Andean Past

Volume 13 *Andean Past 13* Article 4

5-1-2020

Harold B. "Bud" Rollins (1 February 1939-9 January 2017)

Daniel H. Sandweiss
daniels@maine.edu, daniels@maine.edu

HAROLD B. "BUD" ROLLINS (1 FEBRUARY 1939–9 JANUARY 2017)

DANIEL H. SANDWEISS
University of Maine, Orono
daniels@maine.edu

Viewer's Left to Right: Harold B. Rollins, Elena Décima de Zamecnik, Alfredo Narváez, and James B. Richardson III. The canines are unidentified. (Casma Valley, June 1980) Photo by Daniel H. Sandweiss.

Bud Rollins was an incidental Andeanist. Trained and employed as an invertebrate paleontologist, he came to Peru just one time, for about a month, in 1980, yet his influence on Central Andean geoarchaeology is tangible and on-going. He was also a good friend, mentor, and colleague.

Bud Rollins was educated in geology at Colgate University (B.A. 1960), the University of Wisconsin–Madison (M.A. 1963), and Columbia University (Ph.D. 1967). At Columbia, his classmates and friends included Niles Eldredge and Stephen Jay Gould. Eldredge, who developed the theory of punctuated equilibria with Gould, writes that "without Bud's mentoring, there would not be a 'punctuated equilibria'–at least not emanating from us Columbia kids" (Eldredge n.d.). Following the completion of his doctorate, Bud taught for two years at Antioch College in Ohio before taking a job in the Department of Geology and Planetary

ANDEAN PAST 13 (2022):35–40.

Science at the University of Pittsburgh, where he remained through retirement in 2002, having been promoted to Associate Professor with Tenure in 1973 and to Professor in 1984. In 1980, Bud was joint-appointed into the Department of Anthropology.

1980 is also the year that Bud came to Peru along with his close colleague Jack Donahue (a sedimentary geologist and founder of the journal *Geoarchaeology*) and Andean archaeologist James B. Richardson III. The three traveled to Huanchaco on the Peruvian North Coast to meet up with Michael E. Moseley. I was spending the year in Peru before starting my graduate coursework at Cornell, and had spent some time in the Salinas de Chao and on the Santa beach ridges, just north of Chimbote, at Mike's behest and with his support. Inland of the beach ridges, I had found an unusual assemblage of molluscs in Preceramic sites associated with a paleoshoreline. The species were all ones that live in, or tolerate, warm, tropical water and did not include the typical cold-water species found in Peru today. Mike wanted his visitors to see these finds and to that end asked me to show up at his house in Huanchaco on a particular day and time (though he didn't say why). Arriving early, I waited until the others showed up. Mike introduced me to Jim, Jack, and Bud, no last names, and asked me to take them to the Salinas de Chao and the Santa ridges and sites. I didn't know whom I was with for two days.

Over the next week, we visited the sites, excavated a test pit at one of the paleoshoreline sites and one in the ancient beach, and spent our evenings in the 1930s style bar of the Hotel de Turistas in Chimbote, talking about what we had seen and what it might mean. After rejecting various alternatives, under Bud's leadership, we settled on the idea that the Santa paleoshoreline assemblage could not have existed if the El Niño climate system had been functioning then as it does in the present. This idea built on Jim Richardson's pioneering work on Holocene molluscs and climate change further north, in the Talara region (*e.g.* Richardson 1978).

While in Chimbote, we sampled local restaurants for dinner. One night, we went to a *pollería* (chicken restaurant) and started with bowls of *aguadito*, an opaque chicken and rice soup. Bud dipped his spoon and fished out a chicken foot, which he examined and placed on the side of his plate. He kept fishing and eventually ended up with six feet. His comment: "That must have been one strange chicken!" Another night, we spent an hour or so in Coishco on the road into Chimbote from Santa, waiting for sixteen holes in one of our vehicle's inner tubes to be patched. While Jim and I kept an eye on the tire repair process, a group of teenagers celebrating some event in a circle of chairs by the roadside invited Bud, Jack, and a Canadian student with us to join them for hot chocolate. By Bud's later account, he wanted to make polite conversation. Having no Spanish, he pointed the cup of chocolate and asked "¿Que?". One of the hosts must have told him "Se llama chocolate". Driving back to the hotel, Bud innocently asked if it was really true that they fed chocolate to the llamas.

Back in the States, Jim, Bud and I kept in touch. Jim ran some dates for the site with the warm-water molluscs and for preceramic sites we had seen in the Salinas de Chao; the Chao sites had a normal, cool-water molluscan fauna. Bud first presented these data publicly at the 1981 Geological Society of America meeting (Rollins *et al.* 1981) and later we published an initial account of our work as Sandweiss *et al.* (1983). Bud led us in publishing a more definitive version, which he titled "The Birth of El Niño: Geoarchaeological Evidence and Implications" (Rollins, Richardson, and Sandweiss 1986). This paper was the first article in the first issue of the journal *Geoarchaeology*. The paleoclimate community was shell-shocked by this

molluscan perspective on Holocene climate change.

In response to critiques of our hypothesis that El Niño frequency varied at least throughout the Holocene, we continued research on the topic and published a new version in 1996 (Sandweiss *et al.* 1996) and several subsequent papers. Bud remained an important collaborator in this work. The topic remains hotly debated (Sandweiss *et al.* 2020).

Bud Rollins' second major contribution to Andean geoarchaeology and El Niño studies came in the wake of the 1982–83 large-scale El Niño event. Bud realized that individual molluscs that survived the event must have recorded it in their incremental shell growth. He applied for, and received, National Geographic funding to assess this idea. As I was already in Peru, he sent me to collect molluscs along the coast during April and November 1984. His work on these shells found growth breaks dating to the temperature maximum of that El Niño event in May and June of 1983 (Rollins, Sandweiss, and Rollins 1986). A subsequent collaboration with geochemist Uwe Brand led to the first attempt to quantify how shells record El Niño in the chemistry of the growth layers laid down during the event (Rollins *et al.* 1987). This line of research continues to the present, most recently with the research by Matthieu Carré (*e.g.*, Carré *et al.* 2014).

The 1984 collection has continued to prove productive. Fred Andrus (Andrus *et al.* 2005) used shells that survived the 1982–83 event to confirm the utility of Peruvian molluscs to track coastal upwelling. Most recently, Alberto Perez-Huerta (Perez-Huerta *et al.* 2013) studied biomineralization in the shells to determine that they laid down shell material via a different mechanism when stressed by El Niño's high temperatures. As Perez-Huerta and colleagues (*ibid.*:7) conclude, "Further research may indicate that the dual-mechanism for carbonate shell secretion identified here arose as an evolutionary adaptation to temperature stress for some molluscan species."

Finally, in 1988, Bud received funding from the National Science Foundation to search for evidence of El Niño growth breaks and chemical changes in ancient shells. He sent Thomas J. DeVries to Peru to study paleontological collections and me to study archaeological collections. Results were inconclusive, but subsequent work by others (*e.g.*, Carré *et al.* 2014) has shown that the concept works.

For at least forty years, archaeologists working along the Central Andean coast have looked to El Niño as an important environmental variable affecting human eco-dynamics in the region (*e.g.*, Sandweiss and Quilter 2008, 2012). Bud Rollins was the first to recognize the critically important fact that El Niño's behavior has not been stable through time, and he was the first to point to the utility of molluscan growth increments and chemistry in determining the details of this climatic phenomenon as it played out through time along the Central Andean coast. It is no accident that his major publications on these topics have been cited frequently (over 1300 times according to Google Citations and over 600 times according to the more conservative Web of Science/02-07-2022).

Increasingly, not only archaeologists, but also climate scientists, have come to recognize the value of archaeological climate proxies, particularly in regions such as the coast of Peru, where many of the usual natural archives (*e.g.* lakes, glaciers, corals) are largely absent (Sandweiss and Kelley 2012). Bud Rollins was a pioneer in this research.

The Andean work was not Bud's only contribution to geoarchaeology; his involvement with other projects included many years of

collaboration with David Hurst Thomas on St. Catherine's Island off the Georgia (U.S.A.) coast. In all of his studies, Bud applied his creativity and his deep knowledge of invertebrate paleontology, evolution, and stratigraphy to archaeological problems. He took the time to understand what archaeologists needed to know and how to tell us about it. This is a mark of a true interdisciplinarian.

In addition to all his other accomplishments, Bud was the best and most inveterate punner I have ever met, and he was never shellfish about sharing his puns–he always went the whole quahog. Non-punners might say "Ah, baloney!", but Bud could never clam up if a good pun presented itself to his razor wit. It is impossible to number the pearls of punning wisdom he produced. Once started, all other thought processes would slow to a snail's pace. Constant practice kept his mental mussels in shape, and novice punners usually took a shellacking when trying to keep up with Bud. Even experienced punners would limpet along before conching out long before he ran short of retorts, cowryng in fear of his brilliant word play. We will never see another Bud Rollins, but we can do our best to continue his work in molluscan geoarchaeology, climate studies, and punning.

Bud Rollins was a resident of Dunnellon, Florida at the time of his death. He is survived by his son, Steven L. Rollins. His beloved wife, Judith C. Rollins, predeceased him in 2015.

REFERENCES CITED

Andrus, C. Fred T., Gregory W.L. Hodgins, Daniel H. Sandweiss, and Douglas E. Crowe
2005 Molluscan Radiocarbon as a Proxy for El Niño-related Upwelling Variations in Peru. In: *Isotopic and Elemental Tracers of Cenozoic Climate Change*, edited by Germán Mora and Donna Surge. *Geological Society of America Special Paper* 395:13– 20.

Carré, Matthieu, Julian P. Sachs, Sara Purca, Andrew J. Schauer, Pascale Braconnot, Rommel Angeles Falcón, Michèle Julien, and Danièle Lavallée
2014 Holocene History of ENSO Variance and Asymmetry in the Eastern Tropical Pacific. *Science* 345:1045–1048.

Eldredge, Niles
n.d. Remembering Bud. http://nileseldredgecom.weebly.com/remembering-bud-rollins.html (accessed 13 February 2022).

Perez-Huerta, Alberto, Miguel F. Etayo-Cadavid, C. Fred T. Andrus, Teresa E. Jeffries, Clifton Watkins, Shane C. Street, and Daniel H. Sandweiss
2013 El Niño Impact on Mollusk Biomineralization–Implications for Trace Element Proxy Reconstructions and the Paleo-Archeological Record. *PLoS ONE* 8(2):e54274. doi:10.1371/ journal.pone.0054274.

Richardson III, James B.
1978 Early Man on the Peruvian North Coast, Early Maritime Exploitation, and the Pleistocene and Holocene Environment. In: *Early Man in America from a Circum-Pacific Perspective,* edited by Allan Bryan, pp. *274–289***.** Edmonton, Alberta, Canada: University of Alberta Press.

Rollins, Harold B., James B. Richardson III, and Daniel H. Sandweiss
1986 The Birth of El Niño: Geoarchaeological Evidence and Implications. *Geoarchaeology* 1:3–15.

Rollins, Harold B., Daniel H. Sandweiss, Uwe Brand, and Judith C. Rollins
1987 Growth Increment and Stable Isotope Analysis of Marine Bivalves: Implications for the Geoarchaeological Record of El Niño. *Geoarchaeology* 2(3):181–187.

Rollins, Harold B., Daniel H. Sandweiss, and James B. Richardson III
1981 A Thermally-Anomalous Molluscan Assemblage (TAMA) from Archaeological Sites along Coastal Peru: Paleoecological Implications and Biostratigraphic Utility. Geological Society of America, Annual Meeting, *Program with Abstracts* 13:541. Presented by Rollins.

Rollins, Harold B., Daniel H. Sandweiss, and Judith C. Rollins
1986b Effects of the 1982–1983 El Niño on Bivalve Mollusks. *National Geographic Research* 2(1): 106–112.

Sandweiss, D.H., C.F.T. Andrus, A.R. Kelley, K.A. Maasch, E.J. Reitz, and P.B. Roscoe
2020 Archaeological Climate Proxies and the Complexities of Reconstructing Holocene El Niño in Coastal Peru. *Proceedings of the National Academy of Sciences* 117(15):8271–8279.

Sandweiss, Daniel H. and Alice R. Kelley
2012 Archaeological Contributions to Climate Change Research: The Archaeological Record as

a Paleoclimatic and Paleoenvironmental Archive. In: *Annual Review of Anthropology* 41:371–391.

Sandweiss, Daniel H. and Jeffrey Quilter
2012 Collation, Correlation, and Causation in the Prehistory of Coastal Peru. In: *Surviving Sudden Environmental Change: Understanding Hazards, Mitigating Impacts, Avoiding Disasters*, edited by Jago Cooper and Payson Sheets, pp. 117–141. Boulder: University of Colorado Press.

Sandweiss, Daniel H. and Jeffrey Quilter, editors
2008 *El Niño, Catastrophism, and Culture Change in Ancient America*. Washington, D.C.: Dumbarton Oaks Research Library and Collection, Harvard University Press.

Sandweiss, Daniel H., James B. Richardson III, Elizabeth J. Reitz, Harold B. Rollins, and Kirk A. Maasch
1996 Geoarchaeological Evidence from Peru for a 5000 Years B.P. Onset of El Niño. *Science* 273: 1531–1533.

Sandweiss, Daniel H., Harold B. Rollins, and James B. Richardson III
1983 Landscape Alteration and Prehistoric Human Occupation on the North Coast of Peru. *Annals of Carnegie Museum* 52:277–298.

Andean Publications and Papers Presented by Harold B. Rollins

Nicholas, Sarah, Daniel H. Sandweiss, James B. Richardson III, Harold B. Rollins
1995 Stable Isotopes of Marine Shell and Paleoclimate on the North Coast of Peru. Paper presented at the 14th Annual Northeast Conference on Andean Archaeology and Ethnohistory, Rhode Island School of Design (RISD), Providence Rhode Island, October 21–22.

Richardson III, James B., Daniel H. Sandweiss, and Harold B. Rollins
1995 The Origins of El Niño, Round II. Paper presented at the 14th Annual Northeast Conference on Andean Archaeology and Ethnohistory, Rhode Island School of Design (RISD) Providence, Rhode Island, October 21–22.

Rollins, Harold B.
1984 Molluscs and the Origin of El Niño. Abstract, *American Malacological Bulletin* 3(1):96–97.
1987 Geoarchaeology of the Santa-Chao Region, Northern Peru: Alterations in Landscape, Climate, and Human Occupation, Symposium on Geoarchaeology of the Andean Coast: Recent Advances. Paper presented at the 52nd Annual Meeting of the Society for American Archaeology, Toronto, Ontario, Canada, May 6–10, *Abstracts*, p. 116.
1996 Paleoclimate of the North Coast of Peru as Recorded in the Stable Isotope Content of Marine Shells. Paper presented at the 61th Annual Meeting of the Society for American Archaeology, New Orleans, Louisiana, April 10–14.
1998 Mid-Holocene Climate in Western South America: A Malacological Perspective. FERCO International Conference on Climate and Culture at 3,000 B.C., University of Maine, Orono.

Rollins, Harold B. and Uwe Brand
1992 Ancient ENSO Events Inferred by Bivalve Shell Geochemistry: A Critique. Paper presented at the Fifty-Seventh Annual Meeting of the Society for American Archaeology, Pittsburgh, Pennsylvania, *Abstracts,* pp. 108–109.

Rollins, Harold B., James B. Richardson III, and Daniel H. Sandweiss
1986 The Birth of El Niño: Geoarchaeological Evidence and Implications. *Geoarchaeology* 1:3–15.

Rollins, Harold B., Daniel H. Sandweiss, Uwe Brand, and Judith C. Rollins
1987 Growth Increment and Stable Isotope Analysis of Marine Bivalves: Implications for the Geoarchaeological Record of El Niño. *Geoarchaeology* 2(3):181–197.

Rollins, Harold B., Daniel H. Sandweiss, and James B. Richardson III
1981 A Thermally Anomalous Molluscan Assemblage (TAMA) from Archaeological Sites along Coastal Peru: Paleoecological Implications and Biostratigraphical Utility. Paper presented to the Geological Society of America, *Abstracts with Programs*, p. 540.

Rollins, Harold B., Daniel H. Sandweiss, and Judith C. Rollins
1986a Effect of the 1982–1983 El Niño on Bivalve Mollusks. *National Geographic Research* 2:106–112.
1986b Documentation of Large-magnitude El Niño Events Using Mollusks from Coastal Archaeological Sites. American Geophysical Union, Chapman Conference on El Niño, October 27–31, published abstract, p. 29.
1990 Mollusks and Coastal Archaeology: A Review. In: *Archaeological Geology of North America*, edited by Norman P. Lasca and Jack Donahue, pp. 467–478. *Geological Society of America, Centennial Special Volume* 4 (Boulder, Colorado).

Rollins, Harold B., Daniel H. Sandweiss, Judith C. Rollins, and Uwe Brand
1987 Recognition of Large Magnitude El Niño events using Andean Coastal Shell Middens, Symposium on Geoarchaeology of the Andean Coast: Recent Advances. Paper presented at the 52nd Annual Meeting of the Society for American

Archaeology, Toronto, Ontario, Canada, May 6–10, *Abstracts*, p. 115.

Sandweiss, Daniel H., Kirk A. Maasch, C. Fred T. Andrus, Elizabeth J. Reitz, Melanie Riedinger-Whitmore, James B. Richardson III, and Harold B. Rollins

2007 Mid-Holocene Climate and Culture Change in Coastal Peru. In: *Climatic Change and Cultural Dynamics: A Global Perspective on Mid-Holocene Transitions*, edited by David G. Anderson, Kirk A. Maasch, and Daniel H. Sandweiss, pp. 25–50. San Diego, California: Academic Press.

Sandweiss, Daniel H., Kirk A. Maasch, Daniel F. Belnap, James B. Richardson III, and Harold B. Rollins

1998 Discussion of: Lisa E. Wells, 1996 The Santa Beach Ridge Complex, *Journal of Coastal Research* 12(1):1–17. *Journal of Coastal Research* 14(1):367–373.

Sandweiss, Daniel H., Kirk A. Maasch, Richard L. Burger, James B. Richardson III, Harold B. Rollins, and Amy Clement

2001 Variation in Holocene El Niño Frequencies: Climate Records and Cultural Consequences in Ancient Peru. *Geology* 29(7):603–606.

Sandweiss, Daniel H., James B. Richardson III, Elizabeth J. Reitz, Harold B. Rollins, and Kirk A. Maasch

1996 Geoarchaeological Evidence from Peru for a 5000 Years B.P. Onset of El Niño. *Science* 273: 1531–1533.

1997 Determining the Early History of El Niño. Comment by Thomas J. DeVries *et al.*, and response. *Science* 276:965–967.

Sandweiss, Daniel H., Harold B. Rollins, and Thomas H. Anderson

1981 A Single Large Magnitude Uplift in the Holocene Record of the Peruvian North Coast. Geological Society of America, *Abstracts with Programs*, p. 545.

Sandweiss, Daniel H., Harold B. Rollins, and James B. Richardson III

1983 Landscape Alteration and Prehistoric Human Occupation on the North Coast of Peru. *Annals of the Carnegie Museum* 52:277–298.

1985 Prehistoric People and Rapid Landscape Alteration in the Holocene Record of the Peruvian Coast. Geological Society of America, *Abstracts with Programs*, p. 706.