

## DID SHELL LAYERS NEGATIVELY AFFECT ORDOVICIAN SOFT-BODIED INFAUNA?

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What is the relationship, if any, between soft-bodied infaunal animals and shell accumulations? Do shell layers negatively affect infaunal animals and have they in the past? To determine whether this type of taphonomic inhibition may have operated in Ordovician infaunal communities, we evaluated extent of burrow penetration of shell-rich layers in shallow-water limestones of the Lebanon Formation, central Tennessee. Most of the analyzed shell layers, which are a few mm to 15 cm thick, are not cut by burrows. No burrows occur in shell layers in slabs containing 67% of the total area examined (5500 cm<sup>2</sup>), although burrows are common above and below the shell-rich layers.

Most of the few shell-rich layers that are burrowed occur in wackestones in which skeletal fragments are arranged in a loose/dispersed fabric (Kidwell and Holland, 1991). Where burrow diameter is greater (1 cm) than maximum dimension of most shell fragments (2-4 mm), shells outline the burrow, suggesting that the animal pushed them aside during burrow construction. Where burrow diameter is less (2-3 mm) than length of shell fragments (0.5-2 cm), the burrows occur between the fragments, which show no signs of biogenic reorientation. In the single case where grainstone consisting of densely packed skeletal fragments (3-5 mm in longest dimension) is penetrated, burrow diameter (1 cm) exceeds fragment size.

Shell layers penetrated by burrows originated variably as storm deposits, current winnowed accumulations, and dense shell pavements. No layers with vertically imbricated shells are burrowed; they probably were deposited in a high energy environment inimical to burrowers. With this exception there is little evidence that mode of origin of shell bed exerts strong control over subsequent penetration by burrowers.

Although limited, these data suggest that Ordovician soft-bodied infaunal animals avoided burrowing through shell-rich layers. Those shell layers that were penetrated are loosely packed. Characteristically, in burrow-penetrated shell layers the ratio of fragment size: burrow size is either very low (animal pushed fragments aside) or very high (animal moved between shell fragments). Thus, abundance and character of shell-rich layers may have been an important factor controlling the composition and structure of Ordovician infaunal communities.