

UNIFORMITARIANISM AND PALEOECOLOGY: ACROSS THE GREAT DIVIDE

BOTTJER, David J., Department of Earth Sciences, University of Southern California, Los Angeles, CA 90089-0740, U.S.A.

Paleoecology has commonly been characterized as only demonstrating that life in the past lived much the way as it does today, and thus that paleoecology has little new to offer to science other than paleoenvironmental reconstruction. In large part this conclusion was preordained, because most paleoecological studies have been done while following a strict uniformitarian methodology. Thus, not only was the present the key to the past, but the present was the past, with the actors wearing slightly different costumes.

Of course, uniformitarianism was really developed for physical and chemical processes, and not biological processes. Although biochemical processes and characteristics of the genealogical hierarchy appear to be fundamentally conserved, and thus can be used in uniformitarian approaches, the evolutionary expression of these processes within the ecological hierarchy has shown significant change. Thus, the use of uniformitarianism in reconstructing all or some aspects of the ecological hierarchy in ancient settings is only at best variably effective.

An intriguing historical artefact is the difference in the use of uniformitarianism between those studying the Phanerozoic and those studying the Precambrian. Those studying the Precambrian seem very aware that environments and biological systems may have been radically different from modern settings. This awareness has freed them from many of the strictures of uniformitarianism, and hence many advances in Precambrian paleoecology have been made using non-uniformitarian approaches. In contrast, non-uniformitarian thinking seems to be more of a taboo among those studying Phanerozoic environments and life, and paleoecologists studying such settings commonly seem hesitant to stray too far towards a non-uniformitarian conclusion. This difference in approaches has very likely been caused by a tradition of relatively little interaction, at meetings and in journals, between those studying the Precambrian and those studying the Phanerozoic, which has led to "cultural" differences in the application of uniformitarianism.

Thus, while acknowledging the enormous contribution that the uniformitarian approach has made to paleoecology, it is time for Phanerozoic paleoecology to cross the great divide, and to adopt the approach of the Precambrian paleoecologist. In the beginning this will not be easy to do, because of the inertia imposed by previous uniformitarian interpretations. The best way to foster these changes in thinking will be through collaborations between Precambrian and Phanerozoic paleoecologists, and this may become easier to do as additional attention is focused on paleoecological structure and events at the now-seeming artificial boundary between the Precambrian and Phanerozoic.