authors did not find any Tertiary conglomerate (of Shella Formation age) lying over Langpar Formation. The earlier workers also reported that the Tertiary sequence above Langpar Formation is represented by Shella Formation in the form of alternate sandstone and limestone. So, the observation by Chaturvedi and others that conglomerate overlies the Langpar Formation needs rechecking. Is it so that the conglomerate occurs at a higher contour because of faulting? In Muktapur area, we have recorded repetition of Mahadek and Langpar Formations as a result of E-W trending fault.

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ECONOMIC POTENTIAL OF THE HEAVY MINERALS OF THE BEACHES BETWEEN BARUVA AND BAVANAPADU, ANDHRA PRADESH by D. Rajasekhara Reddy, V.S.S. Prasad, V. Malathi, K.S.N. Reddy and D.D. Varma, Jour. Geol. Soc. India, v.57, 2001, pp.443-449.

A.R. Nambiar, Geological Survey of India, Op.: Karnataka and Goa, Vasudha Bhavan, Kumaraswamy Layout, Bangalore 560 078 comments:

1. The authors have estimated inferred reserves of the order of 9.4 million tonnes of heavy minerals in the beaches between Baruva and Bavanapadu, on the basis of samples collected from 9 stations. It is not fair on the part of the authors to go for estimation of resources on the basis of analysis of such a small number of samples from such a large area, covering a stretch of about 45 km. The authors may be well aware that there are exploratory agencies like Atomic Minerals Directorate, who are engaged in resource evaluation of the placer minerals along the coasts of India. It is disheartening that the authors have not cared to find out whether the AMD or other organizations have investigated the area. I found a mention in the Indian Minerals Year Book (1998 and 1999) that the AMD has estimated inferred resources of 9.0 million tones of ilmenite from Bavanapadu-Hukumpeta area, which forms part of the area under reference. Is it not deliberate attempt by the authors not to refer to the work of other organizations and mislead the readers?
2. My humble opinion is that evaluation of resources, which needs enough manpower and infrastructural facilities both in the field and laboratory, should be left to exploration agencies like AMD, GSI, NMDC etc. University Departments have neither the manpower nor time nor the facilities to undertake such work.
3. The authors quoting from a very old reference from Baxter (1976) state that the total heavy mineral content in Kollam beach placer deposit is 18%. Kollam deposit is known to be one of the richest placer deposits in the world and is being exploited for decades. The Indian Minerals Year Book (1997) gives a figure of 28-63% of heavy minerals in Kollam deposit; even the minimum value is much higher than the average given by Baxter (1976).
4. A full paragraph has been devoted to the uses of heavy minerals like ilmenite, zircon, garnet, monazite and sillimanite, which most of the readers may be aware of and so is unnecessary.
5. It is stated that the scatter plot between mean size and weight percentage of heavies in different environments indicate that the maximum concentration of heavy minerals occurs in the sediments having the mean size ranging from 2 to 2.5 phi (p.447). But it is not possible to infer such a relationship from a few samples (8 in number) as depicted in Fig.6.

D. Rajasekhara Reddy, V.S.S. Prasad, V. Malathi, K.S.N. Reddy and **D.D. Varma**, Department of Geology, Andhra University, Visakhapatnam - 530 003, reply:

We thank A.R. Nambiar for his interest in our article. The reply to his comments are as follows:

1. The inferred reserves are estimated, based on the samples collected from surface and subsurface of

different domains viz., dunes, backshore, upper and lower foreshore at 9 stations and not based on 9 samples. For inferred category of reserves, the number of samples we have studied may not be less. As mentioned in the 'Introduction' of the article, we have taken up detailed studies of fraction-wise variation of heavy mineral occurrences in surface and sub-surface sediments with an objective of analyzing the down-depth variation in the occurrence and assess the economic potentiality of different heavy minerals, and not ilmenite alone. We have not come across any published literature on these lines pertaining to the area of study. We have estimated the inferred reserves up to a depth of 1 m. We have neither made any attempt deliberately to avoid mentioning the work of any organization nor had the intention to mislead the readers.

2. The Department of Ocean Development has established the Ocean Science and Technology Cell for the study of beach placers at Tamil University, Thanjavur with Prof. G. Victor Rajamanickam as the co-ordinator. In the light of this, Nambiar may have to revise his opinion.
3. We have taken the averages of different deposits from the available literature for a general comparison. Nambiar himself says that the Kollam deposit is being exploited for decades. In that case, quoting a reference from Baxter (1976) need not be construed as very old. Moreover, what he has referred to from Indian Minerals Year book (1997) is the range (measure of dispersion) of heavy minerals that cannot be used for comparison with the averages (measure of central tendency) of other deposits.
4. In order to highlight the economic importance of heavy minerals from the study area, their uses have been mentioned.
5. The scatter plot between the weight percentage of heavies vs. mean size of the 32 sediment samples without considering the environment shows that the maximum concentration of heavy minerals occurs in the sediments having the mean size from 2 to 2.5 phi. Since the same behaviour is shown by the samples from different environments, instead of plotting in one diagram, we have plotted the data environment-wise for the sake of clarity.

BOOK REVIEW

PRECAMBRIAN CRUSTAL EVOLUTION AND MINERALISATION IN INDIA (PEM-2001 SEMINAR VOLUME). S.P. Singh (Ed.), South Asian Association of Economic Geologists - Patna Chapter, Bhu-Vigyan Bhavan, Patna - 800 020, Price: Rs.700/-

What distinguishes this volume from many other recently published proceedings of group discussions (seminars/workshops/symposia), is the large number of contributions that provide data and maps from reports of the GSI, either unpublished or are not widely known. These new areas of information are highlighted in the course of this review. The volume has 36 papers, predominantly devoted to the NW, Central and East Indian shield – 8 papers are related to stratigraphy and sedimentation, 8 papers on magmatism and metamorphism, 2 papers on structure and dynamics, 15 papers on metallogeny and one paper each on geothermal energy, emerald industry and Antarctic expedition. One paper on the metaphysics of gemstones provides a human touch and a diversion in a volume, that is otherwise pregnant with considerable amount of scientific data on the Precambrian.

NW and Central India

Roy presents a model of evolution for the Aravalli fold belt of Rajasthan. This Proterozoic basin (2500-?1850 Ma) has a three-tier succession and evolved in an asymmetric, riftogenic epicontinental sedimentary basin. Later (? 1650 Ma) "pop-up" thrusts brought up the older high-grade belts (including granulites) against the low-grade rocks of the fold belt. Three phases of deformation are distinguishable by S.P. Singh and his co-authors in a nine-unit succession of the Delhi Supergroup, comprising the Raialo, Alwar and Ajabgarh Groups, recalling the classification earlier proposed by Heron. The Proterozoic Delhi aulacogen evolved through five stages, an early incipient stage, followed by graben, downwarping, geosynclinal and inversion stages. The volcanics of the Lalgarh graben (Jaipur District) belong to the Raialo and Alwar Groups and are