

the process of mutual learning from concrete, societally relevant problems, in order to achieve fair and socially robust solutions.

The book is full of many valuable informations, insights and incentives for new ways of thinking, and will prove to be a useful inspiration for further consolidation and implementation of sustainable development. It is, however, not quite free of contradictions and illusory ideas. Sustainability, for instance, is alternately explained to be ‘the regulative idea of the society’, as ‘the engineering task of the 21st century’ (that is emphasis on technology), and finally as ‘management of system limits’ mentioned before. It leaves open, or lacks references to which system on the different levels is meant, and who will or can manage it – this, of course, forms part of society’s ‘sustain-ability’! – although certain chapters do address this. Scholz puts special emphasis on HES being an ‘inextricably coupled and complex system’. The environment that, in the author’s interpretation, conditions or triggers human decisions, is itself the result of previous human decisions and thus renders it very difficult to find reference states.

In spite of such critical remarks, I regard the book as a landmark within the actual profusion of literature on environment and sustainable development where you easily can get lost. It is a unique achievement of the author. Who is yet able today to present such a highly complex matter (making use of more than 2700 references!) in sufficient understandability? I warmly recommend his reflections to be utilized as yardstick and guideline for future developments aiming at sustainability.

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**Encyclopedia of Theoretical Ecology, A. Hastings, L.J. Gross (Eds.). University of California Press, Berkeley (2012). 848 pp., \$150.00, ISBN 9780520269651 (available also as PDF, ePUB or Kindle version)**

In 2010, Encyclopædia Britannica, the world’s most renowned and oldest English-language encyclopedia, went into its final printed version. Multi-language, continuously updated and, in the case of Wikipedia even free, competitors made the paper-version economically unviable. The days of squeezing the knowledge of the world on a specific topic between the covers of a book were numbered. Or so it would seem. Alan Hastings and Louis Gross have now published a monolithic 800 page Encyclopedia of Theoretical Ecology (ETE). It alphabetically collects 129 entries written by the 12 who-is-who in the field. Each entry closes with links to other entries and a brief list of

further reading suggestions. The encyclopedia itself also features a 30-page glossary and an extensive and highly useful index.

The question, to me, was not whether this tomb was scientifically sound, which I would assume it to be, given the expertise of the authors and the critical mindset of the editors; rather, whether it was useful. How does it compete with easily accessible Internet pages on the topic? Do the references lead me to the best places? Will it place the topic of interest in its academic setting and hence allow me to link to related issues?

Taking a random sample, Biogeochemistry and nutrient cycles by B.Z. Houlton, ETE clearly outperforms both Wikipedia pages on the topic. It is more abstract, draws attention to underlying principles (thermodynamics, feedback and stoichiometry), without delving into system-specific details. On the other hand, this chapter also illustrates two recurring problems throughout book: It remains very generic, and many entries are some steps away from theoretical ecology. I would not have expected to read about Bayesian statistics or Plant dispersal, about Ecosystem Services or Mating behaviour, about Meta-analysis or Urban ecology. All these topics are competently addressed, but they are not obvious choices for an encyclopedia of theoretical ecology. The logic of embracing areas into which theoretical ecology reaches, such as computation, statistics, epidemiology, makes the book much more relevant – but also fuzzy around the edges.

Game theory is a wide, old and fruitful research field for evolution, psychology and economics. Can a 5-page entry do it justice, even when written by Karl Sigmund and his then-still-graduate student Christian Hilbe? It can, and again it is clearer and more abstract than the equivalent Wikipedia page (which is actually very nice, too). However, the average page length of six pages poses a strict limit on the depth to which a topic can be covered. In this particular case I missed the links to fields and research outside ecology.

The entry authors overwhelmingly take an elder statesmen stance (exemplified by the superb entry Phylogeography by Edwards, Devitt and Fujita): they avoid pushing their favourite point of view and paying service to fashion (there is, for example, no entry in the index for “tipping point”). Some, however, present a less balanced view, as is the case for Energy budgets by the father of DEB-theory Kooijman. The entry could more appropriately be titled “Dynamic energy budget theory”.

Finally, to the question whether topics are placed in theoretical and historical context. Here emerge the largest differences among entries. While for example Succession (by Shugart), Metacommunities (Holyoak and Kneitel) and Metapopulations (Hanski) wonderfully cover both the theoretical science and historical development of this theory, most entries are written as if there was no past. Some pay lip service (“has been around for 100 years”), but hardly any entry conceptually links across disciplines (e.g. into mathematics or medicine). They do not explain which alternative

ideas have been rejected in the field or which elements have been absorbed. When opening a page to read, say, about Microbial communities (by Platt, Zee, Mack and Bever), I want to know why this system is any different from classical “macrobial” ecology, rather than only getting a competent outline of microbial model systems alone. (The answer seems to be: they *are* like macrobial systems, just much smaller.)

Overall, the Encyclopedia of Theoretical Ecology is an excellent resource for anybody with a wider range of interests in ecology. It actually defines the field and serves as a starting point as well as a refresher on the basic ideas and

approaches in theoretical ecology across a wide range of fields, but obviously cannot replace topic-specific textbooks for those that want to go into more detail. Its production quality and editorial thoroughness will ensure a lasting usefulness.

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