Memorial to Norman Dennis Newell (1909–2005)

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Norman Newell was a serious researcher, an impressive teacher and paleontologist, and a good friend to all who came to know him. He remained vigorously involved in systematic paleontology and continued active research, writing, and field work well into his 90s. Even though largely confined to a wheelchair, he continued collecting fossil bivalves across the western United States, with his wife Gillian at the wheel, until shortly before his death.

Norman Newell was born in Chicago, Illinois, on 27 January 1909, the son of Virgil Bingham and Nellie Clark Newell. Shortly after his birth, his family moved to a small rural town in central Kansas, where he grew up. Early on he realized he had enough musical talent to be a professional vaudeville musician, and he briefly considered a career there, but with an early display of common sense,



he moved in other directions. His jazz saxophone, nevertheless, helped with his tuition at the University of Kansas, where he organized a dance band. He married Valerie Zirkle 25 February 1928 while still a student at University of Kansas. She passed away in 1972. On 28 April 1973, he married Gillian W. Wormall, and they were married for 23 years before his passing. He often expressed gratitude to both Valerie and Gillian for their constant support.

While still a child, his father introduced him to geology through an old Chamberlain-Salisbury geology textbook and helped him with early explorations and discovery of the geology and fossils around him in Kansas. When he was 12 years old, his father received a letter from Raymond Moore directing him to fossiliferous rocks in Colorado, and in particular the impressive Florissant fossil beds.

Norman entered the University of Kansas in the fall of 1926, where Raymond Moore, having recognized Norman's interests and ability, took him on fossil collecting trips and became his mentor, a long-lasting relationship for both of them. Norman graduated with a B.S. degree in 1929 at the age of 20, and an M.A. degree in 1931. He was recommended for a graduate fellowship by his "foster father," Raymond Moore, and promptly enrolled in the graduate program that fall at Yale University, where he was mentored by Carl Dunbar and other prominent faculty members such as Charles Schuchert. Schuchert hired Norman's wife, Valerie, for temporary curatorial work by using personal funds following the financial crash and start of the Great Depression in 1931, allowing Norman to complete his graduate program. He received the Ph.D. degree in Geology from Yale University in 1933 and returned to the University of Kansas as a faculty member and geologist-paleontologist with the Kansas Geological Survey. He worked there until 1937, when he took a faculty position and taught at the University of Wisconsin until 1945. In 1945, he moved to New York City to accept a professorship at Columbia University and a curatorship at the American Museum of Natural History, positions which he held with distinction until his retirement in 1977, when he was named professor emeritus and curator emeritus, positions which

he held until his death. During his tenure at Columbia University and the American Museum, he helped more than 40 of his graduate students receive advanced degrees.

From 1942 to 1945, on recommendation of the U.S. State Department, he undertook investigation of the stratigraphy and structure of the Lake Titicaca region at elevations of about 12,000 feet in the Andes Mountains of Peru, and he also organized teams that continued research in the Upper Paleozoic rocks of Peru. Their joint efforts documented the geology of the region and the petroleum potential of an area approximately half the size of the state of Pennsylvania.

From the 1930s until his death, Norman was considered as a world-class specialist on fossil bivalve mollusks and also as a scholarly leader in invertebrate paleontology, paleoecology, and reef studies. His reputation as a bivalve authority solidified early with publication of his classic monographs on the Pectinacea and Mytilacea, but he also published many other papers on the geology of Kansas and Oklahoma, along with papers on other fossil groups at the same time. As others have observed, his early studies of the bivalves were far ahead of their time in combining biological and paleontological approaches to analyses of fossil faunas. He was a principal mover in completing the two volumes on pelecypods for the *Treatise on Invertebrate Paleontology* in 1969. Norman continued research, virtually until the eve of his death, on the systematics, evolution, and distribution of the bivalves. That research resulted in numerous publications, often with Don Boyd, a former student and now an encouraging colleague, as a co-author.

In addition to his paleontological contributions, he expended considerable effort during the late 1940s and 1950s on reef research. He organized teams of graduate students and colleagues in studies and documentation of facies and faunas of the Permian reefs of West Texas and New Mexico, along with coordinated investigations in "living" reefs in the Bahama Islands. As a result of these efforts, several significant articles and monographs soon appeared in print, along with the classic volume, *Permian Reef Complex of the Guadalupe Mountains Region, Texas and New Mexico: A Study in Paleoecology.*

I was privileged to join those teams in 1949, when Norman and his co-workers revitalized their Permian projects and started serious investigations of the stratigraphy, sedimentation, paleontology and paleoecology of the Leonardian and Capitanian Guadalupe Mountains reef complexes. Well remembered are the sessions each evening around the dinner table at Pine Springs Camp where we reported on our observations of the day and plans for tomorrow, and so did he. He taught us well by unobtrusively demonstrating "do as I do." As a result of our field work, approximately 20 tons of samples, mainly silicified fossils, were shipped back to the American Museum for processing and analysis. We made the first 2×3 inch carbonate thin sections of which we were aware and investigated as many aspects of the stratigraphic and paleoecologic distributions of the faunas and floras that we could.

Some members of the same teams were seriously involved in parallel "uniformitarian" investigations on living reefs in the Bahama Islands, principally on Andros Island and the Great Bahama Bank. In 1950, our team, under Newell's leadership, was among the first to use aerial photographs to map reef and carbonate sediment facies in that region, and to utilize the "new" scuba equipment in examining and documenting the marginal reefs and upper reef slopes to depths of 200 feet. We also took underwater photographs with regular 35 mm cameras mounted in homemade brass boxes. We again were taught that publication of such studies is an important obligation of researchers.

Norman continued such comparative reef studies when in 1952 he mounted an expedition to Raroia Atoll (of Kon Tiki note) in the Tuamotu Archipelago, and in 1967 when he worked in the Caroline and Marshall Islands in the South Pacific. His research, again, resulted in several published articles on the reefs, sea level fluctuations, geology, and sedimentary processes documentable on the atoll.

The reefs and associated rocks and faunas of the western Tethyan marine Permian provided me with another opportunity in the 1970s to form a research team with Norman. These studies documented the stratigraphy and paleontology of reef complexes in Tunisia over a three-year period. We accumulated thousands of specimens that provided the basis for many systematic paleontological investigations of sponges, clams, corals, and crinoids, among other groups, along with detailed documentation of the reefs and their associated facies.

He remained a serious student of evolutionary theory and documentation of changing faunas through the geologic record during his later years. He became concerned with the rise of sectarian dogma as a "science" and in 1982, his volume *Creation and Evolution; Myth or Reality*? was published. In this volume, he explained the scientific evidence for evolution, particularly emphasizing the paleontological record of changes in faunas and floras with time, as documented by fossils throughout the stratigraphic column. He noted, "It is the how and why of evolution that are certainly matters for scientific and philosophical discussion."

Norman was an active member and served as an officer in several scientific societies. For example, he was president of the Society for the Study of Evolution in 1949; president of the Paleontological Society, 1960–1961; president of the Commission on Paleoecology of the International Paleontological Union, 1960–1967; dean of the council, scientific staff of the American Museum of Natural History, 1966–1967, and president of the Society of Systematic Zoology, 1972–1973.

He was the worthy recipient of numerous honors and awards. He was given the Mary Clarke Thompson Medal of the National Academy of Sciences, 1960; the Distinguished Service to Mankind Alumni Award from Kansas University, 1961; the Hayden Medal in Geology and Paleontology by the Philadelphia Academy of Sciences, 1965; the Verrill Medal of the Peabody Museum, Yale University, 1966, and the Geological Society of Peru Medal, 1977. Later, he was given the American Museum of Natural History Gold Medal for Achievement in Science, 1978; the Paleontological Society Medal, 1979; the Raymond C. Moore Medal of the Society of Economic Paleontologists and Mineralogists, 1980; the American Association for the Advancement of Science Scientific Freedom and Responsibility Award, 1987; the Geological Society of America Penrose Medal, 1990; and the American Association of Petroleum Geologists Special Award, 1996, among other awards. He was elected to both the National Academy of Sciences and the American Academy of Arts and Sciences in 1979.

In 2004, Norman Dennis Newell was named a Legendary Geoscientist by the American Geological Institute, and in this his colleagues, co-workers, students, and friends certainly agree.

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