RIP RAPP ARCHAEOLOGICAL GEOLOGY AWARD

Presented to
Ervan G. Garisson

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University of Georgia

Citation by Scott H. Pike

Today I have the great pleasure of reading the citation for the 2010 recipient of the Rip Rapp Archaeological Geology Award, Erv Garrison. This award is appropriate to recognize the significant contributions that Erv has made to the burgeoning field of archaeological geology. Hidden within Erv's laidback southern demeanor is a scholar and educator who pursues his research with a quiet intensity and provides unwavering support and opportunities for his undergraduate and graduate students. Throughout Erv's career he has always been at the interdisciplinary crossroads between the physical sciences and archaeology.

Erv was first introduced to archaeometry as a master's student at the University of Arkansas, where he worked on nuclear fission track and alpha-recoil dating on micas from the Mississippian site of Hazel Mount and published a dating sequence of the Hohokam in *Archaeometry*.

Following his "archaeometric muse", Erv pursued his dissertation training in nuclear archaeometry at the University of Missouri. Studying under David Cowan and Ralph Rowlett, Erv learned the rudiments of thermoluminescence dating techniques that led to his dissertation on the electron spin resonance dating of archaeological flints. Erv's important work dating geological and archaeological flints made it to the pages of *Nature*. Erv was the first to date an Acheulean biface for the site of Combe Grenal in France.

While at MU, Erv incorporated TL in a rescue excavation of the Shriver site, a Pre-Clovis site in NW Missouri; work that was later published in *Science*. Erv recalls reconciling the TL dates with the midcontinent glacial stratigraphy as a key point in his career trajectory. From that time on out he sought to employ geology to help decipher the archaeological past.

Erv's first foray into the field of archaeological geophysics was in the late 1970s while still at MU. While directing a summer-long excavation in the Meramec River Valley in the Eastern Ozarks, he and David Denmam, using the university's new proton magnetometer and metal detectors, located slag heaps and iron deposits from the oldest bloomery forge in Missouri. Later Erv surveyed a steamboat wreck in the White River, the George Washington Carver National Monument, and a city-block of Mormon Nauvoo.

Erv's academic job at Texas A&M allowed him to focus his research and teaching on geoprospection of terrestrial and marine/estuarine sites. Erv designed a marine archaeology survey course where students mapped known historic shipwrecks in the Gulf of Mexico. In the 1980s, Erv received funding from the Minerals Management Survey to guide a major study of marine survey and mapping methodologies. During this work, he and his team discovered and excavated a 19th century French shipwreck in the Chandeleur Islands off Louisiana.

In 1981, Erv began an international multi-year collaboration with the Archaeological Service of the Canton of Neuchatel in Switzerland. Erv's team carried out geophysical surveys along Lake Neuchatel's north shore and eastern mid-lake sections. In concert with a systematic geophysical coring program, Erv characterized the post-Late Glacial Maximum lacustrine landscape and its relationship to prehistoric settlements on the ancient lakeshore. Erv also led excavations of Neolithic and Late Bronze Age settlements funded in part by EARTHWATCH and the Canton of Neuchatel. In 1985, Erv's team discovered one of the largest bronze metal troves ever discovered in Switzerland.

From 1990 to 1992, Erv began a three year appointment with the National Marine Sanctuaries Program where he established a base for their heritage programs. Following a brief sojourn in DC, he conducted and published a marine geoarchaelogical study off Santra Cruz Island in the north Channel Islands where he calibrated CHIRP sonar data with sediment cores.

In 1992, Erv found himself heading to the University of Georgia where he continues to hold joint appointments in the Anthropology and Geology departments. Erv established a summer field school in shallow geophysics, the first university-based course of its kind offered in the US. Since 1993, the course has taught over 100 students, mostly undergrads, how to use magnetic, electrical and radar survey instruments.

Erv's research program at UGA includes an ambitious marine geoarchaeological survey of the continental shelf that uses NOAA vessels and Georgia survey equipment. The studies have resulted in graduate theses and published journal articles outlining the archaeological and paleontological potential of the continental shelf as a coast landform in the late Pleistocene. Perhaps the most notable discovery of this work to date was the discovery and subsequent excavation at J Reef of a complete subfossil mandible of the extinct Atlantic gray whale, dated to 36 ka. The fossil is currently at the Smithsonian being cast for reference copies.

Having now worked in archaeological geology for over thirty years, Erv and his UGA colleague and former Archaeological Geology Division Award winner, Norman Herz, pulled their vast and varied experiences together and, in 1998, co-authored the textbook "Geological Methods for Archaeology." In 2003, Erv wrote a second textbook "Techniques in Archaeological Geology."

I resist labeling this award a "life-time achievement award" because as I know Erv will continue to produce significant research and train more students in the coming years. With this award the Archaeological Geology Division acknowledges Erv's contributions to the fields of archaeology and geology, yet we also await his future valuable contributions to our science.

Response By Ervan G. Garrison

I would like to thank Scott Pike, my citationist, for finding 500 words to describe my career in archaeological geology. It has made me feel like I may have accomplished something over the past 30 years. I thank my peers in this vibrant branch of GSA and the larger discipline of geology, for extending this honor to me. It is both gratifying and humbling, well-worn adjectives, in the sense

of acceptance prose, but true, nonetheless. I am, likewise, moved to be accepting an award named for a true gentleman and one of the founding scholars of this field, George "Rip" Rapp. Having my name mentioned in the same context as Rip's is an honor. I follow my UGA colleague Norman "Norm" Herz in receiving this award. I was co-citationist on Norm's award.

I am glad Scott mentioned, I'm not quite ready to go quietly into emeritus status. Those of you who know me would probably say Erv doesn't generally go anywhere "quietly". I think, as a teacher and researcher, I have a few miles left in my tank, and if anything energizes one to do more, it is to be recognized for their work on occasions such as this. I am lucky, as I say, to be at a great Southern university, the University of Georgia. It is a pleasure to work at an institution and with earth science colleagues who value a field like archaeological geology. I wish more of our research universities did so. Saying this, I can enumerate several such institutions who house previous awardees so I, and UGA, are in very, very good company. Lastly, as I am so keenly aware, I owe my family for the love, patience and support they have given me over my academic career.

My "travels" in archaeological geology began, as Scott notes, while I was a graduate student at the University of Missouri. I had chosen "Mizzou" for my doctoral training, after two degrees from the University of Arkansas, because of a nuclear reactor. Not just any nuclear reactor, but a "research" reactor and a nascent Laboratory for Nuclear Archaeometry. My University of Arkansas masters study was centered on nuclear track dating of muscovite (mica) in prehistoric pottery. At MU, Walter D. Keller, "Mr. MU Geology" introduced me to the electron microprobe.

My real exposure to earth science, outside of crystalline mineralogy, began at MU through both classes and field studies at the side of some very talented archaeologists and geoscientists. One of these individuals was W. Raymond "Ray" Wood, "Mr. Plains Archaeology", who made "closet" geomorphologists and paleoecologists out a lot of us. So I went to Missouri to "do" archaeometry and left Columbia with a skill set for geoarchaeology.

Interestingly enough, as my career has evolved, I find that I was drawn more-and-more to the "geo" side of things archaeological to the diminishment of my more strictly archaeometric studies. Now this is not to say I do not appreciate an electron microprobe, an XRD or an optical reader for a luminescence dating system. Nor have I abandoned my abiding interest in the application of shallow geophysical techniques in the service of archaeology. One can look around my UGA lab and see more than a little evidence for this passion.

I have not been much of a "job hopper". I have only worked at two great universities—UGA and Texas A&M. My only time outside of the academy was my short stint as archaeologist for the National Oceanic & Atmospheric Administration (NOAA). Even after I came to Georgia, in 1992, I never completely "left" NOAA by virtue of their generous support of my own and my students' offshore marine geoarchaeological studies of the continental shelf. NOAA's research vessels and in-kind support has facilitated research leading to two UGA masters theses and, lately, an on-going doctoral study.

I would like to expand on each of these milestones in my career—Missouri, Texas, Washington, D.C. and Georgia—in sequence, beginning with my introduction to archaeological geology at the University of Missouri. Few people enter a doctoral program with a brand new 6 week old baby but the Garrisons did. Children don't notice "graduate school poverty" so it worked for us over our almost four years at MU.

One brief but important note regarding a publication I co-authored while at the University of Arkansas and in the employ of the reknowned Arkansas Archeological Survey (no, AAS does *not* use an "a"). Jeff Flenniken and I worked for AAS at Fayetteville. Jeff is one of the real gurus of lithic technology and he was good, even back in the mid-70s. He was interested in the properties of novaculite and asked my help on a simple heat treatment experiment which subsequently turned into a 1975 publication in *JFA*. That brief foray into the thermal behavior of flint led to, probably, one our more cited papers.

As I noted, MU had a research reactor *and* a Laboratory for Nuclear Archaeometry. That facility is now directed by my good friend Mike Glasscock. Mike had not arrived at MU while I was resident but he inherited a unique and singular facility in archaeological science. With the unfortunate demise of Penn's MASCA, it pretty much stands alone on the U.S. landscape. MU was doing TL as well. Ralph Rowlett introduced me to that technique and well as to European prehistory. Neutron activation was not new to me when I entered MU. I had used the smaller reactor at then UM-Rolla for the same purpose. MU's machine was a 15 MW reactor thereby allowing shorter, higher neutron flux studies. Without access to such a device I doubt there would have been a doctoral study and subsequent *Nature* article on the ESR dating of French Acheulean flints.

As I say, MU was an eye-opener to a lab-rat like myself. People like Ray Wood and his, then, students were out at Rodgers Shelter, in western Missouri, rewriting the book on paleoenvironmental studies in Midwestern-Ozarks archaeology. I didn't get to work there but I "watched" over their academic shoulders. Without knowing it, I began to adopt their methodology in my own work—palynology/phytoliths; paleoclimate; sedimentology; zooarchaeology; etc. etc. So when I *did* work on a project that involved archaeological geology—the Shriver Site—I was conversant. At Shriver, a "pre-paleo" horizon was identified and subsequently described in a 1978 *Science* publication by Mike Reagan, *et al*. I did the TL and, in the process, met many of the field principals on the study not the least of which was KU's Wakefield Dort, Jr. Dort introduced me to the Peoria Loess and how litho/pedostratigraphy works. Artefacts found atop18 ka land surfaces, such as those at Shriver, by simple deduction, have that *Terminus post quem*. That lesson stuck.

Now, glacial landscapes are non-existent in the Southeast U.S. unless their unseen remains are perched on some buried Paleozoic terrane in the Appalachians. Glacial landscapes abound north of 39 degrees North Latitude aka central Missouri. There I confronted glacial till and end moraines. In one case, my earnest graduate schooled recognition of till-produced "geofacts" led me to contradict a good friend and professional archaeologist's identification of these as "pre-forms". He graciously took it in stride but I learned how very important it is to recognize the "faux" in presumed archaeological materials. A little earth science prevents big embarrassments.

Texas was different. No glaciers down there—at least not since the Paleozoic. I met my first vertisol—it cracked our house foundation. A&M was a place where marine studies are preeminent—oceanography, marine geology, marine geophysics, nautical archaeology, etc. They even had a three person submersible! While I had begun the use of shallow geophysical methods while at MU, the horizons for these types of studies were much broader in Texas. There I had access to marine geophysical instruments such as acoustical and magnetic, and high-precision microwave radar positioning systems. The sea called but first I did a terrestrial survey for David Hurst Thomas at St. Catherines

Island, Georgia. Dave and his American Museum of Natural History team were systematically surveying that barrier island for a lost Spanish mission, *Santa Catalina de Guale*, one of string of 16th and 17th missions established from South Carolina, southward to St. Augustine and one of more important. I borrowed a proton mag from my friend Rik Anuskiewicz, then an archaeologist with the U.S. Army Corps of Engineers, and went "mission hunting". Long story short—we "scored". In less than three days we hit a series of anomalies that had to be associated with some type of man-made structures. We left some flag pins with "guidance" such as "dig here" written on them. Dave dug and the rest is well-documented in journal articles and monographs.

I returned to Georgia in '79–82 to work with Rik Anuskiewicz on the study of a Confederate ironclad, the *CSS Georgia*. It was a project long on interesting results but difficult underwater archaeology. If one has not dove the Savannah River at ebb tide then they cannot really know what fear really is. It's dark—no, it's black—and the current in that river turns a diver into an underwater streamer. I did gain real experience in marine sediment coring using a large Ewing piston coring rig. Reconciling the coring data to SONAR data was a real learning experience. It was the genesis, for me, of the use of this methodology in evolving a protocol for doing marine geoarchaeology off both U.S. coasts and in European lakes.

I "left the land" altogether thereafter conducting several geophysical surveys of lacustrine sites in Switzerland together with offshore sites in the Gulf of Mexico and the Santa Barbara Channel from 1985-1993. In this period I was working at Texas A&M from '85-'90 and then with NOAA from '90-'92. Two interesting projects in the Gulf involved an 18th century French shipwreck and the other a geological mapping of the continental shelf off Mobile. In the Santa Barbara Channel, a large portion of which is National Marine Sanctuary, I led a geoarchaeological study of the drowned shelf of Santa Cruz Island using CHIRP SONAR for the first time and combined this with shallow sediment coring of interesting sub-bottom profiler strata. While we found no ancient land surfaces or paleosols we did get an appreciation of how much discharge those so-called "ephemeral" island streams can produce. Our RC dates for the buried surfaces came back "historic" in age. Those offshore sediment prisms are young. To reach Holocene levels, on the island's shelf, it will take piston or vibracore technology or core the deeper Santa Barbara Basin, which is exactly what Jim Kennett, UCSB, and the Ocean Drilling Program (ODP) did a couple of years later.

Lake Neuchâtel was formed by glacial scour and erosion. I don't know if Louis Agassiz noticed this when he wrote *Studies of Glaciers*, while professor still at Neuchâtel. He probably did. Agassiz remains one of my geological heroes along with another Swiss pioneer, F_A. Forel, who, while at the University of Geneva, founded the modern study of limnology, in the late 19th century. Forel mapped the location of all the prehistoric sites along the Leman aka Lake of Geneva. His career was a clear harbinger for modern archaeological geology. In 1985, '86, '88, '90 and '93 I led geophysical surveys of the northern shore and central basin of Lake Neuchâtel. We were looking for *anything* prehistoric—sites, boats and buried landforms. In an early issue of our field's journal, *Geoarchaology*, we published our discovery of buried Pleistocene age paleochannels which helped inform our understanding of the extensive lake level change in this Alpine hydrological system, from the Paleolithic to today. We dug onshore as well. Excavation of Chalcolithic to Late Bronze Age settlements provided insights into sedimentation rates, erosion-deposition, along with locations for paleoecological studies using these sediments. One thing, in that regard, we quickly learned, was the infill of this lake, after "LGM", was more than we ever imagined. A 14 m+ sediment core, taken in the central lake, was only able to sample Atlantic Period pollen.

1992 marked my move back to academia and to the University of Georgia where I reside today.

As I have said, I never completely "left" NOAA when I made this move. Gray's Reef National Marine Sanctuary is 20 miles offshore of Sapelo Island, Georgia. Thanks to the generous support of the NOAA folks there, we—me, my UGA students and NOAA scientists—began a systematic geoarchaeological survey of this sanctuary. Sherri Littman and Windy Weaver wrote graduate theses on sediment coring studies there. Their work and my own led to a 2008 synthesis of the late Quaternary geology of this mid-to-inner shelf with an eye toward archaeology and paleontology. Working with Fred Rich at Georgia Southern gave me and my students insights into paleoecology of the Georgia Bight and that facet has become an integral element of my research since 1994. In 2006 we discovered a real surprise in the course of our underwater surveys—a prehistoric whale. Not just any prehistoric whale but an extinct Atlantic Gray Whale not seen in the north Atlantic since the 17th century. Excavation over the course of the following two summers recovered a nearly complete mandible and two vertebrae dated to 36-38 ka.

The Smithsonian currently has the mandible making copies for their collection.

The continental shelf has not been as giving in terms of human prehistory at least not off Georgia. It's a big place and hard to survey using SCUBA. Nevertheless, three artefacts have been found in the course of our work there. Two are chipped stone and one is bone/antler. None have come from intact deposits so they are interesting in their own right but telling in what this implies for site preservation on coastal plain landforms. There *are* exposed stream terraces and paleosols out there so hope lives in regard to an eventual discovery of a late Pleistocene—early Holocene archaeological locale. My students, I hope, will find these sites.

A final word regarding shallow geophysics and archaeological geology- what a difference this has made to our endeavors. UGA has supported my own "habit" such that I teach a summer course, each year, in the use of radar, magnetics and EM-electrical methods.

Other schools now do this but when we started back I 1993, UGA was "alone". Many of our UGA students have done theses using these methods. Maybe one of them will find another lost mission. We can always hope.

To sum up, I reiterate that an award such as this makes one think their career choice may have been worth it. I certainly think so. Thank you again for this honor.