

Memorial to Seymour O. Schlanger

1927-1990

EDWARD L. WINTERER

Scripps Institution of Oceanography, La Jolla, California 92093

Seymour O. (Sy) Schlanger, who died on July 1, 1990, at his home in Evanston, Illinois, was born and grew up in New York City. He recounted his boyhood as fondly as any small-town American; in fact, Sy insisted that for him, New York had been nothing but a large cluster of small towns, with the added advantage of wonderful places like the great museums and library. After high school, at age 18, he entered the U.S. Navy as a seaman, and was honorably discharged in 1946. While stationed in Cleveland, he relieved the tedium of his Navy duties by learning to fly a small plane. After the Navy and before starting college, he spent a few months in Honolulu working for a local newspaper by day and having a grand time in the evenings. He then buckled down to four years at Ohio State and Rutgers University, earning a bachelor of science degree in geology and becoming an AAU gold medalist as a 1500-meter swimmer. Sy said it was the descriptions of geological field work in the lectures by Professor Albert Orion Hayes at Rutgers that led him to geology.

In 1951, directly after receiving his Master's degree at Rutgers for a thesis on the sedimentology of the Paleocene Vincentown Formation, Sy was hired by the U.S. Geological Survey, joining the famous little group of Pacific Island geologists that included Harry Ladd, Josh Tracey, Jack Stark, and Dave Doan. He was immediately put on a plane to Guam, where for the next two years he was part of the team mapping the complexities of that island and studying the hydrology of Ulithi Atoll in the Caroline Islands.

It was while working on Guam that Sy met, courted, and married Sally Wimsatt, the daughter of the Commanding General of Anderson Air Force Base. Sally was killed in an auto accident in 1973. They had two daughters, Sarah and Stephanie Schlanger, who survive them.

On returning to Washington, D.C., Sy made his now-classic petrologic studies of the reefal limestones of Guam and of the drill-hole cores from Enewetak Atoll. In these papers he carefully documented the petrographic imprints of diagenesis, especially emphasizing the effects of meteoric water on mineralogy and on the style of cementation. For Enewetak, he documented numerous sea-level drops, through recognition of "solution unconformities." These studies, which he used as part of his doctoral dissertation at the Johns Hopkins University, under the guidance of Francis Pettijohn, earned Sy a place in the front rank of carbonate petrologists. He later recalled to friends his time with the Survey on Guam and in Washington as the happiest of his life; he couldn't imagine doing something more fun.

In 1959, Sy was recruited by Petrobras, the Brazilian national oil company, as part of a group of American geologists commissioned to establish a modern department of geology at the University of Bahia, in Salvador, Brazil. Their object was to train young Brazilians and, in principle, to work themselves out of a job as soon as possible. The job lasted for two years, and introduced Sy to the carbonaceous strata of the oil-producing Cretaceous (Reconcavo) rift basin. Sy's interest in the Cretaceous and in carbonaceous strata, thus sparked, never flagged.

On his return to the United States, Sy continued another year with the USGS, serving part of the time in the USGS Kentucky mapping project. In 1962 he joined the Department of Earth Sciences at the University of California, Riverside. He stayed 13 years, serving for several years as department chair.

At Riverside, Sy reimmersed himself in carbonate petrology and Pacific geology. He joined a U.S.-Japan cooperative science project in the Ryukyus, to study neo-tectonic rates

through ²³⁰Th dating of corals in uplifted reefs. While in Japan, with Ken Konishi, he became interested in the temperate-latitude bryozoan-algal facies, and launched studies of Holocene and Cenozoic algal reefs, both in Japan and, later, in Baja and Alta California. His papers on Paleogene rocks of this facies recovered during drilling on the Emperor Seamounts, which fixed-hot-spot theory says formed at the latitude of Hawaii, where hermatypic corals dominate, suggested an anomaly, either in the fixity of hot spots or in the temperature significance of the two carbonate facies. Besides continuing studies of Pacific oceanic coral reefs, he ventured with this Riverside colleague Ken Hsü into speculations on the crustal history of the Pacific as related to the thermal history of the upper mantle. A 1969 sabbatical leave as a Guggenheim Fellow at the ETH in Zurich, where Hsü had meanwhile moved, resulted in a paper on alpine flysch as related to plate tectonics—at a time when most alpine geologists were reluctant to connect plate tectonics to *their* mountain range.

In 1971, Sy moved into the burgeoning field of pelagic sedimentology through his participation on Leg 17 of the Deep Sea Drilling Project (DSDP), into the central Pacific. Cores from the 1200 m sequence of pelagic carbonates perched on the Magellan Rise, ranging in age from early Cretaceous to Holocene, provided the materials for a landmark paper, written with Bob Douglas, on the progressive diagenetic changes with depth of burial. They introduced the concept of diagenetic potential, that is, the degree to which a layer of newly deposited ooze can potentially be altered by postdepositional changes. A layer rich in aragonite or high-Mg calcite, for example, has a higher potential than an layer containing only low-Mg calcite, and thus certain layers will cement (and become acoustic reflectors) prior to adjacent layers. This paper is the starting point for much of the modern literature on pelagic reflection stratigraphy. Sy himself kept returning to the acoustic properties of pelagic sediments, in association with geophysical colleagues, over the rest of his life. It was Sy who supplied the petrological and geological insight to these collaborative efforts.

By 1973, the hypothesis that chains of seamounts are generated by the lithosphere moving over hot spots in the asthenosphere was gaining currency, and Leg 33 of the DSDP was organized, with Sy and the late Dale Jackson as co-chiefs, to test the hypothesis by drilling along the Line Islands chain. Results from Leg 17 suggested that a strategy of drilling through the sediment apron next to a reef-capped seamount may yield more of the relevant history than a hole directly into the seamount, which might be plastered with younger volcanics. The drilling results were ambiguous, but Sy and his students later returned to the Line Islands on dredging expeditions and collected enough rock to present a plausible case for progressive late Cretaceous volcanism, somewhat muddled by younger events.

Sy married Sarah Von Valtier in 1974, and adopted her two sons, William and Stephen Schlanger, who survive Sy. The marriage ended in divorce.

In 1975, Sy accepted the Chair in Sedimentology at the Universities of Leiden and Utrecht, and, partly as an outgrowth of his long-term interests in the hydrocarbon potential of sediments, turned much of his attention to the black-shale problem. He and Hugh Jenkyns assembled the accumulating data on Cretaceous black shales from ocean drilling and from many land occurrences into a seminal paper on the origin of black shales: ocean-wide anoxia, or expanded oxygen minimum? With Mike Arthur, he wrote a prize-winning paper relating Cretaceous reefs, oceanic anoxic events, and giant oil and gas fields. Sy energetically pursued the subject of Cretaceous black shales over the next dozen years, with two more ocean drilling expeditions (Legs 61 and 89) and field studies in western Europe. He and his colleagues focused particularly on the short-lived and very extensive episode of oceanic anoxia at the Cenomanian-Turonian boundary, relating it to a special combination of global sea-level rise, paleogeography, and climate.

He returned to the United States in 1977, to the University of Hawaii, and took up his Pacific interests with renewed vigor. He and Roger Larson led DSDP Leg 61 to sample Jurassic

sediments and basement in the Nauru Basin, but they encountered a thick (ultimately impenetrable) sequence of Lower Cretaceous mid-plate basalt flows and sills, which seismic records suggested filled most of the basin. Another attempt to sample the Jurassic, this time in the Mariana Basin and led by Sy and Ralph Moberly (Leg 89), was again thwarted by great thicknesses of Aptian volcanoclastic sediments, derived from nearby seamount chains. Sy realized that the Nauru and Mariana basalts, taken together with the already known extent of mid-Cretaceous mid-plate volcanics in the Central Basin, and on the Ontong Java and Manihiki plateaus, constituted a stupendous outpouring of lava, with possible first-order implications for the thermal history of the mantle, the elevation and subsidence of Pacific sea floor, and global sea level. At the time of his death, Sy had just completed a major synthesis, to be published by JOIDES, on the nature, extent, and timing of mid-plate volcanism in the western Pacific.

Sy's abiding interest in oceanic reef geology never waned, even after his move onto the craton, at Northwestern University, in 1981, where he held the William Deering Chair as Professor of Geology. While still in Hawaii, he had continued exploring the Line Islands, and from Northwestern he mounted cruises to the Marshalls, which formed the basis for an atoll-guyot drilling proposal, now scheduled for drilling in 1992, as well as for a series of papers, with Isabella Premoli Silva and his last student, Jonathon Lincoln, on Cenozoic sea-level fluctuations as indicated by both in situ and redeposited reefal sediments.

For his "sustained excellence and originality in marine geological research," Sy was awarded the 1987 Francis P. Shepard Medal by the Society of Economic Paleontologists and Mineralogists. He had been a GSA Fellow since 1960.

This chronological narrative of Sy Schlanger's career in science does scant honor to the man as colleague, friend, and mentor. In every group that included Sy as a member—university departments, advisory panels and committees, field groups or laboratory teams—he was quickly recognized as a natural leader and wise counselor. He was as generous with students, colleagues, and even would-be competitors in sharing his vast experience and scientific knowledge as he was openhearted in his relations with friends and acquaintances. Sy never seemed as happy as when in spirited conversation with friends, especially when the conversations were around the table at, say, a sidewalk cafe in Paris or Barcelona or Papeete. He was an extraordinarily erudite and broadly cultured man, who read voraciously, not only in his science, but in philosophy, history, and belles lettres in general. He particularly enjoyed the writings of A. J. Liebling, and shared with Liebling a taste for the good life and people of strong, albeit odd character, and a critical, amused eye for puffery and sham. His absence leaves a great hole in the lives of all who knew him.

SELECTED BIBLIOGRAPHY OF S. O. SCHLANGER

- 1963 Subsurface geology of Eniwetok Atolls: U.S. Geological Survey Professional Paper 260-BB, 74 p.
- 1964 (with Tracey, J. I., Stark, J. T., Doan, D. B., and May, H. G.) General geology of Guam: U.S. Geological Survey Professional Paper 403-A, 103 p.
- 1974 (and Douglas, R. G.) Diagenesis of pelagic carbonates and its implications for marine stratigraphy: *in* Hsü, K. J., and Jenkyns, H., eds., *Pelagic sediments: On land and under the sea*: International Association of Sedimentologists Special Publications No. 1, p. 403–434.
- 1975 (and Konishi, K.) The geographic boundary between the coral-algal and the bryozoan-algal facies: A paleolatitude indicator: International Congress of Sedimentology, 9th, Proceedings, p. 187–191.

- 1975 (and Jenkyns, H. C.) Cretaceous anoxic events: Causes and consequences: *Geologie en Mijnbouw*, v. 55, p. 179–184.
- 1979 (with Arthur, M.) Cretaceous “Oceanic Anoxic Events” as causal factors in development of reef-reservoired giant oil fields: *American Association of Petroleum Geologists Bulletin*, v. 63, p. 870–885.
- 1981 (and Premoli Silva, I.) Tectonic, volcanic and paleogeographic implications of re-deposited reef faunas of Late Cretaceous and Tertiary age from the Nauru Basin and the Line Islands, in Larson, R. L., Schlanger, S. O., et al., Initial reports of the Deep Sea Drilling Project: Washington, D.C., U.S. Government Printing Office, v. 61, p. 817–828.
- (with Larson, R. L.) Geological evolution of the Nauru Basin and regional implications, in Larson, R. L., Schlanger, S. O., et al., Initial reports of the Deep Sea Drilling Project: Washington, D.C., U.S. Government Printing Office, v. 61, p. 841–862.
- 1984 (and Garcia, M., Keating, B., Naughton, J., Haggerty, J., and Sager, W.) Geology and geochronology of the Line Islands: *Journal of Geophysical Research*, v. 89, p. 11,261–11,272.
- 1985 (with Arthur, M. A., and Dean, W. E.) Variations in the global carbon cycle during the Cretaceous related to climate, volcanism, and changes in atmospheric CO₂, in Sundquist, E. T., and Broecker, W. S., eds., *The carbon cycle and atmospheric CO₂: Natural variations Archean to present*: American Geophysical Union Monograph 32, p. 504–530.
- High frequency sea-level fluctuations in Cretaceous time: An emerging geophysical problem, in Hsü, K. J., ed., *History of Mesozoic and Cenozoic oceans*: American Geophysical Union Geodynamics Series, v. 15, p. 61–74.