

1. Butler, E. J. and Bisby, G. R., *The Fungi of India* (Revised by Vasudeva, R. S.), I.C.A.R., New Delhi, 1960, p. 552.
2. Ellis, M. B., *Dematiaceous Hyphomycetes*, C.M.I., Kew, England, 1971, p. 608.
3. Johnson, T. W. Jr., *The Genus Achlya, Morphology and Taxonomy*, Ann. Arbor., The University of Michigan Press, London, 1956, p. 180.
4. Rangaswami, G., Seshadri, V. S. and Lucy Chennama, K. A., *Fungi of South India*, W. Q. Judge Press, Bangalore, 1970, p. 193.
5. Tilak, S. T. and Ramchander Rao, *Second Supplement to the Fungi of North India*; 1962-67, p. 312.

**The First Record of Algal Bioherms in the Palaeozoic Sequence of the Tethyan Zone of the Kumaun Himalaya**

A fairly thick Palaeo-Mesozoic sequence has been known to occur in the Kumaun Himalaya for a long time and has been studied by a number of workers<sup>1-5</sup>. In a recent visit to the area as members of an expedition sponsored by the Wadia Institute of Himalayan Geology to the Painkhanda region of the Chamoli District (U.P.) the present authors located for the first time a 45 metre thick band of biohermal limestone, which is full of interest and this note is intended to record the same.

The Palaeozoic sequence with the thickness of individual units along the Yong valley, where this limestone is exposed, is as follows :

	Thickness
Kuling Shale	20 m
----- unconformity -----	
Muth Quartzite	150 m
Variegated Series	50 m
Biohermal limestone	45 m
Shiala Series	500 m
Garbyang Series	1000 m (approximately)

The Shiala Series containing typical Ordovician fossils comprises bands of fine-grained pale to olive green shales alternating with biostromal limestone. The latter bears characteristic algal structures, crinoidal stems and distorted and compressed shells. These biostromal bands range in thickness from a few centimetres to about a metre each. Apart from these bands, the limestone also occurs as lensoid bodies within the dominantly shaly formation. Towards the upper part of this

formation the biostromal limestone increases in extent and thickness with concomitant subordination of the shale.

Immediately overlying the Shiala Series with a perfect conformity a green biohermal limestone is exposed near the deserted village of Yong, which comprises essentially branching algal material within which deformed corals, stromatoporids, bryozoan and crinoidal stems are found. This limestone exhibits a mushroom like domal structure which is about 750 metres across and has 45 metres of exposed thickness at the core. The core is almost entirely composed of the organic material whereas towards the margins there are intervening layers of terrigenous sediment and imperceptibly it merges into green biostromal limestone. A chain of such reefal structures is exposed throughout the Yong valley upto Rimkhim and these can be easily located even from a distance due to their characteristic helmet-like disposition. The Variegated Series overlies the reefs with a discordance although it is concordant with the intervening biostromal limestone. This would indicate that the reefs started growing on a more or less even sea floor and thereupon quickly outgrew the surrounding sedimentation, the reef detritus possibly contributing necessary material for the biostromal limestone around the bioherms. The succeeding Variegated Series seems to have been deposited on an uneven surface produced by the reefal growths.

The occurrence of algal bioherms in the Palaeozoic sequence of Tethyan zone has an important palaeogeographical significance, for generally algal bioherms and biostromes are typical of bank environment<sup>6</sup> and a definite shallowing of Tethyan sea towards the end of Ordovician and early Silurian is indicated.

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1. Griesbach, C. L., *Mem. Geol. Surv. India*, 1891, 23, 1.
2. Heim, A. and Gansser, A., *Mem. Soc. Helvétique, Sciences Naturelles*, 1939, 73 (1), 1.
3. Dave, V. K. S. and Rawat, B. S., *Univ. of Roorkee Rev. Jour.*, 1968, 10 (3-4), 97.
4. Kumar, G., Mehdi, S. H. and Prakash, G., *Jour. Pal. Soc. Ind.*, 1970, 15, 86.
5. Valdiya, K. S. and Gupta, V. J., *Him. Geol.*, 1972, 2, 1.
6. Sanders, J. F. and Friedman, G. M., *Development in Sedimentology, 9 A, Carbonate Rocks*, Elsevier, 1967, p. 215.