

binoculars and notebooks replaced them. G. P. Sanderson's *Thirteen Years Among the Wild Beasts of India*, published in 1878, still remains a classic. Col. F. T. Pollock on the other hand, was spot on when he compared the temperament of an elephant under stress, to that of women – 'uncertain, coy and difficult to please'. He also correctly measured the approximate shoulder height of an elephant by multiplying the circumference of its forefoot by two – a fact that was well known to the elephant catchers in Ceylon long before Pollock's time.

Reading Lahiri-Choudhury's carefully selected excerpts makes it clear that a number of hunters contradict each other on the basis of their own experiences and ignorance. There is considerable confusion over the longevity of the species in the wild. While Tennent, on the information he received from knowledgeable natives estimated it as 70 years, he also quotes one Colonel Robertson, who found a domesticated elephant in Ceylon, whose records indicated that it might have lived to more than 140 years! Sanderson betrayed his ignorance of the average life span of an elephant in the wild by putting it around 150 years. One of the most renowned travellers of the seventeenth century, Jean-Baptiste Tavernier too mentions in his classic, *Travels in India* that 'an elephant's age sometimes amounts to 120 or 130'. Furthermore, the exploits of the British hunters were published largely for the consumption of the British audience both in the colonies and in the mother country. Such publications appeared in *Country Life* and *Field* in England. The natives did not exit in the subconscious of the colonials. An exception is Sanderson, who acknowledges the fact that 'the elephant is essentially a native's animal. Natives alone have fully studied his peculiarities and classified him into castes; his capture, training and keeping are in native hands, as well as the trade; and the native standard of merit regulates the market...' The exploits of the colonial hunters do not advance the cause of elephant conservation today. Elephant and wildlife conservation in the Indian sub-continent grew out of the innate concern of the Buddhists and Hindus for the welfare of the animals. However, the need to set up special reserves for protecting wildlife, including the elephant, arose from a concern by the very people who exploited wildlife – namely the British

colonial hunters – who feared that at the rate they were exterminating wildlife, there would be no game left for hunting!

Lahiri-Choudhury's book provides interesting reading for the wealth of first hand information it contains on the elephant both in the wild and in captivity. As many of the primary sources, Lahiri-Choudhury has consulted are no longer readily available to those of us working outside India, the book becomes a valuable adjunct. It also helps us understand the time and culture and mind-set of the colonials who took to the sport of big game-hunting. If there is a message in the book, it is that an understanding of the past could be the beginning of wisdom.

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**The Khulgad Project – An Experiment in Sustainable Development.** K. S. Valdiya (ed.) Gyanodaya Prakashan, Nainital, India. 1998. 134 pp. Price not stated.

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The book under review reflects the coordinated efforts of a team of sincere scientific and social workers. Sustainable development is the need of the hour today. The organization called Central Himalayan Environment Association (CHEA) at Nainital has done a commendable job in performing this experiment on sustainable development selecting the Khulgad catchment as the project area. The selection of the site is ideal and the vision for attempts to develop the hill region is extraordinary.

K. S. Valdiya has compiled and edited the set of relevant papers in a lucid and befitting manner. All the papers truly reflect the aspirations of the people. The paper entitled 'Building effective and lasting organizational culture for developmental changes' by D. P. Joshi, por-

trays a vivid description of the project pertaining to the national scenario of the state-of-the-art CHEA's objectives and modus operandi, its goal and the administrative and financial management of the embarked project. The paper entitled 'Appropriate land use and development of sustainable agriculture in Uttarkhand: Learning lessons of the Khulgad micro-watershed project' by S. L. Shah and T. C. Upreti, reflects the appropriate land use strategies, the method of identification of technology package, modus operandi of programme implementation as well as application of the project. However, the diagrams have not been properly captioned.

Water is generally scarce in the hill regions. As such, it must be well-managed and conserved. The paper entitled 'Management of water resources: Spring sanctuaries' by S. P. Rai *et al.*, opines that the discharge patterns indicate that the amount of spring discharge is controlled by geological structures and secondarily by land use pattern and the nature and extent of vegetal cover. Such an original finding has further been emphasized by their assertion that the principle underlying the development of a spring sanctuary is that the rainwater infiltration in the identified re-charge area be induced or increased by resorting to engineering and biological methods so that there is an augmented discharge in the springs downslope.

U. C. Shah's paper entitled 'Increasing farmer's income through horticulture' is very attractive and encouraging in view of the simple method of generating income and employment through community horticulture.

Male dominance is sometimes a curse in the Indian society, particularly in the tribal community in the hills. Anuradha Pande in her article on 'Gender perspective in the Khulgad project' has brought out the worries and aspirations of the women as well as the challenges they have taken up in resource management; also, the efforts made by them in bridging the gap by setting up different women's groups in managing the resources.

The fragile environment of today needs immediate ecodevelopment for the sake of human beings and other organisms living in it. A. D. Moddie has very lucidly and vividly described sustainable ecodevelopment through a case study.

Modern industrial development could sometimes be considered as a curse in view of the different health hazards involved in such industrial developments. But ecofriendly developments are blessings to us. R. D. Khulbe and L. S. Bisht have summarized the importance of environmental health awareness programme in such projects.

Finalization of the project report by D. P. Joshi *et al.* highlighting the whole project implementation programme with particular emphasis on the importance of planning and sustainable use, is unique.

The efforts displayed by the project staff in aggregating the womenfolk and forming different women's organizations like Mahila Mangal Dal and Pani Panchayat are worth emulating.

Most of the photographs are well-printed and to the point. The book begins with detailed contents and ends with the appendix indicating the names of the CHEA project staff and the project management committee, as well as the list of contributors who are well-experienced in their respective work.

The publishers deserve commendation

for publishing this book which has a large audience.

The Ford Foundation has really chosen the right organization with the right persons in advancing the grant for this kind of social work and basic research.

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## PERSONAL NEWS

### Chanchal Kumar Majumdar (1938–2000) – *An obituary*

Chanchal Kumar Majumdar, an exceptionally gifted condensed matter physicist, passed away in Calcutta on 20 June 2000. His death was so unexpected that it came as a rude shock to the scientific community.

Majumdar had a brilliant academic record in Krishnanagar and Calcutta. Subsequently he obtained his doctoral degree in physics from University of California, La Jolla in 1965 under the supervision of Walter Kohn who went on to win the Nobel prize in Chemistry in the nineties. With Kohn he proved a theorem (the Kohn–Majumdar theorem) on the continuity of the bound and unbound states of the Fermi gas. From 1965 to 1966, Majumdar held a post-doctoral position in Carnegie Institute of Technology (now called Carnegie-Mellon University), Pittsburgh before joining the Tata Institute of Fundamental Research (TIFR) in Mumbai. From TIFR, he had another post-doctoral stint in the University of Manchester. In Pittsburgh and Manchester, Majumdar came in contact with stalwarts like James S. Langer and Sam F. Edwards, though he chose to work independently on the analytic properties of the Onsager solution of the Ising model and non-exponential stress relaxation in glasses.

TIFR days were the most productive for Majumdar. He had a group of several bright students and with them, he tackled a variety of problems with deep mathematical insight. They include the three-

magnon bound state equation, Heisenberg antiferromagnetic chain with known ground state, the critical isotherm of the Ising model and of the Lennard–Jones gas, the band structure of cerium, spin waves in finite magnetic chains, etc. It is interesting to note that during those days in India, what we now know as condensed matter physics was dominated by lattice dynamics. Majumdar was a rare



exception amongst his peers. He was well-versed in then-current subjects of statistical mechanics and critical point phenomena, and their applications to electron states and magnetic properties of solids.

Perhaps the most important contribution of Majumdar for which he is internationally known is the work (with Dipan Ghosh in 1969) on the exact enumeration of the ground state of an anti-ferromagnetic

chain, with specially ascribed values for nearest neighbour and next nearest neighbour interactions. This work on what is now part of the folklore as the Majumdar–Ghosh Hamiltonian is a wonderful illustration, as it were, of how open-ended basic research can be. Almost two decades later the model led to a prototype ‘resonating valence bond’ state, in the context of high temperature superconductivity. One other point is noteworthy here. The years 1965 to 1975 had not yet seen the growth of computational physics as is extant in India today; Majumdar indeed was a pioneer computational physicist of our country. In 1976, he was awarded the Shanti Swarup Bhatnagar prize in Physical Sciences, and in the same year was elected Fellow of the Indian Academy of Sciences.

The decade from 1976 to 1986 marked a new phase in Majumdar's life. As Palit Professor of Physics in Science College of Calcutta University and Head of Magnetism/Solid State Physics Department of the Indian Association for the Cultivation of Science (IACS), he devoted himself to education, teaching and curriculum development. In addition, he switched interest to down-to-earth experimental studies, applying his early work (1965–1970) in the theory of positron annihilation spectroscopy to radiation damage, and also involving Mössbauer spectroscopy of corrosion and inhibition of iron ores in eastern India. His other experimental contribution included the enhancement of