

Is the natural history of Sydney so camouflaged that it will not survive?

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ABSTRACT

Our answer, to the question: Is the natural history of Sydney so camouflaged that it will not survive? is “yes”. Harry Recher, an active participant in the plenary session, took the view that as the ecosystems around us decline, there will be even less native fauna in the city. There exists a strong case for knowing what is native, and not just pushing on with restoration, or setting aside green spaces without knowing what is there, and what will occupy the new habitats. That case is the subject of this paper. Knowing the natural history of Sydney is one element of living in a civilised society, which includes caring about the past, knowing your local plants and animals, and managing for future generations. All the papers in this book are linked thematically around the idea that Sydney has its own rich natural history that is worthy of sustained study and conservation. We comment on the way that historians have looked at Sydney, and where native animals have fitted into the history of Australia, and Sydney in particular. In our view, that subject is only now taking hold, but it will be one that will yield many new insights, and in turn it will merge with ecological thinking and contribute to the new discipline of ecological history. Paul Adam, in his paper, shows the merit of reference back to Britain for our understanding of how and why the colony took the course it did with respect to natural history. He is dismayed that natural history no longer has any prominence, yet it is the foundation stone upon which so many of the specialist disciplines rest. More importantly, it is a guiding light for any major conservation effort. We present one glimpse of the natural history of Sydney, invite others to enjoy its diversity, to support its conservation, and then integrate those views into your city life.

Key words: global city; ecological history; national parks; the Australian city; urban wildlife; town planning; natural history; Sydney.

Introduction

As we were sending this book to the printing presses, the Commonwealth government launched the *State of Australian Cities 2010* report¹. It opened with the statement: “While the struggles and passions of rural life are often used to define the Australian spirit, for the vast and overwhelming majority of Australians, life in the cities is the reality.” For zoologists and botanists, this is a rallying call to highlight the natural history of our cities to make it a vital part of our reality. This book is one contribution to that enterprise. We start by asking a searching question to assist those who are not sure of how many creatures we are talking about and what is the consequence of not seeing them. Our question is the title of this closing paper: Is the natural history of Sydney so camouflaged that it will not survive?

Our answer to this question is “yes”. Our concern is that the habits of the native animals of Sydney, their colour, their times of movement, texture or shapes, may combine

to disguise them in the habitats they occupy. Camouflage is a standard word in the biological sciences, it is the means by which a creature renders itself indistinguishable from its background. Indeed, animals have evolved to be inconspicuous to their predators, and predators from their prey, so it would be no surprise that so many of Sydney’s animals are just not seen by people. Natural historians have, over the 222 years since first settlement by Europeans, named 1200 vertebrates living in Sydney (Booth 2010; Recher 2010). This does not even start on the invertebrates, which constitute the other 99% of the fauna (Ponder and Lunney 1999), so sharply illustrated in the papers by Beechey (2010) on molluscs and Moulds (2010) for cicadas. These two authors have given us a vivid sample of the vast array of Sydney’s invertebrates, with a collection of them going back to Britain with Charles Darwin from his visit to Sydney in 1836 (Nicholas 2010). In our view, it takes practice to see the diversity of

1. http://www.infrastructureaustralia.gov.au/files/MCU_SOAC.pdf, last accessed 12 March 2010

life around you. We may see and hear some of the birds described by Major (2010) in his paper on the birds in backyards project, but how many people can recognise many of the reptiles in the lists in Shea's (2010) paper? How many fish can you name from the 600 in Sydney Harbour? How many cicadas can you name? Even if you could name them if presented with them in a display at the Australian Museum, how many would you see in your suburb? It is possible to answer that question, and the keen work of the Wolli Creek group puts that on display in the paper by Little *et al.* (2010). In fact, this book reveals much of the secret lives of the native wild creatures of Sydney.

This book contains 30 contributions on the subject 'the natural history of Sydney', yet no two contributions approached the subject in the same way. Some themes have emerged, in particular the nature of environmental changes that have occurred, as Sydney has grown and developed. Sustainability has been a common theme of chapters as diverse as urban planning, flora and fauna, amenity and cultural heritage, but the what, why, who, how and where of sustainability seems to have many forms.

A strong view of this diversity of perceptions was evoked by Paul Willis from Harry Recher in the plenary discussions on the day of the forum, in 2007, where the papers in this book were originally presented. That exchange by these two public intellectuals set the tone for the zoological outlook of this closing chapter. The plenary chair, Paul Willis, challenged author Harry Recher with a statement then a question: "I think you really encapsulated the dynamics of just the sheer change in fauna in the Sydney area, and I'd like to know from you what do you see as the limits? What do you see as the natural history of Sydney, seeing as the fauna, just the sheer numbers, are turning over so rapidly?"

Harry Recher responded giving all of us more to think about in his reply: "When I sat through the papers today, one of the things that struck me was, with rare exception, almost everybody focused on native wildlife and focused on the urban area, which is a highly disturbed ecosystem where I don't expect to find natural ecosystems at all. I don't even expect to be able to create natural ecosystems. I wonder if all that energy, all those resources might not be better diverted towards trying to protect what remains of our natural ecosystems on the perimeter of the city, about which we know very little.

Recher then added his views on diversity: "As those ecosystems around us decline, ... there will be even less native fauna in the city. Does it matter? I don't think it matters a damn." "...we can create environments in the city which will give us a lot of wildlife, but it's going to be a reconstructed ecosystem with exotics from other continents, exotics from other parts of Australia, and some native species. For the majority of people in Sydney, that's going to be fine. They don't know what's native. They don't care what's native. They just want wildlife around them."

Support for Recher's views can be found in the *State of Australian Cities 2010*. It noted that the urbanisation of the Australian population has implications for the environment and sustainability (p 87). The example

selected in the report was that urban expansion competes for land with agricultural production and habitat and that the movement of people from rural areas to cities and coastal areas has resulted in relatively high rates of land clearing for urban development, causing the loss of habitat for native plants and animals, and reducing their numbers and geographical spread. This is not only consistent with Recher's views on peri-urban loss, but also with his views on wildlife. Native plants and animals were mentioned, but that was the limit to the degree of detail. That detail lies with the specialists, such as the authors in this book. Without that detail, Sydney would develop not knowing its own natural history and how it fits into Sydney as a global city. What we would like to see is that readers of the *State of Australian Cities 2010* absorb some of the detail of Sydney's natural history, such as displayed in this book, and not assume that the native animals and plants are self-sustaining, whereas in fact some species and ecological communities are going locally extinct, while others are becoming pests. We also note that the question of what is meant by sustainability is not always clear, and can mean different things to people from different disciplines, as was made clear by Norton (2003). He concluded that if he has been successful in his writing then the reader will have strong sense of the importance of consciously improving the transdisciplinary, ordinary language discourse in which scientific knowledge and social evaluation are integrated if we are to find a viable environmental morality.

While Recher considered that the majority of people will not care whether their city wildlife is native, and he is no doubt right, there nevertheless exists the strong case for knowing what is native, and not just pushing on with restoration projects, or setting aside green spaces without knowing what is there now or what will occupy the new habitats. One element of living in a civilised society is to know the natural history of your city, which includes caring about the past, knowing your local plants and animals, and managing for future generations. This book was produced in that spirit, and Harry Recher is more conscious of that than most. He is a scientist who speaks up and provokes others to think, and think ecologically, in this case, on the natural history of Sydney.

There is, however, another way to tackle the question: Is the natural history of Sydney so camouflaged that it may not survive? This raises the issue of seeing only what you want to see. To that end, this closing paper looks at the natural history through the eyes of others, with a particular focus on historians because of their interest in the Aboriginal people who were in Sydney at first contact, and natural historians who were also members of the first fleet and onwards through the 19th and 20th centuries.

Historians and natural history

A plea for historians to encompass urbanisation

In a strong plea for historians to encompass urbanisation, economic historian Sean Glynn (1974, p 120) examined the findings of the first full conference of urban historians in Britain, and discussed the lessons that may be drawn for Australian urban historians. In doing so, Glynn pointed

out that this discipline is new, and noted that of the 43 participants at the conference, historians and economic historians heavily outnumbered geographers, sociologists and others, including a solitary professor of English. Glynn (p 126) made the observation that if the keynote of future historical research is to be a synthesis of interdisciplinary study, then urbanisation will be a natural venue for different kinds of scholars, including historians. Glynn (p 127) concluded his paper with the injunction: “Australian historians must make sure that they have encompassed the Cumberland Plains before they embark on a collective trip on what might become their Cooper’s Creek”.

Tozer (2010) provides a lucid introduction to the Cumberland Plain from a botanical perspective, and presents a compelling case for the conservation of this endangered ecological community within the Sydney region. Burgin (2010) describes how the Cumberland Plain was divided into smaller and smaller pieces, using the example of Ham Common, and Wotherspoon and Burgin (2010) describe how the Cumberland Plain is dying the death of a thousand cuts.

The integration of history, planning, botany, zoology and economics will be slow, but is underway. In her paper, Goodall (2010), an Australian historian, makes the disarming, but engaging statement: “Listening to the presentations from dedicated zoologists at this symposium has confirmed my sense that as a historian I’m sadly lacking in the zoological knowledge which would help me to trace out these relationships between people and nature”. That statement demonstrates the size of the gap, and also the need to close it. Another lead is provided by historian/archaeologist Presland (2008) in his book on how nature has shaped the city of Melbourne. He made the observation that despite what is an obvious connection between natural history and human history in Australia, historical research that focuses on the original environment is rare. However, the contribution of historians has been immense, and zoologists interested in the history of Sydney and its fauna are urged to read these works and draw from them the context of the environment in which Europeans settled Sydney.

Environmental historian, Libby Robin (2007) shows one path for integrating the disciplines in her book *How a continent became a nation*. Robin (p 9) recognised that the landscapes of the Old World, and the normal (European) nature found there, have shaped the views of Australian nature. She cleverly extended the concept of the Cultural Cringe to include the Biological Cringe. This, Robin noticed with great irony, is sometimes manifest in the shame Australians feel for our purportedly primitive and economically useless life forms, as well as the unfortunate converse that there is sometimes an overcompensating patriotic strut about the Australian biota and its associated nation. Archer and Beale (2004) laid the first issue of economically useless to rest in their polemic *Going Native*, and with respect to the second point (primitive), one of us (PH), as an Old World immigrant, has made sure that any strutting by any zoologist (at least invertebrate zoologists) has been earned.

People, not fauna, have occupied the attention of the historians of early Sydney

In our investigation of the historical works that include elements of the natural history of Sydney, we were struck by the fact that people, not fauna, have been the sustained focus for historians. Fauna illuminates some themes, but is not the subject of study, and there is not a systematic appreciation of natural history. A consequence for others is that the natural history of Sydney remains a colourful backdrop, and one that is not even noted as fading. It presents a view that has the danger of becoming accepted as normal or inevitable. It is not our view that the loss is inevitable. Our case is to promote the cause of seeing, understanding, and conserving the natural history of Sydney. However, we are also deeply aware that looking at the changes to the natural history of Sydney out of the context of a full historical explanation is an empty exercise.

In *Dancing with Strangers*, Clendinnen (2003, p 5) concluded her introductory chapter with the hope “that by retracing the difficulties in the way of understanding people of a different culture we might grasp how taxing and tense a condition ‘tolerance’ is, and how we might achieve social justice between Australia’s original immigrants, and those of us who came later”. Her focus was on the Australians (Clendinnen’s word for the Aboriginal people) and the British. That relationship, in Clendinnen’s view, began by dancing together.

In establishing the character of some of the main players, such as surgeon John White, Clendinnen (2003, p 48) commented that White’s enthusiasm for the fauna of the new continent was evident from first contact, but how, she asked, did he respond to its human inhabitants? Our interest, in contrast to Clendinnen, is to hold our focus on the fauna, and not strive instead to interpret White’s response to the local human population. If we could keep an historian’s interest in the fauna, and not be swept away by the dance, we would see yet another gripping piece of the history of Sydney. One approach, successfully tackled by Attenbrow (2010) and Tacon *et al.* (2010), is to employ historical and natural history skills into their archaeological studies.

An imported blindness to our native fauna

Among the aims of this book is to make the natural history of Sydney normal, not alien, to the people who live here, and those who visit. Another is to highlight the consequences of being ignorant of the natural history of Australia. Surely the extinction of 24 mammal species within 60 years of settlement of western NSW (1841-1901) bears grim witness to an imported blindness to our native fauna, and our relentless pursuit of “riding to prosperity on the sheep’s back”, even if that meant stripping western NSW of so much of its faunal richness (Lunney *et al.* 1994; Lunney 2001). Arid Australia, the bulk of the area of the continent, has been particularly vulnerable to the impact of European settlement (Dickman *et al.* 2007). We are fortunate that by the chance of topography and soil quality – too many mountains, not a great deal of arable land on the sandstone around Sydney – the forested coastal and subcoastal strip did not succumb in the same way as did the

drier and flat western NSW, with the loss rates for mammals in the forests being lower and the chances of now managing what remains being higher (Lunney and Matthews 2004). So many of the principles and practices of the way NSW was settled emanated from Sydney, and that, in turn, was British in its understanding of fauna and land management. The British occupation of Sydney in 1788 is thus a starting point for understanding why we are now so busy trying to conserve threatened species, control alien species, and why we struggle to manage human-wildlife conflicts (Hutchings *et al.* 2004; Lunney *et al.* 2007, 2008).

Goodall (2010) begins to bridge the gap between historian and zoologist by recognising the zoological significance of the habitats of the Georges River. While her central theme is a human-centred story, the setting sees the river as more than symbolic, it is alive with native plants and animals. After all, these were the food sources of the local Aboriginal people. Goodall (1996), in *Invasion to Embassy: land in Aboriginal politics in New South Wales, 1770-1972*, discussed the “often violent process of invasion and resistance” (p xxiv), thereby setting a more robust frame of reference to the impact of the British when they occupied Sydney in 1788.

We note the views of these two influential historians – Clendinnen and Goodall - saw the Australian environment for humans, not for the fauna. Although the natural history of Sydney has fascinated many individuals since Cook’s expedition along the east coast of Australia in 1770, it has largely been a background interest in the wide sweep of history from when the first fleet landed in Botany Bay on 19 January 1788, then moved to Sydney Cove and hoisted the British flag on 26 January.

The lack of attention to the impact on the fauna of the settlement of Australia has been long-running as an absent strand in historical writings. By chance, the historian Manning Clark had a property adjacent to a forest (Mumbulla State Forest) where a team of us was studying the impact of logging for woodchips on the fauna in south-east NSW (e.g., Lunney and Moon 1988). One of us (DL) took him on a tour of our study sites in 1982, and broached this subject with him. DL remarked that Clark’s historical writings looked at the harsh impact of the Australian environment on the European settlers, but that the team of researchers was looking at the converse – the harsh impact of the settlers on the local environment. Manning replied that he had only just come to appreciate that point. He accepted an invitation to write a preface for the first edition of *Conservation of Australia’s forest fauna* (Lunney 1991) and acknowledged that what he knew of the subject of forest fauna, bats in particular, which he called “a strange denizen of the Australian forests”, was slight, but he hoped that “many would read this work”. These memories are presented to give a zoological example of Clendinnen’s (2003, p 12) remark that it is a commonplace, rediscovered every decade or so, that individuals see what they see from their own particular perspective. Clark was a historian of his age, which did not include fauna as a unifying element in understanding human history. We have tried, in this book, to help alter that perspective and highlight the fauna of Sydney, and to present people as being both the dangerous backdrop for the fauna, as well as the only means of its conservation.

Stuffed and preserved

In her book, *The Colony: the history of early Sydney*, Karskens (2009) remained within the boundaries of an historian and the natural history of Sydney is presented more as an artefact than an element shaping history. Nevertheless, her book is fascinating to read for anyone with a sense of history and a curiosity about how we have the city that we have, as well as for those of us who are obsessed with putting fauna, and its conservation, more sharply into the spotlight. Consider a few of Karskens’ comments on the history of Sydney: “The ‘rage for curiosity’ spilled nevertheless from the ships as soon as Europeans disembarked. Everyone was soon collecting plant specimens, catching birds, chipping bits of rock, and stealing the tools and implements of the Eora to send home or sell to sailors on the ships. Everyone who could write, or dictate, a letter, took the trouble to describe the plants, animals and native inhabitants of the new land...” (p 256). Karskens added that “Banks, as the leading naturalist and the colony’s patron, naturally received the greatest bounty; stuffed and preserved kangaroos, kegs containing more kangaroos, kangaroo rats and echidna, live possums and parrots, stuffed birds, the skin of an emu, dried flowers, seeds and scores of tubs of plants.” For an insight into how the colony was viewed, this is clear writing, but for a zoologist, the list is painfully brief. What were the kangaroo rats, what species of possums and parrots were sent, and from what part of Sydney? Part of the answer to that question could lie in the fact that curiosity had little to do with it. At that time, natural history specimens were the vogue in Europe and selling specimens was a quick and easy way to earn money. This would have been a special incentive to colonists, most of whom one can imagine lacked ready cash or other means of earning it.

Major (2010), Shea (2010) and Lemckert (2010) look at the changing distribution in Sydney of the birds, reptiles and frogs respectively, and locations of first encounter would be most valuable to know. In fact, Karskens’ list does not mention reptiles or frogs, and yet we have a rich herpetofauna in Sydney, one that exceeds that of the entire UK and not ignored by the colonists. John White (1790) recorded frogs and reptiles in his *Journal of a voyage to New South Wales*. For example, plate 20 is devoted to reptiles, with an easily recognised sketch of a Blue-tongue Lizard *Tiliqua scincoides*. This leaves us alerted to the importance of the natural history of Sydney in the early years of the colony.

Sydney is a rich domain for fauna across a wide range of faunal groups. It is not surprising that some individuals among the first settlers were interested in the natural history of Sydney, but a history of that interest is waiting to be written. There is no doubt that it will involve reading some strange names for today’s fauna, and it will need to be set in an historical framework, not just lists, or lists per location and date. The written records will need interpretation, and here the historian and the biologist will be indispensable co-workers. When one considers the list provided by Karskens of the specimens collected, it is biased heavily towards mammals, large animals (e.g., kangaroos and emu), the colourful (e.g., parrots), and the curious (e.g., echidna). Is this a bias in the reporting by Karskens, or is it a bias in the initial collections? There is some careful research to do here.

The history of the natural history of Sydney

Tracing the history of natural history is a means of coming to grips with the scope of the subject. Fitter's (1990, first edition 1945) *London's natural history* is an enlightened example of what can be achieved by one keen naturalist. Currey's (1966) history of George Caley is another example. Caley was sent to Australia by Sir Joseph Banks to gather botanical specimens. He worked for much of that time – 1800 to 1810 – in and around Parramatta. However, Currey's interest ranges across what Caley knew of conditions in the young colony, the emphasis not being on natural history at all.

Flannery (1999, p 32) found it curious that the first fleters encountered very few snakes, yet he noted that by 1805 this had changed and the public were alarmed at the fatalities. He commented that the ecology of the land was changing at the hands of the new invaders. What Flannery did not do in this introductory chapter was to cite the sources for his comments. He presented this view as an educated guess, but it will take work to look through the lists of animals in individual diaries and letters, with date and locations, to form a more robust picture. Karskens' (2009) list that omitted reptiles might have been an accurate reflection of the recordings, but given that Britain has so few reptiles, it might have been what Clendinnen noted about bird songs – if you are not familiar with them, you do not recognise them. Given what Cogger (2010) and Shea report (2010), Sydney must have been alive with a rich variety of reptiles.

Adam (2010), in his paper, shows the merit of reference back to Britain for our understanding of how and why the colony took the course it did with respect to natural history. He is dismayed that natural history no longer has any prominence, yet it is the foundation stone upon which so many of the specialist disciplines rest. More importantly, it is a guiding light for any major conservation effort. Both Hutchings (2010) and Augee (2010) point to the critical contribution of this way of thinking to modern Sydney, with the Australian Museum and the Linnean Society of NSW being two outstanding legacies of action taken in 19th century Sydney. Further, when one looks at the list of authors in this book – Recher, Smithers, Major, Moulds, Tacon, Cogger, Attenbrow, Beechey and Hutchings – each has worked for a significant period (decades) at the Australian Museum. Also, many of the contributors are members of the Linnean Society. Without that support for both the work and the principles by the Australian Museum and the Linnean Society, natural history would fade even further from view. To that list, we should add the Royal Zoological Society, but do acknowledge that acclimatisation and managing what is now Taronga Zoo, not natural history, was paramount to the RZS in the 19th century. Despite that early history, the Society's journal, *Australian Zoologist*, is the longest running zoological journal in Australia, now in its 96th year and an important publisher of natural history information on the Australian biota.

Natural history evolves into ecological history

At one point, natural history evolves into ecological history, that is, ecology undertaken using the tools of history. It is one means of arriving at an ecological interpretation of long-term changes as to why populations of animals and plants fluctuate, why ecosystems flourish or perish how we may conserve our biological heritage in the face of change. Peters *et al.* (2010) have their personal records since 1970 of a skipper – a butterfly – that has been moving south over this period. They attribute the southward range extension to climate change. In fact, this phenomenon is one of the ways that climate change will be measured for our flora and fauna. The caution for ecologists looking for climate change is that compiling the data will take time, decades perhaps, and that long-term monitoring will be essential. They will, at their heart, be natural history exercises, namely the science or study dealing with all objects in nature, or the aggregate of knowledge dealing with such objects. That rather difficult definition is from the Macquarie Dictionary 3rd edition, but it becomes clearer when it is appreciated that the great museums in the world are, in fact, natural history museums. That is why one of us (Hutchings 2010) makes the point that the Australian Museum encapsulates that outlook. A more expansive definition of natural history can be found in *Wikipedia*: “Natural history is the scientific research of plants or animals, leaning more towards the observational than experimental methods of study, ... [It] is the systematic study of any category of natural objects or organisms.” Historically it includes the geological, anthropological, and paleontological (evolution) sciences, as is evident from inspection of the scope of modern natural history museums. “A person who studies natural history is known as a naturalist or “natural historian”.”

Natural history is given short shrift by modern ecologists and has been for decades (Herman 2002). Beehler (2010) posits that natural history is the forgotten science of the 21st century. Beehler takes the view that what has been deemed irrelevant by the universities because of its descriptive aspect is now needed—urgently—to guide the management of the resources of planet earth. It is through this descriptive process, says Beehler, that important ecological and evolutionary relationships are revealed, results that might not be readily revealed through hypothesis-driven experimentation.

That engaging English natural history writer Richard Mabey (2005, pp 59-62) has mused on the subject of *Fencing Eden: reflections on the myths of Eden*. In his chapter on Paradise Lost, he picked up on a theme that is most relevant to Sydney, particularly the urban fringe. He noted the persistent belief that the Mediterranean is an irretrievably degraded landscape, and that human use is the culprit. Then he added: “The great historical ecologist Oliver Rackham calls it the theory of the ‘Ruined Landscape’.” Mabey, with both insight and irony, labelled the theory as being politically and ecologically dangerous. It has been used as an argument of convenience for those with a political agenda, such as commercial foresters who

would like their plantations to be seen as replacements for the 'lost forest', it is used by large-scale farmers to denigrate the techniques of peasants and smallholders, and it ignores the intricacy and detail of both cultural and natural systems. This has a familiar ring in different parts of Sydney, and it helps put the case for not over-running Sydney with development at the expense of more of its natural history being lost.

Mabey was obviously struck by the research approach of Oliver Rackham. He said that he first encountered him in 1974 and he considered that the circumstances were worth noting (p 63). He was speaking at a major symposium on the English oak, but that Rackham was not then known outside specialised ecological circles. Mabey stated that what Rackham had to say was, in the conventional forestry wisdom of the 1970s, a revelation. In quotes, Mabey cited Rackham: "Contrary to popular belief, the harvesting of woodland produce did not destroy the wood." Then Mabey added the key idea that it was the detail and the texture of his supporting evidence that riveted the audience. He used first hand evidence in the woods themselves, in the timber in buildings, in the unromanticised details of bills of sale and carpenters' accounts. Neither shipyard nor woodland records show more than occasional consignments of East Anglian oak for shipbuilding, against the popular legend that Britain's oakwoods were devastated for the navy. This, stated Mabey, is almost certainly another piece of pseudo-history concocted for political and economic reasons and is easily refuted by looking at the rate of growth of British merchants and naval fleets. It is this meticulous, unromantic approach that so fascinated Mabey, which we argue applies to interpreting the natural history of Sydney, as well as the history of the natural history of Sydney.

There is, of course, more to this position than this text. What this argument conveniently ignores is the cutting of the woods for heating fuel, which in turn was linked to increased population size, or for smelting metals from ore. When the woods were gone, people shifted to coal, which in turn led to the steam engine – initially wood powered, which were needed to pump water from the mines. Wood-powered engines drove vast logging enterprises early in the 20th century to pump water from Perth to the Western Australian goldfields, to pump water from mines, and so on. However, the main point remains, that an historical approach to ecological interpretation can add dimensions not available by other means. It does mean that an interdisciplinary outlook, including history, is part of the story.

We can add a footnote to this review by Mabey. One of us (DL) was also taken by Rackham's (1986) approach to ecological history as Lunney and Leary (1988) and Lunney and Moon (1988) were collecting the information for their ecological history of the Bega district in south-east NSW. We recognised that the existing landscape of the 1980s had been altered by Europeans, principally through farming. Consequently, the more sensitive species to change would have already vanished, so our studies of the impact of the new, high intensity logging operations, known locally as woodchipping, would be an underestimate of the impact

of change, and thereby diminish the value of the existing forests and their value for recovery as fauna habitat. We also noted that such cryptic creatures as bats had not figured in any discussions or publications on fauna conservation, yet our studies (Lunney and Barker 1986, 1987) showed that bats were 40% of the local mammal fauna of these forests. So, we needed a better appreciation of the natural history, and an ecological history of these forests and the surrounding landscape. Reading Rackham's approach was a shot in the arm, it struck us in 1986 as forcibly as it did Mabey in 1974. Fortunately, like Mabey, one of us (DL) was able to call in on Oliver Rackham in 1989 when on a visit to Cambridge. That conversation resonated with Paul Adam's view of the world, and the value of approaching the natural history of Sydney with such an outlook. We were again fortunate that Oliver Rackham visited in 1996, spoke at a meeting of the Australian Forest History Society (a most valuable society because it values the tools of enquiry that Rackham employs) and one of us (DL) took him to visit the woodchipped forest. In the second edition of his book *Ancient woodland*, Rackham (2003, p 435) remarked that "Australia is a miniature planet: its ecosystems work on different principles from the rest of the globe. Most trees (outside rainforest) are species of the vast genus *Eucalyptus*..." Rackham then proceeded to describe his interpretation of our visit to the woodchipped forest, although the key point lies in his opening remark about Australia being a different planet. If an expert forest botanist from Britain can make that statement, one can only imagine how the first settlers viewed this land as far removed from Britain as possible. The animals were just as different. One implication from this observation is that one can import modes of investigation, such as natural history, or ecological history, but if we are to understand Sydney, and by extension Australia, then it is in Australia that we need to study, interpret and set about conserving, not looking for overseas examples of what to do. That leadership needs be home-grown, or at least nurtured locally. The ecology textbook by Recher *et al.* (1986) was based on the fact that international ecological ideas hold equally well in Australia, and that one can write an ecology text book using nothing but Australian examples. So, the gasp of surprise by Rackham that Australia's ecosystems work on different principles is not an ecological statement, it is just an ecologist's in-house way of saying that Australia's ecosystems are different, not the principles.

Appreciating our local green spaces and our national parks

Robin (2007, p 32) observed that a global view of the strangeness of flora and fauna, long isolated from the rest of the world, can be at odds with the familiar associations for this flora and fauna for those who dwell in this land. Robin gives the example that the smell of eucalypts or the laugh of a kookaburra are commonplace around Australia's populous centres, and go unremarked. When a comic item appeared in Column 8, *Sydney Morning Herald* 3 March 2010, we greeted it with a smile. The item ran: " 'All this talk of snakes and birds reminds me of a kookaburra

that swooped down and nicked a black sock from my balcony railing,' writes Ron Bradbury, of Armidale. 'It killed the sock by slapping it on a tree branch a few times but after one attempt at eating it, dropped it on the ground. Now you know why there are all those odd socks in the drawer'.² This nice piece is the exception to Robin's example that kookaburras go unremarked, but it illustrates the comic nature of the kookaburra's laugh and our native enjoyment of it. Now, as inner city residents, three authors of this closing paper rarely hear the laugh of the kookaburra, although it can be heard in Weekly Park in Stanmore and in East Balmain. In contrast, Harry Recher has kookaburras running about the floor of his kitchen if the outside door is left open as food is being prepared. He lives on peri-urban Dangar Island near the mouth of the Hawkesbury River on the northern edge of Sydney. The difference is that Dangar Island does not have cars, and all the space devoted to cars in Sydney are devoted to birds and other animals on Dangar.

We would argue for the restoration of enough bush to sustain a local populations of kookaburras in the inner west of Sydney to keep the bandicoots company that Leary *et al.* (2010) describe provocatively as yuppy bandicoots. The issue is serious, the loss of green spaces for houses, roads, even universities, is a loss of green emerald patches – in Forman's (2008) terms. What it implies is that security of tenure of such patches is critical. Here Sydney is blessed by national parks that are great by world standards, and as secure as any land tenure in the State.

Royal National Park on the southern coastal outskirts of Sydney is part of our natural legacy. The following information was taken from the web²: Established in 1879, Royal National Park is the world's second oldest national park - after Yellowstone in the USA. Only 32 km from Sydney, the Royal contains great natural diversity in a relatively small area, surf beaches, heaths, and rainforest. Most of the 43 native mammal species found in the park live in the tall moist eucalypt forests and rainforests of the Hacking River valley. They include threatened species such as the spotted-tail quoll and red-necked pademelon, both of which were once common in the Illawarra region. Royal National Park is rich in birdlife - 241 species have been sighted in the park, 140 of them resident, nesting or occurring regularly. The estuaries provide habitat to internationally protected migratory birds, such as the eastern curlew, bar-tailed godwit and great egret. The frog and reptile fauna is richer than any other studied coastal park in New South Wales. This is mainly because the park provides so many different habitats, and its favourable climate. Royal National Park has one of the richest native insect faunas of any area in NSW. It also has a diverse terrestrial mollusc population. Snails are most abundant in the rainforests along Lady Carrington Drive, and in the littoral rainforests around Garie and Werrong Beaches.

There is no doubt in our mind of the brilliant and irreplaceable contribution of Royal National Park, Ku-ring-gai National Park on the northern side of Sydney, and the Blue Mountains National Park to the west, are largely responsible for the diversity and survival of the natural history of Sydney. Cogger (2010) makes this point skilfully with reptiles, as does Schulz (2010) with his search of patches over 50 ha. These great national parks, and a suite of smaller national parks and nature reserves, provide the best security that exists for our native fauna. They are the nearest we have to imagining the pre-1788 fauna of Sydney, and they remain absolutely vital to the long-term survival of the native fauna of Sydney, including the sense of what a natural area looks like in this region. While some have argued that they are too small, and thereby serve as death traps, we ask every interested party to look at the alternative – turn them into housing estates, roads and shopping centres. The very thought of it is horrific, and the fauna of the Sydney region would suffer immensely and never recover. These national parks are a vital part of our heritage, and must never be squandered or taken for granted. That they exist at all is a magnificent statement of 19th and 20th century foresight, a treasure on a world scale, and a brilliant exemplar of the natural history of Sydney. We need to be more appreciative of their existence in our current concerns about the development of Sydney, and use them as models of how our city and suburbs can look if we manage them sympathetically, as shown by the various site studies in this book, such as those at Ku-ring-gai, Narrabeen, Willoughby, Wolli and Kogarah. Size is not the issue. The problem with these parks is inappropriate management in the context of urban impingement (accidental and deliberate fires, hazard reduction burns, poor air and water quality – massive tree decline now along Cowan Creek within Ku-ring-gai Chase National Park). They also cannot exist in isolation and show signs of the loss of habitats remote to Sydney. The way we manage the urban parks we do have will be a critical element in their survival.

The chapters by Wilks (2010) on Ku-ring-gai and by Brown and Bernhard (2010) on Willoughby are examples of councils taking their local remnant bush as a serious heritage item, and the wildlife, including invertebrates, are regarded as a living and appreciated part of their local government areas. The story by Little *et al.* (2010) on their Wolli Creek site, White's Kogarah (2010) wetland stories, the account by Harris *et al.* (2010) of Narrabeen Lakes, Burgin's (2010) investigation of Ham Common, and Wotherspoon and Burgin (2010) looking at in the relentless losses from 1000 cuts in western Sydney, are equally inspiring. Some of these areas are protected, some need protection urgently. We hope that this book strengthens the hands of the conservers to maintain these precious elements of Sydney that existed when it was first settled. The overview of the vertebrate fauna of the large (over 50 ha) remnants of native bush in Sydney by Schulz (2010) shows the fascination with what remains, and what

2. (<http://www.environment.nsw.gov.au/NationalParks/parkWildlife.aspx?id=N0030>, last accessed 3 March 2010).

luck it is that we have reached the 21st century with the chance to conserve some of the natural history of Sydney. In contrast, Wotherspoon and Burgin (2010) point to the ever increasing loss of fauna in western Sydney. Tozer's (2010) treatise on the woodland of the Cumberland Plain of western Sydney, an endangered ecological community, tells the grim story of loss, and points out that this community is sufficiently different to other woodlands to warrant special attention. His botanically rich story, the only one wedged in among the zoological studies, illustrates that a parallel book, or one book twice the size, could be produced if the botanical side of the natural history of Sydney were to be included in this monograph. After all, the word "Botany Bay" bears testament to the rich botanical life of Sydney, having been revised from its original zoological name, "Stingray Bay", because of its wonderful flora.

Sydney as a global city

Why Sydney?

In their study of Sydney as a global city, Bryan *et al.* (2006) answered their own question: why Sydney? Most obviously, they said, because the greater Sydney metropolitan region is where we live and work and where for many years we have been interested to observe the patterns of urban change, their drivers and the spatial pattern of social and economic consequences. We agree, that is our reason for producing the natural history of Sydney. However, that view makes more sense in the context of the attractiveness of Sydney. We agree with Keneally (1999), in his colourful foreword to Turnbull's (1999) book on the biography of Sydney, that, "Even Sydneysiders reflect with some wonder at the mystery by which Sydney grew from a penal settlement to one of the world's most desirable, complex and glamorous cities."

Our aim is to integrate the ideas of a city that recognises and conserves its natural heritage with the ideas of a global city as outlined by Bryan *et al.* However, there is more than one challenge here, not the least being that the scope of Sydney's natural history covers terrestrial, marine and freshwater environments. Consider their view that Sydney offers an outstanding international case study of a globalising urban economy producing economic and political re-territorialisation. In a nation that is relatively small economically, albeit huge geographically, and peripheral to the major centres of global political economic power, the Sydney region has become increasingly re-oriented to the international economy. Locally, Bryan *et al.* noted, this is commonly seen as a reason for celebration, as represented by publications sponsored by the local and state governments. They add that recent reforms in the NSW planning legislation were packaged as being necessary to ensure that Sydney could maintain its "status as the nation's economic powerhouse".

As zoologists we are not sure what Bryan *et al.* meant by "re-territorialisation", although we do have a grasp as zoologists that it defines an area defended by one or more individuals against intrusion by others of the same or different species. In the "re-territorialisation" of

Sydney, we now stake out our territory as being those locations that sustain the natural history of Sydney, be it as small as a pond in western Sydney (see Wotherspoon and Burgin 2010), the harbour itself (see the paper on fish by Booth 2010), the remaining large native patches of bush (see the papers by Schulz 2010, and by Junor 2010 on Sydney's catchments) or Narrabeen Lakes (see the paper by Harris and her co-workers 2010), as well as our magnificent national parks. We realise that there may be some territorial disputes over space, some locations may be more profitable to develop than others, but we submit that space for our native flora and fauna is part of the long-term equation for a sustainable city and should not be for sale. Bryan and his colleagues live in Sydney, so do the authors in this book. The space is finite, we are neighbours, and a city with no work, or which is inefficient, is not much use to any of us, but a city where the wildlife has been silenced and the flora buried under concrete and lawns (see Benson and Howell 1995 and Howell and Benson 2000) is also no place to live.

Our concern is in maintaining the quality of life within Sydney. Wingo (1963), in a book on cities and space, made the observation that during the past few years, students and policy makers on the urban scene have had a mounting sense that their approaches to the emerging problems were not completely appropriate. Wingo then made the telling analogy that policy-makers, like generals who brilliantly prepare to fight the preceding war, have occasionally been trying to solve the city that was. We pause to think about kookaburras and the insights that their laughing song gives us for escaping one of the prevailing narrow paradigms for planning and for wildlife conservation.

What can you do as an individual?

In *Towards an eco-city: calming the traffic*, Engwicht (1992 p 152) posed the question: "what can you do as an individual?" His answer was: "Go for a walk around your neighbourhood." His interest was in communities of people and the action that they can take, but he concluded his book (p. 158) with the view that the seeds of the ecological revolution are being planted everywhere. One of the new life forms will be the eco-city. He then added that as he talked to planners and engineers around Australia, he realised that this revolution had already begun. We can see this in the positive response to the natural environment at Ku-ring-gai Council in Wilks' (2010) paper, and by Willoughby Council, as evident in the paper by Brown and Bernhard (2010). The local group protecting and managing Wolli Creek is most encouraging (Little *et al.* 2010), but the paper by Conny Harris and colleagues (2010) on the uncertain future of Narrabeen Lakes is a sharp reminder of what can be lost when national government policy that encourages population growth, which in turn drives the need to maximize use of existing infrastructure and space within cities. Hence, the high impacts on already developed areas. As this cannot accommodate all the growth, the release of land for more housing extends the city even further, thereby compounding environmental problems. At a

more local level, there are some planners and engineers for whom the natural environment is an opportunity for development, not a fabulous legacy in one of Australia's largest cities, and one of its most attractive to live in and visit. However, one might acknowledge that planners and engineers are not the real problem, more like the front line of development. Arguably, it is government policy at local, state and nationally that determines, or at least influences, population growth and its distribution. To deal with this matter, our focus in this paper is to showcase the natural history of Sydney as a co-requisite, not an after thought, to managing it ecologically and humanely. Our additional answer to Engwicht's response is to get to know and enjoy the natural history of your local area, then the city itself, from the harbour to the Blue Mountains, from Narrabeen on the coast to Richmond in the north-west, from Campbelltown in the south-west to Hawkesbury estuary in the north-east.

The significance of knowing an area becomes apparent when you read the works from other lands. One of the most vivid of ecological writers, Richard Mabey (1986), brought this out clearly in his award-winning biography of the renowned author of *The Natural History of Selbourne*, Gilbert White. It was published in 1789. Mabey (1986 p 2) called it a deceptively simple and unpretentious account of natural comings and goings in an 18th century Hampshire parish that has come to be regarded as one of the most realised celebrations of nature in the English language. "But", says, Mabey (1986 p 3), "like many others, I did not come painlessly to the Natural History. For years I was put off by the aura of sanctity and bluntness which seemed to surround it." Then comes the flash of enlightenment: "It was seeing Selbourne itself, the source of White's inspiration, that changed my view decisively, and helped me understand what the book was truly about." If a writer of Mabey's skills and experience had that shock realisation, how much harder is it for an Australian to comprehend the meaning of natural history to an English writer. It does take experience of both to appreciate what can transfer, and what cannot. That is why Paul Adam's contribution to this book is so valuable as he plies between his home in Britain and his home in Sydney in Australia. There is also another lesson to draw from this moment of epiphany when Mabey went to Selbourne. That lesson is that we need to see Sydney for ourselves, to have that moment when we appreciate the local plants and animals, and then we can show family, friends and visitors the natural history of Sydney. Densy Clyne (1993) does this with delightful simplicity in her books on wildlife in the suburbs. This leads to our view that local input to any decisions for changing the landscape is essential. Conny Harris (2010) and her co-workers make that point firmly, Narrabeen Lakes is their patch, their Selbourne, and that sense comes through just a strongly

in the paper by Little *et al.* (2010) in their description of Wollie. It follows, although it might not be that obvious, that we need to write about things in a way to make sure that others have the opportunity to see and enjoy the natural history of Sydney. Three of the authors of this paper were not raised in Sydney, but it is evident that once the lesson is learnt, it can be translocated. One of us (PH) grew up in the UK and DH grew up in Melbourne. HR arrived in Australia from America as a fully-fledged ecologist, but he is now part of the natural landscape of Sydney, catches and eats the local fish from the Hawkesbury estuary and is as alert as any native Sydneysider to the changes in the fauna of our city. DL is a long-term local (Lunney 2010).

Escaping the prevailing paradigm for Australian conservation

All the authors in this book begin to fulfil Possingham's (2008, p 160) call to escape the prevailing paradigm for Australian conservation: to put things back exactly the way they were, which means before Europeans invaded. Making cities, agriculture and unnatural wetlands biodiversity-friendly is, said Possingham, what Europeans have been doing for hundreds of years, but we have only just begun. In this book, we drew on this depth of thinking, the intellectual challenges and combined it with the skills of a range of researchers who have devoted their entire life (more than just their working life) to understanding the natural world around them.

This book holds its focus on the natural history of Sydney, with a particular emphasis on animals, and endeavours to draw out what is so fascinating about the fauna of Sydney. The obvious concern for the future of that fauna emerges, and while it points to the importance of skilled city and regional planning, just putting the rich fauna on display, and urging that it be added to the planning mix in this global city, have been the modest aims here as far as planning is concerned. What also absorbs the attention of many of the authors is how this knowledge can be retained and expanded. We are delighted that, in listing what Possingham (2008 p 159) sees as the commitments for reshaping the lucky country's environment, he included as one of his ten commitments that a large investment in taxonomy is urgently needed. Natural history depends upon it, as well as the institutions that nurture such research. So, we present one glimpse of the natural history of Sydney, invite others to enjoy its diversity from the Australian Museum to Royal National Park, to support its conservation as well as the institutions that support the discipline of conservation, and then integrate those views into your city life. It will be the more colourful for it, in short, the camouflage will be revealed and the natural history of Sydney –its fauna and its flora - will become more visible and more tangible, and thus more worthy of admiration and conservation.

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