Stephen M. Rowland

Professor of Geology

Undergraduate Coordinator

Ph.D. - University of California, Santa Cruz: 1978

In 1967, Dr. Rowland received a B.A. in Zoology from the University of California, Berkeley. He went on to work for the U.S. Forest Service in wildlife management, during which he developed an interest in geology. He then taught high school biology and geology for four years, while he returned to school himself to study geology. In 1978, he completed a Ph.D. in Geology from the University of California, Santa Cruz. His knowledge of zoology and geology has led to into the fields of paleoecology and paleontology. He is currently a Professor of Geology at UNLV teaching several courses associated with paleontology, paleobiology, and paleoecology. Dr. Rowland and students perform paleoecological studies of Pleistocene mammalian faunas and the paleoecology of Cambrian and Neoproterozoic reef ecosystems. This type of research involves the analyzing of fossils in order to characterize past ecosystems and how they changed through time.

Courses:

GEOL 102 - Earth and Life Through Time

Systematic review of the history of the earth and the methods by which the details of earth history are unraveled.

GEOLXXX - Science in American Culture

Analysis of the relationship between science and American culture from colonial times to the present. Key themes include 1) evolving relationships between science, religion, and art, 2) influence of the maturation of the historical sciences on American culture in the nineteenth century, and 3) role of science in American public policy today.

By: Bill Travis, undergraduate, UNLV College of Sciences, SCI-499, Fall 2010

GEOL 301 - Fossil Record

History and evolution of life as recorded in the fossil record.

GEOL 436 - Quaternary Paleoecology

Examination of the fossil record of the Quaternary including vertebrate, invertebrate, and floral assemblages. Emphasis on paleoenvironmental and paleoclimatological reconstructions.

Paleoecology:

Paleoecology is a subcategory of paleontology (the study of fossils). It is the study of the relationships between ancient organisms and their environments. Paleoecologists use data from fossils to reconstruct ancient ecosystems and discover dynamic biological responses to changing environments over time. They use concepts from several fields of science, including geology, biology, and chemistry, to come up with models for how past organisms lived.

The study of ancient environments is often tackled through several different methods. The application of statistics and chemical analysis with an understanding of geology, biology, and history often works best. Statistics play a major role in determining biological trends and interpreting quantitative data to give hints to the life cycles of organisms, population sizes, and even an organism's movements. Chemical analysis of ancient soils and sea beds reveal the possible atmospheric conditions and help determine biological processes organisms may have needed in order to survive in such environments. The chemical makeup of fossils may also reveal the compounds present in the environment during the life of an organism and physical structure of the organism itself, such as compounds found in bones or shells. For large organisms, chemical markers and food remnants in feces may be used to determine changes in an organism's

diet over time. Analyzing past environments and organisms often uses environments and organisms currently existing today to act as possible analogs, or models. If there is not a living analog for a fossilized organism, models are often formed based on known biological functions and most plausible theoretical lifestyle for the organism in question. Knowledge of geology, particularly geological history and plate tectonics, allows a paleoecologist to determine the approximate age and global location of a fossil when it was deposited. An understanding of geological processes makes it easier to locate the proper types and layers of rock in which to search for fossils. A paleoecologist must have a broad understanding of the sciences in order to choose methodology and develop theories.

The data and conclusions reached by paleoecologists add to the history of life that can be found in the fossil record. The fossil record contains changes on earth and the evolution of life over time. There are also grand unsolved mysteries, such as the mass extinction of Pleistocene megafauna around the world. There are several gaps in theories concerning evolution, formation of the earth, and how life began. This leaves much to be discovered by future scientists; however, additions to the fossil record sometimes only deepen the mystery further.

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