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The Asian Elephant: Ecology and Management. By R. SUKUMAR. Cambridge: Cambridge University Press (1992). Pp. xiii+255. Price $34.95.

At a time when biodiversity is being imperilled throughout the planet and biologists attempt to stem this tide, they are finding that basic knowledge of natural history is often unavailable to formulate even the most rudimentary management plans for mitigating past and ongoing threats. Given the emphasis that conservationists place upon the charismatic megafauna of the world, it is even more surprising that we should be faced with a paucity of data on one of the largest extant, terrestrial mammals and a species that has played such an intimate role in human culture, the Asian elephant, *Elephas maximus.* Sukumar does a thorough job of compiling the existing information on this species into a well-written survey of the Asian elephant throughout its remaining, but much reduced range. In particular, he presents detailed results from his own research within a single tract in India, a quilt-work landscape comprised of nature preserve, commercial forest and cultivation. His work, however, provides more than a natural history review only of interest to specialists dealing with elephants or Asian conservation.

First, the author has attempted to weave current theoretical concepts from behavioural, evolutionary, population and conservation ecology into the natural history narrative. These concepts include life-history strategies, foraging strategies, population stability and oscillations, and minimum viable population size for conservation. While the paucity of information on the Asian elephant does not permit definitive statements on the applicability of these concepts (and I sometimes took exception with the author's interpretation and application of some concepts), the reference to these concepts illustrates new strategies that might be explored in addressing nagging management issues dealing with habitat preservation, threatened species and animal damage management. For example, an understanding of foraging theory might enable a manager to reduce the elephants' use of agricultural crops by providing a better alternative food or nutritional supplement at appropriate times of the year. This solution would benefit both the animal and people, which is a very different perspective from the perennial desire only to reduce damage and enhance economic output. Perhaps, plans for preventing animal damage should require an aspect of compensation to the wildlife for their lost access to resources. Therefore, the author's weaving of theoretical concepts into a management topic is exemplary and can be used as an educational tool for future managers, who often see basic science as esoteric.

Second, the perspective that the author brings to conservation from his experiences in Asia, especially India, are eye-opening to those of us more familiar with conservation problems and strategies in Western countries. For example, in my Western chauvinism, I found myself asking why the author was concerned over what appeared to be trivial issues compared with protection of the elephant and the small extent of remaining natural area. Why be concerned with an economic loss of crops to elephants in all of southern India that is valued at only $0.5 million (and this is a liberal estimate, because time spent at night protecting fields from elephants was given a lost wage value amounting to 48% of the total loss)? Why worry about elephant damage to fields that results in 7–25% losses in crop production, when frequent droughts reduce production by 25–50%? Why, in a population that exceeds 790 million people, with many dying from malnutrition and preventable diseases, should we be concerned with the deaths of 100–150 individuals killed annually by elephants in all of India? Why worry about the economic consequences of eliminating poaching for ivory which only amounts to a $270 000 a year industry?

While never explicitly answering the above questions, the author gives us the reasons. Consider that India's human population has more than tripled to greater than 790 million in less than nine decades, a population more than twice that in the U.S., but with a landmass only a third of the U.S. Consider that while elephants are protected by law and the cultural/religious attitudes favour elephant protection, the government fosters economic development and human resettlement on the remaining elephant habitat. Consider that the so-called nature preserves are often not what we as 'Westerners' consider preserves, but are areas established to promote exploitation (multiple-use of public forests) that is not conducive to elephant survival. From the author's discussion of regulations to prevent over-exploitation, these would appear to be rudimentary and poorly enforced. Consider that the majority of individuals killed by elephants are heads of families that provide all or most of a household's (5·5 people) net income ($400/household/year) and economic value (GNP:

$1000/household/year). This latter point illustrates the immensity of the conservation problem when the author as part of his overall conservation plan proposes an insurance programme costing $1 per annum for each household to guarantee a household $1200 per annum in the event of the head of the household's death from an elephant, a sum greater than the economic benefit to the household, if the head had not been killed!

The author does an exceptional job providing some innovative possibilities for Asian elephant conservation by reducing human–animal conflict, protecting suitable habitat, and monitoring population trends. One suggestion made by the author was to consider the domesticated Asian elephants now used as beasts of burden for logging as stock in a captive breeding programme. While these actions are necessary, I cannot see how they will be sufficient to preserve the elephant in the wild, since our best intentions and scientific knowledge for conservation cannot stem the tide of human population growth and poverty in many Asian countries, especially India, that threaten the remaining wildlife habitat. Our only hope may be that the good intentions and scientific knowledge advocated by the author help to delay the demise of species until the ultimate threats of poverty and overpopulation can be curtailed. As I put the book down, I asked myself whether the grim image presented by the author foretold the future for Western countries, or whether in our smugness, we are already facing the same problems, but for reasons other than the immediate threats of poverty and overpopulation, since we also are concerned about small losses due to animal damage and the economic cost of conservation.

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Stereotypic Animal Behaviour: Fundamentals and Applications to Welfare. Edited by ALISTAIR B. LAWRENCE & JEFFREY RUSHEN. Wallingford, Oxon: CAB International (1993). Pp. 224. Price £37.50.

Both editors of this book have stong research backgrounds in the analysis of sterotypic behaviour. This has allowed them to contribute profitably to four of the nine chapters, and to attract workers from a variety of other traditions to write the remainder. The result is an important book that brings together, for the first time in a readily available format, the views of ethologists, neurobiologists and pharmacologists. A vast amount of detailed information and theorizing is packed into a relatively concise format, making the book a potentially tough read for those with only a casual interest in the subject. No quick and easy explanation here of, for example, the ubiquitous pacing polar bear. However, by emphasizing what is still unknown, unexplained or unexplored at the boundaries of each tradition this book has the potential to stimulate some exciting research over the next few years.

The structure of the book is interesting. The first few chapters on behavioural analysis overtly set out to deconstruct previous theories, with authors emphasizing the apparent heterogeneity in causation, form and proximate effect of different stereotypies. Middle chapters, dealing with physiological and neurobiological correlates, also highlight differences rather than similarities between stereotypies. The hope seems to be that discrepancies in the results of different workers (e.g. in the association of stereotypic behaviour with endogenous opioid release) may eventually be resolved if more attention is paid to standardizing the type and stage of development of the stereotypy on which they work. It is left to Frank Odberg in the penultimate chapter to attempt some re-synthesis, and to give passing mention to the (seemingly unfashionable) idea of a unifying theory.

The book is not entirely above criticism. Despite the fact that a picture, or at least a visual representation of a theoretical model, could have painted a thousand words, the first diagram does not appear until page 100. One or two author citations are incorrect, and the subject index is of very limited use. The 'emancipation' of stereotypies, for example, is mentioned directly and indirectly many times but the index lists only one occurrence. There are also places where the strain of integrating ideas across so many disciplines shows through. After reading a clear chapter 3 on the motivational basis of stereotypies I was jolted to find motivation described as a 'simple' unidimensional energetic construct on page 166. In contrast to the balanced reviews elsewhere in the book, Wemelsfelder's chapter on animal subjectivity is more idiosyncratic. Some provocative claims are made, including for example, that orientative, explorative and playful behaviour patterns are a direct expression of animal subjectivity. The question of animal consciousness is central to the relationship between animal behaviour and animal welfare, and I felt this section deserved a more considered treatment.