

Book reviews

AUSTRALIAN ECHINODERMS BIOLOGY, ECOLOGY AND EVOLUTION

Edited by Maria Byrne and Timothy D. O'Hara
2017. Published by CSIRO Publishing, Melbourne, Vic.,
Australia, 624 pp.
Hardback, AU\$180, ISBN 9781486307623.

This book is part of a series initiated some years ago by the Australian Biological Resources Study (ABRS) to provide a synthesis of the Australian Fauna. Subsequent volumes on invertebrates include the Mollusca and Polychaeta and Allies, with which I was closely involved so I really know how much time and effort is involved in organising such a synthesis.

While the format for the echinoderms differs slightly from the two previous volumes on invertebrates, it represents an amazingly comprehensive treatment of this common group of invertebrates. Echinoderms are an incredibly diverse group, not only in morphology, but in all aspects of their biology, ecology and evolution. Unlike some other groups of invertebrates, echinoderms have a very extensive fossil record which really helps to elucidate the evolution of the group.

The book, which is extensively illustrated, initially covers the ecology and behaviour, life histories, feral species and conservation of commercially important species, biogeography and the phylogeny and geological history of this group, and then in Part 2 discusses each of the five classes.

The first five chapters are written by the editors Maria Byrne and Tim O'Hara, which is entirely appropriate given their extensive knowledge of the group, and in part largely based on their own research on all aspects of the Australian fauna. The next chapter by Andrew Smith from the Department of Palaeontology, Natural History Museum in London reviews the phylogeny and geological history of this group especially with reference to the Australian fauna. O'Hara then compares this record with what can be derived from the molecular data and how this supports the relationships between the classes.

These first five chapters really introduce the echinoderms. The Introduction explains how to recognise the five groups, with good images to illustrate the tremendous diversity of this group. It highlights that worm-like holothurians are related to feather stars and starfish, even though they look so different, and explains how they are related to some other invertebrates. Detailed illustrations explain the anatomy of the body wall and skeleton. The way in which they feed is detailed across the group and highlights how diverse their feeding methods are. While all echinoderms lack a dedicated respiratory and excretory system they have found ways in which to achieve good gas exchange even though most lack respiratory pigments as well as efficient ways of getting rid of nitrogenous waste. While one thinks of echinoderms as fairly slow moving animals some are quite efficient at swimming or hitchhiking. A detailed chapter on the ecology and behaviour is given, and how they occur from the intertidal to protected embayments to the deep sea. I found it interesting to reflect on all the behaviours which the group are involved in, never having really thought of echinoderms as

having many patterns of behaviour. I was wrong, they can confuse their predators, by having toxic skin, being camouflaged to confuse their prey, shedding arms and being able to regenerate them, or cover themselves with seagrasses or detritus, or just eviscerate their sticky cuverian tubules to ensnare their would-be predators. While we also aware of the plagues of Crown of Thorns (COTS) starfish, I had not realised that other species can also form mass aggregations. A detailed section is given on echinoderm parasites and the abundant commensals from a wide range of groups which live in close association with them, far more than I ever realised, and while knowing about scale worms on some holothurians I did not realise they also live on the disc of ophiuroids. Several pages are given over to the range of crustaceans which are associated with echinoderms.

An expansive chapter is devoted to life histories; not surprising given Byrne's long term interest in echinoderm reproduction and many of the images are reproduced from her studies.

One small gripe is that some topics are duplicated in boxes but also in the main text, especially with regard to the pest species such as the Pacific Starfish and the plagues of COTS. With regard to the latter species, increasingly it is being shown that increasing eutrophication of inshore waters is only a minor factor in the outbreaks of plagues of COTS with entrainment of waters in protected bays of the numerous islands in the Lizard Island region being far more important in facilitating high levels of successful fertilisation and development of a new cohort in initiating plagues. Such duplications means one needs to read several pages often well separated to understand our current knowledge of these phenomena.

A very interesting section is the summary of the commercial harvesting of trepan, and how the common names have changed over time, and how this industry in Australia has been one of boom and bust. Similarly, the harvesting of urchins in temperate Australia has been characterised by explosive growth leading to overfishing and decline.

A good synthesis of how echinoderms can be used to identify marine biogeographical areas is given by O'Hara who has undertaken major surveys around Australia to document these distributions especially in deeper waters. By putting the current day fauna into a historical perspective he attempts to explain why shallow waters in southern Australia are so diverse but also highlights the need for more studies which are revealing an increasing number of cryptic species. Also with increasing water temperatures associated with climate change we are seeing some species moving southwards.

I enjoyed reading the chapter by Smith on the phylogeny and geological history of the group; a good synthesis of the origins of the echinoderms and the relationship between the groups using both morphological and more recently molecular data. Smith then puts it into an Australian perspective and the wealth of the Australian fossil record ranging from the Cambrian to the Pleistocene.

The second part of this book then discusses each of the five classes of echinoderms with particular reference to the Australian fauna. Some of these chapters are multi-authored with all the relevant Australian and overseas experts on taxa

such as the crinoids, asteroids, echinoids and the holothurians. The chapter on Ophiuroids is written by O'Hara who has spent most of his research career working on them including many from the deep sea. Each of these chapters follows the same format: a general description of the group including useful diagnostic features and then each Order and the families within is discussed. Information on Australian species is given wherever possible and an estimate of the Australian diversity of each family is given with numerous illustrations of Australian species.

Throughout the text is referenced so there is a very extensive bibliography including references to papers published in 2016. There is also a comprehensive index which allows people to check out particular species or search for geographical locations in the text or for common names. This is extremely useful as this is a book to browse certainly not one to read cover to cover.

CARBON ACCOUNTING AND SAVANNA FIRE MANAGEMENT

Edited by Brett P. Murphy, Andrew C. Edwards, Mick Meyer and Jeremy Russell-Smith
2015. Published by CSIRO Publishing, Melbourne, Vic., Australia, 368 pp.
Paperback, AU\$120, ISBN: 9780643108516.

Human-induced global climate change places challenges on countries to develop carbon-credits based economies. In a carbon economy, businesses emitting greenhouse gases would purchase carbon credits generated by carbon-capturing enterprises to neutralise their emissions. In countries with vast areas dominated by fire-prone ecosystems, e.g. Australia, knowledge on how to manage land to minimise greenhouse gas emissions from wildfires is urgently needed. Furthermore, appropriate fire management could lead to carbon sequestration and to a perspective of engaging with the carbon economy. A book that deals with a contemporary gap in knowledge on carbon accounting in fire-prone environments would fulfil that need. *Carbon accounting and savanna fire management* provides just that – a comprehensive compilation of the most recent techniques and technological approaches to management of fire in the tropical savannas of Australia (~1.9 million km²).

The introductory chapter draws a broad picture of the environmental, social and economic settings of study sites. This chapter demonstrates that skilled fire management cannot only generate carbon credits but also can increase biodiversity and have positive social outcomes for local indigenous people. Following the introductory chapter the reader will engage with the most recent advances in the science of fire land management through to chapter 15.

Fire patterns in north Australian savannas are well reported for higher rainfall regions (above 1000 mm per annum) and chapter 2, reproduced from Whitehead *et al.* (2014), investigates the rationale behind extending the reach of the greenhouse gas emission abatement scheme for savanna regions in the 600–1000 mm rainfall bracket. Reporting fire events over vast savanna areas is a highly technological skill that involves use of

The editors need to be congratulated for such a comprehensive account of echinoderms which I know has had a very long gestation and been a labour of love and this book needs to be available in all marine biology departments. While the focus is on the Australian fauna it is relevant to anybody studying this group anywhere in the world and I cannot think of anything else like it, certainly not in terms of its comprehensiveness. I would also like to congratulate ABRS and CSIRO Publishing for supporting this project and one can only hope that the remaining major groups of invertebrates will be treated in a similar way. Although finding editors willing to be take on such a task is always going to be difficult, especially when a host of authors are involved.

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satellite imagery and advanced mapping software and this is well presented and described. These sophisticated mapping tools produce many opportunities for managing northern Australia's ecosystems, but they also pose many challenges. The next 13 chapters focus explicitly on describing methodological solutions to these challenges and introduce models critical to understanding savanna ecosystems. The reader will learn how to validate maps produced by different satellites with a high level of confidence so that these maps can be used in website-based mapping tools like www.firenorth.org.au that are very popular among land managers. Vegetation is a vital proxy to assess fuel load in potential fire events and remote-sensing mapping techniques that classify vegetation-fuel types are described in detail in this work. Canopy height, foliage projective cover and dominant graminoid forms in the ground stratum serve as the most important indices. Similarly, the role of such parameters as fuel load accumulation rates, fuel load types, fire seasons, fire patchiness and burning efficiency factors are analysed and their part in the adequate planning of a carbon abatement program finely described.

There are a few easy ways that the book could have assisted readers, who are not accustomed to issues around fire and land management in northern Australia. Structurally, the book would gain more clarity if chapter 12, reproduced from Murphy *et al.* (2015), would be placed at the beginning. Chapter 12 clearly illustrates the ecology of the savanna and the associated emission abatement program in an easy-to-understand context. Instead, the reader is confronted right away with a statistically-heavy chapter 2. Results sections in this and some other chapters can be challenging to understand. For example, median and mean rainfall values seem to be used interchangeably and unusually high values recorded on field sites were removed due to (unclear) statistical reasons. These complex statistical methods may obscure understanding of the applied side of the research on carbon accounting in savanna fire management. Additionally, frequent use of acronyms obscures understanding of the message that the authors try to convey. A list of abbreviations at the beginning of the book or clearer captions under respective tables and figures would be very beneficial for a broader audience.

Overall, this book is an excellent resource for hands-on managers who want to know how to benefit from carbon emission abatement programs planned for the future carbon economy, as

well as academics and students interested in fire ecology. *Carbon accounting and savanna fire management* compiles outcomes of the most recent research on carbon methodologies that form essential reference for future greenhouse gas abatement programs in Australia as well as across the world.

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BIRDS OF NEW GUINEA. INCLUDING BISMARCK ARCHIPELAGO AND BOUGAINVILLE

By Phil Gregory

2017. Published by Lynx Edicions, Barcelona, 464 pp.
Hardback, €60 (~AU\$92), ISBN 9788494189272

The author of this work, Phil Gregory, has contributed several sections on bird families in the *Handbook of the Birds of the World* (del Hoyo *et al.* 1992–2013), published by Lynx Edicions. His contributions included the bristlebirds (Dasyornithidae), scrubwrens and gerygones (Acanthizidae), berry-peckers and longbills (Melanocharitidae) and monarchs (Monarchidae). He has lived in Papua New Guinea, although now resides in northern Queensland. He is involved with a tourism company that conducts tours in Asia and has also been involved with training guides in the Solomon Islands.

This is a field guide covering the greater Papua New Guinea region including Aru Island, the Bismarck Archipelago (including New Britain), Bougainville and the D'Entrecasteaux and Louisiade Archipelagos. It aims to cover the extensive assemblage of bird species as succinctly as possible, being intrinsically a field guide and concentrating on field characters to aid identification.

Like other field guides this book is structured with an introduction (albeit a light one), in which you will find the geographic scope outlined and some summarised points on conservation threats. Some very generalised birding hotspots are also given. Most of the book is given to species accounts. The maps, figures and other sundry metrics are a high quality and appear to be taken from *HBW and BirdLife International Illustrated Checklist of the Birds of the World* (del Hoyo and Collar 2014–2016). After the species accounts there is a short reference and further reading section and finally an index closes the book. The index covers only the birds' common and scientific names. I did not find the number of species dealt with in the book, mentioned in the book, but the accompanying brochure indicates that 943 species might be dealt with including 456 endemics. A section at the end of the normal species accounts gives the accounts of 75 vagrants.

Given that this book is written in English its first audience must be regarded as English speaking Papuans and Indonesians. Given that the author is connected with the tourism trade to the region then bird enthusiasts who visit the region, occasionally or regularly, would also be an important audience.

This book is attempting to be a dedicated field guide and it is reaching out to a larger audience by covering the Bismarck Archipelago, Bougainville and the D'Entrecasteaux and

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Louisiane Archipelagos. As a field guide it succeeds by being intentionally brief, but fails by being too big to fit into your pocket (unless you have big pockets). It is 23.5 cm by 16.5 cm and a little under 3 cm thick. The text of the species accounts is well organised and sufficient, giving the birds' names, conservation status, measurements, subspecies with distributions, plumage and other identification characteristics, voices, similar species and alternative names. Short introductions to each family are also given. Thus, it contains the elements typically seen in modern field guides and overall achieves its aims.

In a broad context it does little to advance educational and research functions. There are more detailed texts available, some of which are, according to this book, 'somewhat unwieldy for field use'. However, the level of research, particularly in the area of field diagnostic characters is sufficient and pertinent. The book stands as quick reference guide especially where it covers the Bismarck Archipelago, Bougainville and etcetera not covered in similar texts.

The writing style is clear and succinct as was intended by the author. It confesses to omitting breeding data for exactly this purpose, but this is not a great strength. Short crisp notes on breeding would have made it a more useful field guide. Breeding plumage and nests being things that bird observers would want to know more about and perhaps see for themselves.

The quality of the illustrations is high and they are laid out orderly and clearly enabling quick and precise recognition. They are all on the right hand side page with the associated text on the left. The maps are small (40 mm by 18 mm), yet quick to comprehend with my reading glasses on.

I would recommend this book to those who want the Bismarck Archipelago, Bougainville and etcetera included and who only want a quick field guide. It will also sit nicely on the bookshelf alongside other works in the series of birds from different regions by Lynx Edicions. I would not recommend it for those who want a detailed handbook. And despite not fitting into my pocket, I note it will fit into my back pack.

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BIRDS OF EASTERN POLYNESIA. A BIOGEOGRAPHIC ATLAS

By Jean-Claude Thibault and Alice Cibois
2017. Published by Lynx Edicions, Barcelona. 440 pp.
Hardback, €29.95 (~AU\$46), ISBN 9788416278053

Jean-Claude Thibault is corresponding member of the Muséum national d'Histoire naturelle (Paris, France) and Alice Cibois is research officer in charge of the bird collection at the Natural History Museum of Geneva (Switzerland). Both are academics who have researched and published papers on the birds of Eastern Polynesia. Previously, Jean-Claude Thibault co-wrote the *Contribution à l'étude des oiseaux de Polynésie orientale* with David Holyoak on the region's birds (Holyoak and Thibault 1984). They are clearly among those you might want to write this book.

This is the first biogeographic atlas on birds covering this vast and often overlooked region of Oceania. This book combines all the available literature of eastern Polynesian birds including unpublished reports from the region, and miscellaneous data from local ornithologists and biologists. It covers all of the birds, illustrated in colour, except those known only from bone fragments. The aim of this book is to provide a comprehensive account of the birds of Eastern Polynesia through synthesising the current biogeographical and phylogenetic data for extant and extinct species.

This work is presented as an atlas of extant and extinct birds. The information for each of the 241 species is presented on detailed maps along with all reference sources and summary text associated with compiling the maps. Summaries of each species are given that discuss their systematics and distribution. This is largely a technical work presented with illustrations.

The volume covers a vast area of ~10 million km² of ocean with the 151 main islands representing 7350 km² of terrestrial land. It impresses with a large and completely functional introduction that is broken down into: geographical area; physical oceanography; geology and island categories; area and altitude; climate; vegetation; colonisation by humans; anthropic habitat changes; nuclear bomb tests; human demography; brief history of ornithological activities and the biogeography of the birds, which includes: colonisation; sympatry; routes and times; natural extinction; the taxon cycle hypothesis; anthropogenic extinction; ecological characteristic of insular landbirds; migratory birds; and seabirds. These are then followed by five pages detailing how to use the atlas. In all 50 pages are given before the systematic list of 310 pages begins. The systematic list is then followed by an extensive 40 page bibliography, an index of bird names, and a set of functional nomenclatural appendices and a glossary.

The authors are addressing an international and local audience of professional ornithologists, biologists, biogeographers and etcetera including bird watchers who might want to locate the birds. This book has many strengths. Its maps are formatted to

allow a quick reading of a taxon's distribution, be it extinct or extant or simply a bone record. Each family is introduced with a cladogram and accurately detailed summaries. The species accounts are detailed and clearly set out with consistent and useful headings, all fully referenced with in text Harvard style referencing. The significant introduction, outlined above, is also fully referenced and completely up-to-date. The bird drawings are, 'for the delight of the eyes rather than for species identification, are painted by some of the best bird contemporary artists.'

This volume will be a vital aid to any professional discipline that interacts with the birds of the region. The introduction providing useful background only adds to the volume's usefulness. By being up-to-date and comprehensive it will enable many educational, research or professional functions: educationally from secondary schools in Oceania (and elsewhere) to post-graduate research internationally. I was able to quickly look up the birds that I am curious about, although I do not research in the area, and quickly have my curiosity satisfied beyond my expectations. The level of research is well beyond any field guide and stands as a first rate primary reference source, which is fully referenced. This will become a go to text for anyone researching these birds or who desires to know where exactly they might find them or how they are distributed.

If the authors' first language is not English, I could not tell. The text is easy to read and its structure simple to follow. The supplementary material includes the glossary, which is pertinent and extends the book's functionality. The name and precise locations of the islands are given in yet another functional appendix. The whole introduction adequately explains the background enabling a deeper understanding of the factors involved in the birds biogeography and the photos of the volcanic islands are stunning and inviting.

Don't judge a book by its cover. This book's cover suggests that it might be another field guide or brief outlining handbook in the Lynx Edicions series of regional bird books. Yet it is much more than that: it is comparable to the best atlases I have seen and in some ways an advancement on them. I would recommend this book to all school and libraries in eastern and western Polynesia and then to all good universities and to all those, who, like me, were curious about this less well known region of the Pacific.

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