* (Perth: Art Gallery of Western Australia, 1979) 53.
- ⁴² All held by The Art Gallery of Western Australia; Chapman, *The Colonial Eye*, 64, 66.
- ⁴³ Held by Mitchell Library; Chapman, *The Colonial Eye*, 65.
- ⁴⁴ A.H. Stone, Perth From Mt Eliza And Little Lizzie [photograph], Stone album of photographs of early Perth 6909B/22, online image 001324D, Batty Library, Perth, 1860, <<http://www.slwa.wa.gov.au/images/museum/001324d.jpg>>. This resemblance was also noted by Seddon and Ravine, *A City and its Setting*, 79.
- ⁴⁵ Held by Art Gallery of Western Australia; Chapman, *The Colonial Eye*, 73.
- ⁴⁶ Seddon and Ravine, *A City and its Setting*, 119.
- ⁴⁷ Held in a private collection; Chapman, *The Colonial Eye*, 70.
- ⁴⁸ Sophie C. Ducker (ed.), *The Contented Botanist: Letters of W.H. Harvey about Australia and the Pacific* (Melbourne: Melbourne University Press, 1988), 106–7.
- ⁴⁹ Held by Holmes à Court Gallery; Anderson, *Western Australian Art*, 19.
- ⁵⁰ Held by Holmes à Court Gallery; R. Anderson, *Early Western Australian Art From the Robert Holmes à Court Collection* (Perth: Heytesbury Holdings, 1983), 9.
- ⁵¹ See for example A Pickering, South Perth from Perth Park, WA, [photograph], Peet collection of Photographs BA 1344/47, online image 011504D, Batty Library, Perth, c.1900s, <<http://www.slwa.wa.gov.au/images/robinson/011504d.jpg>>.
- ⁵² Held by Art Gallery of Western Australia.
- ⁵³ Held by Holmes à Court Gallery; Anderson, *Early Western Australian Art*, 33.