

Memorial to George Devries Klein 1933–2018

GEORGE DEVRIES KLEIN
Barragada, Guam

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EARLY YEARS AND EDUCATION

George Devries Klein was born on 21 January 1933 in The Hague, Netherlands, the son of Alfred R.H. and Doris Devries Klein. In 1939, the Klein family moved to Australia where George completed his primary and junior high school education, attending Scotch College, in Melbourne, Australia, from 1943–1946. The Kleins immigrated to the United States in 1947, and the family settled in Larchmont, New York. George graduated from Mamaroneck Senior High School in 1950, and entered Wesleyan University from which he earned a B.A. in geology in 1954. He then earned an M.A. in geology in 1957 from the University of Kansas at Lawrence. Klein earned his Ph.D. in geology in 1960 from Yale University under the supervision of Prof. John E. Sanders. His Ph.D. thesis dealt with both the sedimentology and sedimentary petrology of the Triassic of the Maritime provinces of Canada, and a reconnaissance of the intertidal flats of the Bay of Fundy.



PROFESSIONAL CAREER IN THE PETROLEUM INDUSTRY AND ACADEMIA

Klein worked for Sinclair Research in Tulsa, Oklahoma, as a research geologist from 1960–1961, where he completed research on the petrology of the Jackfork Group of Arkansas and Oklahoma, the reservoir potential of the Atoka Group of the Arkoma basin, and the Minnelusa Formation of Wyoming. He then accepted a faculty appointment as an assistant professor of geology in 1961 at the University of Pittsburgh and completed research on the Great Oolite Series of the United Kingdom. In 1963, he joined the faculty of the University of Pennsylvania, first as an assistant professor, and then was promoted to a tenured associate professorship in 1966.

Shortly after arriving at Pennsylvania, he began a detailed research program supported by ONR (Office of Naval Research) and NSF (National Science Foundation) on the sediment dynamics of intertidal sand bodies in the Bay of Fundy. This work, published in the *Journal of Sedimentary Petrology*, was awarded SEPM's (Society of Sedimentary Geology) Outstanding Paper award in 1972. Following a sabbatical in 1969 as a visiting fellow of Wolfson College, Oxford University, he joined the University of Illinois at Urbana-Champaign, was promoted to a full professorship in 1972, and spent 23-and-a-half years undertaking a variety of research programs and supervising 7 Ph.D., 5 external Ph.D., 14 M.S., and 5 affiliated research students. Although these numbers appear small, Klein focused on providing a quality graduate education for his students and was selective in whom he chose to supervise. Thus, out of this group of students emerged an Energy Research Institute director, an associate director for geoscience at NSF, the director of the Scripps Institution of Oceanography, the director of a Great Lakes research institute, a past-president of SEPM, a regional exploration manager for a supermajor

oil company, a prolific writer of sedimentary geology books, four department chairs, a state geologist, several professors (some prominent), and a journal editor. During his time, Klein also served on two cruises of the Deep Sea Drilling Project and Ocean Drilling Program, the second one as co-chief scientist (Leg 58).

RESEARCH CONTRIBUTIONS

One of his most noteworthy accomplishments was proposing the term “tidalite” for tidal process facies formed by tidal currents. Development of this term was based on research Klein completed during the 1960s on tidal sediment dynamics in the Bay of Fundy, which earned the SEPM Outstanding Paper Award. Then, during the fall of 1969, he went on sabbatical at Oxford University and researched a variety of examples of tidalites ranging in age from Precambrian to Cretaceous. During the 1970 spring quarter at UC Berkeley as a visiting professor, he had the opportunity to go to the Death Valley region, Nevada, and research late Precambrian, Cambrian, and Ordovician tidalites. On returning to Urbana, he started to integrate his modern sediment work with the outcrop examples he had seen, and concluded that these sediments of tidal origin represented a major global process facies because it was astronomically forced.

At that time, the prevailing paradigm was that most major clastics were turbidites, deltas, or beach-barrier systems. Tidal sediments were considered more of an oddball curiosity. He therefore wrote a summary paper to propose the tidalite concept, which was published in 1971. The term “tidalite” was intended to focus attention on the role of tidal sediments in the rock record, which at the time were considered of minimal importance. That facies recognition became a mainstream depositional system recognized globally by sedimentologists and was refined subsequently by Klein and others. It led others to organize an international “tidalite” research conference. Klein’s lasting contribution was to define a new process facies and the research agenda for developing it. In the process, sedimentologists became aware of the role of astronomic forcing factors on sediment deposition.

Long before climate change became a subject of study, Klein (1993) was publishing papers on the role of climate on sea-level changes. Even during retirement in Guam, Klein was very active in pursuing research on climate change. He was disappointed that, as he saw it, most scientists failed to take into account all the available data in presenting an account of climate change. As a response, he relentlessly gathered data. Klein (2016) posted his results in AAPG’s online journal, *Search and Discovery*.

Klein was a pioneer in introducing the concept of tidal currents in the deep sea and its implications for interpreting the ancient sedimentary record.

While at Illinois, Klein also expanded his research to cratonic sedimentology, deep-water sedimentology, back-arc basin evolution, cratonic basin evolution, sedimentary basin classification, basin analysis, and Pennsylvanian cyclothems. His students worked on these projects or designed their own, leading to definitive studies on glacial sedimentology, fluvial sedimentology, black shales, storm deposits, cycle stratigraphy, sandstone diagenesis, deepwater depositional processes, and foreland basins.

During his career at Illinois, Klein served as a Continuing Education instructor for the petroleum industry. His sponsors included the American Association of Petroleum Geologists, the Society of Exploration Geophysicists, the Geological Society of America, IHRDC (Boston, Massachusetts), the South African Geological Society, and the Venezuelan Geological Society. He taught courses on sedimentary basin analysis, and on recognizing clastic depositional systems in petroleum reservoirs. His courses were offered on every continent except Antarctica.

In 1993, Klein retired early from Illinois as professor emeritus to become president of the New Jersey Marine Science Consortium and State Sea Grant Director of the New Jersey Sea Grant College Program. During his three-year service, he increased federal funding for both

programs by 79 percent. Missing geology, he left in 1996, to open up a geological consulting firm, SED-STRAT Geoscience Consultants, Inc., and moved to the Houston, Texas, area. There, he worked on projects in the U.S. Gulf of Mexico, the Gulf Coast, Illinois basin, Permian basin, San Joaquin basin, East Texas basin, and on international projects dealing with Peru, Venezuela, Mexico, Trinidad, Romania, Russia, Portugal, the eastern Mediterranean, Senegal, Somalia, Angola, and South Africa. As a consultant he discovered 160 mmb oil and 3.2 tcf gas (both solo and as a team member) for his clients.

Klein was a member of the Houston Geological Society and a Geological Society of America Fellow. He received numerous awards including a visiting fellowship, Wolfson College, Oxford University (1969); the outstanding paper award for his 1970 *Journal of Sedimentary Petrology* paper, SEPM (1972); an honorable mention, outstanding paper, 1971 annual meeting, SEPM (1972); twice received an associateship, Center for Advanced Study of the University of Illinois (1974, 1983); Erasmus Haworth Distinguished Alumnus Award, University of Kansas, Department of Geology (1980); a citation of recognition, Illinois House of Representatives (1980); senior research fellowship, Japan Society for the Promotion of Science (1983); Outstanding Faculty Award, Geology Graduate Students Association, University of Illinois (1983); a Senior Fulbright Research Fellowship, Netherlands (1989); the Laurence L. Sloss Award for Sedimentary Geology from the GSA Division on Sedimentary Geology (2000); and the Houston Geological Society Rising Star Award (2002) and its Geological Legends Award (2013). He was listed in *American Men and Women of Science*, *Who's Who in America*, and *Who's Who in the World*.

Klein actively served the geological profession in numerous ways. He was the founding chairperson of the Geological Society of America's Division on Sedimentary Geology, served on its Committee on Committees, and its Research Grants Committee. He also served on the editorial boards of *GSA Bulletin*, *Geology*, *Earth Science Review*, *Journal of Geodynamics*, McGraw-Hill's *Encyclopedia of Science and Technology*, and Prentice-Hall's Geological Sciences series. He also chaired SEPM's Research Committee, and served on a special ad hoc task force on the future direction of SEPM in the late 1970s as well as SEPM's nominating committee and as chair of SEPM's ad hoc Committee on Committees. He served on the American Association of Petroleum Geologists' (AAPG) Publication Committee, Membership Committee, the DPA (Division of Petroleum Affairs) Government Affairs Committee, Publication Pipeline Committee, and was an elected delegate to AAPG's House of Delegates from the Houston Geological Society, serving as delegate foreman from 2003–2004.

Klein passed away on 30 April 2018. He is survived by his wife, Suyon Cheong Klein, originally from Seoul, South Korea; two children from an earlier marriage, Richard L. Klein of Washington, D.C., and Roger N. Klein of Champaign, Illinois; and a sister, Mrs. Marianne Mandel of Bethesda, Maryland.

Remembrance gifts can be made payable to the KU Endowment/Geology Associates Fund/George Devries Klein Colloquium Lectureship. (Geology Associates Account #08421; Contact KU Endowment Association, P.O. Box 928, Lawrence, KS 66044-4201; 785-864-2194.)

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