BOOK REVIEWS

INDIAN MONUMENTS THROUGH THE AGES. By Indian Society of Engineering Geology (1992) Oxford and IBH Publishing Co., Pvt. Ltd., 66, Janpath. New Delhi 110 001, 198 p.

This volume containing very good colour, and black and white photographs (> 130), of many of the famous temples and monuments of India has been brought forth surprisingly by the Indian Society of Engineering Geology on the occasion of its Silver Jubilee Celebration at Calcutta. The Society has duly acknowledged that most of the material is provided by the Archaeological Survey of India (ASI). Possibly the attempt to bring out this publication was motivated to show how our ancients have used practically every type of material available in the country in constructing temples and monuments of great beauty. Needless to say that in most of the cases the proximal availability of rocks, durable strength, capacity to stand ravages of weathering, and existence of expert sculptors were the factors that prompted most of the monarchs to embark upon planning and executing temples and historical monuments, throughout the length and breadth of the country.

It would be noticed that practically every type of rock has been used in these constructions. A map with locations of all the temples and monuments dealt with, is given. Site plans and illustrations (of ASI) to scale, of some (~ 15) of the famous temples follow.

From here on, almost every page is a description of a temple/monument with its location, the duration of construction, the organisations (invariably kings of different dynasties), materials used, the style of construction, its present state etc. If some of the structures have been affected by weathering, it is not necessarily because the sculptors did not know about the inherent defects, but because they had to make good with the material that was readily available. In some cases they knew quite well the susceptibility to weathering of some minerals more than others, for example, they usually chose olivine-free basalt (p. 36). There are rock caves, paintings, sculptures on *in situ* rocks, and constructions with and without mortor and lime.

Ajanta, Ellora and Elephanta caves are in the Deccan Basalts (pp. 24–45), but Udayagiri and Khandagiri caves in Orissa are in Attgarh sandstone (p. 20). Sanchi stupa in Vidisha in Madhya Pradesh is dry stony masonary (p. 14). In Hanamkonda near Warangal, A.P., the thousand pillared temple is carved out of granite (p. 116). The monuments of Mahabalipuram near Madras (p. 62) as well as many temples in Tamil Nadu are sculptured in Charnockites. Usually basic rocks are the material of which deities are made, as in Bodh Gaya (p. 54) and Nalanda (p. 51). In Avantipur in Kashmir, fossiliferous limestone has been used (p. 74), whereas Miliolitic limestone is the rock used in Dwarka (p. 96) in Gujarat, marble in Mt. Abu in Rajasthan, and also in the world famous Taj Mahal near Agra. Vindhyan sandstones have been extensively used in many temples and monuments in Rajasthan, Madhya Pradesh and Uttar Pradesh. The famous Khajuraho temple near Panna in M.P. has granite besement, but all others are in Vindhyan sandstones (p. 78). In Belur in Karnataka, the exquisite carvings are in—soapstone (p. 108), the sun

temple in Konark in Orissa is in Khondalites (p. 126) and many in Kerala are in laterites (p. 142). Even quartzites and quartzite phyllites have been used in Chamba in Himachal Pradesh (p. 94). Brick constructions, even centuries ago, were common as seen in the excavations at Nalanda in Bihar (p. 51). Many in West Bengal were in terracota, using good quality clay (p. 188). Thus it can be seen that practically every type of rocky and earthy material has been used since centuries in this country and most of them have stood the ravages of time.

While the publication is definitely praiseworthy (though pricewise. only libraries can afford it), it does not possess the stamp of an engineering geologist, in the sense that besides just mentioning the rocks that have been used, a few appendices could have been provided giving important particulars like location, physical and chemical properties, strength etc., of different types of rocks used in construction. The Society is to be congratulated, however, for bringing out such a useful publication.

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'APPLICATIONS OF MATHEMATICAL MORPHOLOGY FOR PATTERN STUDIES', 1992. Editors: S. V. L. N. Rao and B. S. Prakasa Rao, Geo-Engineering Department, Andhra University, Visakhapatnam. Publisher: J. P. Laser, Graphics, Akkayyapalam, Visakhapatnam-530 016. About pages 100, Price: Rs. 150/- US $ 15.00 Paperbound.

This booklet contains sixteen assorted papers on applications of mathematical morphology and image processing for pattern recognition in geoscientific studies using remote-sensed data and computers. Relevant applications as proposed and partly demonstrated include: those for Droughts, Texture characterization, Drainage extraction, Pattern recognition based on satellite digital remote-sensed data. Geoscientists may obtain useful concepts of mathematical morphology and image processing for geological feature/pattern extraction.

The editors have done a fine job of collecting a large number of scattered information on mathematical morphology, image analysis, etc., in a single cover which would help the computer oriented geoscientist to analyze digital remote-sensed data and obtain better inferences. Paper Nos. 1, 2, 3, 4, 6, 7, 10, 12 seem to be more relevant for geoscientific research and applications and would be of value to students and professionals.

However, the extreme brevity of papers often leave several concepts unclear and undefined; which necessitate the original publications to be perused. References, Tables and Figures are often incomplete, which is rather annoying. Sometimes text and Figures are incomplete and ambiguous (such as page B 11, relations between resolution, record length and spatial frequency; Page F 9A, B: Figure 4 Harmonic Numbers are not included, etc.). Moreover, the high price at Rs. 1.50 (or US $ 0.15) per page would tend to exclude personal purchases. In spite of the above drawbacks, the book fills the need for a quick summary of mathematical morphology and image processing techniques that are useful to geosciences and hence recommended for libraries.

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