

## In Memoriam

### Arthur James Boucot (1924–2017)

Sally E. Walker,<sup>1</sup> Kathy M. Nichols,<sup>2</sup> and David Rohr<sup>3</sup>

<sup>1</sup>Department of Geology, University of Georgia, Athens, Georgia 30602, USA (swalker@gly.uga.edu)

<sup>2</sup>Consulting Geologist, 1235 Estes Street, Lakewood, Colorado 80215, USA (slbring@comcast.net)

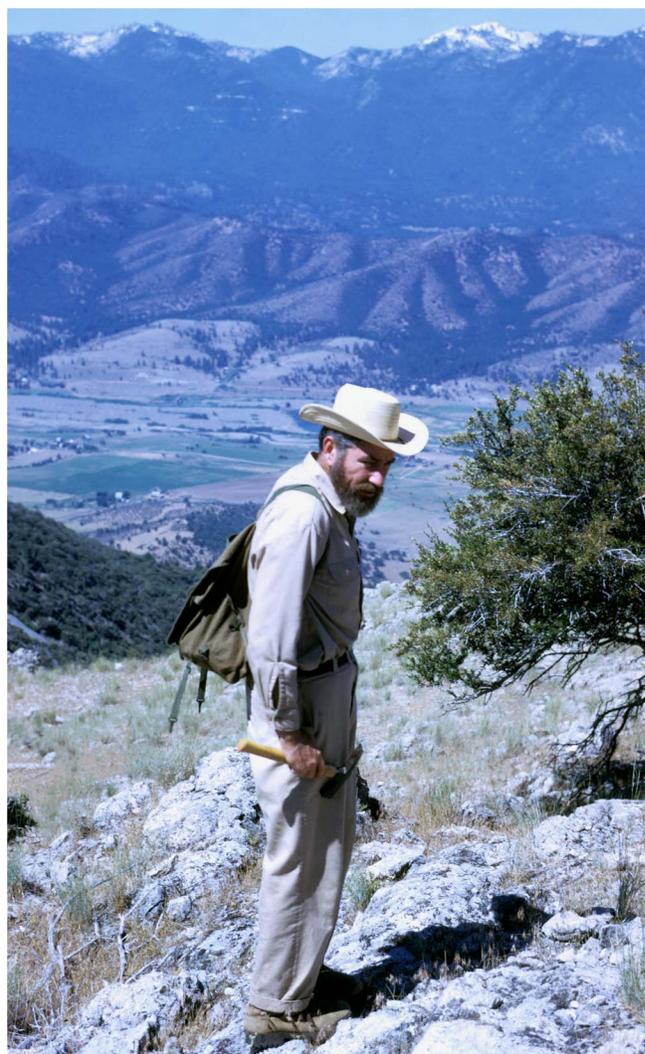
<sup>3</sup>Department of Earth & Physical Sciences, Sul Ross State University, Alpine, Texas 79832, USA (drohr@sulross.edu)

Arthur James Boucot, 93, a world-renown brachiopod expert, paleobiogeographer, and evolutionary paleoecologist passed away April 10, 2017, in Denver, Colorado, during an operation for congestive heart failure. Masterful in Siluro-Devonian biostratigraphy, he also developed paleocommunity evolution with his concept of ecological-evolutionary units, and, with Jane Gray, pushed back the origination of vascular plants by 40 Ma at the time of their discovery. He was also an ace field geologist who examined and collected Paleozoic rocks on every continent, a mineralogist, and an inspired teacher who sought out, cultivated, and nurtured nascent scientists from all over the world (Figure 1). His towering presence, quick-witted humor accompanied by a wink of the eye, and his encyclopedic knowledge of the fossil record will be deeply missed by his colleagues the world over.

Born in Philadelphia, Pennsylvania, on 26 May 1924, Art's early childhood was challenging. His father, Arthur Guest, who was intermittently unemployed, suffered from tuberculosis among other entanglements, and his mother, Katharine Boucot Sturgis (formerly K. Guest), struggled to support her family; although she eventually finished her medical degree after twenty years and became a famous pulmonary specialist with a prodigious publication record like her son. Art even ran away at one point, hopping a freight train for Montana. Fortunately, at the University of Pennsylvania, where his mother attended pre-medical classes, young Art was enthusiastically mentored by both the energetic paleontologist Frank Swartz and the caring mineralogist Arthur Honess. His mother also cultivated Art's early geological interests, as he was particularly fond of brachiopods. In fact, at the time of his death, Art still had the first brachiopod he collected as a child. The world-traveling mineralogist Samuel G. Gordon at the Philadelphia Academy of Natural Sciences also inspired Art, after whom he named one of his sons. Like Gordon, Art started his geological studies at the Wagner Free Institute of Science (1935–1939) taking courses in physical and historical geology.

At 17, Art majored in chemical engineering at the University of Pennsylvania (1941–1942), but dropped out to work as a crystal finisher of quartz oscillator plates—following S.G. Gordon—at RCA in New Jersey (1942–1943) until he was drafted into WWII. He served as an ace navigator for the U.S. Army Air Corps, Eighth Air Force (First Lieutenant:

1943–1945), flying ~45 missions over Western Europe in B-24 bombers (Figures 2, 3). On one such mission, flak hit an engine disabling it. Leaking fuel, they dropped out of formation and flew low over Germany. Crossing the English Channel and just



**Figure 1.** Arthur James Boucot in the Klamath Mountains (1972).



**Figure 2.** Navigator Art Boucot, standing third from left, Topeka Kansas Air Base, 1944, prior to going overseas during WWII.



**Figure 3.** Art enjoying the snow at Horsham St. Faith Air Field, England, 1944, WWII.

six miles from their English airbase, the remaining three engines went out. Incredibly, the pilot dove through the clouds to maintain speed and landed the B-24 in the grass just short of the runway (a B-24 was not supposed to glide!).

Awarded the Distinguished Flying Cross, among other service medals, Art returned from the War, and, facilitated by Dr. Gordon and Veteran's National Scholarships, he started his undergraduate mineralogical studies at Harvard College. Although he published his first paper on the mineral triplite

in 1947, he soon found that mineral chemistry was not his forte, and he turned to paleontology and stratigraphy under the inspired mentorship of the innovative geobiologist Preston Cloud, Jr., then an assistant professor at Harvard University. Art graduated magna cum laude in Geology (A.B., 1948) and obtained his master's degree a year later.

Art received his Ph.D. at Harvard University in 1953 for his work on the Silurian–Devonian stratigraphy of the Moose River Group, west-central Maine, mentored first by Cloud and then by Marland Billings, after Cloud moved to the U.S.G.S. Cloud offered Art a job at the U.S.G.S. working in mapping and stratigraphy (1951–1956). During that time, Art learned Paleozoic gastropods and brachiopods from the world-renown J. Brookes Knight and G. Arthur Cooper, respectively, at the Smithsonian Institution. Art went through the ranks to associate professor at MIT (1957–1961), moved to the California Institute of Technology (Caltech) in 1961, and received his professorship there in 1966. He then transferred to the University of Pennsylvania in 1968, but after a disgruntled year, became a professor of geology, and then zoology, at Oregon State University (OSU; 1969–2006) in Corvallis, Oregon. At OSU, Art was a distinguished professor of zoology (1991–2006) and emeritus professor from 2006 to his death.

His scientific passions concerned the biostratigraphy of Silurian and Devonian rocks and the evolutionary ecology and biogeography of paleocommunities. He worked primarily with Paleozoic brachiopods discovering that rare species were important for recognizing stratigraphic boundaries, while cosmopolitan taxa were more resistant to extinction. He was known to ‘boucotize’ outcrops so that he could find the rare species that helped him refine geologic maps and stratigraphic relationships. Clearly, Art dissolved or cut open megatons of limestone in pursuit of brachiopods and other paleoinvertebrates! One Boucot rumor suggests that he took a backhoe to dig up fossils on a golf course in Wales: that did not go over well. He also studied how taxa with small populations evolved more quickly than taxa with larger populations. These findings led to the development of his evolutionary-ecology units (EEUs, with homage to d’Orbigny and Oppel), laying the foundation for Phanerozoic community stasis during environmental stability and community turnover during environmental change. He also saw that behavior, once formed, was relatively fixed in ecological systems and over time. He was especially keen on the study of coevolution, from parasites to symbiosis. With Jane Gray, he published the earliest record of land plants at that time (1971), and they continued their research on early land-plant evolution and the importance of fossils as paleoclimatic indicators until her death in 2000 (Figure 4). His early studies (1951–1953) presaged the taphonomic revolution in the 1980s, revealing how current sorting affected shell distributions, how life and death assemblages were different, and how fossils were preserved in metamorphic rocks. In all, Art published nearly 570 papers, including eight books, a prodigious number of geologic maps and monographs, book chapters, and edited volumes.

True to his dictum that evolution does not take place in an ecological vacuum, Art was a great collaborator. He worked with graptolite specialist William “Bill” Berry on Silurian stratigraphy of North America, conodont specialist Michael Murphy on Great Basin stratigraphy, and



**Figure 4.** Art and his collaborator, Jane Gray, at the Geological Society of America meeting, Riverside, California, 1971.

paleoinvertebrate expert, John Talent, on global Devonian biogeography and biostratigraphy. Art collaborated extensively with Jess Johnson, a brilliant Devonian specialist on brachiopods and conodonts, who was working on his Ph.D. at UCLA when he contracted polio in 1959 and thereafter was tied to a respirator. Art convinced Jess to move to Caltech as his research assistant in 1962, enabling Jess to finish his Ph.D., and from then on, produce an extensive publication record that revolutionized middle Paleozoic stratigraphy of western North America. From Caltech, Jess moved to OSU with Art, where he became a Professor of Geology. At OSU, Art also had an extensive collaboration on the stasis of fossil behavior with life-in-amber specialist, George Poinar, Jr. Art's last published tome focused on Phanerozoic paleoclimate in collaboration with Chen Yu (Nanjing Institute) and Christopher Scotese (University of Texas). For that book, they published a compendium of 28 maps that detailed the paleogeographic distributions of the continents and their paleoclimates based on lithology, minerals and fossils. Fortunately for us, his books detail his encyclopedic and synthetic knowledge of the fossil record, providing a springboard for future research projects.

Art mentored many students, from undergraduates to postdocs. His eight doctoral students included biostratigrapher and biofacies expert Charles Harper, Jr.; sequence stratigrapher and Upper Paleozoic fossil specialist, Peter Isaacson (University of Idaho); Paleozoic gastropod expert, David Rohr (Sul Ross

University); Devonian brachiopod specialist William F. Koch (Oregon); paleontologist Don Mikulic (Illinois Geological Survey); brachiopod/gastropod and tectonic specialist, Robert Blodgett (Alaska); entrepreneur Ning Zhang (Oregon); and geologist Al Potter (Texas). Art also mentored evolutionary paleobiologist Peter Sheehan (Milwaukee Public Museum) in his early work on brachiopods. One of Art's postdocs was David Perry, who was fast becoming a noted Devonian brachiopod specialist until his untimely death in a helicopter crash in the Canadian Rockies. Art also corresponded with the first author of this memoriam while she was a graduate student and, during a difficult time in her life, provided a postdoc for her to continue her paleoecological studies at OSU. Art's motto was that all publications were "progress reports" and to keep going, no matter what occurs in your life.

He was also known for his generosity in hosting scientists who wished to visit his lab and he kept up a voluminous correspondence with paleobiologists from all over the world. He also had an infamous hydrochloric acid leaching facility—likely the largest in the world—where he and his colleagues dissolved tons of limestone to extract thousands upon thousands of silicified brachiopods, gastropods, corals, and other Paleozoic invertebrates.

Art's influential international work received many honors. He received a Guggenheim Fellowship to examine the Silurian–Devonian rocks of Western Europe and several distinguished honors from the National Academy of Sciences, including Exchange Fellow to the Soviet Union, Senior Scholar to China, and Distinguished Scholar to China. Additionally he garnered the Congressional Antarctic Medal, SEPM's Raymond C. Moore Medal, National Science Award—First Class—Academia Sinica, Paleontological Society Medal, and the Gilbert Harris Award of the Paleontological Research Institute, among other distinguished honors. The Advisory Committee for Antarctic Names honored Art with a plateau in the Geologists Range—the Boucot Plateau—for his stratigraphic work in Antarctica (1964–1965).

Art's service to paleontology and geology was legion, and only a few salient contributions are discussed here. He served from 1972 to his death as the U.S. member for the International Geological Congress (IGU) subcommittee on the Silurian System and as a U.S. member for the IGU subcommittee on the Ordovician–Silurian Boundary (1974–1987). He was Chairman for Project Ecostratigraphy (IGU, 1974–1976), a member of the National Research Council Panel concerning pre-Pleistocene Climates (1980–1982), and an advisory committee member for NSF's Earth's Sciences (1982–1985). He was President for both the Paleontological Society (1980–1981) and the International Palaeontological Association (1984–1989), and Vice-President for the International Commission on Stratigraphy (1986–1989).

Art could not have done his work without his beloved wife, Barbara "Bobbie" Boucot. Bobbie was a brilliant student at Radcliffe and was tasked with teaching Art the French language so that he could pass his Ph.D. comps. Well, one thing led to another, and Bobbie and Art were married in Cambridge, Massachusetts (1948). Soon after, they had four wonderful Boucot children: Hanna, Katharine, Samuel Gordon (named after the mineralogist), and Peter. Bobbie kept Art's life in order, from helping with field work, boxing up fossils that took several

semi-trucks to move among institutions, editing his manuscripts, raising their family, as well as engaging in her passion for genealogy and the Indiana Pacers. Sadly, Bobbie passed away in 2011 with Art by her side after 63 years of marriage. He was devastated. A few years passed and Art connected with Kathy Nichols, a Triassic paleontologist who had just lost her precious husband after 45 years of marriage, the Triassic biostratigrapher, Norm Silberling. Art and Kathy were dear companions up to his death. Art's children (all living in Oregon), three grandchildren, and Kathy survive him. Art was preceded in death by his mother, the noted pulmonary specialist, Katharine Boucot Sturgis, and her first husband, Arthur Barrow Guest, a lawyer and insurance agent (after WWII, Art changed his last name to Boucot after his mother's second husband).

Art was not all science—although he worked seven days a week pounding furiously on the keyboard with the fastest two fingers in the West—he also had a passion for collecting “wicked” minerals from all over the world, including gigantic opals that gleamed and glistened brighter than the sun. He donated his world-class mineral collection to the Smithsonian Institution along with ~20,000 brachiopod specimens. He also loved his rhododendrons and fussy cats, and he had a kicker of a salad dressing, full of spicy seasonings. He was on par with William Buckland, devouring extreme gastronomic delights on his international travels. The first author of this memoriam was aghast when he practically inhaled a plate of stewed chicken feet before her eyes and then washed them down with broiled jellyfish at a San Francisco Chinese restaurant. He also enjoyed smoking cigars and eating raw oysters with John Rubin every Friday afternoon, as they “chewed the fat” about dinosaur physiology and other topics. But most of all, he cared about the future of paleontology. To that end, Bobbie and Art led a relatively frugal lifestyle (Art stuffed his 6'3" frame into the same little red Datsun for 34 years), and they saved enough money to contribute to an endowment—the Arthur James Boucot Research Grants—to fund early-career paleontologists.

They transferred that fund to the Paleontological Society in 2000. Art is honored with another fund at the Paleontological Society, the Boucot Fund, which supports undergraduate and graduate student research in paleontology. Art's stratigraphic insights and collections were foundational, his knowledge of the fossil record unparalleled, and his support for the future of paleontology was unwavering. Paleontology has lost a giant, but he will never be forgotten.

### Acknowledgments

The authors wish to thank Robert Blodgett and Peter Isaacson for their remembrances of Art. We also benefited from the articles by John Talent (“Arthur J. [‘Art’] Boucot: Palaeontologic virtuoso and guru” [1996, *Historical Biology*, v. 11:3–7]; “The inimitable Jess Johnson” [1997, *Geological Society of America Special Paper*, v. 321:1–10]); and Thomas Dutro's “Presentation of the Paleontological Society Medal to Arthur J. Boucot” (2000, *Journal of Paleontology*, v. 74:754–757).

### Selected Bibliography of Art Boucot

- Boucot, A.J., 1975, *Evolution and Extinction Rate Controls*: Amsterdam, Netherlands, Elsevier, 27 p.
- Boucot, A.J., 1981, *Principles of Benthic Marine Paleocology*: New York, Academic Press, 463 p.
- Boucot, A.J., 1990, *Evolutionary Paleobiology of Behavior and Coevolution*: Amsterdam, Netherlands, Elsevier, 725 p.
- Boucot, A.J., and Lawson, J.D., eds., 1999, *Paleocommunities—A Case Study from the Silurian and Lower Devonian*, *World and Regional Geology II*: Cambridge, England, Cambridge University Press, 895 p.
- Boucot, A.J., and Poinar, G.O., Jr., 2010, *Fossil Behavior Compendium*: Boca Raton, Florida, CRC Press, Taylor & Francis Group, 424 p.
- Boucot, A.J., Xu, C., and Scotese, C., 2013, Phanerozoic Paleoclimate: SEPM Concepts in Sedimentology and Paleontology, v. 11, p. 1–347.
- Gray, J., and Boucot, A.J., eds., 1979, *Historical Biogeography, Plate Tectonics and the Changing Environment*: Corvallis, Oregon, Oregon State University Press, 482 p.
- Gray, J., Boucot, A.J., and Berry, W.B.N., 1981, *Communities of the Past*: New York, New York, Hutchinson Ross Publishing Company, 623 p.