PALAIOS, 2011, v. 26, p. 730–742

Research Article

DOI: 10.2110/palo.2011.p11-050r

Paleoecology of the olenid Trilobite *Triarthrus*: New evidence from Beecher's Trilobite Bed and other sites of pyritization

Úna C. Farrell,[1]* Derek E. G. Briggs,[1,2] And Robert R. Gaines[3]

[1]Department of Geology and Geophysics, Yale University, P.O. Box 208109, New Haven, Connecticut 06520-8109, USA, ufarrell@ku.edu; [2] Yale Peabody Museum of Natural History, Yale University, P.O. Box 208118, New Haven, Connecticut 06520-8118, USA, derek.briggs@yale.edu; [3] Geology Department, Pomona College, Claremont, California 91711, USA, robert.gaines@pomona.edu

**Corresponding author.*

Keywords: dysaerobic, oxygen, chemoautotrophic symbiosis, *Konservat Lagerstätte*, Ordovician

ABSTRACT

Olenid trilobites are characteristic of low-oxygen environments in the early Paleozoic, and researchers have proposed that olenids may have harbored chemoautotrophic symbionts, allowing them to live in borderline sulfidic environments. Beds with soft-tissue preservation at the Beecher's Trilobite Bed site in the Frankfort Shale and the Martin Quarry in the Whetstone Gulf Formation (both Ordovician, New York State) are dominated by the olenid *Triarthrus.* A bed-by-bed analysis of the sedimentology, taphonomy, paleoecology, and ichnology demonstrates that the exceptionally preserved organisms did not undergo extensive transport, and that the intervals bearing *Triarthrus* accumulated predominantly in the lower part of the dysaerobic zone. These intervals contain a low-diversity benthic fauna occurring in relatively low abundance, and consisting primarily of small brachiopods and trilobites. The taphonomy, in particular localized pyritization, the associated fauna, and the distribution of *Triarthrus* elsewhere in the Taconic foreland basin demonstrate that the environments in which *Triarthrus* lived were not sulfidic, and that these trilobites were unlikely to have adopted a chemoautotrophic mode of life.