possess high medicinal value like *Phyllanthus amarus*, *Solanum nigrum* and *Withania somnifera*.

A dedicated chapter on Grasses, Sedges and Cat tails enlists 22 species belonging to 20 genera. Some of the species possess excellent ornamental value that include *Pennisetum pedicellatum*, *Pennisetum polystachyan* and *Cyperus alternifolius*.

Some of the interesting plants that love water and marshy places are collated in a chapter on Plants of Water and Marsh in which 17 species belonging to 15 genera are described. The anaesthetic effect of the florets (on tongue and mouth) of toothache plant (*Spilanthes oleracea*) is very interesting.

A brief description on Flowering Parasites educates us about the unique survival ability of a group of plants that parasitize trees, shrubs and herbs. The majestic araucaria, cupressus, thujas and cycads are described briefly under non-flowering seed plants. The lower members of the plant kingdom: the algae, fungi, lichens, mosses and ferns are well illustrated notwithstanding their botanical description.

I earnestly request the readers to identify those species listed in a chapter on Yet to be Identified Species and help the author to document the same in their future endeavours. The efforts of the author to analyse the flora in terms of relative abundance of plant groups, predominant plant families and the morphological forms are noteworthy.

With a pocket size layout, the two volume treatise is a valuable guide for researchers, students, garden lovers, garden curators and botanists to identify the plants and understand them. The photographs are impeccable and aid the reader in easy identification of the species. The initiative taken by the Indian Institute of Science to document the flora of their campus needs to be replicated in the major botanical gardens, public and private gardens of fame, green campuses of educational and industrial establishments in the country to document the plant wealth that India possesses.

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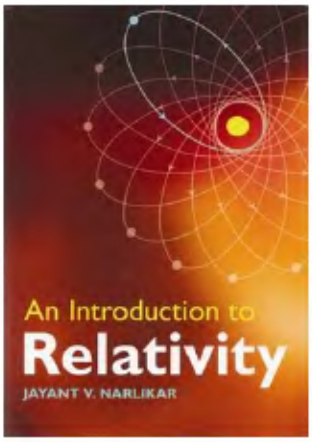

An Introduction to Relativity. Jayant Narlikar. Cambridge University Press. 2010. 363 pp. Price: £ 30.

The book under review is, slightly paraphrasing the author's own description, a little enlarged and updated fresh rewrite of his popular 1978 text. As it is perhaps the most recent addition to a growing number of entry-level texts in a field long dominated by advanced classics by Synge, Landau and Lifshitz, Ellis and Hawking, Chandrasekhar, and, more recently, Wald, a comparison with other introductory books may be useful. Taking these up in chronological order of appearance, but without any claim to completeness, *A First Course in General Relativity* by Bernard F. Schutz has gone through 16 editions from 1985 onwards. The treatment of the requisite mathematics of tensors, covariant differentiation and curvature is detailed, but not at the expense of shortchanging the physics. Cosmological models, gravitational radiation, stars and their gravitational collapse, black holes and the Hawking effect are discussed in some detail. Overall, however, in comparison with Narlikar this is a book oriented more towards theory than observational astrophysics issues. As in all the books considered here, D'Inverno's 1992 *Introducing Einstein's Relativity* starts with the special theory of relativity, then goes on to the general theory to discuss geodesic and field equations, followed by their static black hole and wave solutions. Unlike Schutz who brings in forms, D'Inverno treats manifolds entirely by coordinate-based tensorial methods. It is suitable for self-study by students whose mathematical background does not extend beyond advanced calculus. There is a highly compressed but adequate discussion of cosmological models. On the whole, the emphasis is again more on theory than on a detailed discussion of astrophysical phenomena. *Exploring Black Holes* (2000) by Taylor and Wheeler bypasses the mathematics of forms and tensors and focuses on physical aspects of selected metrics, and in particular, on static and spinning black holes. There is much original material especially on the Kerr metric, presented in typical Wheeleresque style mixing metaphors, mathematics, pictures, insights and queries. Some readers will enjoy this approach, but there are bound to be others who will find it irritating and distracting. *Gravity* (2003) by James Hartle, on the other hand, is a book aiming at a somewhat more advanced student, who is led through geometrical ideas and special relativity to the motion of particles in curved spacetimes, and, subsequently, into a detailed discussion of astrophysical phenomena, gravitational waves, cosmological models, the Big Bang and inflation. It is only in the last one-fifth of the book that the standard mathematical machinery of general relativity and the Einstein field equations are presented. They are then applied to astrophysical systems such as relativistic stars, pulsars, neutron stars and gravitational radiation from binary stars.

Narlikar's 2010 text, combining a detailed treatment of Riemannian geometry with a variety of cosmological and astrophysical applications, is closest to Hartle's in choice of material and pedagogical level. One of their main differences is that Narlikar dispenses with special relativity quickly, and then, setting up the required mathematical framework, introduces Einstein's equations before discussing applications. The advantage of this approach is not only logical order, but economy of presentation. One thus avoids going back and forth, borrowing advanced formulae for use in a specific early context, and re-deriving them more systematically later. This perhaps accounts partially for Narlikar's roughly 350 pages to Hartle's 550 (on the other hand, the advantage of Hartle's self-described 'physics first' approach is that one can cover a large number of topics and perhaps postpone the full theory to a later course). Within this relatively limited size, Narlikar manages to discuss experimental tests of general relativity, gravitational radiation and the proposed experiments to detect it, relativistic astrophysics, gravitational lensing, Kerr–Newman black holes and black hole thermodynamics, cosmological models, the early universe, primordial nucleosynthesis and the formation of light nuclei, finally bringing the reader up-to-date on the theory of inflation, its experimental support and what is known about dark matter and dark energy. The wealth of up-to-date experimental and observational data places the book somewhere between a work of reference and the introductory text it claims to be. For further information, the reader is referred to Narlikar's other Cambridge University Press volume *An Introduction to Cosmology*.

It would have been surprising if Narlikar made no reference to steady-state cosmology after delving into the mentioned subjects, but the discussion is limited to five pages; it is clear there is no underlying agenda of challenging the prevailing general Big Bang scenario. All in all, the book succeeds in being clear and concise, while simultaneously leaving out little of importance in the subject. As in the other books, there are many instructive exercises in this volume (the instructors' job is made easier by password protected solutions to the problems), but a unique feature of Narlikar's is the large number of solved examples; these will undoubtedly be appreciated especially by beginners. It is a very suitable introduction to the field for an advanced undergraduate or a first-year graduate student.

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Annual Review of Biophysics, 2009. Douglas C. Rees, Ken A. Dill, Michael P. Sheetz and James R. Williamson (eds). Annual Reviews, 4139 El Camino Way, P.O. Box 10139, Palo Alto, California 94303, USA. Vol. 38. x + 407 pp. Price: US$ 84.

The *Annual Review of Biophysics* has been at the forefront of presenting timely reviews and latest trends in biophysics over the years and the 2009 issue is no exception to this tradition. In recent years, this series has also been able to effectively capture the rapidly changing face of biophysics, and the 2009 issue strongly endorses this aspect. Whereas most of the reviews in this issue are scholarly compilations by leading researchers in the respective fields, some reviews also attempt to propose bold new hypotheses.

Every issue of *Annual Review of Biophysics* typically begins with an autobiographical sketch of an illustrious person which makes interesting reading. This year's autobiographical sketch is by a distinguished biophysical chemist, Sunney I. Chan. He takes the readers through a fascinating journey of his growing up in the suburbs of San Francisco in very modest settings, being born to Chinese immigrant parents, having attempted to find Chinese roots of education in Hong Kong, and eventually ending up at the leading schools of UC Berkeley, Harvard and Caltech. This sketch also gives insights into the early evolution of spectroscopic methods, especially nuclear magnetic resonance (NMR), and their application to membrane proteins. There are some interesting anecdotes that a reader would not get to read in a typical research paper. For example, the crystal structure of the membrane bound monooxygenase is that of an inactive enzyme, and consequently the crystal structure does not reveal the trinuclear copper centre, which is an important component of this enzyme's active site. It is activated by molecular oxygen, which then transfers a singlet oxene to methane at the active site. The author thus highlights a significant message, i.e. the importance of sample preparation, whether for spectroscopic, diffraction or any other experimental analyses, before the experimental measurements are actually undertaken.

Among the contemporary challenges that have arisen due to rapid advances in experimental techniques, is the storage, analysis and management of large data. It is anticipated that this challenge is going to get even more severe in the near future with rapid advances in instrumentation. The article on Bioimage informatics (pp. 327–346) lists some of the issues in management of large imaging data. The challenges are similar to the early days of management of sequence data gathering and storage (e.g. EMBL or GenBank), or the protein databank (PDB). Database managers usually have to deal with numerous file formats, uniformity among different experiments (or lack of it), dynamic and heterogenous nature of the data, etc. The OME community (Open Microscopy Consortium) has been working towards meeting some of these challenges. In recent years, the consortium has expanded its scope to include data modelling, file format conversions, data management and image-based machine learning. This review nicely captures the efforts that are being made towards meeting the challenges in image informatics. Although the primary target of this consortium is biological microscopists, I wonder if the crystallographers might be interested in similar ideas in gathering and storing raw diffraction images. There has been an increasing uneasiness among crystallographers over the lack of information in the public domain on the early experimental steps before the actual structure determination, and an OME-like consortium might help addressing these questions.

For the practitioners of X-ray crystallography, there are three articles that are of interest. One of them highlights the advances in crystallizing membrane proteins using lipidic mesophase (pp. 29–52). The use of bicontinuous lipid mesophase for crystallizing membrane proteins has emerged only recently, and promises to be an exciting development in membrane protein crystallizations. However, many details about its mechanism are still not clear. The author, Martin Caffrey, attempts to provide a hypothesis on the mechanism of crystallization. Another review of interest to the crystallographers is by Fourme *et al.* (pp. 153–172), which details advances in high pressure crystallography, especially as applied to protein crystals. The applications of high pressure crystallography to inorganic and small molecule crystals have been in practice for several years. However, instrumentation aspects for similar applications in protein crystallography are not yet optimal. This article describes in detail various issues involved in instrumentation, diffraction data collection and potential applications of this technique to biological problems. This description is useful to those who would like to undertake similar research problems. The authors, however, make certain claims, for example, disassociation of oligomeric proteins, or the shortening of hydrogen bonds under high pressure, which might need better justification before being widely accepted.