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(This concludes Discussion on the paper by D.K. Bhatt and Ravindra Kumar - Editor)

ACRITARCHS FROM MESOPROTEROZOIC CHITRAKOOT FORMATION, SEMRI GROUP, CHITRAKOOT AREA, CENTRAL INDIA by K. Anbarasu, Jour. Geol. Soc. India, v.57, 2001, pp.179-183.

(1)

B.N. Tiwari, Wadia Institute of Himalayan Geology, 33 General Mahadeo Singh Road, Dehra Dun - 248 001 comments:

I congratulate the author for describing acritarchs from the Semri Group of Chitrakoot area. The basic data is unequivocal and does not support the Mesoproterozoic age for Chitrakoot Formation of Semri Group. As mentioned in the systematics of *Cymatiospheroides kullingii*, it indicates earliest Cambrian or latest Proterozoic age for the Chitrakoot Formation. Thus the report is in consonance with the age inferences drawn recently on the basis of SSFs (Azmi, 1998a, 1999a).

The paper ambiguously lacks recent references to literature published in national and international fora (Azmi, 1998b; Brasier, 1998; Seilcher et al. 1998; Kathal et al. 2000), pertaining to Vindhyan palaeontology and therefore, is rather incomplete.

(2)

H.N. Sinha, Lecturer and Head, Department of Geology, P.K. Roy Memorial College, P.O. ISM, District Dhanbad - 826 004, Jharkhand State, comments:

While I do appreciate the recovery of acritarchs and filamentous microfossils from the Chitrakoot Formation of Lower Vindhyan, I have following comments on the identification of *Cymatiospheroides kullingii* and its environmental interpretation.

1. Is the specimen illustrated as *C. kullingii* in Fig.2b really reticulate? The "reticulate or honey-comb appearance of cyst wall" of identified *C. kullingii* Fig.2b,c and unnamed form 'A' in Fig.2g,h is rather like moulds after small pyrite crystals. It seems that the fossils are corroded by pyrite and give rise to polygonal to semi-circular figures on the cyst wall (Fig.2b,c,g, h). Such type of wall structures/textures may be commonly found in acritarchs due to remains of dissolution of pyrite crystals which take place during early diagenesis in the sedimentary basin containing organic matter. However, the wall structure of identified forms appears more likely to be laevigate (Fig.2a).
2. The presence of pyrite should not be ignored while discussing the environment because reducing environment favours the preservation of organic matter and produces iron sulphide minerals. Pyrite is the indicator of reducing, aspidic, euxinic or poorly oxygenated low energy environment. Thus the recovered forms from the Chitrakoot Formation probably flourished in a low energy marine regime.

K. Anbarasu, Centre for Geosciences and Engineering, Anna University, Chennai - 600 025 replies:

I thank B.N. Tiwari for commenting on age discrepancy

noted in the adjective Mesoproterozoic given to Chitrakoot Formation and the age referred to for *Cymatiospheroides kullingii* in the paper. First of all, I would like to emphasize that this paper is not related to age determination, but only on reporting of acritarchs and discussion on its preservational environment. Under systematic palaeontology, I have compared the morphological similarity of Chitrakoot *Cymatiospheroides kullingii* with that of Tindir Group *C. kullingii* of northwest Canada, which belongs to earliest Cambrian or latest Proterozoic age (Allison and Awramik, 1989). Assigning Cambrian age to Chitrakoot Formation based only on one acritarch species may not be appropriate unless the fossil concerned is age-controlled. These acritarchs are found in a wide spectrum of ages. Further investigation of acritarchs in Semri Group may provide a better understanding of its age control and relevance in assigning age to a particular formation. Among the references mentioned by B.N. Tiwari for incorporating in the paper, some of them are controversial and others are beyond the scope of the present paper, as the emphasis is not on age.

I thank H.N. Sinha for encouraging me to think on different lines for some of the surface features exhibited by the acritarchs. I do agree with his view that polygonal to semi-circular openings might have been produced by the dissolution of pyrite crystals. But the reticulate or honey-comb texture could be seen if we enlarge the inter-opening part of the cyst wall. I found it to be very difficult to focus the specimen in full to get a better picture. In Fig.2c, the specimen was focused to show the pyrite crystals studded on the wall. As the critic has rightly pointed out, the surface openings could have formed due to early diagenesis, but the author was more interested in explaining its original surface texture. Apart from these polygonal/semi-circular openings, there are specimens with reticulate or honey-comb texture in the portions devoid of pyrite crystal derived openings. The author did not ignore the importance of pyrite crystals in explaining the preservational environment, but has concentrated on the physical environment rather than the chemical environment of preservation.

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ERRATA

In the Notes item on : "Improved Oil Recovery" by A.B. Das Gupta (JGSI, v.57, pp.283-287, March 2001), the following errors may be corrected.

Line 9, para 1, col.1, p.284 : gas coming *out* of solution
Line 17, para 1, col.1, p.284 : *constant* value
Line 7, para 1, col.2, p.284 : channel sand (delete *of*)
Line 10, para 3, col.1, p.285 : Ko/μo
Line 6, para 2, col.2, p.285 : trying *out*
Line 1, para 2, col.1, p.286 : Golden *Spike*
Line 1, para 1, col.2, p.286 : delete "it was found that"
Line 1, para 3, col.1, p.287 : *stimulation*