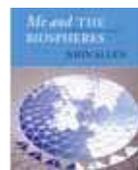


Reviews

Our regular round-up of books published in the fields of biology and related sciences



Me and the Biospheres: a memoir by the inventor of Biosphere 2
John Allen

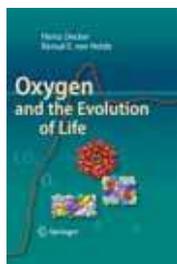
Synergetic Press, £25.00

Me and The Biospheres is the autobiography of John Allen, inventor of the world's largest laboratory of global ecology, Biosphere 2. I'm not surprised Allen's book was voted best autobiography of 2010 by the Benjamin Franklin Awards for independent publishing. He is the most amazing man I know. I've learned even more about him and his associates from this book - and *what* associates: from Konrad Lorenz and Buckminster Fuller to William Burroughs, Sir Ghillelan Prance and Richard Schultes.

Allen started the Biosphere enterprise at the Synergia Ranch in Santa Fe having bought and renovated - by hand - a great stretch of Australian outback to prepare specimens. He did this while building a ship, *Heraclitus*, setting up the Vajra hotel in Kathmandu and the October Gallery in London. When it became clear Biosphere 2 would need a tropical rainforest, he bought a patch of Puerto Rican land, planted hardwood trees and used it for the source of the rainforest biome - creating a conservation-focused, as well as profit-making business. I can't begin to detail his many other enterprises here - buy the book!

The culmination of it all is Biosphere 2 in the Arizona desert. This was a completely closed system in which eight people lived for two years, with air, water and agriculture all perfectly recycled, with four connected-but-independent biomes including a coral reef, desert and rainforest. This is a great book for biologists. Read it to see just how much can be done during an eclectic life. Did I mention that the author is also Johnny Dolphin, the poet and playwright?

Jack Cohen FSB



Oxygen and the Evolution of Life
"Three chapters cover the biological role of oxygen, notably how organisms developed mechanisms for coping with an oxygen-rich atmosphere"

LIFE'S A GAS

Oxygen and the Evolution of Life
Heinz Decker & Kensal E van Holde
Springer Dordrecht, £53.99

All elements are important but some are more important than others. Oxygen falls into the latter category, due to its significance in the evolution and continuance of life on Earth, and its penchant for combining with other elements. This short introduction provides synopses of oxygen's major characteristics.

It opens with oxygen's chemistry: its atomic structure, bonding capacity and roles in ozone, water and carbon dioxide formation, as well as its solubility, hydrolysis, dehydration and redox reactions. The subsequent chapter begins with cosmic history and the formation of the solar system, then focuses on the early Earth with its carbon dioxide rich atmosphere, and how that was transformed over billions of years into an atmosphere with 21% oxygen. The development of photosynthesis is highlighted as a major biological and geological force.

The next three chapters cover the biological role of oxygen, notably how organisms developed mechanisms for coping with an oxygen-rich atmosphere, the physiological benefits of aerobic conditions and the evolution of multicellular organisms, plus oxygen transport systems in animals involving proteins like haemoglobins. Chapters six and seven focus on oxygen-climate relationships, on long-term Earth history with its warm and cool stages, and real and potential human impact due to increasing carbon dioxide emissions since the 1800s. A further chapter examines oxygen-related medical conditions such as hypoxia and oxidative stress and their treatment. The final chapter speculates on oxygen and life beyond planet Earth as well as problems with supplying oxygen to space explorers.

This book adopts an interesting, indeed risky approach when it comes to sales. It is relevant to a wide but scientific audience though the cost is prohibitive for purchase by individuals.
Dr A M Mannon



Owlet Caterpillars of Eastern North America

David L Wagner, Dale F Schweitzer, J Bolling Sullivan & Richard C Reardon

Princeton University Press, £59.00

Over a million insect species are known to science, with anything between 3-8 million – perhaps as many as 13 million – still to go. A lot, certainly, are mostly described in the adult stage only. For less than a third we have knowledge of the early stages and many, extinct already, we will simply never know. Happily, the Lepidoptera are one group where the larvae are comparatively well known, at least for the better-studied regions, although often this information is scattered and arcane.

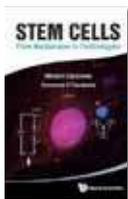
This volume, the latest by Wagner and co-authors, packs an absurd amount of information about the larvae of noctuid moths of eastern North America into its 576 pages, with scarcely an inch wasted. After a concise introduction it launches straight into the descriptions, genus by genus, with a large photograph of the mature larva of each species and a brief résumé of key features, habitats, distribution, food plants and comments, citing from a bibliography of over 260 references but with plenty of new, unpublished and corrected data also.

In many cases there are photographs of the adult moth in natural repose or as set specimen, often both. The photographs are uniformly excellent, and the diversity of forms and habits is staggering – a real eye-opener. Over 800 species are included.

This book wouldn't necessarily catch the attention of European lepidopterists, but it should – even if only for the beautiful illustrations.

The fact that many of the genera share taxa with Europe also gives it real utility beyond its home range.

David Clements CBiol MSB



Stem Cells – From Mechanisms to Technologies

Michal K. Stachowiak and Emmanuel S Tzanakakis (Eds)

World Scientific, £84.00

Many people have now heard of stem cells and their remarkable capacity to differentiate into mature cells with specific functions, potentially

facilitating the treatment of the previously untreatable.

They, and indeed some biologists, will be far less aware of the variety of problems still to be solved before stem cells can find a central place in clinical medicine.

Adopting a systems approach, this book surveys the requisite research on both basic physiology and the technology necessary to generate these cells in medically useful quantities. The editors co-author three of the 12 chapters, on stem cell bioprocessing for regenerative medicine, the triggering of neurogenesis by endogenous brain stem cells with DNA nanoplexes, and a common integrative nuclear signalling module for stem cell development.

Overall, the book affords a highly accessible portrait of this nascent therapy, not only for researchers directly involved but also for biologists and medicos in other areas. Two particularly challenging chapters are those on the engineering of bioactive scaffolds for vascular therapy and the possible treatment of central nervous system disorders using stem cells from the human umbilical cord.

“Stem cells have an astounding capability to self-renew or differentiate under a plethora of seemingly chaotic external and internal inductive signals which may lead to contradicting fate decisions,” write the editors. This book will go a long way to clarify the components of the chaos and to facilitate progress towards applications that may, in time, become crucial components of routine medical practice.

Bernard Dixon



Reframing Rights: bioconstitutionalism in the genetic age

Sheila Jasanoff (Ed)

MIT Press, £17.95

Many lab-based bioscientists consider that the low level of public enthusiasm for recent advances in the life sciences is frustratingly reactionary. Despite biologists' widespread acceptance for over 150 years of (neo) Darwinian theory, which has received indisputable endorsement from recent advances in genomics and biotechnology,

public resistance to embracing the vast potential benefits for medicine, agriculture and industry is often viewed, from the laboratory bench, with incredulity.

But, as Jasanoff stresses in her opening chapter, these new levels of understanding and technological capability have transformed traditional “notions of race, diversity, kinship, ethnic and social identity, normality, deviance, criminality, justice and human uniqueness”, while biotechnology has, inter alia, created “new forms of life, embryos, stem cells and human-animal chimeras”. So it is hardly surprising that they have enormous political, legal and social implications.

Arguably, most bioethicists' responses to such developments have tended to be rooted in deterministic thinking: for example, focusing on the (supposedly inevitable) legal consequences for safety, privacy, liability, equitable healthcare provision and environmental pollution. But, more radically, the perspective of the bioconstitutionalism that runs through this book acknowledges the ‘irreducible contingency of life-law relationships that aims to restore normative agency to social factors’.

The 13 chapters address issues such as cloning, forensic uses of DNA databases, xenotransplantation, human population genomics and the precautionary principle. Except for a single chapter from the UK, all authors have strong associations with one department of government at Harvard University. Even so, this important book should be available in every bioscience library.

Ben Mepham

Dragonflies and Damselflies of the East

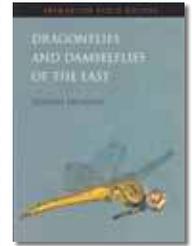
Dennis Paulson

Princeton University Press, £24.95

A counterpart to *Dragonflies and Damselflies of the West*, together these books provide a complete, concise and encyclopaedic reference work covering all dragonflies and damselflies in continental USA and Canada.

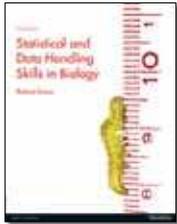
Dragonflies and Damselflies of the East includes 336 out of the total of 462 species of the order Odonata found within the USA and Canada.

The introduction contains details of the dragonfly's lifecycle, habitats, behaviour, and suggested methods of observation and study. This book



Dragonflies and Damselflies of the East

“Of interest to all dragonfly enthusiasts thanks to its beautiful and meticulous close-up pictures of both the male and female of each species”



Statistical and Data Handling Skills in Biology "A well-written, clearly-illustrated and user-friendly guidebook that explains the mysteries of biostatistics without scaring off first-year students with complex-looking equations"

will be of interest to all dragonfly enthusiasts thanks to its beautiful and meticulous close-up pictures of both the male and female of each species. Anyone able to visit the USA and spend time looking for dragonflies will find the notes, full descriptions and labelled line diagrams helpful to assist in species identification.

Information is clearly and systematically presented with species grouped by genus. Habitats are described to assist observations and locations are identified diagrammatically as highlighted areas on a thumbnail map of the USA. The use of diagrams make it ideal for taking out on fieldwork; however it may be better in e-book or paperback format. In hardback edition this book feels like a coffee table book, containing as it does such a wealth of attractive and vibrant pictures. A list of dragonfly societies, websites and a glossary of all terms used are given as appendices.

Dr Amanda Hardy

Statistical and Data Handling Skills in Biology (3rd edition)
Roland Ennos
Pearson, £28.99

For many biology students the least enjoyable and most feared part of their university course is when they have to learn statistics. Part of this may be due to a general 'maths phobia', but I suspect that the majority of the problems stem from the inability of professors and lecturers to clearly explain how to use statistics or to convey the excitement and sense of satisfaction when the data finally yields to your analysis. This is unfortunate: not only is a grasp of basic statistics an integral part of any biologist's toolkit, it is also essential for robust data collection, experimental design and, at the most basic level, the generation of hypotheses.

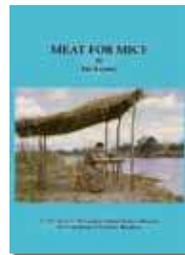
What is required is a well-written, clearly-illustrated and user-friendly guidebook that explains the mysteries of biostatistics without either oversimplifying or scaring off first-year students with complex-looking equations. This is exactly what Roland Ennos has produced in a well-deserved third edition of his basic statistics textbook.

The new edition differs from the former in that equivalent parametric and non-parametric statistics are

now dealt with in the same chapters, and the book has been expanded to include some additional statistical tests – including logistic regression, an increasingly important model in many sub-disciplines of biology. Moreover, and perhaps most usefully, there are comprehensive instructions on how to perform statistical tests in two of the most common software packages: SPSSv19 and MINITABv6.

There are lots of basic statistics textbooks out there, but this is one of the best.

Ana Claudia Mendes Malhado



Meat for Mice – A vet's diary of the London Natural History Museum 1962 Expedition to Northern Rhodesia
Ian Keymer

Romney Publications Ltd, £45.00

In 1962, Ian Keymer set out with museum staff from the London Natural History Museum for Northern Rhodesia (now known as Zambia) to collect specimens. As a vet and pathologist, his main job was to carry out post-mortems on the animals, checking for zoonoses and animal diseases communicable to humans, though at times he also acted as unofficial doctor to expedition members and others.

Based on diaries kept by the author, there is remarkable detail on the people, dates and places involved in this expedition, which was primarily a hunting safari. The idea of killing animals for research specimens mostly belongs to an era long gone, and as attitudes towards animal welfare have changed, some of the activities described are disturbing.

Although the author addresses issues to do with apartheid in his introduction, some terminology used in the book is also controversial e.g. "piccaninnies". Nevertheless, this provides a historical vignette into how these kinds of expeditions were once run.

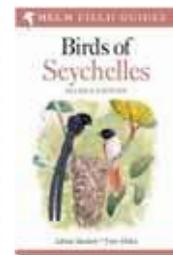
Over 90 photos, sketches and maps make this a well-illustrated account. Considering most of the photos were taken over 50 years ago, their quality is good, but be warned not all are pretty pictures: for example, the puka deer being skinned.

Appendices include a list of the

specimens collected, including stomach contents and external parasites, from 516 mammals of at least 79 different species; the results of examinations for protozoan and viral diseases; a list of government and university departments; and people mentioned in the text and a glossary.

Students of tropical medicine and anyone curious about east African natural history might find this of interest.

Sue Howarth FSB



Birds of Seychelles
Adrian Skerrett & Tony Disley
Bloomsbury Publishing,
£24.99

The Seychelles consists of more than 155 separate islands scattered over a vast area of the Indian Ocean and, as such, has a rich diversity of birdlife, all of which have been comprehensively covered in this slim volume.

With around 257 species so far recorded in the Seychelles, equal consideration is given to resident species as well as to migrants and vagrants, and there is also a small section on six extinct species. The text is concise yet informative, with a great deal of detail about key identification features, and there are over 800 extremely useful colour illustrations.

Included in the text for each species are relevant facts on habitat, birdsong, distribution and status. There is a helpful colour coded table at the back of the book that shows when to expect bird species to be found on the main islands, although this may prove cumbersome to use in the field and distribution maps adjacent to the text for each species might have been preferable.

This is an indispensable bird guide for visitors to the Seychelles, whether they are visiting birders or nature-loving tourists. It will fit neatly into pockets or bags and I can see this being used effectively in the field by anyone who wants to identify the birds they encounter. It is certainly a book I wish I'd had when I visited the Seychelles some years ago – it is superb.

Dr Alan Woolhead