BOOK REVIEWS


Measurement of time is fundamental to all living beings. It enables the organisms to judiciously organize their activities (activity and rest periods, foraging, predation, predator avoidance, timing of reproduction, and interactions with specifics and heterospecifics and so on) in relation to daily, seasonal and annual changes in the environment and maximize their fitness. However, the idea that animals, plants and microorganisms can measure time was considered absurd nearly until the mid 20th century. It is around this period, M. K. Chandrasekaran (MKC) began his research career and subsequently made major contribution to chronobiology/animal behavior independently and in association with other researchers working especially in Germany and USA. Study of animal behavior was popularized in India mainly by the efforts of MKC who was also successful in placing this branch of biology on a firm footing by training and inspiring a large number of students to undertake teaching and research in the area. Biological rhythms are widespread among living organisms. They are shaped by the endogenous pacemakers and entrained by the geophysical correlates of the environment. The circadian (daily), lunar-monthly and circannual rhythms are described for several species of plants and animals. Also, the clock genes are now discovered depicting chronobiological events at the molecular level.

The book has VII chapters. The first chapter introduces the subject of chronobiology, the terminology used, methods of study and historical perspective very lucidly. Chapter II describes tidal and lunar rhythms of the marine crab, Emerita asiatica and highlights the ecological relevance of such rhythms. The author details how accidentally he rediscovered the biological rhythm of the crab by working round the clock. Chapter III deals with the circadian clock of the fruit fly (Drosophila) and describes the mechanisms governing the eclosion and developmental plasticity. Chapter IV deals with the biological clocks and behaviour of insect bats. It describes many interesting aspects of behaviour of the bats with respect to foraging, recognition of their pups, and factors entraining their emergence from caves and so on. Chapter V deals with the biological clock of the field mouse (Mus booduga) and elegantly describes maternal entrainment of the activity rhythms of the pups. Chapter VI deals with the human circadian rhythms of sleep/wakefulness, REM sleep, problems of shift workers, isolation experiments in male and female subjects, influence of isolation on temperature rhythms and menstrual cycles, role of social cues in time estimation, the head clock, implications of circadian rhythms in health, medicine and psychiatry. The last chapter entitled ‘Looking Back’ narrates the author’s sojourn from his graduation days to the present position. All chapters are written lucidly and much of the technicalities are avoided so that even a non-specialist/non-biologist can understand the essence of chronobiology with considerable ease and clarity. The sequel in which the various chapters are arranged is logical. In particular the last two chapters are highly readable and inspiring.

A novel feature of this book is that it reads like the author’s memoir providing glimpses of his discoveries and experiences, in India and abroad; interaction with many contemporary scientists, establishment of laboratories for behavioural studies, and isolation facilities for human studies on par with the international standards and so on at Madurai University, documenting carefully and elegantly, in a manner that will surely inspire young as well as senior scientists. The book provides a deeper insight on how plants, animals and humans measure time. I greatly enjoyed reading this book. Certainly, the book deserves a place in the personal library of every biologist.

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1. See Rajinder Singh and Falk Riess, Mahatma Gandhi and his four chances for the Peace Nobel Prize, Diskus, 2000, 10, 43–48.