OUR DEBT TO THE PAST, OUR PROMISE TO THE FUTURE: THE CONSERVATION OF ARCHAEOLOGICAL COLLECTIONS

RESEARCH CONTRIBUTION 33

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Debi Hacker and Michael Trinkley

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Columbia, SC 29202

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That "conservation" of archaeological specimens has come into vogue, or at least that its importance is better understood, seems clear enough. For years the archaeologist's conservation bible was Plenderleith's The Conservation of Antiquities and Works of Art, first published in 1956. However obtuse and difficult this volume might have been to use, it was one of the few sources on conservation which consistently could be found in archaeological libraries. Strangely enough, the volume was often in mint condition, with the binding barely broken.

The more recent interest in archaeological conservation is evidenced by Curt Moyer's regular column in the Society for Historical Archaeology Newsletter, A Conservation Manual for the Field Archaeologist by Catherine Sease, and The Conservation of Archaeological Artifacts from Freshwater Environments by Katherine Singley. Now, perhaps for the first time, the archaeologist has a number of sources readily available which provide information on the conservation of excavated specimens.

This has created for many an ethical dilemma. We archaeologists have gradually come to realize that artifacts lie buried in soil, or submerged in water, for years, often reacting to the environment surrounding them. Frequently, the artifacts reach a point of equilibrium in this environment. Excavation, however, thrusts the specimens into a new, and often hostile, environment with greatly fluctuating temperature and humidity. This new setting will eventually cause the destruction of many artifacts -- sometimes slowly as is frequently the case with ceramics and glass, sometimes quickly as in the case of most iron artifacts from the coastal plain of South Carolina.

When there were few sources on the techniques of archaeological conservation, and even fewer conservators, we archaeologists could, with little thought or guilt, use china menders for our pottery and throw our nails in a plastic bag after they were counted. Now we are confronted both by our knowledge of the inevitable deterioration of the artifacts we have worked so hard to find and catalog, as well as the increasingly available sources and technology to ensure that these remains are preserved for future generations.

At Chicora, this confrontation with the duty owed to the archaeological record has come slowly and with great pain. We have faced the costs of conservation and the seemingly insurmountable logistical problems conservation can create. This paper, we hope, will discuss how we have worked to resolve these problems in our organization.

Conservation, very simply, is the process of cleaning, repairing, and treating artifacts in order to stabilize their physical condition and to prevent further deterioration. Often the process can reverse some of the existing degradation of the specimen. Conservation, however, is not the same as restoration, which is process of restoring an artifact, as closely as possible, to its original state. Conservation implies stabilization, restoration implies replacement of parts, painting, and producing an aesthetically pleasing specimen. This, of course, is a significant difference. Conservation requires that treatments be reversible: what is done to an object must have the ability to be undone. For example, an adhesive to mend a ceramic vessel must be completely soluble in a solvent that will not adversely affect the vessel. An epoxy that cannot easily be dissolved, but must be chipped away, is not appropriate in conservation. In addition, the axiom "less is best" often applies and clearly distinguishes conservation from restoration. Finally, conservation requires documentation of all treatments, including the procedures and the chemicals used. It is essential that in the future, should any of the treatments need to be redone or reversed, all prior information is available.

At Chicora, our introduction to conservation came through the realization that iron specimens cataloged in seemingly good condition a few years ago, when re-examined, were barely recognizable. Sometimes they were simply powder, at other times they were a mass of oozing corrosion. It seemed simple enough to establish a system of electrolytic reduction for iron specimens and maintain simple logs for each artifact. Then we began to notice bright green corrosion on brass buttons. We found that bits of leather found in damp conditions were one-third their original size and very brittle. The gold gilt on the porcelain and the red pigment on pottery sherds when they were found in the field, were no longer found during analysis. And so it became increasingly clear that many more artifacts other than just iron specimens were slowly being lost.

We were fortunate to have the assistance of the conservator then at the South Carolina Institute of Archaeology and Anthropology, Curtiss Peterson. With his assistance we slowly began to develop a strategy for dealing with what we decided were our obligations to the archaeological record.

But, of course, our problems were only beginning. While we at first established only simple laboratory protocols for treatment, we quickly discovered that it was equally as important to establish some mechanisms for routinely handling items in the field. Even on small projects we found that items were returning to the laboratory in worse condition than when originally recovered, largely through improper packing and delayed examination. As a result, field crews are now trained to at least recognize items, such as bone handled knives or overglazed porcelain, which need special treatment immediately. These items are frequently packed separately in the field and transported back to the laboratory prior to the completion of the field project. Naturally, it requires extra effort to ensure that the specimens are accounted for and are not "overlooked" during analysis.

We quickly found that working on an industrial site, where most of the specimens are iron, that it was logistically impossible to stabilize artifacts in a sodium carbonate solution. While this is the preferred technique, it resulted in a large quantity of plastic buckets filled with artifacts which had to be cleaned, cataloged wet, replaced in a fresh solution, treated, and then integrated into the existing bagging and boxing framework. Since this effort, we have compromised by ensuring that analysis and conservation treatments begin as soon as practical after the end of the field project.

In all cases the field director notifies the lab, prior to the project's conclusion, of the types of material which may require conservation treatments. This allows us to plan our conservation schedule and order any special materials necessary for treatments, prior to the arrival of the materials. Of course, we also have a good idea of the types of material expected at a site before we go into the field and this permits us to minimally budget for conservation needs.

We have also trained those individuals who work in the lab to be mindful of specimens requiring additional care during washing and drying. In the case of the Broom Hall Plantation excavations, we had sorted out most of the overglazed porcelain in the field, but those specimens not identified in the field were set aside before washing. Some materials, such as brass and leather, of course, are not washed at all, but are only dry brushed.

Once the materials are cleaned and the analysis process begins, all specimens are evaluated for their conservation needs. This seems simple enough, at least until you are faced with 700 machine cut nails in various stages of deterioration from one provenience. Here again, we found it essential to establish a lab protocol, but this also had to be refined considerably over the past year.

Today we routinely provide treatments to the few leather specimens we recover, as well as to all composite specimens, such as bone handle knives. Cupreous specimens which evidence active corrosion are set aside for treatment. Historic ceramics and glass which show clear signs of deterioration are also routinely scheduled for treatment. Altered bone specimens receive treatment only if they lack sufficient integrity to be stored safely. Virtually all iron specimens exhibit signs of advanced corrosion, but only those which are diagnostic receive treatment. For example, we do not treat every piece of strap metal or kettle fragment from every provenience. In fact, we do not even take a sample from every provenience. But, we do ensure that from each site there is a small sample of such items conserved. In the case of nails, we randomly select a 1% to 5% sample from each provenience for treatment. All potentially diagnostic iron specimens, such as buttons, belt buckles, architectural hardware, and so forth, receive treatment.

Each specimen pulled for conservation is first cataloged. We have found that it is an administrative nightmare to begin conservation treatments, many of which can last several months, using only FS numbers or other temporary designations. Each artifact, or the case of similar artifacts such as nails, each lot, is documented using a conservation form. This form provides information on the catalog number, a description of the specimen, its current condition, and the treatment procedures. Although ideally each object would be photographed both before and after treatments, under our current time and budget constraints this is rarely possible. When as many as 100 nails from a single site are being treated, the cost of the film alone, ignoring archival processing and the labor involved, is prohibitive. We have chosen, instead, to photograph the more unusual objects or those submitted to a more unusual treatment, after the work is done. When treatments are completed and the collection is sent to the curatorial facility, these forms remain with the materials as part of the permanent documentation.

We have found it most convenient to pack conserved specimens separately from those not requiring treatments. While this does break up the collection, it allows us to pack the bulk of the specimens as analysis proceeds. In addition, this procedure also clearly designates those boxes which contain specimens which have been conserved, making it easier to periodically check the materials to ensure that the treatments were successful and that additional work is not required. It also allows curatorial facilities easier access to specimens which may be useful for display.

There are many simple conservation treatments used in the Chicora labs. Glass and ceramics which require mending or stabilization of glazes are treated with various concentrations of acryloid B-72 in toluene, which is inexpensive, stable, non-yellowing, and easily reversible. Because the majority of mended vessels are rarely displayed and create difficulties in storage, we prefer to pack matched pieces together without mending.

Iron specimens which lack solid metal, but are represented only by corrosion by-products, typically receive multiple deionized water soaks until their soluble chloride levels are under 0.1 ppm. Iron specimens which contain a solid core of metal are typically subjected to electrolytic reduction in a sodium carbonate at about 3 amps for periods ranging from a week to several months. Afterwards they are soaked in deionized water to remove soluble chlorides to a level of less than 0.1 ppm, dried in acetone baths, and receive coatings of 5% phosphoric acid, 20% tannic acid, and 10% acryloid B-72 in toluene.

Non-ferrous metals, primarily copper and brass specimens are also subjected to electrolytic reduction, although a stronger sodium carbonate solution and a higher amperage is generally used. These specimens are also soaked in deionized water to remove soluble chlorides and are dried in acetone baths. While we have used a coating of Incralac and toluene on some, we have found that generally B-72, without the chelating agent benzotrizole, works satisfactorily. We have chosen to minimize our treatment of metals such as lead and pewter because the wastes from such treatments contain the toxic heavy metal lead. Such wastes cannot be easily disposed of in an environmentally sound manner. Where it has been essential to clean lead we have found that a 5% solution of EDTA is satisfactory.

Organic remains which we have treated include bone, leather, and wood. Treatments vary greatly, depending on the specimen's condition and the ultimate use of the object. Bone is usually treated with several coats of dilute acryloid B-72 since consolidation is all that is usually necessary. Leather, which has been found in moist field conditions, has been treated by first rinsing in deionized water, then soaking in baths of dilute oxalic acid followed by ammonium hydroxide. After again rinsing the leather in deionized water to remove the chemicals, the leather has been dried in acetone baths. Afterwards, it has been treated with a neatsfoot oil and lanolin mixture. A leather shoe heel, recovered in poor condition from dry conditions, seems to have been satisfactorily treated using only multiple coatings of very dilute B-72 in order to consolidate the layers. Wood specimens have thus far been treated with saturated solutions of sucrose, although the performance of this treatment is marginal and we will probably begin using polyethylene glycol.

Composite artifacts are among the most difficult for us to treat and require the most time. Perhaps the most common types contain ferrous metal and bone, such as bone handled utensils. While we have tried separating the bone and metal to permit independent treatments, this has been unsatisfying and, of course, results in damage to the specimen. We are now manually removing corrosion from the accessible parts of the iron and soaking the specimen in deionized water to remove soluble chlorides. The bone then receives several coatings of B-72, while the iron is coated with phosphoric and tannic acid. The entire specimen receives a final coat of B-72. Our results have been generally satisfactory, although occasionally such specimens will require retreatment.

On the one hand, these treatments may seem simplistic to trained conservators, while on the other hand, they may seem complex to those who have not faced the conservation of archaeological specimens at all. We, however, feel that Chicora is providing a minimal level of conservation to a sample of virtually all specimens that we collect. Naturally, these treatments have real, monetary costs. We estimate that the cost of conservation supplies and equipment is approximately 5% of each project budget. The time required for conservation is even greater. For every eight field days, one day of conservation time is required, although the total time involved in conservation treatments may stretch out over months. The long periods involved in soaking specimens to remove chlorides, for example, means that it is not possible to transport collections to the curatorial facility for up to four months after the completion of the field work. Our initial investment in equipment was approximately $1000 and we have found that at least 200 square feet of lab space must be dedicated to conservation treatments. There are no shortcuts in the conservation of archaeological specimens -- the work requires money, time, and patience.

However, rather than asking how much conservation will cost, we at Chicora have been forced to ask ourselves what it will cost <u>not</u> to perform conservation treatments. The answer to that question is clear -- without such treatments large portions of our excavated archaeological heritage will simply deteriorate and disappear. We feel that <u>if</u> it is in the public interest to excavate the specimens, then it is also in the public interest to ensure the preservation of the collections for future generations. After all, the underlying goals of archaeology are the preservation of the past and the education of the public. We do not believe that either of these goals can be achieved if we do not properly care for the building blocks of our discipline-- the artifacts themselves. Consequently, at Chicora we have chosen to ensure that our debt to the past is paid and that we ensure the preservation of our future.