almost equally startling to find that after exposure to wind and rain for centuries, it has remained unrusted and the capital and inscriptions are as clear and as sharp as when put up fifteen centuries ago'. The rustless nature of the pillar is attributed to low carbon and high phosphorus content of the iron, microstructural heterogeneity and adhered protective film. In 2001, Baldev Raj and his collegues from Indira Gandhi Centre for Atomic Research (IGCAR), Kalpakkam made detailed studies of the DIP using acoustic methods, *in situ* metallography, XRF, etc. Balasubramaniam and his collegues from IIT, Kanpur are making in-depth studies on the dust characterization of DIP and other historical iron objects using various surface analytical techniques like optical microscopy, SEM and Mössbauer Spectroscopy.

India was also famous for the 'magical' Wootz steel (1.6% C), which was exported to the Middle East for making high-quality Damascus swords for several centuries. Many researchers have the conviction that the science and technology of Wootz steel can be harnessed to develop a super-plastic high strength alloy for present-day automobiles (p. 335).

Copper was the first metal that dominated human history. In Mohenjodaro, copper of 99–100% purity was made. Pure copper was made using silica as flux. The technological prowess of ancient Indian metallurgists can be gauged by the massive 5th century AD statue of the standing Buddha at Sultangung, Uttar Pradesh, 2.25 m high and weighing one ton, discovered in 1864. Metal workers of those days knew alloying copper with zinc, tin, etc. In South India, the technology and art of making bronze icons of exquisite symmetry and beauty was well known. The IGCAR group studied some of these bronzes using metallography, XRF, SEM, etc. They observed that the science and technology of South Indian bronzes is relevant to today's investment casting methodology used for making gas turbine blades and many other intricate high-technology components (p. 335).

A brass vase containing 34.54% zinc found in Taxila provides evidence that making pure zinc metal was known to Indians before the 4th century BC. Archaeological investigations in the 1980s in the Zawar region of Rajasthan led to the spectacular discovery of distillation equipment for industrial-scale production of zinc metal. Zinc extraction is a difficult technological process. The design of the furnaces used in Zawar was copied by Willam Champion in 1748 for his plant in England. The debris of over six lakh tons of used retorts around Zawar corresponds to about one lakh tons of zinc metal production during 13th to 18th centuries. The pioneering process of zinc production in India was formally recognized in 1989 by the American Society of Metals as an 'International Historical Landmark for Metallurgy'. The IIT Kanpur team has a programme to recover an estimated 5000 to 6000 tons of zinc metal present in the huge amounts of used retorts and glassy slag (p. 131).

Here are a few comments: Chapter 11 on 'Copper and Copper Alloys in Archaeological Perspective' by Prasanta Dutta, which reads like a treatise on metallurgy of copper and its alloys with little to say on archaeology, is unnecessarily long for the intended readership. To some extent the same might be said of chapter 10.

In chapter 5, p. 85 last para, it is mentioned that 'the common components of a sensor system are shown in this table', the table is not there. In the same chapter on p. 87, para four, the mentioned next diagram does not exist. In chapter 3, p. 48, the author mentions that the AMS technique of carbon dating increases the age determination range by a factor of 10^2 to 10^3 compared to the β counting method. He mentions on p. 51 that the AMS range is 10^5 yrs. This is a clear inconsistency. In chapter 1, pp. 5–6 archaeologist M. P. Joshi is referred to as M. C. Joshi.

As examples of exciting challenges that await modern archaeologists one may mention two items which appeared in the June 2005 issue of *National Geographic*. A whole township was discovered a few years ago in Hanoi Vietnam, while digging for constructing a new National Assembly House. CT scan investigations were carried out in January 2005 of the mummy of a Pharo, who died young in Egypt 3300 years ago. The scan pictures, analysed by a team of experts, revealed that the Pharo was nineteen years old when he died, and was 5 ft 6 inches tall and thin.

The publication of the book under review is timely. It contains a mine of information useful to traditional archaeologists as well as other scientists interested in archaeology. The editor has done an excellent job of bringing together so many expert contributors and making the compilation useful.

P. RAMAKOTESWARA RAO

7, Saras Baug, Deonar,
Mumbai 400 088, India
e-mail: prkrao@vsnl.net

Disaster Management. Harsh K. Gupta (ed.). Universities Press (India) Pvt Ltd, 3-5-819, Hyderguda, Hyderabad 500 029. 2003. 152 pp. Price: Rs 470.

India is one of the most vulnerable countries in the world to a plethora of natural disasters. While floods and droughts are recurrent disasters in a few states, tropical cyclones hit most of the east coast, which is more than 1000 km long, on a regular basis. About 57% area of the country is highly seismic in nature. The Himalayan region of the Alpine belt is seismically one of the most active intra-continental regions anywhere in the world. The current seismic activity is the result of the continental collision between the Indian and Eurasian plates.

The book under review is a compilation of seven research papers by eminent people engaged in scientific research in the area of natural disasters, edited by a geophysicist, Harsh Gupta (presently Secretary, Department of Ocean Development, Government of India). His overview on major and great earthquakes in the Himalayan region in the book portrays his vast knowledge and experience in the field. Gupta served in many important committees of the Government of India and currently is chairman of a committee set up by Department of Science and Technology on seismic research planning and monitoring in the country.

Scientific data collection and research in natural disaster formally started after 1880, when a Famine Commission submitted its report. After Independence, we had four major droughts (1965–67; 1972–73; 1979–80 and 1986–87) and some major floods, capturing the nation's attention completely, so that the entire disaster management efforts were focused on these two types of disasters. The Ministry of Agriculture was assigned the role of providing relief and rehabilitation. As these were the main focus areas, limited resources were provided for preparedness and mitigation. The two articles on flood and droughts by Kale and Rao gave a comprehensive account

of the Indian approach to these two hazards and their management. Environmental management is directly linked with the disaster mitigation. It is a proven fact that if the slopes and mountains have vegetation cover, it will reduce the frequency of landslides and will help in soil and water conservation. P. S. Ramakrishnan's paper endeavours to establish the link between conservation of natural flora and vegetation with natural disaster mitigation.

India's vast coastline, especially the entire eastern cost from West Bengal to Tamil Nadu and part of the western coast of Gujarat and Maharashtra, is highly vulnerable to tropical cyclones. India has made considerable progress in implementing a forecasting and warning system for tropical cyclones in the last two decades. The entire coastline is covered by radars to monitor any small depression in the Bay of Bengal or Arabian Sea. We have developed a system to give warning to not only the concerned states and districts, but also our neighbouring countries. Kalsi, who has had a long career with the India Meteorological Department, deals with these aspects of cyclones with the help of a few cases like the Orissa super cyclone in 1999.

Similarly, India's long Himalayan mountain range in the north, is geologically a young range of mountain chains. Every year, we face several hundred landslides from J&K to the northeastern states and there is enormous loss of life and property. R. K. Bhandari has presented two case-studies of the Alaknanda tragedy in 1970 and Malpa tragedy in 1998. These case-studies depict that we can learn lessons from our past disasters and study the cause of such devastations to improve our system.

In 1994, I had edited a book with a similar title *Disaster Management* published by the Indian Institute of Public Administration, New Delhi, with assistance from UNDP. After almost a decade this new book provides a fresh perspective and sufficient material for researchers in the area of disaster management and will serve as a reference book.

VINOD SHARMA

NSET, GPO Box 13775,
Kathmandu, Nepal
e-mail: cop.peg@nset.org.np

MEETINGS/SYMPOSIA/SEMINARS

International Conference on Science and Spirituality in Modern India

Date: February 2006
Place: New Delhi, India

The conference will also include several panels or papers of a more theoretical kind under the rubric 'issues in science and spirituality'. Under this head, several issues such as origin of natural sciences and of systematic spiritual practices. Science and spirituality: defining the terms; Religio-spiritual sources of modern science; Science as a form of spirituality and spirituality as a type of science; Time in science vs spirituality; Space in science vs spirituality; Causality in science vs spirituality; The methodologies of science and spirituality; What is in science that is not in spirituality?; What is in spirituality that is not in science?; Objects of study in science vs spirituality. More specialized topics include: Science in the new age Supracortical Consciousness; Nested hierarchy of nature; Elements of subjective experience/elements of private self; Uncertainty as the bridging element between classical determinism and divine certitude; Embodied approach to death phenomenon; The big picture for the science for consciousness; Further evolution of the cortical being; Yoga and consciousness; Meditation and consciousness; Psychiatry-psychoanalysis and consciousness; Ontology-epistemology and consciousness; Aesthetics and consciousness; Ethics and consciousness.

Contact: Dr Makarand Paranjape
School of Language, Literature and Culture Study
Jawaharlal Nehru University
New Delhi 110 067, India
Phone: 011-2670 4663

Trombay Symposium on Radiation and Photochemistry (TSRP-2006)

Date: 5–9 January 2006
Place: Mumbai

Topics include: Fast and ultra fast processes; Inorganic, organic and polymer radiation and photochemistry; Gas phase photochemistry and dynamics; Charge, electron and energy transfer processes; Radiation and photochemistry for environmental protection; Radiation and photochemistry of drugs and antioxidants; Industrial applications of radiation and photochemistry; Radiation and photochemistry in biology and medicine; Radiation and photochemistry of advanced materials; Role of radiation and photochemistry in nanosciences.

Contact: Dr A. C. Bhasikuttan
Convener, TSRP-2006
Radiation and Photochemistry Division
Bhabha Atomic Research Centre
Mumbai 400 085, India
Phone: 91-22-2559 0300/5396
Fax: 91-22-2550 5331
e-mail: tsro2006@barc.ernet.in