

that 'Pakistan will have to "compensate" this disproportion by building up its nuclear potential, particularly by accelerating the production of nuclear materials for military use, continuously improving warheads, increasing the number of warheads' (p. 79). During the discussions that followed Novikov's presentation, Sun Xianghi of the Institute for Applied Physics and Computational Mathematics, Beijing, China refers to 'The only function of nuclear weapons is to deter nuclear attacks. It can also play a role in wars, to prevent major conventional wars among the bigger powers You can't use them in general or in low-level conflicts. So limited deterrence means some kind of deterrence of war fighting and combat. It is nonsense. It is not possible. We never take this kind of view seriously in China' (p. 84).

The paper 'Nuclear weapons, deterrence and stability in the international system: South Asian dynamics' by Sri-dhar K. Chari (NIAS) began with a definition of stability 'as absence of war or conflict, or the absence of crisis situations that might either lead to conflict or impede "normal" relations' or 'in broader terms, stability can be thought of as order' (p. 87) and proceeded to provide some theoretical constructs of models to look at strategic stability. This paper brought to the fore the underlying reasons for strain between India and Pakistan going back to even 1000 years. The only direct aspect of discussion relevant to stability in South Asia was a question posed by Raja Ramanna: 'Has the time come when we can say that armaments, nuclear or otherwise, will not be passed on to other countries secretly, which adds to the threat in South Asia? In South Asia, it is an important threat' (p. 104).

One can go on highlighting through a few quotes – if not summarizing – several interesting, overlapping issues raised and discussed at this round-table meeting. It is a good compendium of a cross-section of views of a few select strategic thinkers. NIAS and Rajagopal and Sri-dhar deserve appreciation for making this neat booklet available to the lay public. Notable by their absence are several other strategists – some who may hold counter views – especially from India and Pakistan. This reviewer would have liked to read a paper reflecting the views of Raja Ramanna, who spearheaded the nuclear programme in India in the seventies; he has had the privilege of a ring-

side view of the goings-on in the government and in the cabinet in his various capacities in the subsequent decades. Sad to say, this is sorely missing. As stated by Balakrishnan Rajagopal elsewhere, 'Ours has become the age of threats. India threatens Pakistan with a "limited war" and a complete nuclear annihilation if it uses nuclear weapons first. Pakistan openly threatens India with a "first strike" nuclear option if it as much as moves its forces one inch across the Line of Control'. There does not seem to be any discussion of such realities that may arise if further confrontational postures prevail in the subcontinent. Since the prospects of stability in the subcontinent are somewhat obscured, the strategists and other intellectuals would have to continue to gaze at the crystal ball and present the changing scenario as it unfolds. Of course, there is hope in that if yesterday's 'enemy no. 1' can become today's 'friend no. 1', one may witness new relations emerging in the fast geo-political dynamics in the subcontinent.

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Concepts in Space Science. R. R. Daniel (ed.). Universities Press (India) Pvt. Ltd., 3-5-819, Hyderguda, Hyderabad 500 029. 2002. 392 pp. Price: Rs 325.

The book under review is a collection of thirteen articles, each of which has been authored by eminent scientists in their respective branch of science. The central theme of the book is to provide an understanding of space environment, the way it is probed, and the way it has altered and revolutionized our thinking of human limitations. It must have been a challenge for the authors to present complex themes and ideas in a simple and concise manner that would interest even those

uninitiated in the subject. The book does, by and large, succeed in meeting the stated objective of providing the younger generation the awareness of the achievements and excitement of space science. However, space science is so all-encompassing that the topics covered are necessarily diverse, ranging from biology to astronomy and space platforms to material sciences and so on. Not many readers might be interested in all the contents, but anyone with even a casual acquaintance with science would find some exciting article in the book.

The book opens with a general introduction to the fascinating scientific frontier, with a brief historical perspective and a prelude to the detailed articles that follow. A bird's-eye view of the issues in space environment and the amazing opportunities it offers to different sciences succeed in arousing the curiosity of the reader.

The two sections dealing with space platforms give detailed account of different stages of technological advances, from simple balloons to deep-space probes. Some interesting examples, like how a group of college students conceived, designed and built payloads for sounding rockets or how the *Pathfinder's* walk-about on Martian surface was controlled from the earth, could be inspiring to young readers. Students would perhaps appreciate more schematics, diagrams and photographs and less of descriptive text.

There are so many astonishing aspects of our immediate surroundings, the atmosphere, that it is exciting to learn how nature has worked through billions of years to build this home, the planet earth for us. The 'Air around us' is a well-written, informative piece, although one wonders if the discussion occasionally goes beyond the theme of the book. At places, the contents are profound and inspiring, such as the 'Origin and evolution of the atmosphere', but some others appear mundane.

Remote sensing using space platforms is so much a contemporary development that the article 'Eye in the sky' can be a refresher study even to a practitioner in this area. This topic is often more appreciated than understood and this article, therefore, is good reading material for all. Remote sensing, both as a science and as a tool for resource management, is witnessing rapid advancements and what can be covered in a popular article is very limited. From this point of view, the

distinct format of this article with a long list of references and material for further reading seems to have met the editor's approval.

The 'Climate in the tropics' should perhaps have followed immediately after the 'Air around us'. The authors have adopted a style that definitely addresses the youngsters and have brought out how much the satellites have aided in understanding the climate and the weather, specifically in the Indian context. The awesome combination of space technology and computer technology that is the lifeline of such fields, is evident in the article.

'Changing face of the earth', due largely to the human dominance of this planet is elucidated in a rather too brief an article, reminding one that the space does cover the earth too. Curiosity is aroused by many interesting remarks like 'more water goes through the vegetation into the atmosphere than flows through all the rivers in the world', but the scientific descriptions that would satiate the curiosity are missing.

Astronomy has always been an exciting science and the present-day space science and technology have drawn inspiration from this branch. In the past four decades the space missions, in return, have had great influence on astronomical observations – confirming or revising the beliefs on the evolution of the cosmic bodies and making exciting new discoveries. The sections on 'The solar system' and 'low and high energy astronomy' take the reader far from the hitherto geocentric science to the frighteningly expansive and active deep space. The difficulty of condensing a large amount of exciting information into a few pages of popular reading is perceptible. Yet the articles are refreshing, especially the one on 'Low energy astronomy' whose language, style and clarity will meet the appreciation of young readers.

Though the effects of space environment, in particular of reduced gravity, have been of interest since long, it has gained immense importance in the last fifty years due to the necessity of proper functioning of equipment and living beings in space missions. But man is also attempting to exploit the now-available space environment for furthering the conventional science and technology, such as material processing. The article on 'Material science in microgravity' delineates some advantages and issues, but

strays away from the central theme of space science. In 'Living in space', one finds a lucid description of how microgravity among all environmental effects, would have a severe influence on the earth-based biological systems trying to conquer space. There is also a good case made for manned missions. The author, in the inimitable Russian style of writing popular science, answers many questions that many of us have in our minds, but hesitate to ask.

Going a little further, in 'Astrobiology – A new dimension is life science', the author shares his personal experiences and excitements with the reader. The article is rather too extensive to be appreciated by non-biologists, but throws light on many unexpected and surprising findings in astrobiology. The author is very candid in admitting failures and limitations of the studies so far, but offers good arguments for continued activities in this field in future.

A book of this nature cannot possibly avoid the ever-fascinating question of 'Life in other worlds' or the search for extraterrestrial intelligence. Although it strikes a different note from other pieces in relating to commonly perceived space science and technology, the article makes a good reading with some interesting but less-known references, such as Miller's experiment and Drake's equation.

In the end, the editor, returns to summarize the contents of the book and provides a glimpse of the future activities and strategies in space science. As he puts it, the promises are greater, the tasks harder and the demands on technology more than ever before.

Bringing out a compendium of this type is indeed a difficult task. Each author writes in a different style, format and level. The book does justice to its proclaimed readership of school and college students, but falters at places by dwelling too long on simple concepts and leaving a few important ones unexplained. There are indications that some of the articles are at least a few years old, which makes a difference in this rapidly-advancing field. Some articles seem to be specific to the Indian scenario, while others address a wider readership. In general, more figures and pictures could have been used to illustrate the concepts effectively and reduce the text to some extent. At the same time, some of the plates could have been replaced by good line diagrams (examples of which are com-

ponents of sounding rocket and orbital parameters) and some others could have been deleted without any loss to the descriptions. There is also repetition of ideas, simply because each author appears to have worked on his script in isolation.

Space science, as a theme, permeates into many basic disciplines and is not easily amenable to confine within the covers of a single book. It is likely that each topic presented here can be found elsewhere; but is equally unlikely that all these topics are found together at one place. From this point of view, this book is an outcome of a commendable effort. Not many readers might like to read all articles, as many of them appear too distant from their basic interests. But the reviewer wishes to recommend reading of all the articles to any serious pursuer of space science, especially the young unbiased ones who can discover for themselves many astonishing and fascinating facets of space science.

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Green Pharmacy. James A Duke. Scientific Publishers, P.O. Box 91, 5a New Pali Road, Jodhpur 342 001. 2002. 508 pp. Price: Rs 850.

Herbs or medicinal plants have attracted serious attention of scientists only in the last two centuries. But primitive man who lived close to 'earth' – the planet, depended on plants for both food and medicine. Mankind had realized very early the value of herbs as a 'gift from the divine' to heal both bodily and mental ailments.

While being dazzled by the wonders performed in scientified laboratories – particularly now (in the 21st century) with such tremendous advances in genetics, molecular and cell biology, we tend to forget that plants were synthesizing and storing potent and useful products