

New Information from Old Collections

The Interface of Science and Systematic Collections

Old museum collections have value for inspiring new scientific field research, but there are problems ahead in preserving collections' research potential in the future. I illustrate my discussion with examples of the role of collection research in guiding my field research in the Brazilian Amazon.

After finishing my doctoral dissertation on prehistoric agriculture in the Orinoco basin, Venezuela, I decided to review museum collections from Greater Amazonia—the tropical lowlands east of the Andes—to write a synthesis of the archeology. In doing background research for the dissertation, I had learned that the majority of research in the lowlands had not been published but that many of the collections and records from the research had been deposited in museum and university collections. At this time, I was Curator of South and Central American Anthropology at the Museum of the American Indian, Heye Foundation. In 1981, a curator from another museum told me about an under-applied-for funding program at the National Endowment for the Arts (NEA), the Fellowship for Museum Professionals. It gave funds for curators to develop their expertise with a research project of their own choosing. I successfully applied to NEA for a grant to tour South American collections in museums and universities in the Western Hemisphere and Europe in 1981-82.

My museum tour was a real eye-opener about lowland archeology, and, providentially, it led to contacts that gained me excavation permits and National Science Foundation (NSF) and National Endowment for the Humanities (NEH) funding for research in the Brazilian Amazon over the last 20 years or so. Among the several important unknown facts that emerged from my examination of these collections, I learned that the archeological sequence for the Brazilian Amazon in the textbooks was completely wrong.

In many textbooks, it began about 3,000 years ago with an invasion of ceramic-age agricultural people from the Andes. A few researchers had challenged the idea of Amazonian cultural retardation,¹ but had not been able to produce empirical evidence needed for a new sequence. What I eventually discovered from the collections and subsequent field research was that the sequence actually began more than 11,000 years ago with pre-ceramic tropical forest hunter-gatherers who made spectacular rock paintings and exquisitely-flaked triangular projectile points. In addition, far from being Andean offshoots, the first Brazilian cultures to make pottery vessels were the earliest in the Americas, appearing about 7,500 years ago, more than 2,000 years earlier than Andean pottery-making cultures. Many other interesting facets about Amazonian archeology and archeologists emerged in the course of the 20 years of research, and, here, I relate only a few examples.

How did the new information emerge from the dusty shelves? First, my examination of the collections and archives revealed that earlier research had recovered important categories of materials not mentioned in the current literature in English. One category was early Archaic stage pottery. The Archaic was defined as the stage of broad-spectrum hunting and gathering that New World peoples developed after the end of the Ice-Age, when world climates warmed, the glaciers melted, and the megafauna became extinct. It was generally assumed by archeologists at the time that people who made pottery were agriculturalists, because agriculture allowed sedentary settlement, considered a necessity for pottery cultures. Hunter-gatherers were thought too nomadic to find pottery useful. What we now know is that there are hunter-gatherers that are sedentary and even complex in culture.² Some natural resources are dense and productive enough to support sedentary settlement, and key among these are fisheries. In Amazonia, such

resources are a prominent part of the landscape, but archeologists tended to evaluate the potential for human land use in terms of agriculture, so they underestimated the evolutionary significance of the wild resources. But some early geologists working in Amazonia had discovered what appeared to be early fishing villages with crude pottery. They could not date them directly, since the discovery of radiocarbon dating would not be made until the next century, but their research on fluvial terrace geology suggested that they were of early post-glacial age.

At the Harvard Peabody Museum, I was fortunate enough to come across both the collections and archival papers of one of these geologists, Charles Frederick Hartt. (I learned of his research in a reference by Helen Constance Palmatary,³ of the University of Pennsylvania Museum, to his 1885

Portuguese article in the *Archivos do Museu Nacional de Rio de Janeiro*.⁴) He had written a book on his excavations at Lower Amazon archeological sites, such as the shell mound Taperinha, Para, Brazil, in the 1860s, but it had been lost before it was published. He had deposited pottery and shells from Taperinha both at Harvard, where he studied under Louis Agassiz, and at Cornell, where he later taught. The Harvard collection held a large enough sample of datable material that the curators felt that some could be destroyed for dating and yet the majority of the collection would be intact. Accelerator

Mass Spectrometry allowed radiocarbon dating of very small samples, limiting the amount of destruction. The information gained from dating would set an important collection in its cultural and chronological context for the first time. Accordingly, Harvard gave me permission to take a sample for radiocarbon dating, and the sample came out about 6,000 B.P., at the time the earliest date for pottery in the New World. This date set the stage for the revision of Amazonian culture history, a process that was to reverberate in New World culture history as a whole.

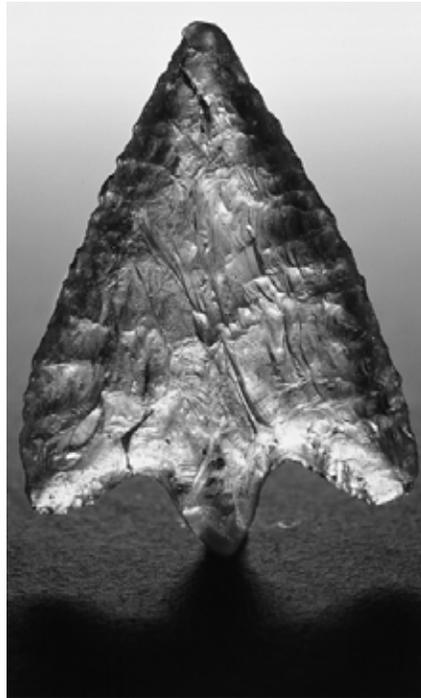
It was interesting to me at the time of this collection research that the collections at Cornell had not been cataloged with sufficient precision to preserve Hartt's exact proveniences in contrast to the situation with the collections at Harvard. Hartt's meticulous paper labels, which were preserved at the Peabody, had been removed in many cases from the objects in the Cornell collection, and a new series of catalog numbers had been added, which in several cases had switched proveniences and thus raised doubt about which sites the objects came from. Clearly, the Harvard collection, which had long been administered by a series of professional collection managers, archivists, conservators, and curators, was in better shape for new scientific research than the Cornell collection, which had been curated part time by professors and cataloged by a student without professional curatorial supervision.

Equally important for my future research was another discovery at the Peabody. When I had reviewed the object collection, the curator asked me if I would like to see the X-files. What were these mysteriously-named files? They turned out to be the series of unpublished paper records associated with each object collection in the museum. When those for the Hartt collection were brought out to me in a large, battered tray, in their midst was a tall stack of yellow-lined, legal pages tied neatly up with one of those librarians' pink tape cords. As soon as I saw the

pile of yellow pages, I knew they must be Hartt's long-lost book. It had been sent by his student, Orville Derby, to the Peabody from Brazil upon Hartt's untimely death in his 30s from Yellow Fever, but for some reason Harvard had never published it, and its presence in the collection remained unknown to the outside world.

The radiocarbon date from the Hartt collection and the information that I gleaned from his manuscript were the basis for a successful series of applications to NEH for funds to excavate in the Santarem-Monte Alegre Region

Rock crystal, stemmed, triangular projectile point, Museu Paraense Emilio Goeldi, Belem, Brazil (Roosevelt, et al., 1996: Figure 1A).



(about half-way between Manaus and Belem on the Lower Amazon in Brazil). With the help of Hartt's detailed descriptions of his and his research team's finds at Taperinha and other sites, I was able to design and carry out surveys and excavations in the Lower Amazon between 1985 and 1993. At Taperinha we found—just as Hartt had described—a 6-meter-deep stack of intact strata of shell, fishbones, and pottery, and the large series of dates run on these placed the occupation of the mound between c. 7,100 and 6,000 years ago. The existence of this little-known early pottery culture aroused surprise and controversy when I and my colleagues first published it in 1991 in *Science*.⁵ Our article has since been followed by the publication of similar dates from nine other sites in eastern Amazonia, the largest cluster of early pottery sites yet known in the Americas.⁶ Many of these had been dated in the early decades of radiocarbon dating, but the unexpectedly early dates lay unpublished in the Smithsonian Anthropology Archives, because they seemed wrong in the light of the theories of the time. The existence of these and the newly dated sites has helped to change Western Hemisphere culture history by interposing a phase of early ceramic-age fishing peoples after the Paleoindians and before the first horticultural "Formative" peoples.⁷

In the second example of new information from old collections, Hartt and some of his students had mentioned the existence of numerous finely flaked flint spear-points, and I found examples of them in nearly every sizeable early collection of artifacts from Amazonia: the Cultural Center Museum in Santarem; the Museu Paraense Emilio Goeldi, Belem; the Museu de Etnographia e Arqueologia, Universidade de Sao Paulo; the Museu Nacional, Rio de Janeiro; the University of Pennsylvania Museum, Philadelphia; the Museum of the American Indian, New York; etc. Since such points had never been found in ceramic-age sites in the Amazon, by process of elimination they had to be pre-ceramic. A Brazilian scholar at the Museu Goeldi, a museum that held such points, had published an article there describing two of the pre-ceramic points,⁸ but his work, which was in Portuguese, was not integrated into English textbooks. The prevailing view among North American Paleoindian specialists was that Paleoindians were nomadic peoples who lived by specialized big-game hunting in cool upland inte-

rior steppes throughout the Americas between about 11,000 and 10,000 years before the present (B.P.). As I mentioned above, the first broad-spectrum foragers were thought to have appeared only after the Paleoindians had run out of game and habitat, sometime after 10,000 B.P. Only then, according to the theory, did people expand from the high plains into lowland coasts and forests. The game-poor tropical forest, however, was assumed to have been off-limits to humans until the discovery of agriculture made it possible for people to enter the Amazon basin.

Some archeologists had questioned this view of the peopling of the Americas,^{9,10} but until our work in Monte Alegre, no one had been able to find a sealed, stratified site that produced enough spear points, food remains, and dates to document scientifically the existence of foragers contemporary with Clovis. But where were we to look for such a site? Erosion and deposition are very active processes in lowland tropical rainforest basins, and most Ice-Age surfaces are either deeply buried under recent sediment or washed away long ago. It happened, however, that both Hartt¹¹ and Alfred Russell Wallace¹² had written about possibly early rock art and caves in Monte Alegre, Para, Brazil, on the north bank of the Amazon opposite Santarem. There they described exploring low sandstone ranges riddled with caves and covered with bold rock paintings. I decided that the best place to look for early pre-ceramic people was to go where there were signs of human occupation, as at Monte Alegre. I could have organized a general survey to cover systematic transects of territory searching the landscape for sites, but the chance of finding an exposed site in such a large region was slim. At the caves, at least, early sediments strata would be sheltered from erosion, and the rock art showed that someone had been there.

In fact, it took ridiculously little time to find an intact, stratified site with all the desired features. I went to Monte Alegre in 1988 to find out if anyone still knew about the caves that Wallace and Hartt had visited and met Nelsi Sadeck, then a high school ecology teacher. He knew all about Hartt's and Wallace's visits and took me to the caves the very next day. Then and there I was able to determine that Caverna da Pedra Pintada, which had abundant artifacts and food remains exposed in erosion at a tourist path cut below its entrance in 1974, was the site to excavate. Our excavations there, carried out in

1991 and 1992, recovered 30,000 stone artifacts, pigment, and many thousands of burnt nuts, seeds, shells, and bones. And lying undisturbed in place for more than 10,000 years, there were broken spear points of some of the same forms that were in the museum collections that I saw with the NEA grant. An added dividend of the research was the find of spattered paint drops in the Paleoindian layers. The chemical similarity of this paint to that in the ceiling paintings high above the excavations allowed us to conclude that the first Amazonian people had been avid painters as well as foragers who collected plants, fished, shellfished, and hunted small game. We ran 58 radiocarbon dates on fruits, seeds, and wood from the five main layers of the occupation, and all fell between 11,200 and 10,000 years ago. Most interesting, the stable carbon isotope ratios of these specimens were approximately the same as mature tropical forest in the vicinity, documenting a similar degree of vegetation cover in the terminal Pleistocene epoch. Some climatologists had speculated that tropical forest had disappeared from places like Monte Alegre in Glacial times, but our results and those of others since then show that the forest continued. The ancient remains included no taxa or isotope ratios typical of savannas. These ancient Amazonians were undoubtedly forest foragers, not savanna hunters.

Many other archeologists have since documented comparable, non-big-game hunters among both North and South American Paleoindian cultures, but this culture was one of the first to gain international recognition through our publications in *Science*.^{13,14} The general sig-

nificance of these findings about the early occupation of tropical rainforests is that they do not fit the prevailing assumption that early human hunter-gatherers lived in open, steppe environments by practicing big-game hunting, an adaptation that is supposed to have imprinted our genome with various current human traits such as tendencies to violence, male dominance, and a preference for open, grassy, temperate habitats (i.e., suburban lawns!).¹⁵ Since the research at Monte Alegre, I and my colleagues have been working at archeological sites in Central Africa, following up on the question about the nature of early human ecological and social adaptations. A series of new finds by several researchers in Africa suggest that the tropical forest was the habitat where the hominid bipedal locomotion and the prehistoric stone tool cultures may have appeared first, in a context of broad-spectrum hunting and gathering, rather than big-game hunting.^{16,17,18} If so, then, the implications of our ancient adaptations for the development of the human genome will have to be revised.

So it was that dusty old collections led to new research that changed the picture of the first radiation of humans into the new world and raise questions about the early history of human ecological adaptation. Both Taperinha and the Monte Alegre hills, which are two of the last few undisturbed wooded areas along the mainstream in the Lower Amazon, are under consideration to be made into functioning natural and cultural history parks and reserves. If they can be so consecrated, it will not be a moment too soon. Subsidized colonization for agriculture and cattle has eaten up the majority of the mature tropical forest stands around these sites, and increased tourism, facilitated by the extension of new roads into the forest, has brought a heavy toll of damage to the rock art and the strata of the sites. It would indeed be ironic if such ancient habitats and archeological monuments important in the history of world cultures should be destroyed so soon after they were brought to the light of science.

The future for collections such as our excavated material from Taperinha and Monte Alegre is also not so rosy. The proper disposition of new systematic collections from current NSF- and NEH-funded field research is a serious problem for future archeological science. Such collections constitute the original data on which scientific conclusions were based and should be preserved

Rock crystal, stemmed, triangular projectile point, broken in manufacture, in situ, Excavation Unit 10, Caverna da Pedra Pintada, Para, Brazil (Roosevelt, et. al. 1996: Figure 6A).



as archives for purposes of checking and documenting data. In principle, also, they can serve as the early collections have, as a source of data for new research, which becomes needed as interpretations change and new questions arise. Unfortunately, many such new collections may soon be lost to scientific knowledge because of problems in curation at the museums and universities through which scientists apply to get their grants. On the premise that these institutions are housing the scientists and their laboratories and helping to administer the research, NSF includes hefty overhead funds for them in its budgets. However, it is often the case that many universities receiving sponsored research do not maintain the facilities and know-how to curate the collections adequately. Even some museums with sponsored funding do not take seriously their responsibility to house the collections gathered through sponsored research. Some decline to acquire field collections because of a lack of interest in sherds, rocks, and fragmentary biological specimens, compared to art objects, and refuse even to commit to store them during analysis. I, for example, have to store field collections from the Amazon research in the damp basement of my slightly decrepit 1850s Evanston house, not in my climate-controlled lab at The Field Museum of Natural History, because the museum will not be acquiring them, and my department does not have the space to store them.

NSF does have a program to fund applications for curation of systematic anthropology collections, but the funds are insufficient to provide for the curation of most new collections. This means that, unless a principal investigator can find a museum willing to acquire them, future researchers will not be able to check results or pursue other lines of research on the collections. One solution to this problem is for NSF to make it a requirement of funding that the sponsoring institutions that get the overhead take responsibility for the permanent, professional curation of the collections and records resulting from that research. Another is for archeologists who create field collections needing curation to try to find positions in university museums, where the connection of collections and scientific research have long been maintained. Without such solutions, valuable scientific collections will be lost, and the scholarly heritage of research on the long-term interaction of humans and the environment, a knowledge base urgently needed in the search for

sustainable uses for tropical habitats, will be all the poorer.

Notes

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A. C. Roosevelt is Curator of Archeology, The Field Museum of Natural History, and Professor of Anthropology, University of Illinois at Chicago, Chicago, Illinois.

All That Glitters Is Not Gold

Death Valley is a land that sparks the imagination and lures the adventurous. The history of Death Valley is replete with legends and lore of hidden gold, lost and found treasures, outrageous hoaxes, and get-rich-quick schemes, all of which generated great public interest and intense media scrutiny. Though many would come to Death Valley in search of fortune and fame, the rugged land seldom and reluctantly relinquished its riches.

On January 5, 1999, a Death Valley National Park visitor delivered a mysterious trunk and its contents to park headquarters. The visitor claimed he had found the trunk under a rock overhang deep within the park's backcountry. A handwritten manifest and a letter in the trunk purportedly associated the find with the "Lost '49ers," a group of men, women, and children who traveled through Death Valley in December 1849 and January 1850 en route to the gold fields of California. If validated, the trunk would be historically significant, as only a small number of artifacts from this group of argonauts are known to exist.



Chest or trunk, date and manufacture unknown. Contents of the trunk have various dates and origin of manufacture. (DEVA63126) Photo courtesy Death Valley National Park, National Park Service.

At first glance, the trunk appeared to be a wonderful talisman of the personal possessions of a group of people headed for new beginnings in California. Upon closer scrutiny, however, National Park Service (NPS) staff soon discovered a number of discrepancies, and so began the long and methodical process of authenticating the "treasure."

The most obvious disparities included a lack of dirt or dust, scant evidence of insect or rodent damage, inconsistent corrosion of metals, and well-preserved fabrics. These conditions are not typical of a trunk stashed in a rock outcropping, subject to 150 years of sunlight, wind, dust, precipitation, and extreme temperatures. NPS museum conservation staff also discovered the presence of 20th-century adhesives.

NPS curatorial staff then contacted subject experts and historians from other NPS sites, area museums, regional universities, the Federal Bureau of Investigation, the Smithsonian Institution,

and Christie's Auction House, to assist in dating and verifying specific objects. Although many items are authentic to the 1849 period, a number of the items originate from later dates. For example, the pottery mark of a lidded ceramic dish dates from 1914 to the present; a doll's date of manufacture is approximately 1910; and all of the coins showed inconsistent wear patterns. In addition, one of the gold coins was conclusively described and dated to 1853!

The discovery of the Death Valley trunk generated a great deal of press from all over the world. NPS staff continues to receive inquiries from those who believe the trunk is not bunk, and from those intent on solving its mystery. The trunk is now located in the park's museum collection and NPS staff will continue to investigate the origin of the trunk and will determine what, if any, further actions will be taken.

*Blair Davenport
Museum Curator
Death Valley National Park
California and Nevada*