 Ecology, Conservation, and Adventure of the Tropical Forests in Asia and New Guinea

On the Forests of Tropical Asia. Lest the Memory Fade. Ashton, P. 2014. Royal Botanic Gardens, Kew, U.K., and University of Chicago Press, Chicago, IL, U.S.A. 670 pp. $180.00 (hardcover). ISBN 13: 9781842464755.

Searching for Pekpek: Cassowaries and Conservation in the New Guinea Rainforest. Mack, A. L. 2014. Cassowary & Conservation Publishing. xvii + 235 pp. $19.95 (paperback). ISBN 13: 9780989390309.

Rainforests typically feature in coffee-table books of lavish photos, textbooks heavy on dry ecological theory, or travelogues that describe the collecting adventures of ecologists. Peter Ashton’s On the Forests of Tropical Asia combines all three genres in a 670-page, 3-kg masterpiece. As Ashton recounts it, his is indeed “the first attempt to describe and compare the forests of one whole tropical region as a unity.”

The author was introduced to rainforests by four Iban Dayak men when he was a young botanist in the service of the Sultan of Brunei. Three years later, he returned to Cambridge with “an impressive knowledge of a hyperdiverse local flora, classified according to the Iban terminology.” The book is dedicated to these men, and Ashton’s is far from the only case of indigenous initiation for an academic ecologist. Tropical forest science has been shaped by rainforest peoples perhaps more than we care to admit. In this, it is no different from modern art, also inspired by indigenous traditions, except, for example, Picasso’s African period lasted only 3 years, whereas Ashton’s tropical Asia period is entering its 60th year and still going strong.

Opportunities for students of ecology to experience indigenous ecology have almost disappeared, as have many pristine forests of Asia. Lest the Memory Fade is unfortunately an apt subtitle for a book that documents an ancient and disappearing world. I imagine the next generation of Bornean-born biologists looking at the black and white photos in the book and comparing the forests of old with the oil-palm plantations that shaped their childhoods. Ashton’s book may help ensure that there are ecologists working in Borneo in the future, a prerequisite for the survival of at least some forest remnants.

Peter Ashton has made a huge advantage, which should be replicated by his successors whenever possible, of studying tropical forests for over half a century. It is probably the broad perspective Ashton gained from studying 156 forests that led him to attempt an overall classification and description of Asian rainforests in their often confusing diversity. His approach is grounded by historical perspective, starting with the complicated tectonic dynamics of the region.

General ecological principles often lose their predictive power when applied to specific ecological situations—tree species, forest types, or regions. Ashton italicizes known unknowns throughout the text: “the regeneration paths of climax species with differing light responses can at present be only inferred.” In other words, although we do understand early successional dynamics in tree gaps reasonably well, we still do not know how the primary forest will assemble after the pioneer-species stage.

The author’s quest to understand forest composition included a rare laboratory adventure. Ashton was “spectacularly lucky” to see how J. R. Bray and J. T. Curtis devised a new analytical method, ordination, so that “after three weeks of 14-hour days on a hand calculator, the coefficients of similarity between plots were ready and patterns gradually emerged.” Modern ordinations provide a guide to the composition of various forest types in Asia. This perspective is expanded to elevational gradients and augmented with phylogenetic and phylogeographic perspectives. The chapter on the mechanisms maintaining forest diversity goes well beyond the usual dichotomy between neutral and niche theory frameworks in that it discusses the often complicated interplay of historical accident, environmental filters, niche structure, and neutral dynamics in individual forests. Unsurprisingly, the result is not particularly satisfying for ecology students who would prefer to learn a single, all-explaining principle for rainforest biodiversity.

The chapter “People and the Forest: a Tightly Interwoven Tapestry Has Frayed” describes people–forest relationships in the past and the radical changes they are undergoing presently. The overview includes the history of agriculture, village and state governance, global trade (since Roman times), the concept of plantations brought by the Dutch and British, European forestry practices, the “triumph of mercantilism” in our approach to forests, and the quest for sustainable forest management. The decline of traditional forest knowledge and the stirrings of a local conservation movement are elucidated.

The last chapter is on the future of the forests and asks, “Can we retain forest options profitably?” The opening paragraph likens forest destruction to burning of the Alexandria library in the 7th century, a better simile of the
rainforests' importance than their reduction to a provider of carbon capture, climate mitigation or other ecosystem services. The book gives an excellent, unsentimental analysis of current pressures on forests that acknowledges significant opportunity costs of rainforest protection, both for indigenous peoples and entire countries. Rainforest value in Asia, following a Kuznets curve, is now, at the height of industrialization, probably around its historical minimum. It should increase again with continuing economic development. Will Asian societies develop fast enough for the forests to become valued again before they are all gone? The race between economic growth and forest destruction is full of suspense.

Andrew Mack's *Searching for Pekpek* is a personal story of rainforest research with a rainforest-conservation message. It may take only a few more generations of students before Mack’s account of his research on Cassowaries reads as a quaint tale from an ancient past, perhaps similar to Wallace’s account of shooting orangutans to be stuffed as museum specimens in the Malay Archipelago. Few present-day tropical ecologists start their research careers to the sound of tropical trees crashing to the ground, cleared to make space for their own research station in a remote rainforest, but to a sufficiently determined biologist Papua New Guinea (PNG) is one of the few places on Earth that still provides this kind of academic freedom.

Mack leaves readers in little doubt about his determination. The birth of the Sera Field Station in one of the least accessible rainforests of PNG rates among the more adventurous and entertaining reports on doctoral research available in contemporary biological literature. In PNG, rules that are part of tribal oral history guide the present day ownership of forests, forcing Mack to negotiate fieldwork with village landowners. Unfortunately, few western academics have a natural talent for playing tribal politics in an alien culture. Mack vividly describes how these academics inevitably caused misunderstanding and conflict but also forged relationships that ultimately benefitted their research. A lifetime spent in the rainforest makes Papua New Guineans highly efficient field researchers with a formidable knowledge of natural history, although one that is not structured according to the canons of hypothesis-driven Western science (Novotny et al. 2012). The close encounters between university academics and villagers tend to be in equal measure frustrating and enlightening for both sides.

Virtually all Papua New Guineans are landowners. Together, they control the fate of the country’s forests, making decisions about conservation and exploitation of natural resources. This may sound like good news for conservation to foreigners who subscribe to the myth that rainforest dwellers are all born conservationists. In reality, however, tribal societies prefer to maintain their lifestyle while eagerly seeking, testing, and absorbing novel ideas and items from the outside world. Conservation needs to support such synthesis of tradition and modernity by providing a viable income or be easily defeated by the allure of logging royalties (Novotny 2010). Mack describes often rather desperate efforts to integrate conservation with so-called sustainable business projects that would pay conservation costs, including implausibly located ecotourist lodges and marketing schemes for rainforest products that do not have a market. His experience with international conservation leads to a seemingly common sense, but in the world of practical conservation still radical, epiphany; that is, rainforest conservation in PNG and other tropical countries can never succeed unless driven by local conservationists and overseas experts would be best utilized to train nationals rather than executing conservation plans themselves in places where they lack the necessary social skills and political clout to sustain them.

International conservation has of course taken the concept of capacity building fully on board and developed very fine rhetoric on the subject. However, when Mack and collaborators got to work transforming the Wildlife Conservation Society’s PNG operation into a genuine training base with numerous local students working on a variety of dissertation projects on rainforest biodiversity, it was a revelation, and one of the most exciting and significant developments in PNG conservation in decades. The termination of this experiment, when WCS decided to return to business-as-usual conservation, appears to be one of the larger mistakes in the recent history of rainforest conservation.

Tropical conservation is socially complicated because it connects three very different worlds with often conflicting interests: rainforest village societies and local non-governmental organizations (NGOs), government agencies, and international conservation NGOs. The villagers, who are theoretically rich because they own a globally important biodiversity estate, although one that often lacks the basic amenities such as electricity and healthcare, often view their partner NGOs, with salaried staff and air-conditioned offices, as living in excessive luxury and being paid with funds that should rightfully be going to the forest owners (West 2006). Mack’s sentiments toward the even better appointed headquarters of global conservation organizations mirror those of the villagers towards their local NGOs. His critique of overseas-driven conservation would have benefited from a broader examination of conservation projects in PNG that included NGOs with which he had not been personally involved. Similar comparative analyses are conspicuously lacking in the world of donor-driven conservation, where every project has to be an unqualified success.
In a perfect world, training of conservation experts and professional biologists should be spearheaded by local universities rather than conservation projects. However, many developing tropical countries, including PNG, have only teaching universities that lack research facilities and expect their staff to teach full time. As a result, students of such institutions rarely see, let alone experience, research in action. These countries also often lack the mechanisms for awarding funds according to the quality of research that could support the careers of promising young scientists. Tutoring students and junior biologists may be a more efficient long-term strategy for conservation in these countries than seemingly more direct efforts at establishing conservation areas. The main point of Mack’s book, that overseas-driven conservation is doomed without a supportive indigenous academic community, is a valid one. It is an important insight, earned after years of hardship, and delivered in the most entertaining manner.

Vojtech Novotny∗†‡

* Biology Center of the Academy of Sciences of the Czech Republic & University of South Bohemia, Branisovska 31, Ceske Budejovice, Czech Republic
† New Guinea Binatang Research Center, P.O. Box 604, Madang, Papua New Guinea
‡ Address for correspondence: Biology Center of the Academy of Sciences of the Czech Republic & University of South Bohemia, Branisovska 31, Ceske Budejovice, Czech Republic; email novotny@entu.cas.cz

Literature Cited

Novotny V. 2010. Rainforest conservation in a tribal world: why forest dwellers prefer loggers to conservationists. Biotropica 42:546–549.
Novotny V, Weiblen GD, Miller SE, Basset Y. 2012. The role of paracologists in 21st century tropical forest research. Pages 154–157 in Lowman MD, Schowalter TD, Franklin JF, editors. Methods in forest canopy research. University of California Press, Berkeley.
West P. 2006. Conservation is our government now. The politics of ecology in Papua New Guinea. Duke University Press, Durham, North Carolina.

Communicating Biological Science to the Public

Seven Modern Plagues & How We Are Caus- ing Them, Walters, M.J. 2014. Island Press, Washington, D.C., U.S.A. 236 pp. $26.66 (paperback). ISBN 9781610914659.

Unnatural Selection: How We Are Changing Life, Gene by Gene, Monosson, E. 2014. Island Press, Washington, D.C., U.S.A. 200 pp. $30.00 (hardcover). ISBN 9781610914987.

Wild Life: the Institution of Nature, Braverman, I. 2015. Stanford University Press, Stanford, California, U.S.A. 344 pp. $24.95 (paperback). ISBN 9780804794763.

These three books deal with a range of important topics that have direct or indirect relevance to conservation biology. Two focus on the emergence and reemergence of pests and diseases, whereas the third examines the politics and differing perspectives prevalent in the field of conservation. In all three books, the authors have used case studies to illustrate key concepts, and in doing so they made the material more accessible to a broader audience than would generally be the case with more specialized textbooks. With the media’s coverage of a wide range of scientific topics and the growing availability of pseudoscientific information through the internet, there is a need for academics to make their research, and scientific perspective, more readily available to the public. To be effective, this needs to be done in a readable format using a style to which a broad audience can relate. In considering the value of this approach, academics need to be aware that the more formal scientific literature is rarely accessed by the public and so there is a growing need for researchers and subject experts to share their findings with a wider audience through different formats including popular media.

The Seven Modern Plagues by Mark Jerome Walters is well written and easy to read. He uses a series of personalized stories to provide context and atmosphere to his theme. The book has seven chapters, each of which outlines a specific disease event or series of events. Walters is a veterinarian by profession, and this background along with his skills as a journalist have facilitated an insightful overview of current concerns about emerging and reemerging infectious diseases.

The diseases discussed include the spongiform encephalopathies, food-borne diseases such as salmonellosis, the pandemic potential of avian influenza viruses, and vector-borne diseases such as West Nile Virus and Lyme disease. There is also some mention of hantavirus, severe acute respiratory syndrome, and Middle East respiratory syndrome coronavirus. The writing style makes the information on disease epidemiology accessible to a wider audience than would have been the case if he had used a more formal scholastic approach with more technical information, and infers the author makes about the disease events appear reliable. The infectious diseases outlined in the book are largely those with the potential to be transmitted between animals and humans, and most have been featured recently in the media.

Although the majority of the chapters focus on the developed world, there is some mention of emerging concerns in more remote and resource—poor parts of Asia and Africa. The latter reminds the reader that the world is an interconnected world and that infectious diseases generally do not observe national and international political borders. One of the chapters that I found most
interesting was the author’s perspective on the first cases of the prion disease, bovine spongiform encephalopathy (BSE), on a farm in the United Kingdom. This and other examples are reminders to be aware that new diseases can emerge as a result of human interference, including changes in agricultural practice, as well as occurring as a result of pathogen evolution and natural selection pressure. In another chapter, Walters’ uses an example from southern Asia to illustrate the potential harm that using tainted fish products in animal feed can have, and he explores a potential link of such practices to the emergence of antimicrobial resistance.

The broader threat of antimicrobial resistance to animal and human health is discussed, although the topic is given a more comprehensive treatment in Emily Monosson’s book, *Unnatural Selection*. In Walters’ chapters on vector-borne diseases, he discusses the role of environmental change, including the impact of deforestation and climate change, on the survival and prevalence of arthropod vectors and how this can affect the epidemiology of diseases that they have the potential to transmit. These chapters possibly have a little less depth than those on BSE and the pandemic potential of influenza viruses.

In the latter, Walters explains that epidemiologists are braced for the next influenza pandemic and that the next emergent virus could affect the human population to the same extent as the influenza pandemic of 1918-1919, which killed at least 20 million people worldwide. Recently, there have been several candidates for such a virus, including the H5N1 bird flu, which circulated widely across Asia and Europe in 2003 and more recently the emergence of a new strain of influenza in swine with zoonotic potential (H1N1). There is ongoing concern that concurrent emergence of new influenza strains in pigs and poultry and subsequent infection of humans could result in viral strains with enhanced potential to transmit from human to human (Capua & Alexander 2002; Kalthoff et al. 2010; Van Ranst & Lemey 2013). The chapter on human immunodeficiency virus (HIV) has a focus that is slightly different from other books. Walters devotes quite a bit of space to discussing the risk of HIV, and potentially other virus infections, from consumption of bush meat and the potential interspecies transfer of pathogens linked to cultural dietary preferences.

In summary, this book is a really informative read that talks about the ways in which diseases can spread and about the challenges faced by scientific experts and clinicians when dealing with emerging and reemerging zoonotic diseases. It also points to the interconnectedness of humans and nature, which has obvious implications for conservation, although this link is for the reader to make.

Emily Monosson’s *Unnatural Selection* is a well-paced book in which the author uses case studies to illustrate how humanity is “changing life, gene by gene.” The case studies are well chosen and cover antimicrobial resistance, emergence of insecticide-resistant bedbugs, herbicide-resistant weeds, and the potential impacts of pollution on our environment. I especially enjoyed Monosson’s insights into gene expression and how environmental stressors are leaving their mark on plants, animals, and humans, potentially for generations to come.

In layman’s terms Monosson, a toxicologist, eloquently describes how life is resilient, and she cleverly illustrates her thoughts with contemporary examples that should interest a wide readership. The chapter on bedbugs, in particular, provides a good example of an emerging problem that was previously considered easy to address with readily available insecticides. The emergence of resistant strains of bedbugs as well as current concerns over increasingly resistant strains of head lice should stimulate interest from a wide readership especially given these examples may represent the tip of the iceberg with regard to what society may face in both the developed and developing world (Downs et al. 2002; Zhu et al. 2013). The evolutionary adaptations of insects, bacteria, and other organisms will not surprise evolutionary biologists, but the public may find the information disturbing. This is most likely the author’s intent in her attempt to bring current science to the layman, which she does in a way that should allow most readers to relate. Despite its brevity, the book delivers a good range of material that would be of interest to a wide spectrum of readers.

Irus Braverman’s book, *Wild Life: the Institution of Nature*, deals with a very different theme and focuses largely on the heated debate between advocates for in situ versus ex situ conservation strategies. The issue is not a new one and has often led to polarized views and heated debates among conservation advocates (Blamford et al. 1995). Braverman has a legal background, but she demonstrates familiarity with key issues in conservation and has evidently consulted widely with a variety of experts who present a range of different viewpoints. Much of the book is devoted to explaining key concepts and the terminology used in conservation science. This volume follows her well-received book, *Zooland* (Braverman 2012). In *Wild Life*, Braverman illustrates some of the politics behind conservation efforts through case studies. Overall, this work presents some important issues that can complicate and detract from the success of conservation initiatives, and it will be of value to graduate students and professionals seriously considering a career in conservation.

All three of these authors effectively used case studies to illustrate key concepts. Walters and Monosson provide a number of different examples on the social impact of a range of pests and diseases and both used their personal insight to provide added interest for a general audience. They also show that people’s activities and conservation can mix in unexpected ways. Braverman’s book is more focused and is probably more suited to the specialist reader than the broader public.
Susan Catherine Cork

Department of Ecosystem & Public Health, Faculty of Veterinary Medicine, University of Calgary, 3280 Hospital Drive, Alberta T2N 4Z6, Canada, email sccork@ucalgary.ca

Literature Cited

Blamford A, Leader-Williams N, Green MJB. 1995. Parks or arks: Where to conserve threatened mammals? Biodiversity & Conservation 4:595–607.
Braverman I. 2012. Zooland: the institution of captivity. Stanford University Press, Stanford, California.
Capua I, Alexander Dj. 2002. Avian influenza and human health. Acta Tropica 83:1–6.
Downs AMR, Stafford KA, Hunt LP, Ravenscroft JC, Coles GC. 2002. Widespread insecticide resistance in head lice to the over-the-counter pediculocides in England, and the emergence of carbaryl resistance. British Journal of Dermatology 146:88–91.
Kalthoff D, Globig A, Beer M. 2010. (Highly pathogenic) avian influenza as a zoonotic agent. Veterinary Microbiology 140:257–245.
Van Ranst M, Lemey P. 2013. Genesis of avian—origin H7N9 influenza A viruses. Lancet 381:1883–1884.
Zhu F, Gujar H, Gordon JR, Haynes KF, Potter MF, Palli SR. 2013. Bed bugs evolved unique adaptive strategy to resist pyrethroid insecticides. Scientific Reports 3:1456. DOI: 10.1038/srep01456.