

Book reviews

MAGNIFICENT MIHIRUNGS: THE COLOSSAL FLIGHTLESS BIRDS OF THE AUSTRALIAN DREAMTIME

By Peter F. Murray and Patricia Vickers-Rich

2004. Published by Indiana University Press, Bloomington, USA. 410 pp., many black and white photographs, line drawings, maps and tables. Hardback, \$A125, ISBN 0-253-34282-1.

Among the avian groups in Australia's fossil record, few are more notable than the Dromornithidae, a family of giant flightless birds, superficially resembling giant emus and known only from Australia. These birds are significant for several reasons. They have an extensive fossil record, possibly starting with a footprint in the Early Eocene, but definitely established by the Late Oligocene, and continuing until 40–30 000 years ago, when they overlapped with humans. There are nine known species, not all formally named. Dromornithids have been found at fossil localities throughout eastern Australia (the dearth in the western half of the continent reflecting a lack of work rather than the absence of these birds), where they are major components of many Tertiary and Pleistocene faunas. Some of these birds were striking in their dimensions. Given their size and abundance, they must have played an important part in these fossil communities. Thus, the paucity of studies on them is surprising.

Although the earliest named species, *Dromornis australis*, was described in a short paper in 1872, the first major work resulted in a series of papers by E. C. Stirling and A. H. C. Zietz of the South Australian Museum starting in the late 1890s (e.g. Stirling and Zietz, 1896, *Trans. Roy. Soc. S. Aust.* **20**, 171–190). They made extensive descriptions of the Lake Callabona remains of *Genyornis newtoni*. Following their last publication in 1913, these birds were essentially ignored for over 70 years. In 1979, Patricia Vickers-Rich produced an extensive monograph (Rich, 1979, *Bull. Bur. Nat. Res. Geol. Geophy.* **184**, 1–196) based on new material that had been found in northern Australia during fieldwork for other groups of animals. She described a number of new genera and species, but provided limited speculation on aspects of their biology. After this, the dromornithids once again disappeared from view, with little written for almost two decades; however, as with the period preceding the Rich monograph, there were more specimens accumulating from the same sites.

Whereas the hindlimb was by far the best represented and thus best known part of the skeleton, very little was understood about the skull, which was known from a single badly damaged specimen. Up to this point, dromornithids had, for lack of any useful information to the contrary, been assumed to be related to other large flightless birds such as emus; reconstructions of the head were little more than scaled up

versions of an Emu's. When Peter Murray and Dirk Megirian published their findings on the skull in the late 1990s (Murray and Megirian, 1998, *Rec. S. Aust. Mus.* **31**, 51–97), they showed that the relationships of dromornithids lay not with ratites, but with the waterfowl. The immense, heavy-billed skull was a remarkable structure, quite unlike that of any living bird. This revelation stimulated ideas on the diet and lifestyle of these birds.

Skull morphology was not the only new information that had been gathering since Rich's 1979 monograph but, unfortunately, there was nowhere to access this: no single up-to-date source of the accumulated knowledge, either in scientific journals or more accessible book form, existed – until now. *Magnificent Mihirungs* is an important publication in avian palaeontology, offering new information on these birds and novel interpretations of their biology. (The title comes from indigenous legends of giant 'emus' known as *mihirung paringmal*, which may have arisen during co-existence of humans and dromornithids during the Pleistocene.)

This book, part of Indiana University Press' growing number of *Life of the Past* palaeontological titles, is divided into four major sections, themselves comprising several subsections. The first, *Discovery*, presents a detailed history of the discovery of the dromornithids, summarising previous work carried out on them and introducing those who made these studies. This touches on a number of the major events in Australian palaeo-ornithology and provides a good introductory overview of the topic.

The second section is *Systematics and Morphology*. It opens with a summary of the structure of dromornithids. This subsection's title reference (and elsewhere) to them as 'giant geese', as they were touted in the press, is somewhat at odds with the authors' protestations later in the book about another popularised name, the Demon Duck of Doom. There is an extensive introduction to the species of dromornithids themselves, as well as to other records such as eggs and footprints attributed to them. The localities from which these have been recovered are discussed, particularly in terms of the other fauna sharing the sites and the palaeoenvironments thought to have occurred at the time. This information serves as a starting point for other topics later in the book.

Much of the section is taken up with discussion of the morphology of the dromornithid skeleton, both as a group and as comparisons among species. This subsection is particularly well illustrated with line drawings by Murray and nicely presented photographs. It includes considerable new information on the osteology of these birds that was not known at the time of Rich (1979). This structural information is used to analyse the relationships of the dromornithids with other higher-level groups of birds. The authors' phylogeny places them among the waterfowl (Anseriformes), closest to the screamers (Anhimidae) of South America. This is developed further in broader considerations of the origins of the

Anseriformes and comparisons with another group of giant flightless waterfowl derivatives, the diatrymids of the Northern Hemisphere. Of particular interest is the examination of the phylogenetic relationships among the species, yielding conclusions differing significantly from those of Rich (1979). There is a major frustration here: although the authors reach convincing systematic resolutions, they do not take the logical next step and explicitly implement the changes in the classification. Instead, they choose to retain the nomenclature of the 1979 monograph despite having ably demonstrated its inaccuracy. This leads to incongruous use of the old names in discussions of the newly discovered relationships and evolutionary trends in the family.

The third major section, on the *Palaeobiology*, is necessarily somewhat more subjective than the description of the physical remains. Here the authors reconstruct the appearance and size of these birds, how they moved and the construction and use of the beak and associated feeding structures. Using previously undescribed material of the vertebrae, the authors determine the range of movement of the neck – important in subsequent interpretations of foraging zones. This also allows them to estimate the size of the largest species of dromornithid, *Dromornis stirtoni*. With an upper height range about 3 m, this would have approached or matched the Giant Elephantbird of Madagascar. Height is not the only criterion of overall size. Employing several methods of determining mass, estimates of the different dromornithids and other large birds such as the Great Moa and the Elephantbird are made and compared. Each method gives different values but all suggest that *Dromornis* was similar to, and may have exceeded, these two in mass. At possibly 500 kg, this would have made it the heaviest bird known to have existed. Such large size has implications for terrestrial locomotion. The book discusses the extent of running ability in dromornithids. This gives a good introduction into the contributing parameters of leg and bone lengths, foot structure and other mechanical aspects of running. The conclusion is that dromornithids could have indeed run, the smaller species very well and even *Dromornis stirtoni* managing around 15 km h⁻¹ – an impressive notion for a bird of its size.

Information on the beak is expanded, going into greater anatomical detail than the 1998 paper. The discovery of the powerful feeding apparatus of dromornithids gave rise to one of the most contentious debates regarding their lifestyle: What was the diet of these large birds? When it was thought that the skull was merely a supersized version of an Emu's, then portraying these birds as herbivores did not evoke much debate. After the new skull reconstructions an alternative view was expressed alleging that such construction was excessive to the needs of a plant-eating bird and thus implying carnivory, albeit not necessarily active predation. Although the arguments forwarded for both views are presented, those favouring carnivory are dismissed in a rather offhand manner and the authors come down strongly in

favour of a herbivorous diet. Whether the reasoning presented here will convince everyone is unlikely. There are several unremarked aspects that could warrant mention. The question of the dromornithid diet seems doubtfully resolved, despite the authors' forceful argument.

The final section is the most speculative, and necessarily so. Extrapolations from skeletal remains and associated fossil faunas to interpretations of an animal's palaeoecology must rely to some extent on modern counterparts, a task complicated in the absence of any close analogues. That said, there is a wealth of useful information presented here. Consideration of the habitat and diet of dromornithids encompasses extensive information on the development of and changes to the middle and late Tertiary Australian environment and vegetation.

One of the outstanding features of the book is the illustrations. These are pleasing in themselves, as well as complementing the text. The photographs show a greater range of osteological specimens than Rich (1979) and are of a markedly higher standard. The line drawings are excellent. Special mention must be made of the colour painting by Peter Trusler of the Early Miocene species *Bullockornis planei* that appears on the dust cover and title page, certainly the best reconstruction of a dromornithid to date. The illustrations are also useful in an appendix discussing the avian skeleton. The various elements, shown in several views and supplemented in places by photographs, are shown for several species, both flightless and volant. Because it is difficult to find such diagrams with this amount of detail and clarity, this section should prove a most beneficial pictorial reference to avian osteology.

There are aspects of the book that can be criticised. Some of the problems suggest carelessness during parts of the compilation or a failure to closely proofread the final text. There is an ample glossary, although some entries are so general as not to be particularly illuminating. The reference list is extensive, including almost everything that has been written about dromornithids, but it contains errors in some citations. For a more detailed assessment of some of these points see the review by Olson (2005, *Auk* **122**, 367–371).

Overall, however, this is an impressive book and a valuable contribution to the vertebrate palaeontology of Australia. Dromornithids are too prominent in the fossil record for them to continue receiving so little attention. This book will go a long way in rectifying this oversight: it is the most complete coverage of these birds and is likely to be the baseline for any work on them for some years to come. The relevant information is available to readers with its comprehensive coverage in a detailed yet accessible manner. Anyone working on Australian vertebrate palaeoecology will benefit from access to this book because of the insights it offers in understanding this major faunal component of Australian fossil communities. Its appeal should extend beyond this continent because of its worthy discussions on other large flightless birds from

elsewhere in the world, while more than vertebrate palaeontologists will find its extensive coverage of the development of the Australian environment and biota beneficial. The production values of the book are high. It is attractive, not only specifically in the illustrations but also in its general presentation. The Royal Zoological Society of New South Wales awarded *Magnificent Mihirungs* its 2004 Whitley Medal, given for publications deemed of superior quality that make a landmark contribution to the understanding, content or dissemination of zoological knowledge.

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ALBATROSSES AND PETRELS ACROSS THE WORLD – PROCELLARIIDAE

By Michael Brooke

2004. Bird Families of the World Series. Published by Oxford University Press, Oxford, UK. 499 pp., 16 colour plates, 33 numbered figures, many unnumbered text figures and photographs. Hardback, \$A310, ISBN 0-19-850125-0.

This important work is in three parts: the first in Chapters 1–10 covers the main aspects of a petrel's life, origins, etc. in 165 pages; the second part gives summarised accounts of 125 species; and the third consists of colour plates inserted, rather awkwardly, in the account of the Wandering Albatross. There are 47 pages of references (very few later than 2000) and a 14-page index.

The general chapters are: 1. An introduction to the petrels; 2. The origins and radiation of the petrels; 3. The colonial imperative and its impact on behaviour; 4. The build-up to laying; 5. Petrel eggs: the long haul from laying to hatching; 6. The chick's passage from the egg to the high seas; 7. Factors influencing breeding success of petrels; 8. The life history of petrels; 9. How does a petrel find food at sea: some developing answers; 10. Perils for petrels. These general chapters give up-to-date accounts of their topics aided by graphs and other figures mainly from the literature, but with some from the author's work. There are also black and white photographs, mostly small and occasionally almost a waste of time, e.g. that of 'Yolla', the late Dom Serventy's research hut on Fisher Island, Bass Strait. And the photographs by and large are rather unadventurous, many just simple portraits – nothing of gadfly petrels tearing through the night sky or a family of a burrowing species underground. As the author explains, he deliberately avoided dealing with petrel anatomy, physiology and moult, and this has given him the space for comments on other topics.

Brooke's list of 125 species (+ *Oceanites maorianus*) is partly based on traditional criteria and, where these have been published, on DNA analyses. So there are nine mollymawks, *Thalassarche*, compared with five in most earlier

lists, whereas the circumpolar Fairy Prion, *Pachyptila turtur*, remains unsplit – as do all the other prion species.

The first chapter is an introduction to the petrels, a term including the albatrosses. Oddly enough Brooke seems to avoid 'tubenose' at all – a simple and descriptive term that can make a change from 'procellariiform'. In the first chapter, Brooke brings out some of the peculiarities of the order such as their tubular nostrils, sense of smell, low body temperature, big proventriculus for oil storage and the general peculiarities of the breeding cycles.

There is a useful review of the recent work on relationships and origins in Chapter 2. Brooke notes the absence in modern petrels of birds of medium size as measured on their wing lengths, although such birds show up in the fossil record but, like your reviewer some 30 years ago, cannot explain their absence. Brooke uses Sibley and Ahlquist's DNA hybridisation studies and Imber's on the gadfly petrels and discusses some of the more recent work in this field, but makes no mention of attempts to resolve relationships through the study of the birds' parasites. He refers rather briefly to the fossil record, which isn't quite as poor as he suggests, and makes no mention of an albatross, *Diomedea minimus* Fischer, 1985, from the Oligocene of Germany nor of *Eopuffinus* Nesselov, 1986 from the Palaeocene of Central Asia (no less!). Were these really petrels as claimed by their authors?

Chapter 3 is devoted mainly to the kinds of nest sites, the timing of activity at nocturnal colonies, how the birds find their nests at night and various experiments undertaken to tease out how this was possible in complete darkness. Finally, he discusses the roles of calls. He accepts that the poor responses of Spectacled Petrels to calls of White-chinned Petrels merits their provisional separation as full species.

Chapter 4 deals with the pre-laying period – how often breeding occurs, its timing, pre-laying behaviour, nest-site and mate fidelity, extra-pair mating (no extra-pair chicks detected in five species checked), and the pre-laying exodus. Incubation and the egg occupy 14 pages of Chapter 5 with a particularly useful discussion of the advantages and disadvantages of producing a single large egg, resistant to chilling. Chapter 6 on chick rearing covers growth rates, feeding frequency, long and short feeding trips, meal sizes, food composition, fledging periods and chick desertion. The problem of fat retention is dealt with here.

Breeding success is the main concern of Chapter 7. With the results of several long-term studies now available, the possibility of teasing out some of the basic factors controlling the success of different categories of pairs in producing flying chicks seems feasible – providing that the researcher lives long enough to follow events to the finish! Brooke looks at those of the Short-tailed Shearwater and the Northern Fulmar, which have been carried on long enough for the depressant effect of old age to show, with some reasonable estimates of reproductive success being possible. As with other birds examined, most recruits into the breed-

ing populations were the progeny of a limited number of long-lived individuals. With *Puffinus tenuirostris*, 8% of the breeders reared 49% of the new recruits. Life-time reproduction success seems to depend on lifespan in general.

In Chapter 8, the author considers the general pattern of breeding in tubenoses: ages at first return to colony and pre-breeding behaviour, philopatry, ages at first breeding and breeding frequency, survivorship and effects of senility. The chapter ends with a useful discussion on how the populations may be regulated.

Finding food at sea is the main concern of Chapter 9, a topic that is actively being researched. Brooke summarises what petrels eat and where they get it. He also provides a useful table of the depths to which petrels dive for food ranging from Cory's Shearwater, which doesn't dive, to Light-mantled Sooty Albatrosses averaging 4.7 m, Sooty Shearwaters 39 m, Short-tailed Shearwaters up to 58 m down, while diving petrels of various species chase their prey from 26–39 m below the surface. Where the birds get their food is being rapidly clarified thanks to the recoveries of satellite-tracked birds, initially from albatrosses and giant petrels large enough to carry the recording gadgets, and increasingly as these become more miniaturised, by smaller species. The results show that particular species have favoured feeding places, sometimes different for the sexes.

The last of these general chapters deals with man-made hazards to tubenoses, on land and at sea. Here one can get a picture of the direct use of petrels as human food, still important in a few communities. The many problems caused by the depredations of introduced mammals: cats, several species of rats, mustelids, dogs and pigs are summarised here. There is also a wide-ranging account of the detrimental effects of long-lining fisheries on albatrosses and *Procellaria* petrels and with attempts at regulation and of mitigation measures. In some instances, the big losses to long-liners are reflected in reduced pairs breeding on the colonies, but in at least one species commonly taken, *Thalassarche bulleri*, the population has increased steadily, possibly from the greater availability of offal from the fishing fleet (Sagar *et al.* 1994, *Notornis*, **41**, 85–92).

Perhaps the best parts of these 165 pages are the opportunities given the author to speculate on problems special to tubenoses. For example, in Chapter 9 he spends some time on the effect of petrels on the marine systems and of the amount of food taken worldwide and the competition, if any, with world fisheries. Total annual take of fisheries was estimated at about 70 million tonnes, with the petrels taking about 16 million tonnes. Crude though these calculations are, they do show that the bulk of the petrel harvest is in temperate and high latitude seas, with procellariids taking about 81% of the prey and with Short-tailed Shearwaters probably the top consumer.

The second section covers 125 taxa plus a hastily added New Zealand Storm-Petrel, *Oceanites maorianus*, based on photographs of birds off New Zealand's North Island. At

least one and perhaps three of the species are extinct. No fossil species are included. The New Zealand Ornithological Society is as yet not adding *maorianus* to the national list for want of better evidence like the shape of the legs and claws – diagnostic features in storm-petrels.

These individual species' accounts give up-to-date information about each bird – the subspecies (if any), conservation status, history of its scientific name, its plumage and identifying features, measurements, breeding biology and behaviour, voice and display, life history (age at first breeding, survival, etc.), feeding behaviour and diet, distribution at sea (with maps), precise locations of colonies with estimates of individual and world populations. As the author explains, partly to save space, the sections on voice and display are quite short, the reader being referred to earlier and more complete descriptions and sonagrams in standard works. Indeed, the only detailed diagram showing display repertoire is Jouventin and Weimerskirch's 1984 figure of nuptial display in the Sooty Albatross.

Whereas the plumage and identification sections draw attention to differences from similar species, it is to the plates that the reader expects to get the most help. These take up 16 pages. Most birds are shown in flight, revealing upper- and under-wing patterns, adequate for most species. However, the figures are quite small, too reduced to show some of the diagnostic features, particularly of the soft parts like beaks and claws. Even with a magnifier the differences in bill patterns between the three black *Procellaria* are not detectable, the bills of the Sooty and Short-tailed Shearwaters look of equal length (although the difference is noted in the text) and the diagnostic features of storm-petrel feet are quite lost. These difficulties could have been met had there been separate close-ups of bills, feet, etc., as has been done to good effect for the prions.

All in all this is a very useful addition to the literature, clearly written with a light hand, even with some levity here and there, and almost free of typographical errors. Despite the omissions of physiological, skeletal and other matters, the volume is quite weighty being printed on good quality paper. Highly recommended.

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THE GREBES – PODICIPEDIDAE

By Jon Fjeldså

2004. Bird Families of the World Series. Published by Oxford University Press, Oxford, UK. 246 pp., 8 colour plates, many line drawings and maps. Hardback, \$A260, ISBN 0-19-850064-5.

This book is the twelfth volume in the successful Oxford University Press' *Bird Families of the World Series*. Jon

Fjelds  was an ideal choice to author this scientific treatise on the world's grebes (Podicipedidae). When in high school in Norway, he made observations of a pair of Horned Grebes, which subsequently piqued his interest in grebes. After nearly 30 years he has managed to conduct field studies on most of the 22 grebe species, and has published several seminal papers on the comparative feeding ecology of grebes as well as the origin and evolution of grebe behaviours. Fjelds 's extensive field work also led to the unfortunate discovery that a variety of man-induced environmental threats has resulted in the serious decline of many grebe populations and the extinction of three species by the end of the 20th century. His concern for the conservation of grebes culminated with his forming the Grebe Specialist Group in 1985 and later development of a global conservation strategy for grebes.

Grebes are foot-propelled diving birds that are well adapted to an aquatic lifestyle. Even their eggs, which are laid in damp, floating nests, have a shell that prevents the diffusion of liquid water, yet permits the exchange of water vapour. One of the most unusual habits of grebes is the ingestion of their own feathers. Adults also feed feathers to their young, even to day-old chicks. But to ornithologists and bird enthusiasts alike, it is the elaborate courtship behaviours of grebes that have always attracted most attention. Even the descriptive names for some grebe displays emphasise their uniqueness – the 'Ghostly Penguin Display', the 'Cat Display', and the 'Weed Dance' to name a few. Another unique aspect of grebe behaviour is the sexual ambivalence of the displays. In most of them males and females adopt the same posture. When they do adopt different postures, they can reverse the roles; even during mounting.

This volume was originally scheduled to cover grebes and divers (loons), but the authors selected to cover the divers were unable to meet the publisher's deadline. Fjelds , however, has included many useful comparative remarks about grebes and divers throughout. The book is divided into three main sections. The first section provides a basic introduction to this group and individual chapters on the constraints of diving, the taxonomic relationships of grebes and divers, and a review of the characteristic morphological traits of grebes. I found the chapter on the morphological and ecological constraints of diving in water birds (foot-propelled versus wing-propelled diving) especially informative as it covered topics such as buoyancy, diving capacity in relation to metabolic output, and visual ability underwater. The chapter on the relationships of grebes and divers effectively summarises evidence for the general consensus that observed morphological similarities between these two groups is the result of convergent evolution, not common descent. Although the origin of grebes is still debatable, Fjelds  includes an interesting drawing (Figure 3.3) of how an ancestor of grebes may have appeared – small and rail-like.

The second section of the book is a series of chapters that cover various aspects of the biology and conservation of grebes. It starts with a chapter that provides a global perspective on their distribution. Fjelds  hypothesises that the ancestral area of grebes may have extended from the Archiplatean region of South America eastward across the Antarctic landmass at a time when the summer-time climate was temperate. He then suggests that the two *Poliocephalus* grebes (Hoary-headed and New Zealand Grebes) may have originally dispersed to Australia and New Zealand as a result of Antarctic-breeding grebes migrating out to marine waters during the colder winter period. The next two chapters in this section, on ecological distribution and feeding ecology, help to provide a good understanding of habitat selection by grebes and how the varied feeding specialisations in this group may be the result of past competitive interactions among species. A chapter on behaviour and communication focuses mainly on courtship. Various aspects of the breeding biology and life history of grebes are covered in the next chapter. The last two chapters in this section focus on environmental threats to grebes and the resulting challenges of conserving grebe populations. Fjelds  discusses some specific areas of research that need to be pursued to help improve conservation efforts.

The third section of the book is especially informative as it provides a new phylogeny of all the grebes based on a cladistic analysis of morphological characteristics. The supporting character matrix is provided in two appendices. The meat of this section, however, is the series of species accounts, which include basic information on nomenclature, external morphology, vocalisations, geographic range (including distribution maps), habitat, and species status. In addition, species-specific details about feeding habits, behaviours and breeding biology are summarised.

The Grebes is an authoritative and easy-to-read account of grebe biology and conservation issues. The book is illustrated throughout with more than 80 of the author's lively line drawings, including one of various species shown in flight. The full-colour plates section includes a judicious selection of photographs as well as Fjelds 's beautiful renditions of all the grebe species, including the downy chicks. Anyone with an interest in grebes in particular, or diving birds in general, should find this book delightful reading. It is sure to remain the most comprehensive text on this fascinating group of birds for many years to come.

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EAGLES, HAWKS AND FALCONS OF AUSTRALIA (SECOND EDITION)

By David Hollands

2003. Published by Bloomings Books, Melbourne, Australia. 212 pp., 165 colour photographs. Hardback, \$A45, ISBN 1-876473-19-3.

David Hollands has published several superb books featuring his photographs, and this title is no exception. It is the second edition of a piece first published in 1984, featuring all 24 of Australia's diurnal raptors. The book takes the form of a series of short essays describing the author's dealing with each species, interspersed with colour photographs of the birds in various settings. Although the bulk of the pictures were captured at the nest, many are of birds in flight, including some spectacular hunting shots. A short field guide section, reference list and useful index follow the essays.

In the Preface the author states that he has attempted to make the text 'lyrical and evocative', enabling the reader to gain an appreciation of both the birds and the habitats that they occupy. In this the author succeeds, with the rich and descriptive text in every species account bringing his fascinating experiences to life. Having spent many often fruitless days in search of our sometimes elusive raptors myself, I sympathised with his attempts to find difficult species, in particular the numerous expeditions mounted in search of Grey Falcons, *Falco hypoleucos*, and Red Goshawks, *Erythroriorchis radiatus*. Indeed the book is a tribute to what must have been an extraordinary level of perseverance and dedication on the part of Hollands.

The photographs are of a high standard and for the large part printed at a reasonable quality. Although there must be a limit to how many photographs can be published, I was disappointed to find only a few of some species, for example four of the Osprey, *Pandion haliaetus*, and just two of the Collared Sparrowhawk, *Accipiter cirrhocephalus*. The most frustrating aspect of the work is that many pages can separate the text and photographs for each species, and the photographs of some species are split between more than one group of plates. Moreover, the order in which species are depicted differs from the text to the photographs. Several minor printing problems are also apparent; for example, the last page of text in the Brahminy Kite, *Haliastur indus*, essay is in a smaller font than previous pages.

Some comparison with the previous edition is warranted given the book is advertised as a completely revised and updated second edition. In all I was disappointed at the relatively small changes made, with the essays of only four species being altered by more than half a page and 17 species having at best a handful of minor alterations with little to no new text. By my count 18 new photographs have been included, with two removed. Perhaps of most interest are five additional photographs of the rare Red Goshawk and two

each of the Letter-winged Kite, *Elanus scriptus*, and the Christmas Island race of the Brown Goshawk, *Accipiter fasciatus natalis*. Some of the descriptions of the photographs would have also benefited from updating, for example the first Brown Falcon, *Falco berigora*, photograph, opposite p. 172, clearly depicts a juvenile (Weatherly *et al.*, 1985, *Emu*, **85**, 257–260) and could have been labelled as such. The field guide section has also been updated in places, although the reference list of books and in particular journals is not as up to date as it could have been, with the latest paper cited published in 1992. However, the book has no pretence of being a comprehensive field guide or bibliography, so few readers would want for these omissions.

Although the changes in this second edition are relatively minor, the book provides much useful information on each species and clearly identifies the author's love and great knowledge of his subjects. Indeed, much of the added text answers some of the questions raised by the author in the first edition. Although at times I found myself reaching a different interpretation of several behaviours described, the book highlights just how little we know about many of the species depicted, as well as pointing the reader to interesting directions of study that may well inspire new raptor researchers. Although owners of the first edition may be disappointed by the relatively minor changes, they are of rare and unusual species and thus are of high quality. Given the first edition is long out of print, the second is timely and remains a stunning collection of photographs and text that bring the birds and their habits to life. This book would delight any bird lover and is a must for raptor enthusiasts.

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WILDLIFE OF THE BOX-IRONBARK COUNTRY

By Chris Tzaros

2005. Published by CSIRO Publishing, Melbourne, Australia. 256 pp., numerous colour photographs, distribution and location maps, and a CD-ROM of bird calls. Paperback, \$A39.95, ISBN 0-643-06967-4.

This handbook is a golden find for birdwatchers. It describes the highly significant box-ironbark forests and woodlands of northern and central Victoria, which have increasingly been recognised as one of the most diverse ecosystems in the state. It is also home to many threatened birds, such as the Regent Honeyeater and Swift Parrot, and so is of great conservation significance: but more of that below.

The avifauna is particularly rich because of its geographical location between the semi-arid and arid zones to the north and west and the wetter environments to the east and south. As a result, not only box-ironbark specialists and

widespread species occur in this region, but it enjoys visitors from adjacent cooler areas during the winter months and from more arid areas during drought or long summer periods. The other big attraction of the region is the exceptional autumn–spring flowering of a range of box and ironbark eucalypts, which brings nomadic and migratory birds such as the endangered Swift Parrot from as far afield as Tasmania. And of course there are spring–summer migrants from northern Australia and beyond, most of which breed in the region.

The book does a wonderful job of leading the reader through the ecology of the Box–Ironbark Country, with details of distribution patterns, ecological groupings of birds, regular and irregular movements of species, and habitat types. Following this are photographs and detailed species descriptions for all birds found in characteristic box–ironbark habitats. The photographs (187 of different birds) are generally of good diagnostic quality although it could well be asked why provide them when there are plenty of excellent field guides around? My own answer would be that along with the mammals, reptiles and frogs, it's really convenient to have everything illustrated in one book. It makes life easier when you're trekking through this country and you don't want to lug several heavy field guides with you (this book weighs <700 g) and spend a lot of time locating the species in them. And the text that goes with each species is tight but informative, with ecological information that is often absent from other guides. My only criticism is that the maps are rather tiny and distinguishing historical records from more recent ones may prove difficult for the visually challenged. But a general impression of distribution, both in the Box–Ironbark Country and statewide, can be gained.

With cross-reference to the location details in the species descriptions, there is a useful section towards the end of the book on where to watch wildlife. The extremely unfortunate mistake that strikes the reader familiar with this country is that the broad descriptive map of the region on pages 184–185 has numbered sites that do not match the numbers given in the list of viewing sites or the following text. I daresay the author, publisher and others have suffered enough from this error so I won't go on, just remember to check the extremely accurate large-scale maps on the pages that follow, to work out where you're going. [*Note added in*

proof: a correct version of the map can be downloaded in PDF format from the book's page on the publisher's website: <http://www.publish.csiro.au/pid/4856.htm>.]

There is a neat little section on finding and observing wildlife, a checklist of species for you to add that exciting tick, a handy list of selected reading that leads the reader to many localised field guides as well as research and management information, useful contacts, and a four-seasons CD of birdsong, frog calls and other natural sounds from a range of locations in north-central Victoria. The text provides guidance in identifying the calls on the CD and some lovely descriptions of the avian activities going on whilst the recordings were taken.

One of the most important contributions of this book is to raise awareness of the perilous conservation status of many box–ironbark birds. The author gives a clear picture of the human impacts that have led to the decline of specialist species in this region since European settlement. He matches this with clear descriptions of what has been and can be done to protect and enhance remnant habitat to ensure a future for threatened and declining species. After enjoying this beautifully presented book, the reader can consider the part they might play in the recovery of the rich box–ironbark avifauna. In particular, landowners will gain some clear guidance on how they might assist in the restoration of this ecosystem.

This is an extremely comprehensive book and if you're interested in other vertebrate groups as well as birds, you will find it very satisfying. I would have liked to see just a little more elaboration on the Box–Ironbark Country in a national context. There is mention of it being part of the Temperate Woodlands Region, which has suffered the types of habitat and fauna declines described for the Box–Ironbark Country. An Australian map and a small amount of text to illustrate where these woodlands were and are and the nature of the country in other states would have been a great adjunct.

Chris Tzaros and the other contributors have produced an excellent handbook that will appeal to both newcomers and those with a long-term interest in the Box–Ironbark Country. It will hopefully provide a great model for similar guides to other ecosystems. And it's a good price.

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