

THE LOWER CAMBRIAN MOBERGELLANS: ENIGMATIC TAXA OR OLD FRIENDS?

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A widely accepted tenet in the study of the Cambrian “explosion” is that there are a significant number of fossils that cannot be ascribed to known major groups. In some instances it has been even claimed that they represent extinct phyla. Much of the debate has focused on animals from Burgess Shale-type faunas, where recent studies have emphasized more their place in schemes of early metazoan phylogeny rather than as exemplars of the supposed failures of current evolutionary theory. By no means all problems concerning Burgess Shale-type taxa are resolved, and this remains even more apparent in examples taken from the early skeletal faunas. Uncertainties of original skeletal configuration and absence of associated soft-tissues, combined with varied taphonomic histories, have made some taxa remarkably refractory to phylogenetic analysis. Recent successes, such as the recognition of hadimopanellid sclerites as being derived from the cuticles of priapulid worms and the recovery of halkieriid scleritomes, need to be off-set against remaining enigmas. These are exemplified by the mobergellans, a Lower Cambrian group of phosphatic discs that grew by marginal accretion and on their interior bear a series of radiating scars that presumably represent muscle insertions. Current opinion is unable to place them in any known phylum, and hypotheses of function encompass the opercula of tubes, an arrangement as some sort of scleritome, or as a solitary conch covering a limpet-like animal.

Material from the Khaikhan Formation (Botomian) of south-west Mongolia, presently referred to as *Discinella mongolica*, and equivalent-aged sediments of the Taconic Allochthon of New York (*D. micans*) suggest that our understanding of the mobergellans remains incomplete. The Mongolian material possesses two remarkable features. The umbonal region is pronounced and bears prominent transverse furrows that impart a segmentation. The structures equivalent to the muscle-scars are represented by a peculiar series of discs, each housing a radiating bundle of fibres (?collagenous) and sealed by a cap. *Discinella micans* is superficially different, and bears deep muscle scars that are strongly reminiscent of the arrangement seen in tryblidacean monoplacophorans.

While it remains possible that the mobergellans are polyphyletic, it may be worth considering a molluscan affinity for this supposedly enigmatic group. The phosphatic composition of the shell may not be a fatal objection to this hypothesis, given that phyla such as the brachiopods and arthropods have species secreting either calcareous or phosphatic skeletons. Investigation of other mobergellan taxa is overdue, but progress may be accelerated if a concerted attempt is made to place them within the emerging schemes of metazoan phylogeny rather than placing them in the limbo of *incertae sedis*.