



The Little Book of Planet Earth. Rolf Meissner. Copernicus Books, 37 East 7th Street, New York, NY10003, USA. 2002. 202 pp. (English translation of the original German edition) Price not stated.

Exhaustive tomes, written more for specialists, are available about the earth but since the 1970s, application of advanced instrumental techniques aided by computer technology to problems in geoscience has resulted in fresh thinking and revision of many of the existing views. A simple book incorporating them for non-specialist readers is what Rolf Meissner, a former Professor of Geophysics at Kiel, Germany offers in this publication. After dwelling on the ideas of the ancients about the earth's place in the solar system, Meissner narrates how growth of scientific inquiry led to better understanding of the planetary system and how, for example, the discovery of radioactivity heralded innovative approaches to solve baffling features of the earth. The role of seismology in deciphering the structure of the earth's interior, tracing subducted crustal slabs, locating thermal anomalies, exploring mineral deposits and the study of the earth's free oscillations are emphasized. A full chapter on the earth's magnetic field discusses how this has helped in reconstructing the earth's palaeogeography through palaeomagnetism, which in turn contributed to the subject of magnetic stratigraphy, magnetic reversals, sea-floor spreading and plate tectonics.

No book about the earth will be complete without discussion on the physics and chemistry of the minerals in the crust and mantle of the earth and the author has not ignored them. Highlights of compositional shifts of minerals and rocks with increasing depths, metamorphism of rocks or their breakdown to sediments and sedimentary rocks are well documented. The author aptly points out how these rocks formed at various times of the earth's history serve as useful records to interpret the likely

geological scenario of those times. For example, it is only through such records that we infer that the earth's interior was much hotter during the turbulent pre-Archaeon times and that the thin crust that formed and survived was subjected to intense volcanism producing early crustal segments of greenstone-granulite belts, magnesium-rich komatiites and diamondiferous kimberlites. Such rock records have also helped to infer about development of oxygen in the atmosphere. The author traces how the oceans were oxygenated first with the emergence of photosynthesizing forms of marine life. The banded iron formations of ferric oxide are products resulting from such oxygenation when the dissolved ferrous iron became oxidized to these ferric forms; and likewise, the continental red beds of the Proterozoic indicate rise of oxygen in the atmosphere. The book rightly covers recent ideas about the fluctuating nature of early atmosphere and climate caused by a surfeit of volcanic gas emissions, reduced solar luminosity, a highly tilted earth-axis (obliquity-oblateness view) all of which led to global snow cover during Neoproterozoic.

Rolf Meissner has justifiably devoted considerable space to the revolutionary plate tectonic theory, tracing its roots from Alfred Wegner's concept of continental fits to the shaping of the full-fledged theory during the 1960s. The important aspects of this theory and related orogenic processes like mountain-building and basin formations are explained with good illustrations. Towards the end, a chapter brings out new concepts and discoveries coming out through seismological studies like seismic tomography, seismic anisotropy, seismic boundary evaluation, terrane concepts, delamination processes and plume theory. The last few pages deal with fundamental aspects of the origins of life, both exogenic and endogenic, the molecular chemistry involved and evolution of life to higher forms with passage of geological ages. An epilogue discusses the available non-renewable resources of the earth and emphasizes the need to tap alternate sources of energy like the nuclear, solar, wind and geothermal forms.

The book is mainly a description of the earth through the eyes of a geophysicist, particularly that of a seismologist. However, those readers who may be looking for some of the important contri-

butions and breakthroughs achieved through geochemical, petrological and palaeontological research, which have also considerably enhanced our understanding of the planet earth, during the last couple of decades, will miss them.

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Flora of Udupi. K. Gopalakrishna Bhat. Indian Naturalist, Udupi. 2003. 913 pp. Price: Rs 1200/US \$ 50.

The area covered is the Udupi taluk (Udupi district, Karnataka), a representative sector of the west coast of the Indian peninsula and notably species-rich, including coastal and mangrove elements. About 1242 species of flowering plants belonging to 694 genera from 171 families are treated with 288 text figures and 160 colour photographs. A short introduction on location, physiography and vegetation (pp. 1–6) is followed by key to the families (pp. 7–20), the floristic treatment (pp. 21–870) and indices both to the scientific names (pp. 871–903) and to vernacular names (pp. 904–913). The text is clearly set forth with adequate use of bold face and italics, and is free of error.

Each family is treated in the following sequence: family characters, key to genera, generic characters, key to species and treatment of species. Each species, in turn, has the correct name [often with one or more of the common synonym(s)], a short description, occurrence in the field with duration of flowering and rounded off with the vernacular name(s).

The author deserves the genuine gratitude of the user community for his dogged perseverance in achieving this low profile but essential, user-friendly *vademecum*. Ensuring a wide net of assistance has been decisive for success: resourceful benefactors took care of the finances (only his sympathetic wife may know how much has been siphoned off from the family budget to fill in gaps!), the regional herbaria for plant identification, preparation of text figures and photographs. I shall indicate a number of positive features and conclude with some points for attention for the future.

The keys are conventional, but carry the stamp of a practitioner. The nomenclature is generally up to date (till about 2001), and mentioning of the more common synonym(s) helpful. The descriptions are methodical and generally comparable. Giving the duration of only the flowering (and not of fruits) vouches for authenticity of information! The photographs are carefully chosen and are a help for identification, despite indifferent colour reproduction in some cases. The text figures, by and large, represent the less known species, though in some genera like *Lindernia*, *Murdannia*, etc. several species are illustrated. All in all, a worthwhile contribution.

The following remarks are less a criticism than an aid for improvement. The work, being truly a 'pocket flora' (covering only a taluk, and without the nomenclatural apparatus), can dispense with the family and generic characters, or at least have them considerably shortened, in favour of enriched species descriptions. This will significantly shorten the text without sacrificing essential information. The text figures have suffered from smudging probably owing to excessive reduction from the original plate and/or heavy shading. Indication of the scale of the figures would have been helpful. Exposing the draftsman to some good recent illustrations would have made for comparable plates as also avoiding diagrammatic sketches, especially of stamens and

pistil(s). All *genera* being illustrated may be kept as an ideal. Separate indices to text figures and photographs would have been helpful. The herbarium, as the resource base, should be carefully curated. A 'consultation herbarium' with 1 or 2 sheets per species can serve the uninitiated user, and avoid damage to the resource herbarium.

Though the price is not excessive, the book is beyond the ordinary means of the user community (students and teachers, etc.). Well-wishers contributing towards a subsidy for publication costs is essential to ensure that such a really useful work does not largely remain confined to library shelves.

These suggestions can be taken into account in preparing a vernacular edition since reaching out to the non-English speaking public door-delivery of knowledge of plants to the commoner is ever more decisive in involving the wider community to the care of nature.

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Standard Model for Beginners. K. K. Sinha. Allied Publishers Pvt Ltd, A-104, Mayapuri Phase II, New Delhi 110 064. 2002. 113 pp. Price not mentioned.

The current standard model of particle physics is a partially unified quantum gauge field theory for electromagnetic and weak interactions, which exhibits a broken $SU(2) \times U(1)$ symmetry together

with the $SU(3)$ symmetric quantum chromodynamics (QCD) of strong interactions. It gives a satisfactory account of the interaction of fundamental particles, which are quark, leptons and gauge bosons.

K. K. Sinha has made timely and worthwhile attempts to describe the above features of the standard model to beginners. However, there should have been more step-by-step derivations of some of the important results, if the text is for beginners. Perhaps the author expects the students to work out the underlying steps. The review of the recent electron-positron collider experiments to confirm the standard model, exploration to prove the existence of Higgs boson and the problem of mass generation are nicely given in this abridged version of the standard model.

Again, a book written for beginners must follow the historical chronology of the development of the subject. For example, the gradual refinement of the form of current-current interaction originally suggested by Fermi, the discovery of parity violation which led to the vector minus axial vector ($V-A$) structure of current and Cabibbo's hypothesis that the weak currents of hadrons have definite $SU(3)$ transformation properties required for the description of decay of strange particles in the current-current coupling scheme, are not dealt in proper sequence. The author has mixed elementary and advanced topics, which makes learning difficult. The book contains some misprints as well. Graduate students will find the book useful because there are few books written at an elementary level on this difficult subject, avoiding the complexity of quantum field theory.

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