

Ecological Zonation: Theory, Problems, and Perspectives

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Harold Willard Clark was an Adventist pioneer in the study of the fossil record who was decades ahead of his time within the creationist community and as we shall see, with respect to the geologic community as well. Clark lived from 1891-1986. He was a professor of biology and geology at Pacific Union College, Angwin, California. Author of *The New Diluvialism* in 1946, Clark began formulating his theory of Ecological Zonation (EZ) after a trip to the oil fields of Texas and Oklahoma where he observed fossil sequences in well cores recovered from oil and gas wells. His intense study of Phanerozoic organisms (the fossil record) ensued.

The result of Clark's trip to the oil fields is well known within the Adventist community. A rift developed between Dr. Clark and George McCready Price who did not accept order in the fossil record for many years. Clark maintains that Price, in later publication, "did not propose to do away with the orderly classification of the rocks that had been and was being developed" (Clark p.62). In his development of the EZ Theory, Clark postulated a direct creation by an omniscient Creator and believed the following assumptions to be unavoidable: 1) The earth's surface was diversified by mountains, plains, lakes, seas and streams. 2) These environments would have many different types of plants and animals. 3) Flora and fauna would be grouped into communities that in a broader aspect would constitute the major life zones. 4) Based on his understanding that the Creator pronounced the creation "very good," Clark assumed that structural features and life zones would be closely correlated. Lastly, he believed a more complete series of organisms existed pre-Flood than today (Clark p.71). Based on these assumptions the EZ Theory suggests that the order of fossils in sedimentary basins reflects landscapes sequentially eroded by rising Flood waters.

The most stunning aspect of Clark's position is his appeal to modern analogues in support of his theory. In Clark's discussion of various organisms he appealed to catastrophic, modern analogues, "Here again is a plain example of ecological zonation, if one interprets the past in terms of the present rather than in terms of an *a priori* theory" (Clark p.73). The geologic community would not begin to accept catastrophic modern analogues for another 30 years! Today geologists, as actualists, use catastrophic modern analogues to interpret the past. Indeed, geologists have been compelled to redefine uniformitarianism ("the present is the key to the past") as actualism ("what you see is what you get").

There has been much discussion in the Adventist church about sequences of small land mammals and the inadequacy of the EZ Theory to explain such order in the record. Clark used modern examples to explain these phenomena. He discusses the rabbits of the western United States as well as the weasel family, arguing, "Anyone finding these [referring to the living organisms] as fossils would be able to prepare as convincing evidence of their evolution as has been done for the Tertiary mammals. And yet there is absolutely no proof that one has evolved from another or all from common stock" (Clark p.78). In this discussion, Clark seems to be addressing the variation of species without evaluating the stratigraphic sequence. However, he does address the difficulty of correlation, citing H. F. Osborn's *The Age of Mammals*, "Tertiary fossils are found largely in scattered basins, surrounded by mountains and volcanic peaks. The deposits are largely of volcanic ash, although the manner of deposition is not well understood" (Clark p.74). Later in the book he acknowledges the Gulf Coast Tertiary deposits which are laid down "in long narrow lines along a shallow sea" (Clark p.131). The point being that Clark was aware of that sequence and saw it as evidence of materials sequentially washed down from the highlands. In defense of his theory, Clark refers to the repeated references in the literature to incomplete ecological relationships in a variety of systems. Indeed, post-flood Pleistocene deposits with extinct animals, we know little about, occur in deposits that are difficult to interpret. With such a poor understanding of the more recent material, how can we expect to more fully understand the more complex deposition and destruction found in the lower units?

At present, we need to recognize that the scenario is even more complex than it was presented by Clark. There are difficulties in taxonomy of extinct plants because different parts of the same plant have been given different names. For example, *Lepidodendron* is the name for the trunk of a tree fern; *Lepidophylloides* is the name for the leaves; *Lepidostrobus* is the name for the cones; but the term *Stigmaria* is the name for the roots of the same plant because originally the connection between the roots and the stem was not known. In some cases, such as *Lepidodendron*, some very fortunate finds were made fairly early and the plant, for the most part, was better understood. This is not the case with all of the plants which are often drawn without roots or canopy in the case of some of the fern trees or with much of the extinct invertebrate fauna. Adults, juveniles, males, females, life stage morphologies are all difficult to ascertain, and these problems complicate the taxonomy of fossil sequences. Gigantism and dwarfism also contribute to the complications within the fossil record. Adding to the complexity, are the plant extinctions that are not synchronous with the extinction events of the animal kingdom. Despite all the complexity to be found in the geologic record, Clark asks his readers, "When will geologists go all the way and accept the natural conclusion, that the whole geological series simply represents the ecological arrangement of a world which was complete as a unit, and not strung out throughout age after age of time?" (Clark p.80).

In a letter to *Science*, Dr. David M. Raup at the Field Museum of Natural History in Chicago stated: "One of the ironies of the evolution-creation debate is that the creationists have accepted the mistaken notion that the fossil record shows a detailed and orderly progression and they have gone to great lengths to accommodate this 'fact' in their flood geology" (Raup, 1981). Note that this is not an Adventist response but rather, this comment comes from one of America's better known paleontologists. He is not referring simply to the order in the record but rather to the order of fossil links that evolutionary biologists hope to find. In the view of some, things have improved somewhat for evolutionists since this statement was made. Nevertheless, his point is well taken, i.e., in the fossil sequences most scientists see a hierarchy of primitive to modern characters in the organisms but this hierarchy may not represent reality at the time of deposition. In Clark's view, the sequences in the fossil record may not represent long age sequences but rather sequential burial of organisms during the Genesis flood that we have not as yet, adequately explained.

Recognizing the differences in the pre-Flood ecologies relative to modern ecologies, the theory works well in general with marine organisms suddenly appearing and dominating the lower part of the record, followed by a wide variety of terrestrial organisms that suddenly appear together higher in the record and may represent lowland life forms. It is important to remember that the fossil sequences actually do not record the sudden appearance of life forms but rather, the sequence represents a record of death. Most researchers believe the first occurrence of a fossil in the rock record marks the beginning of that organism's existence in the long chronology proposed for this earth's history. Many creationists believe that the first appearance of a species represents that point in time during the Genesis flood that a particular group of organisms began dying. Thus, interpretation of this record of death is highly complex. Complicating factors for Flood geology in the sequence include escape motility of organisms, transport and sorting, bloat and float properties, etc. Perhaps this is the primary reason the ecological zones are not complete in the fossil record.

The order in the fossil record seems problematic for creationists and although the theory of ecological zonation was proposed in response to this issue, the sequences remain problematic. Recognition that pre-Flood ecologies were very different from the ecologies we have today, and acceptance of the fact that our visions of global Flood activity may not reflect the reality, should encourage researchers to study the theory of ecological zonation more carefully as well as to encourage exploration of alternative theories within the context of a literal understanding of the creation account and a short chronological history for life on this planet.

References:

Clark, H. W. 1946. *The New Diluvialism*: Science Publication, Angwin, CA, 222p.

Raup, D. M. 1981. Evolution and the Fossil Record: Letter to Science, Science 213:289.

Roth, A. A. 1998. *Origins-Linking Science and Scripture*: Review & Herald Publishing Association, Hagerstown, MD, 384p.

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