

BOOK REVIEWS

which would be detected, or into other particles that may have evaded detection. Thus the LHC is the most probable place to see beyond the standard model particles, or their ghostly signatures in processes involving only standard model particles. Thus, the absence of any real signature would then translate into bounds on masses of hitherto undiscovered particles, or their couplings to known particles.

Prior to the discovery of the Higgs, and the tau-type neutrino, the last standard model particle to have been discovered was the top-quark at the Fermilab's Tevatron collider by the CDF and Dzero collaborations. It has also been studied in great detail now at the LHC, with the CMS and ATLAS collaborations gathering a large amount of data on the top-quark. Frederic Deliot *et al.* provide a detailed review on the 'Properties of the top quark' which is compulsory reading for any student of particle physics. In the quest to go beyond the standard model, one of the most popular avenues has been string theory. This theory purports to be the theory of everything and also advertises itself as a candidate for a quantum theory of gravitation, or at least one that would address the problems of conventional quantum theories of gravitation. A popular variant of this theory is given by 'TeV-Scale Strings' which has been reviewed by David Berenstein, where the phenomenological signatures of such a model are discussed in great detail. Of the many new ideas introduced by string theory, not the least significant are those introduced by Juan Maldacena, which in turn led to the work of Son *et al.* by applying such ideas to hydrodynamics and matter at high densities such as the quark gluon plasma, thereby predicting a bound on the ratio of the viscosity to the specific entropy to be a universal constant. Thomas Schaefer in his article 'Fluid dynamics and viscosity in strongly correlated fluids' reviews this fascinating field.

While it is widely known that the LHC is a proton-proton collider, it has an equally important role as a collider of very heavy ions, in particular to replicate on Earth the conditions that must have prevailed soon after the Big Bang. Edwin Norbeck (deceased) *et al.* in 'Hard-scattering results in heavy ion collisions at the LHC' provide a refreshing review of the results in this sector. None of these machines and experiments would have

been possible but for the enormous advances made by accelerator physicists and engineers in the preceding decades, which render possible highly energetic as well as focused beams, without which event rates would have been abysmally low. Michael Blaskiewicz in 'Cooling of high-energy hadron beams' reviews the accomplishments and the challenges in this frontier area. Hasan S. Padamsee in 'Superconducting radio-frequency cavities' describes how without these no high energy physics experiments would have been possible.

Jens Erler *et al.* in 'Weak polarized electron scattering' explain how scattering polarized electrons provides an important probe of the weak interactions due to the intrinsic parity violating nature of the weak interactions. High precision experiments here may well provide us our first glimpse of physics beyond the standard model.

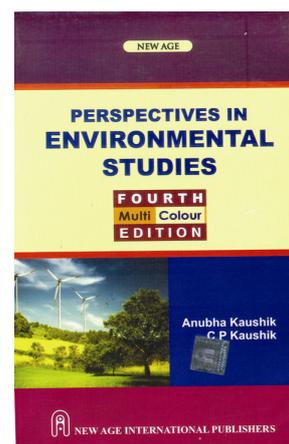
The existence of neutrinos was predicted by Wolfgang Pauli and were applied by Enrico Fermi to nuclear phenomena. Now, neutrino research has become a sensitive probe of the cosmos, because they are produced everywhere, in solar interiors and elsewhere. Such work has been made possible by completely mind boggling experiments defying human imagination. They are of gigantic scale and on far corners of the earth, if not deep beneath our feet. IceCube is one such, built in the clear ice of the South Pole, whose physics is described in an article by the same name by pioneers Thomas Gaisser and Francis Halzen. Takaki Kajita reviews 'The measurement of neutrino properties with atmospheric neutrinos' based on information coming from interactions of cosmic rays with the atmosphere.

To summarize, this volume is an outstanding collection of topical and authoritative articles on several subjects and represent the state of the art. No library would be complete without it.

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Perspectives in Environmental Studies, Fourth Multi Colour Edition. Anubha Kaushik and C. P. Kaushik. New Age International Publishers, 7/30A, Daryaganj, New Delhi 110 002. 2014. xviii + 357 pp. Price: Rs 200.

The fourth edition of *Perspectives in Environmental Studies* is the latest EVS guide book by Anubha Kaushik and C. P. Kaushik. Both authors are well versed in the subject and have, through this book, attempted to provide an overview of the host of environmental concepts that students need to understand. Given that these concepts are broad, multidisciplinary, fast growing and extremely active, the authors have attempted to provide a comprehensive overview without compromising on important details. The last 20 years have seen an overwhelming panoply of important discoveries and data in the field of environmental science. It is exceedingly difficult to keep up with current developments in these areas, let alone judge their long-term significance. Consequently, to bridge that gap, the authors have attempted to provide the most recent examples that will help a reader understand the gravity of some of the most significant global and local environmental issues that are currently a concern.

While covering a wide range of environmental concerns, the cause, impact and possible solutions for each issue have been clearly explained in a manner that gives the reader a clear understanding of the interconnectivity of development and sustainability. Each chapter is divided into sub-chapters for ease of understanding and throughout the book, for each sub-chapter, relevant examples and case studies have also been provided. Given that the book under review is

primarily targeting Indian readers, most of the examples provided are Indian based. However, the authors have taken into consideration the global nature of environmental issues and ample examples of international case studies have also been mentioned, as and where required.

In order to evoke inquiry and self-learning, the authors have written each chapter and sub-chapter in question-answer format. The title for each chapter is a question, with the content of the chapter serving as an answer. This is an effective pedagogy for students as it prepares them well for an examination in the subject. To further aid the process of study, each chapter is followed by a few pages of objective questions. Each question group is based on the chapter preceding it and no answers are provided. The reader is expected to refer to the chapter to answer the questions. The questions have been designed to help the reader summarize and understand the content rather than analyse the test-taking ability of the reader. Consequently, the questions are relatively open-ended and allow for opinion-based essay-type answers. The objective questions are either in the form of 'fill in the blanks' or 'multiple choice questions', all of which are designed to test specific details of the chapter.

A thorough understanding of the subject necessitates an understanding of all aspects of it. Consequently, the authors have taken care not to ignore the technical aspects of environmentalism. Throughout the book, the science of ecosystem functionality, nutrient flow, energy and a plethora of more 'scientific' concepts have been covered with detailed explanations, examples and simple diagrams. Difficult concepts, such as vertical and horizontal zonation or animal

respiration have been illustrated with simple yet effective diagrams. Well-designed diagrams of this kind help the reader to visualize the concepts being explained and thereby better understand them. Students learn better when presented with imagery rather than plain text. The authors have further developed explanations through the use of statistical information in the form of graphs and tables. However, given the constantly changing nature of knowledge and information, it would be recommended that any reader verify the information provided with alternate sources. While the authors have utilized detailed diagrams throughout the book, the content is still very 'text-heavy' which can often be a problem for students. While a few of the chapters are punctuated with imagery relevant to the text, much of the book is text-heavy. It is imperative that books pertaining to the natural sciences be illustrated with pictures.

The 'Environmental pollution' section of the book is particularly useful as it not only mentions and defines the various forms of pollutions (soil, air, water, etc.) but also the sources of these pollutions and their effects on humans and other organisms. The section covers, in detail, the various solutions to environmental pollutants, which is especially useful as a majority of these can be applied to real world situations. As is the case with the rest of the chapters, relevant case studies are also provided. For each major pollution issue, the authors have provided a range of technical and socio-environmental solutions that will help in abatement. By covering the entire gambit of solutions, the book serves as a guide, not only for engineering and science students, but also sociology students who would wish to tackle these problems from a community and societal standpoint.

In keeping with the theme of a holistic approach to environmental education, the authors have devoted an entire section to 'Social issues and the environment'. The content in this section is aimed at a different demographic of students, mainly sociologists, but would still be of interest to science and engineering students as well. In fact, this section points out the important interconnectivity of environmental issues. Human beings are very much a part of the equation and environmental problems have considerable ripple effects on the economy and

society as a whole. This section covers a multitude of such problems, including the impacts on marginalized people, women, etc. The authors have also touched upon topics which are usually not associated with environmental issues in most textbooks, but in fact should be, such as HIV/AIDs, Human Rights and Family Planning, since human population is interrelated to every environmental issue. It is crucial that neo-education focuses on drawing connections between issues. In addition, there is a growing realization that tackling poverty, hunger, and other social issues require a better understanding how each of these issues is linked to environmental degradation. Consequently, colleges, universities and other educational and research institutes across the world are encouraging more multi-disciplinary research. This book thus prepares the student to tackle environmental issues in tandem with social and economic issues as it clearly points out the many linkages. This book also covers the legality of environmentalism including relevant laws and legislation. However, while the book does provide an overview of the relevant legislation, it in no way encompasses the entirety of the existing laws and legal case studies. Readers would thus be cautioned not to utilize the book as a legal aid. However, bearing in mind the fact that additional reading is always necessary, especially for a subject so diverse, the authors have provided a comprehensive 'Reading list' that, when combined with the information in this book, will give the reader a clear understanding of current environmental issues.

In summary, the fourth edition of *Perspectives in Environmental Studies* is an informative, comprehensive and useful book that not only covers the science of environmental education, but also interlinks the various socio-economic issues associated with environmental degradation. Consequently, this book can be utilized not only by students as part of their education but also by the lay person who is simply interested in the subject.

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Non-banded Armadillo: useful in Leprosy research