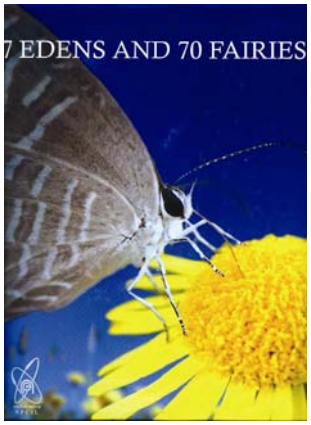
and other models of visual attention. This would have enabled one to see the advantages and disadvantages of approaching the problem from slightly differing perspectives that can explain similar empirical data. Perhaps with different assumptions and approaches, it would have been difficult to achieve in a single book given the current status of the discipline. In addition, perception involves information from more than one modality and it is not clear how the computational perspective presented in the volume can be directly extended to multimodal situations, especially when there is a need to combine information, say vision and touch in the context of object recognition and action planning.

Another aspect that would have been welcome is to extend the modelling or point to the way computational models can be extended to account for recent results indicating the dependence of attentional processes on emotion and motivation. Studies clearly show that emotional stimuli can attract attention and influence the nature of selection and control processes involved in visual perception, especially of socially relevant stimuli. Motivational and goal-driven processes influence attentional processes and these in turn influence visual perception. In addition, as a consequence of attention, information selected or not selected is attached with a value that would in turn affect later perception. This is all the more imperative given that the visual system has evolved to perceive certain classes of stimuli present in a given environment, especially the social environment in the case of the human visual system.

On the whole, this book is definitely recommended for those who want to understand and model visual attention. It would be especially valuable to neuroscientists and psychologists interested in the computational perspective on visual attention. The book fills a large void given the lack of comprehensive books on computational modelling of attention, and one hopes that this book would inspire other books that discuss different computational models of attention in greater detail in future.

NARAYANAN SRINIVASAN

Centre of Behavioural and Cognitive Sciences,
University of Allahabad,
Allahabad 211 002, India
e-mail: ammuns@yahoo.com

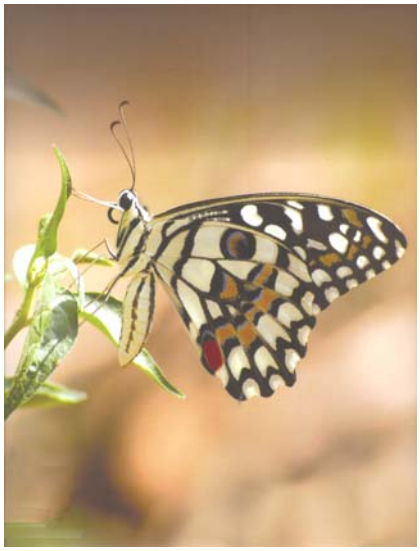


7 Edens and 70 Fairies. J. Devaprakash. Corporate Communications Group, NPCIL, Mumbai. 2012. 200 pp. Price not mentioned.

Butterflies (order Lepidoptera) are one of the well-studied insects in India and hitherto about 1200 species are recorded within its political boundaries. Butterflies, due to their colourful morphology and day-flying nature have attracted the attention of naturalists and artists from earlier times. Like birds, English common names are available for most of the Indian species and they can be easily observed and identified in the field, thus making them popular among students, naturalists, photographers and professional biologists. The adult and larval stages of butterflies are closely associated with specific habitats and food plants. Hence they are widely recognized as good indicators of environment quality and used in ecology and conservation studies.

The earliest record of accurate documentation of Indian butterflies dates back to the 17th century natural history paintings of Ustad Mansur, a renowned artist in the court of Emperor Jehangir. However, it was Carl Linnaeus who scientifically described many common Indian butterflies such as Twany Coster (*Acraea violae* (Linnaeus, 1758)), Peacock Pansy (*Junonia almanac* (Linnaeus, 1758)), etc. With increased interest in butterfly collection during the late 18th and early 19th century in Europe, extensive collections of butterflies were made from different parts of India and many new species were described. This fascination for exotic insects in Europe resulted in the publication of Westwood's (1848) *The Cabinet of Oriental Entomology* which featured colour illustrations of many beautiful butterflies and other insects from the Indian region. During the second half of the 19th century, many important publications were made on Indian butterflies. Lepidopterologists such as E. Y. Watson, T. R. Bell, C. B. Antram, W. H. Evans, Frederic Moore, C. T. Bingham and Lionel de Nicéville significantly contributed to the knowledge on Indian butterflies. The ten-volume colour illustrated *Lepidoptera Indica* by Frederic Moore published between 1890 and 1913 is a natural history classic. The fauna of India volumes on butterflies by C. T. Bingham (1905 and 1907) and Talbot (1939 and 1947) are detailed taxonomic monographs for Indian butterflies and summarize all the information gathered up to that time. The first illustrated field guide to Indian butterflies titled *The Butterflies of Indian Region* was published by Wynter-Blyth in 1957. This popular field guide encouraged many students and amateur naturalists to take up butterfly studies in India. In the last 20 years, many field guides in regional languages and English with colour photos have been published on Indian butterflies. Now a vibrant community of butterfly enthusiasts comprising professionals, students, teachers, photographers and naturalists exists in India. This community exchanges information on biology, ecology and distribution of Indian butterflies through on-line discussion groups.

The book under review is a documentation of biodiversity, especially butterflies of seven nuclear power plants of



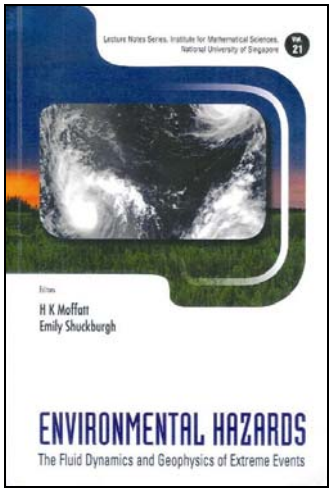
Lovely Lime. A Lime Butterfly, an ace flyer, rests after a long flight.

India. It is attractively designed in a coffee table book format with larger-than-life size photographs of butterflies in their natural habitats. The book is divided into to two parts, viz. 7 Edens and 70 Fairies. The first part provides a brief overview of biodiversity of the seven nuclear power plants of India. The second part deals with the description of 70 butterfly species recorded from the nuclear power plants. The species descriptions are organized according to butterfly families. A brief overview of the family is provided before species description. Each species is illustrated with multiple photographs in its natural habitat. The text part of the species description is divided into subsections such as common name, scientific name, physical characteristics, similar species, distribution and status, habitat, habit, favourite flowers, life cycle and host plants. The book ends with a section on butterfly gardens and an appendix of the species list with nectar and host plants.

Overall the book is well designed and provides useful information on butterflies of the nuclear power plants. The current list of 70 species may not be a complete checklist of the species occurring in the study area. Hence, a detailed checklist of species documented from all the seven nuclear power plants would have added more value to the book. Errors such as map of India without Lakshadweep, Andaman and Nicobar, and Uttarakhand could have been avoided. However, the book is an asset to libraries and useful for creating conservation awareness.

K. A. SUBRAMANIAN

Zoological Survey of India,
Prani Vigyan Bhavan,
M-Block, New Alipore,
Kolkata 700 053, India
e-mail: subbuka.zsi@gmail.com



Environmental Hazards: The Fluid Dynamics and Geophysics of Extreme Events. H. K. Moffatt and Emily Shuckburgh (eds). World Scientific Publishing Co Pte Ltd, 5 Toh Tuck Link, Singapore 596 224. 2011. xiv + 315 pp. Price is not mentioned.

Some extreme environmental events leave such a trail of disastrous consequences that they become etched in our minds. Memories of hurricane *Sandy* of 2012, Fukushima earthquake and tsunami of 2011 and Indus floods of 2010 are still fresh, but those of the Andaman–Sumatra earthquake and tsunami of 2004 have not faded away.

It is however instructive to examine data on such disasters recorded over a long time. Emergency Events Database (EMDAT, http://www.emdat.be) is one such database maintained by University Catholic Louvain, Belgium. It includes those extreme events which result in more than ten reported deaths or reported displacement of more than 100 persons or declaration of an emergency by the concerned government. The database has core data on over 18,000 such events since 1900. Jayawardena, in a chapter in the book under review, discusses the results of a study of 1000 worst natural disasters reported in 1900–2006. Two points deserve special attention. First, floods, windstorms and droughts account for nearly seven out of eight of these natural disasters. Second, windstorms have nearly doubled and floods nearly quadrupled from 1980–1982 to 2004–2006. Evidently, there is an urgent need to marshal all the human resources that we can muster towards attaining greater scientific understanding of such events.

To put it simply, the Earth has two envelopes, atmosphere being the outer and total, and oceans being the inner and partial. Both are rather thin as their height or depth is smaller by over two orders of magnitude than their horizontal dimensions. Prolonged action of gravity has made them stratified and the outermost part, the upper and middle stratosphere, and the innermost part, deep sea, extremely stable. Solar radiation heats up the lowermost part of the atmosphere, the planetary boundary layer, and the uppermost part of the ocean, the mixed layer, where stability is usually the least. Greenhouse effects of certain atmospheric trace gases, moisture and aerosols are well known.

Tilt of the Earth's rotational axis with the orbital plane results in the incoming radiation being larger, in the annual mean, than the outgoing (reflected plus emitted) radiation in the tropical low latitudes (30°S–30°N) and being smaller in the northern and the southern mid and high-latitudes. The resulting equator-to-pole temperature gradient determines the large-scale annual flow patterns of the atmosphere and the ocean. Their most striking feature, two westerly mid-latitude jet streams, is the consequence of Coriolis acceleration. These jets seasonally oscillate around ~30° North or South. The seasonal variation of their speed results in a similar variation in their instability. It is the seasonally growing disturbances advected by the jets, which are primarily responsible for the transport of heat, mostly in the form of latent heat, over mid-latitudes to the radiation-deficit mid and high-latitude regions. When the Earth is in a warming phase, its thermoregulation requires increasing poleward heat transport and therefore, increasingly more heat-transporting disturbances. There lies the built-in connection between the warming planet and increasingly intense large-scale extreme events.

Scientists from the days of Newton and Euler have modelled air and water alike, which the ancient Greeks may not approve, as a fluid, or a continuum (material filling space continuously) that is incapable of resisting change of shape, and they have represented the effects of molecular structure indirectly by fluid properties like viscosity and thermal conductivity. But the resulting governing Navier–Stokes equations have posed formidable challenges. A frequent appro-