CONDUCTING CONSERVATION ASSESSMENTS: PLANNING FOR THE FUTURE OF OUR COLLECTIONS

by

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Foreword

The Alexandria Archaeology Publications series is composed of papers on various aspects of research conducted under the auspices of Alexandria Archaeology, a division of the Office of Historic Alexandria, City of Alexandria, Virginia. The authors include professional staff members, university students and Alexandria Archaeology volunteers. Editing of the papers has been kept to a minimum. It should be understood that the papers vary in tone and level of technicality, since they were originally directed toward many different audiences.

We are pleased to offer the papers within this series and in so doing are opening our "manuscripts on file" - including professional conference papers, background documentary studies, student course papers, and volunteer research papers - to professionals and public alike.

Pamela J. Cressey, Ph.D.
City Archaeologist
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Historical archaeology collections in the nation's museums, research facilities and repositories are expanding at an ever increasing rate, creating an immense problem of storage, conservation and access. Archaeological protection legislation and the proliferation of contract archaeology have added to this growth in recent years. Many facilities store large site assemblages collected by other researchers or collected in the distant past, of which the condition, and perhaps even the contents, are unknown. Planning for long-term care and preservation of collections is of the utmost importance for the future of research in historical archaeology.

The poor condition of many archaeological collections has resulted from lack of funding, from poor storage facilities, a shortage of archaeologists trained in collections care, and a shortage of professionally trained archaeological conservators. For those of us with older collections, a conservation assessment and long-range planning to deal with the recommendations of the survey are critical to the preservation of these often neglected materials. A survey is not only the logical first step in planning conservation treatment, but is generally required for obtaining grants to treat and preserve collections.

In conducting a survey, a trained conservator, familiar with the needs of an archaeological collection, will examine storage, exhibition and research facilities. Factors assessed include climate, lighting, pests, pollutants, materials used in construction, storage units, and packaging; and policy, procedures and practice of collections care and handling. A new conservation assessment grant from the Institute for Museum Services was introduced this year to address this need. Following a general conservation assessment, a condition survey should be conducted to examine objects in the collection and to determine their conservation requirements, in terms of both storage and treatment.

Philosophies for conservation vary according to the nature of the discipline and of the material to be preserved. Thus the priority for archaeological conservation is stabilization and preservation, rather than restoration. This can, for many objects, be achieved through proper storage, including a controlled environment and stable packing materials.

Alexandria Archaeology is a municipally funded museum conducting research, preservation and education in urban archaeology for the City of Alexandria, Virginia. Our collection is the result of 28 years of archaeological research and rescue projects, on 112 sites within the Alexandria city limits. Like any systematic archaeological collections, the documentation of the collection (its related field and laboratory notes, site maps, photographs, catalogues, etc.) is as important for the collection's research value as the artifacts themselves.

We have recently completed the first phase of a project to improve storage conditions and care of the collection. This project is being undertaken by myself, as project director and assistant director of Alexandria Archaeology, and by archaeological conservator Carol Snow, co-author of this paper. This first phase was jointly funded by the National Science Foundation's program of support for Systematic Collections in Anthropology and an Institute for Museum Services Conservation Project grant. It consisted of the general environmental survey and a detailed conservation survey which assessed the condition and needs of the artifacts, and development of both short and long-range plans for collections care and conservation. It is hoped that today's discussion of the methodology developed for the project will assist other archaeologists in coming to grips with the problems inherent in their own collections.

For the general environmental survey, the conservator examined each of six locations in which artifacts are currently stored, as well as a room which is undergoing renovation as our new, climate controlled storage facility. Together, we filled out survey forms for each room, describing the physical aspects, security, lighting, climate, etc. I provided hygrothermograph charts which showed the range and fluctuations in temperature and humidity, and we also monitored for insects in all facilities.

The conservation survey team, consisting of the conservator and two assistants with archaeological laboratory experience, surveyed the contents of 3,158 boxes, shelves, drawers and exhibit cases. Obviously, it was not practical to survey each of our more than two million objects separately, but a general review of each box provided sufficient information to establish plans for treatment and care of the collections. In 652 of these boxes, objects were found which will require conservation treatment.

Information from the survey was entered directly into a portable computer, saving a tremendous amount of time and allowing us to immediately make use of the inventory and locational data. Minark archaeological database program (developed by archaeologist Ian Johnson) was used for cataloguing and other data management purposes. Because of the large amount of dust generated by opening boxes of dirty artifacts, it was necessary to use a computer with a hard drive, which is sealed from the dust. Our first attempt at using a computer with 3 1/2 inch disks caused us some tense moments as specks of dust caused data errors, but our copious back-ups made onto another computer saved us from losing any information.

Five kinds of data were recorded, in a total of 49 text or nominal variables. Information obtained included: inventory data (including box location), current methods of storage, treatment history, proposed methods for repacking, and prioritized required conservation. This data provided quantitative and qualitative descriptions of conservation needs. Following the inventory we began, right away, to follow some of the conservator's most urgent recommendations. Consideration of our storage facilities and some of the problems encountered will, we hope, provide some ideas for your own collection's needs.

One of our major concerns, before we learned we would be able to renovate a new storeroom, was the lack of humidity control in our primary remote storeroom. We monitored the temperature and humidity in this basement room for one and a half years, using a 31-day recording hygrothermograph which was recalibrated monthly. The charts show that the temperature was fairly consistent in this room, but the humidity fluctuated wildly, sometimes as much as 40% in one day. This is very damaging to organic materials which will shrink and expand along with the humidity. With this high humidity--up to 100%--metal can corrode, salt crystals can grow in ceramics, and glass can decay. Boxes--even good acid-free ones--will fall apart, as will paper bags and labels.

We originally thought that the higher humidity readings were due to the ambient temperature, but when the readings were compared with local readings from the National Climatic Data Center, we discovered that there was little correlation. The reason for the occasional readings of 90 to 100% humidity were more likely from small floods, which went undetected because the storeroom was not visited frequently. A water censor tied into our electronic security system could have alerted us to this problem. During the survey when we worked in the room daily, we encountered three floods--two from a failing sump-pump and one raw sewage leak. Luckily, the waters did not reach the part of the room occupied by our boxes, but each flood raised the humidity level for several days. Mildew on the walls and on some boxes underscored the problem.

Our new storeroom will be on an upper floor, well insulated, and will have a computer-room HVAC unit to maintain a constant temperature and humidity, like this one in our in-house storeroom. There can be many problems caused by climate-control systems, as well, so it is important to have a system designed by professional engineers familiar with establishing such rigid controls.

The conservator also looked at the surrounding environment, to look at factors which might affect both the old and new storerooms (located one above the other in the same building.) Next door to Payne Street Center is the Fire Department's training building where they throw smoke bombs and practice putting out fires. After their exercises, our temporary garage storeroom smells strongly of smoke, and has a little extra ground-water problem.

Another source of pollution is the neighboring sewage treatment plant. Their engineer assured me that methane gases and other pollutants were well contained, although the plant suffered an occasional spill of lime (which is very corrosive). Right after his reassurances they had a chlorine gas explosion which caused the neighborhood to be evacuated for several hours. The smell of chlorine gas (corrosive as well as deadly) could be detected in the interior storeroom for several days. Fortunately the new storeroom's HVAC system should filter out all of these contaminants.

Fire suppression and security systems were also examined. Security and fire alarms are tied into an alarm company and the public safety department, and a wet-pipe sprinkler system is used for fire suppression. Fire suppression systems are important in any facility, but especially in a remote, unstaffed storeroom. Fire would be much more damaging to the collection than water. In a fire, the cardboard boxes would burn readily, with the artifacts and their labels damaged beyond recognition, as happened at an unfortunate archaeological storeroom in England. We are considering eventual replacement of all of our cardboard boxes with polyethylene or polypropylene boxes, which would protect the collection from both water and fire damage. This type of box withstood the English fire well, with only some melting of the box lids.

We also monitored all facilities for insects, using Mr. Sticky bug traps, but we did not catch any. This is particularly surprising, since we did find mouse nests from a shredded cardboard box and others made from shredded artifact bags. We also found the skin of a black snake, shed in one of the artifact boxes. Fortunately, the snake, in his new skin, was nowhere to be seen.

Our collection's major problem, besides the humidity, was extreme overcrowding. The basement storeroom was already too small before we were forced to move there in 1982. Overflow collections are now in the garage area, in our director's office, in the attic of another local museum, and in our in-house storeroom-also filled beyond its capacity. Prior to the survey, many of the aisles were filled with boxes, severely limiting accessibility. The stacks of boxes were collapsing from the weight of the artifacts on the cardboard weakened from the damp. After some consolidation from repacking and rearranging during the survey, only two aisles contained boxes, permitting access to most of the collection with library stairs. Next year, movable aisle shelving will more than double our storage capacity, and the new, larger room (of 1500 square feet) will allow for additional growth.

The small in-house climate controlled storeroom hold materials requiring special care, in addition to artifacts currently being processed in the laboratory. Restored ceramics, glass and small finds are, for the most part, kept in enclosed metal cabinets on shelves lined with polyethylene foam, or in drawers in these cabinets. These drawers, selected for use in storage and in the laboratory because they are light-weight, are made of PVC--not one of the good plastics. Because of this, metal is not stored in these drawers. However, because the cabinets are not air-tight, off-gassing from the PVC is not expected to harm the artifacts. Wooden drawers also produce gases which can damage metals, so metal fixtures are preferable. Rubber gaskets and other materials used to seal metal cabinets are also potentially harmful--fortunately not a problem in our facility. In selecting compactor shelving for the new facility, we have had to avoid such things as rubber gaskets, PVC end panels, and plywood ramps in favor of all steel construction and flat tracks.

Another major problem for us, and for any older archaeological collection, is the packing materials used to house the collection. In many cases artifacts were packed in acidic paper bags and boxes, or padded with crumbling acidic newspaper. And much of the appropriate packing materials were damaged by the high humidity.

In some boxes, we found the contents spilled from deteriorated paper bags. This pitcher was padded with acidic brown paper towels, which became very moldy. Fortunately this did not harm the artifact. Leather shoes, conserved in the early 1970's with rather too much grease, were wrapped in diapers or saran wrap, or in liquor boxes with no protection at all. They were labeled with acidic green paper labels, string ties, and even dymo-tape which was stapled to the leather. These shoes were immediately repacked following the survey, but they still require some de-greasing.

All told, we urgently need to replace 2,600 boxes, 42,600 bags and one-and-a-half million labels, at a cost of more than $7,000, for supplies alone!

Several other problems were encountered during the survey which were, unfortunately, caused by the archaeologists, rather than by the burial conditions. The most prominent problem was the presence of masking tape, between 10 and 20 years old, on many partially restored artifacts. As most of you have probably discovered, masking tape becomes more and more sticky over time. We have been successful at removing it by soaking cotton wool in acetone and sealing it with tin-foil to allow it to soak into the tape. Because this is so time consuming, we plan to try a more effective commercial health-care product called Unisolve, which contains naphtha and trichlorethane and must be used under a fume hood. When tape has been applied to porous surfaces, as on coarse earthenware, it will leave a stain after even a short period of time.

In one box, a heavy iron cannon ball was packed alongside fragile creamware. Amazingly, there was no breakage. The cannonball, however, had a mysterious substance oozing from under a clay cap. This prompted us to call the bomb squad, just to make sure the clay didn't cover a hole containing deteriorating black powder. The substance turned out to be deteriorating 18 year old modeling clay, probably put there to support the object in an old exhibit, but better safe than sorry. Live ammunition was actually found in cannon balls at Alexandria's Civil War museum.

Untreated iron presents another problem, of unstable corrosion. Wrapping one object in newspaper did nothing to help the situation. Iron should be x-rayed and corrosion carefully removed by a conservator. Electrolytic reduction runs the risk of removing metal along with the rust. To stabilize iron and other metals until such time as they can be treated, they should be cleaned and stored in a very dry environment to prevent further corrosion. We are dry-brushing metal objects and then packing them in unsealed plastic bags within an air-tight polyethylene box. Within each box is a packet of silica gel. The dry, blue crystals turn pink when the silica gel needs to be replaced, and the crystals can simply be dried out in the oven or microwave. The conservator has advised us of additional steps to use in the preservation of iron, including rinsing the surface cleaned artifacts in acetone to dehydrate and degrease them.

The survey report provides detailed instructions for what the staff can do, with supervision, to stabilize objects of various materials, as well as recommendations for work which must be done by a professional conservator. It also provides guidelines to follow for artifacts now being excavated, so we will not continue to generate more problems in the future.

What does the future hold for our collection? Next summer we will move the collection to its new climate controlled storeroom--the culmination of many years of planning. Then, we and our volunteers will begin the massive job of repacking the collection in archival materials, creating microenvironments for metals and organic materials. The conservator will oversee massive treatments such as desalination of ceramics and removal of mold from organic objects, and will treat those objects requiring professional care, according to priorities established in the survey. We hope that much of this work will be funded by further grants.

We will also need to microfilm our field records, of which there is now only one copy, on acidic paper; and to replace our acidic wooden file cabinets. A separate archival survey has provided us with recommendations for dealing with the records which are so vital a part of the collection.

This work will take several years to complete, but the most urgent problems will be dealt with quickly, and we have a workable plan to keep us on track. And we have a realistic goal of preserving our important archaeological collection for the future.

Reference

Snow, Carol
1989 *Alexandria Archaeology Conservation Survey, Report on a Collection Survey conducted June 6 - August 25, 1989*. Baltimore: Art Conservation and Technical Services.