

between water required for drinking and water required for cleaning, washing and other purposes which can be recycled and made available over and over again. The suggestions given in Chapter 15 are valuable and it is hoped municipalities throughout the country will arrange to collect used water (except water used for sanitation), construct recycling plants and arrange for a system aimed at supplying recycled water to every household. This requires very extensive planning and management.

Sarvothaman is probably the only author on the subject of water who has laid emphasis on desalination as an important way of augmenting water resources especially in the coastal regions. The process through intensive research, has to be made economically viable.

The last chapter deals with the management part – who is to do the job. Too much reliance on government machinery and the crowd of civil engineers who pervade the Public Works Departments of most of the States may not have the desired effect. They are overly ingrained in traditions and not receptive to new technology. A new management group, young in spirit, bold in taking decision, and armed with the new technologies (information, space and nuclear) should take over this important business of meeting the water needs of our growing population. Sarvothaman is to be congratulated for his efforts in focusing our attention on the various aspects of the most precious of all resources – water.

Email: kttts@bgl.vsnl.net.in

B P RADHAKRISHNA

MEASUREMENTS OF GEOMORPHOLOGY AND HYDROLOGY AND CHANGES WITH TIME by John A. Moody, Robert H. Meade and David R. Jones
Circular 1246, U.S. Department of Interior, U.S. Geological Survey, 2003, 100p (Free on application to USGS, Information Services, Box 25286, Denver, CO – 80225-0286)

The efforts of the pioneers in the study of the land with all its attributes were mainly to provide “a scientific basis for planning how society might best live in harmony with the land and its natural resources.”

About two centuries ago (1803-1806) Meriwether Lewis and William Clark were the first to explore part of the Trans-Mississippi west of the United States and give an account of the numerous observations they made including some on the geomorphology and hydrology. Though the observations were mainly confined to the narrow corridors of the rivers along which they made the traverse (mainly along Missouri, Yellowstone, Snake and Columbia rivers, besides Ohio), there was enough material to extrapolate on the nature of land and its use farther inland on both sides.

The ‘geomorphology’ section deals with erosion, sediment transport and deposition processes (pp 11-62) and the ‘hydrology’ section deals with runoff processes including river characteristics, hydraulic geometry and river velocities (pp 63-83). The measurements that they made with the instruments at their disposal of the various features and parameters associated with riverine morphology are reasonably close to what has been found later by sophisticated instruments and in many cases have helped to arrive at the changes that have taken place during the last two centuries.

Water colour paintings made of the landforms of those times and the later colour photographs (terrestrial and oblique aerial photographs), interspersed with hand-drawn sketches of the flow pattern of the sections of the rivers with notes, and the extensive quotations (though here and there with archaic phonetic spellings) from the observations of the above pioneers enrich the text and make a very interesting reading material. A number of clearly labeled block diagrams, coloured sketches and profiles (p 40) drawing attention to the geometry of the features as understood now are welcome additions to appreciate the advances made in our knowledge of the same phenomena, which were mostly described earlier in qualitative terms. Their observations on the flow in the rivers in different seasons of the year (partly collected from the local people) fairly tally with the hydrographs prepared later (p 69). Major changes in the characteristics of the rivers as observed now are mainly due to the construction of dams and reservoirs. It is surprising that they took pains to measure the velocity of the flow (using logline and reel) to be helpful to the navigators (p 71).

Whereas all the above are dealt with in three chapters (83p), chapter 4 is an excellent illustrative summary with photos and sketches (15p) of the changes that have taken place in some sections of the traverses made by them (pp 87-91).

What strikes the reader is the faithful and unbiased observations of Lewis and Clark which now form as a database for the later earth scientists to note the changes and arrive at plausible inferences that caused them, over a

time. This publication should be of interest to students of fluvial geomorphology.

Email: rvaidya31@sify.com

R. VAIDYANADHAN

PRECAMBRIAN CRUSTAL EVOLUTION AND METALLOGENESIS (with special reference to Central India). Edited by K.L. Rai and S.C. Patel. Recent Researches in Geology, v.17, Hindustan Publishing Corporation (India), New Delhi – 110 002, 2004, 144p., Price: Rs.375/-

The volume includes eleven papers presented at a National Seminar, held at Indian School of Mines (ISM), Dhanbad in January 1993, on "Precambrian Crustal Evolution and Metallogenesis". South Asian Association of Economic Geologists (India Chapter) funded Publication of this volume. Highlights of the papers are as follows:

- Recognition of two distinct tectonomagmatic blocks viz., the Bundelkhand Protocontinent in the north and the Deccan Protocontinent in the south, separated by a Proterozoic collision zone christened as the Central Indian suture constitutes the crux of the paper authored by R.N. Padhi et al. (pp.1-27).
- Son-Nannada Rift predates the (Middle Proterozoic) Satpura orogeny and the deformation of Mahakoshal Group (Son valley) in the Jhirkadandi Pluton was probably a consequence of the Middle Proterozoic deformational episode according to the contribution of Dheeraj Pande et al. (pp.28-40).
- S.K. Chellani et al. advocate that Polyphase deformation accompanied by anatexis, regional metamorphism and granitisation characterize the Betul Precambrian belt. The greenstone assemblage of Bargaon Group is considered a favourable loci for base metal and gold mineralisation (pp.41-53).
- Genetic aspects of base metal mineralisation around Oranga in Surguja district (M.P.) is the central theme of the paper authored by Suresh C.Patel et al. (pp.54-63).
- R.N. Mishra attempted a general discussion of some modern concepts in ore genesis with reference to Indian scenario (pp.64-76).
- The Proterozoic Eon appears to be an ideal period for uranium mineralisation and hence Proterozoic Basins constitute the prime targets for search of uranium mineralisation. This is the essence of the well

documented and synthesized contribution by P. Krishnamurthy et al. (pp.77-100).

- Lineament controlled metallogenesis *inter alia* identification of 'fertile' pegmatites that may host rare earths/metals, in parts of Chotanagpur gneissic complex in the northern part of Purulia district, W.Bengal constitutes the core of the presentation by A.K. Talapatra (pp.101-107).
- K.G.Bhoskar et al. attempted conceptual modelling of Tungsten mineralisation in the Sakoli basin Central India (pp.108-119).
- Precambrian metallogeny of Singhbhum Protocontinent has been succinctly traced in the contribution authored by K.L. Rai (pp.120-123).
- A well known segment of the Indian Precambrian Shield is the Bundelkhand Massif in Central India. M.E.A. Mondal and Syed M. Zainuddin proposed an Andean type plate tectonic configuration, during Archaean time in this region (pp.124-135).
- A lucid account of the Precambrian Phosphorites of Chattisgarh Supergroup in Durg district, Chattisgarh is presented by M.W.Y. Khan and Arunangshu Mukherjee (pp.136-144).
- The editors have done a good job not only in pooling up the papers presented in 1993 but also presented them in an effective manner. The present publication is volume number 17 under the Recent Researches in Geology series brought out by the Publisher and deserves our appreciation. The volume is fairly priced. It holds good promise of a reference manual on the focal theme "Precambrian Crustal Evolution and Metallogenesis."

Plot No.22, Flat #22
Naimisam, Srinagar Colony
Hyderabad – 500 073

P.K. RAMAM