focus is on philosophy and ideas, and scant attention is paid to applications. For example, he writes: "Chaos control is being studied in chemically reacting systems. . .. Such research could lead to enhanced productivity in chemical processing and could be useful in improving chemical combustion." But not much more detail than references is given for possible applications. Chaos is strictly defined only for deterministic systems and is characterized by the behaviour of orbits. Again, important concepts distinct from chaos are referred to, including probability ideas, statistical mechanics and random fractals.

Chaos theory has relied heavily on computer graphics to follow dynamical orbits and has paid less attention to precise mathematical solutions. This, in part, is because one must accept the loss of analytical solutions for nonlinear equations where slight variations in a parameter can change the behaviour of a solution from periodic to chaotic and because general solutions with these properties have not been forthcoming. Çambel keeps his mathematics to a minimum, using it more as a caption than as a challenge for solution or manipulation. The discussion of entropy from its statistical mechanical origins, through information theory, to the measurement of divergence of dynamical orbits is illuminating and informative (although in the Rényi entropy equation on page 156, $p_i \log p_i$ should be replaced by p_i^q).

Several software packages are used to generate the figures in the book, such as the bifurcation diagram of the logistic map. This is perhaps the best known picture from chaos theory and it is not difficult to program. Bifurcation plots of other maps in the same universality class would have been useful. For example, a comparison of values where bifurcations occur in the sine map and the logistic map would demonstrate the power of universality when it applies.

Biology is one area where I would have liked a stronger emphasis: living organisms with their emergent properties based on the laws of physics are, perhaps, the ultimate complex system. New discoveries, such as control of biological oscillators (including cardiac tissue), stochastic resonance in the peripheral nervous system, spatio-temporal cortical voltage patterns and motor–sensory transient synchronization, are ripe for dynamical treatment.

The book ends with thought-provoking discussion topics and ideas for one's own home chaos laboratory. For the uninitiated, Çambel's book will be a rewarding experience. □

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Biodiversity in brief

Norman Myers

Global Biodiversity: Status of the Earth's Living Resources. Edited by B. Groombridge. *Chapman and Hall: 1992. Pp. 585. £30, $59.95.*

Conserving Biodiversity: A Research Agenda for Development Agencies. By the Board on Science and Technology for International Development, US National Research Council. *National Academy Press: 1992. Pp. 127. $19.00 (pbk).*

Systematics, Ecology, and the Biodiversity Crisis. Edited by N. Eldredge. *Columbia University Press: 1992. Pp. 220. $61.50.*

THE message that we are on the verge of a biotic holocaust is steadily dawning on the general public, and, less strongly, on our political leaders. So there is good cause to welcome three fine books that, in their disparate ways, help to present the message still more forcefully.

By far the best in terms of information and documentation is *Global Biodiversity*, compiled by the World Conservation Monitoring Centre, Cambridge, United Kingdom. It is a splendid compendium on biodiversity from the standpoint of systematics, genetic diversity, species-rich areas, habitat classification, resource economics, international conservation and a host of other topics. The encyclopaedic format is packed with data, making this a collation that is way ahead of anything else in the field so far. It is understandable though regrettable that there should be sundry errors of data — probably a reflection of the fact that the book is too selective in its professional sources. A number of leading experts are not even cited. It is curious too that the book is sometimes not so up to date as it might be generally. And, more particularly, it is unfair to criticize scientists for assertions made a dozen years ago while ignoring subsequent papers in which they have advanced their analyses.

A further limitation is the lack of any substantive assessment of the survival outlook for biodiversity. When the issue in question is the only environmental problem of our time that will leave its mark for many millions rather than a few hundred years, one would expect there to be an appraisal, however summary, of biodiversity's prospects. Nor is there anything on what will surely turn out to be more important in the long run than the loss of large numbers of species: the impoverishing effect on evolution for a period at least 200,000 times longer than humankind has existed as a species. Or perhaps I have missed something during my perusal: the book has no index.

Conserving Biodiversity is a succinct report by an expert panel convened to address some pragmatic challenges of biodiversity conservation. It explicitly avoids a rehashing of biodiversity's importance and decline, nor does it aim for a comprehensive action plan or even a technical research programme. It examines several avenues of research that will enable development agencies to play a larger role in biodiversity conservation within a context of sustainable development. The book succeeds admirably with the first part, but not so well with the second (largely because nobody yet knows exactly what sustainable development means, especially in operational terms). It is soundest on project- and country-level initiatives, with some emphasis on local knowledge.

Systematics, Ecology, and the Biodiversity Crisis consists of symposium papers by leading systematists, taxonomists, palaeontologists and ecologists who explore the relationship between systematics and other biological sciences with respect to our "understanding of the origin, maintenance and loss of biological diversity". As Niles Eldredge asserts, "It may well be that the dynamics of extinction processes will prove to be . . . exclusively in the realm of ecology. But the problems of extinction can be defined, recognized, measured, and assessed only through the tools of the systematist."

His claim is well supported in most of the book. The analyses are generally probing and stimulating, drawing on geology, genealogy, phylogeny, palaeontology and population biology among other fields. Nor is the book unduly theoretical: there are stacks of case-studies from Madagascar, Cuba, Chile, East Africa and the oceans. An illuminating volume. □

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■ The International Council for Bird Preservation (Cambridge, UK) has recently published *Putting Biodiversity on the Map* (£12.50, $23; pbk), which aims to identify priority areas for the conservation of global biological diversity. It is based on a "thorough and rigorous" analysis of bird distributional data. Because they occur in most habitats on land and their taxonomy and distribution are better documented than for any other life form, birds make excellent indicators of biodiversity. The study reveals that about 20 per cent of all bird species are confined to just 2 per cent of the Earth's land surface and pinpoints 221 conservation 'hotspots'.