The Ethnographic Conservation Newsletter

Number 17 ISSN 1036-6210 April 1998

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FROM THE COORDINATORS

Gentle readers: At the time of writing it is only twenty months until the next ICOM-Committee for Conservation triennial meeting in France. While most of the program will take place in the host town of Lyon, there will be additional final events in Paris (with transportation provided). **The dates of the 12th Triennial Meeting are 30 August - 5 September, 1999.**

As established by ICOM-CC, **the deadline for papers is 30 November 1998.** We encourage all members to consider submission of a paper to the meeting. As the deadline grows near the guidelines for authors will be available from the James & James website, http://www.Jxj.com/ ; from the ICOM-CC website, http:/www.natmus.min.dk/cons/icom_cc; and from the committee coordinators, Sherry at SherryDoyal@compuserve.com or Nancy at odegaard@u.arizona.edu

The ICOM Committee for Conservation has specifically asked for papers stressing collaborations between curators and conservators. Please examine your own work over the triennial period and consider submitting a paper for the meeting. We need about eight papers for a session and would like to have papers in both the official languages of ICOM,

English and French (particularly as a mark of respect for our host nation). Please submit proposals for papers to either of the co-coordinators.

We wish to congratulate the editors of the ECN on their continued hard work and thank those of you who have contributed text. Please continue to do so. We make a particular appeal to regional coordinators; do not allow your conservation community to go unrepresented in these pages.

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NOTE FROM YOUR EDITORS

Newsletter 17 was produced with the invaluable help of an additional editor. Landis Smith has joined our newsletter staff having recently moved from Santa Fe, New Mexico, to the Washington, DC, area. In the short time she has been here, we have benefited from her experience in the conservation field, her knowledge of current issues facing conservators, and her willingness to help broaden the base of coordinators and contributors for the newsletter.

We are very pleased with Newsletter 17 because we have contributions from Bangladesh, South Africa, Zambia, and New Zealand, as well as from North America. We feel we have finally produced a truly international newsletter! As editors, we rely on our regional coordinators to help collect articles from their areas. Please help us to continue to make the newsletter a vehicle for exchange of information and ideas for a worldwide readership by sending in contributions.

Welcome New Regional Coordinator For New Zealand

The editors would like to welcome conservator, Sasha Stollman, as the new ICOM Newsletter Regional Coordinator for New Zealand. Sasha has been Conservator, Head of Department, at the Canterbury Museum for the past three years. To introduce readers to some of the important and relevant developments in that area of the world, we are pleased to include news of the opening of an exciting new museum in New Zealand along with an accompanying article by the Museum's Textile Conservator, Rangi Te Kenawa. We look forward to future newsletter contributions from New Zealand!

TE PAPA: A NEW MUSEUM OPENS IN NEW ZEALAND

On Saturday 14 February 1998, the Museum of New Zealand *Te Papa Tongarewa* (Te Papa) opened in Wellington, New Zealand. Te Papa's opening celebrates "New Zealandness", the richness of the multi-cultures living here, the magnitude and quality of Te Papa as a structure, and the richness of the Taonga (treasures) held inside. Te Papa is a project of grand proportions which is breaking new ground with its mechanical interactives, philosophies and presentations. It is the combination of the richness and treasures of New Zealand, joined with the energy and needs of a dynamic nation entering a new millennium.

Based on Te Papa's housewarming celebrations, the opening day festivities featured music, dance and multi-cultural performances inside and outside Te Papa, entertaining about fifty thousand people that day. The sunrise ceremony began in the early light of morning with the sound of puoro (traditional Maori instruments) from the puwhara (flying bridge) heralding the new day. On the shoreline of Chaffers Beach the crews of the waka taua (war canoes) prepared for the arrival of the large ocean going waka, Te Aurere, which carried iwi (tribal) representatives from Aotearoa (N.Z.) and Hawaii and was accompanied by seventeen smaller waka ama (outrigger canoes).

As Te Aurere and the waka ama came within sight of Te Papa, they paused in the harbour and signaled their arrival with the sound of putatara (shell trumpet). A putatara responded from Te Marae (meeting place at Te Papa) and the waka taua launched from Chaffers Beach to meet the visiting waka. On entering the shelter of Chaffers Beach, the sound of haka powhiri (welcoming performance) burst forth from the shoreline. The visiting waka responded with haka. The waka people met face to face on the shore and the karanga (welcoming call) echoed from the Te Marae. The visitors moved from the shoreline to Te Ara a Tane, the walkway up to the marae. Visitors then ascended the stairway of Tane to the sound of the karanga and were welcomed onto the marae. From the Wellington tugboats to tiny P-class yachts, the harbour buzzed with activity... all around Te Papa a sense of celebration carried on throughout the day.

At midday, Sir Howard Morrison began the official part of the day with the New Zealand National Anthem. The Prime Minister of New Zealand formally opened Te Papa in the company of Sir Peter Blake in a simple, poignant and theatrical event at the main entrance-way of Te Papa. As the first people entered Te Papa, a specially commissioned fanfare by young Wellington composer, John Psathas, was performed by the New Zealand Symphony Orchestra resounding brilliantly around the atrium of the entrance foyer into Te Papa.

Between 14 February and 8 March, 253,000 people had visited Te Papa.

Briony Ellis
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THE CONSERVATION OF BLACK NEW ZEALAND FLAX IN MAORI TEXTILES

A progress report on the research programme investigating the degradation of black Phormium fibre, headed by Dr. Gerald Smith at Industrial Research Limited, Lower Hutt, Wellington.

New Zealand flax (Phormium tenax or Harakeke) is traditionally used by the Maori for weaving cloaks and other garments. Much of this material is dyed black by a process which involves soaking the fibres in a bath containing various tree-bark tannins such as Manuka and Hinau followed by immersion in a black, iron-rich mud. The dyed black fibre is woven into many fine early examples of flax weaving and are suffering from a substantial amount of mechanical degradation.

As a result of discussions with Maori weavers and Dr. V. Daniels of the British Museum as well as a literature survey, it appears the black colour is a complex between the ferric ion and phenolic hyroxyl groups of the tannins. This is subject to oxidation by light and heat and as a consequence it is possible that ferric ions bound to the phenolic groups of the tannins can be transferred to sensitive groups associated with cellulose. In the same situation these ferric ions can then oxidise and degrade the cellulose.

It is known that black degraded flax or phormium fibre (Muka) fades to a brownish colour as compared to the newly dyed blue-black material. Reflectance spectra of the new black fibre and fibre artificially aged with ultra violet radiation were measured in our laboratory. The reflectance spectra of the aged fibre showed signs of degradation of phenolic compounds and concomitant formation of products which absorb in the blue part of the spectrum. This behavior is consistent with colour changes observed by eye. We have also studied fluorescence from black fibre that is typical of tanninised fibre, however the intensity of the fluorescence was very much reduced as a result of the degradation.

Several old degraded samples of black dyed fibre supplied by R. Te Kanawa from Te Papa, Museum of New Zealand collection, have been consolidated using the naturally occurring alginate polysaccharide. The alginate contains a buffer that is expected to benefit the fibre by limiting the rise in acidity that has been found to accompany degradation. The flax is visually unaltered and the treatment reduces fragmentation. The fibres consolidated in this way are to be inspected by museum conservators for their appraisal of their condition.

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TECHNICAL EXCHANGE

THE PROBLEM OF CELLULOLYTIC FUNGI ON BASKETRY AT THE BANGLADESH NATIONAL MUSEUM

In Bangladesh, basketry is a traditional rural craft intimately connected with everyday life. The baskets are made from bamboo that is cut into strips. Bamboo is hygroscopic and under normal conditions tends to absorb or give up moisture with the rise and fall of relative humidity and temperature. Excessive moisture however, tends to weaken the tissue of the bamboo, and promotes growth of microorganisms that rot the strips and cause staining. The components of bamboo, cellulose, hemicellulose, and pectins, are excellent nutrients for fungi and when the relative humidity exceeds 70%, mold (belonging mainly to the imperfect fungi or ascomycetes) begins to grow. The broad physiological capability of molds enables them to colonize on a wide range of materials (pH-2.5-11; temperature OEC - 50EC). The superficial type of mycelial growth produces a mildew discoloration about l mm in depth with heavy sporulation mainly of conidia, which may be white, green or black. These molds produce acids that subject the cellulose of the bamboo to acid hydrolysis, leading to degradation and loss of mechanical strength of basketry materials. At the same time, staining develops due to the coloured products produced by the molds. Over the last few years in Dhaka, a series of hot summers and mild winters has resulted in a marked increase in the activity of molds in the Ethnographic store at the Bangladesh National Museum. In 1994 during a detailed survey of the reserve collections of basketry in the store, a preliminary assessment of the distribution and infestation of cellulolytic fungi on the basketry was made. The assessment of the baskets, stored on shelves with polythene covers, included collecting random mold samples to determine the following: identification of species, a determination of acid production, and a screening for cellulolytic fungi. The environmental parameters were also reviewed. The testing procedures and results are outlined below.

Testing Materials and Methods

(I) Isolation of fungi on PDA - Fungi samples were randomly collected from basketry in the Ethnographic store during the 1994 rainy season. Samples were collected by the cotton swab technique and by direct scraping. The samples were then placed in sterilized test tubes with proper labeling and taken to the conservation laboratory. Fresh samples were mounted in cotton blue with lectophenol and observed under the compound microscope. The serial dilution method was used to isolate the fungi. Isolated colonies were subcultured and maintained in the laboratory at room temperature.

(II) Acid production - Acid production by the isolates was tested in Czapekdox solution supplemented with CMC (1.2%w/v). The pH of the medium was adjusted to 6.5.

(III) Screening of cellulolytic fungi - For screening of cellulolytic fungi, isolated fungi were plated on Czapekdox agar medium supplemented with CMC (1.2%w/v). After an appropriate incubation period (5 days), cellulolytic activity was detected by the appearance of clear zones around the colonies. Hydrolytic zones around the growing colonies were recorded for CMCase activity. To enhance the visibility of hydrolytic zones, the plates were treated as follows. They were first flooded with 10 ml of congo red solution. The coloration was then terminated by pouring off the congo red solution after 20 minutes

and reflooding the plates with 10 ml of 5 ml/L NaCl solution. After an additional 20 minutes, the salt solution was discarded and the CMCase activity was revealed by the presence of a pale orange zone around the colonies.

Testing Results

(I) Isolation of fungi on PDA - A total of 162 fungal isolates, representing 16 species, were obtained from the basketry collection (Table 1). The isolated fungi mostly belonged to the imperfect fungi group. *Asperigillus niger*, *Aspergillus* spp., *Penicillium* spp., *Curvularia* spp., and *Trichoderma* spp., were the dominating species.

(II) Acid production by the isolates - It was observed that all of the isolates showed acid secretion under the laboratory conditions. The change of pH 6.5 of the Czapekdox liquid with CMC (1.2% w/v) ranged from 6.1 to 5.5. The initial pH of the medium was adjusted to 6.5.

(III) Screening of cellulolytic fungi - The study revealed that most of the isolates were cellulolytic (having the capacity to hydrolyze cellulose). Out of 16 species, 14 showed cellulolytic activity by producing a pale orange zone around the colonies. Among them, *Aspergillus niger* and *Curvularia* spp., were most cellulolytic (+ + +) [Figure a and b], followed by *Aspergillus* spp., *Alternaria* spp., *Trichoderma* spp., *Humicola* spp., *Penicillium* spp., (++), and then *Cladosporium* spp., (+).

Environmental Parameters

Meteorological data for the city of Dhaka was obtained from the climatic division of Bangladesh Meteorological Department. The monthly temperature, humidity and rainfall of the city from 1990 to 1994 was reviewed. The meteorological data for the city varied ± 2 points on average from the temperature and humidity in the Ethnographic store.

Discussion

The above mentioned meteorological data, shows an average humidity of > 75% and an average temperature > 25EC, conditions effectively favourable for microbial deterioration of basketry. Accordingly, our primary goal is now to control the humidity and temperature in the Ethnographic store to a constant 55% - 60% RH and 16EC - 25EC, ranges that will inhibit mold growth on the basketry.

An examination of the condition of the basketry during the assessment revealed that the basketry in the store were effected by mold in varying degrees, depending upon the condition of the bamboo strips. The random survey revealed that the bamboo strips of the basketry with extensive mold growth were mostly acidic (pH 5.5 - 6.8). The development of acidity accelerates the degradation and loss of mechanical strength of the bamboo strips providing a favorable condition for fungal growth. The acid condition of the bamboo strips may be due to aging, iron from dust, or the presence of sulfurdioxide which converts into sulfuric acid. It was also observed that different coloured stains developed on the strips around the mold colonies because of coloured conidial masses or mycelial growth.

References

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Raper, K.B., and Thom, C., ***A Manual of the Penicillia***. (New York: Hafner Publishing Company, 1968).
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TREATMENT FOR EGYPTIAN POLYCHROMED WOOD

The following is a summary of techniques to repair degraded ancient Egyptian polychromed wood. Developed by Colin Johnson, recently retired from the Organics Materials Section of the British Museum, the techniques are adaptable to a wide range of painted wood objects. They fall into four categories: consolidation, paint flake relaxation, flake adhesion and clamping.

Consolidating the Substrate

Colin consolidates gesso, mud and wood, as well as fragile pigments, with 3% w/v Klucel™ G (hydroxypropyl cellulose) in IMS (industrial methylated spirits). First he pretreats the surface with pipetted IMS, as a wetting agent, to improve absorption of the adhesive. Then he brushes on the Klucel™, with multiple applications. When degraded areas are too inaccessible for brushing on the Klucel™, he delivers the adhesive through a flexible needle, which he creates in the following manner: using an alcohol (spirit) lamp or other type of small burner, he heats the nozzle of a plastic syringe. Just when it softens, he draws out the tip with a tweezers in a fast, flicking motion to form a thin hollow tube one to three inches long or longer. Trimmed if necessary to remove a fused point or to create a variety of useful lengths, these flexible nozzles may be used to insert consolidant into extremely tiny holes or deep into blind spots. It takes practice to get the timing right, but you can make nozzles as fine as hypodermic needles. When a syringe in use clogs up, it can simply be flushed with water.

Relaxing the Paint Flakes

If paint flakes are curled or cupped, Colin relaxes them just before adhering them to the

substrate by dampening their underside with brushed or pipetted Stoddard solvent, while working under magnification. Besides relaxing flakes, Stoddard solvent, a petroleum distillate, makes them resist absorbing the water-based adhesive Colin prefers, Vinamul™ 3252. Moreover, the addition of Stoddard solvent reduces the surface tension of Vinamul™ at the paint interface, allowing it to penetrate farther under the flakes. If Stoddard solvent should stain or disturb the paint, ethanol may be substituted.

Adhering the Paint Flakes to the Substrate

Colin advocates adhering paint flakes with Vinamul™ 3252, an ethylene-vinyl acetate emulsion. This emulsion was part of a British Museum test group of adhesives subjected to artificial aging, and emerged the unexpected winner of the tests, e.g., maintaining its virtually neutral pH. Colin normally uses a 10% v/v solution in distilled water; because Vinamul™ 3252 is distributed in a 57% solution, this produces an approximate 5% solution of solid components. Colin applies the adhesive by pipette or brush and then uses a facial tissue-covered finger to manipulate the flakes into place while also blotting up excess adhesive. If cupped flakes are too brittle to be relaxed, Colin uses a 20% Vinamul™ solution to attach just the flat portion of the flake to the substrate.

Clamping Down the Drying Flakes

How do you clamp on a vertical surface that offers no opposing, securing surface? Colin creates clamps from plastic soda straws, cut to any convenient length. Strategically positioning thin vertical strips of Plastazote (closed cell ethylene foam) over a surface of adhered flakes that need to be clamped, he arches the soda straws, often two per strip, between the strips and any impromptu wall--a heavy metal bar or tower of bricks on a stool, for example--placed in front of the surface. The tension of the arch provides gentle but effective pressure. Most clamping jobs require at least two strips and frequently more, resulting in rows of arched straws, like rows of flying buttresses (see figure).

Alternatives

Conservators concerned about Stoddard solvent might substitute a very low-aromatic or non-aromatic hydrocarbon such as iso-octane or 340HT mineral spirits, as suggested by Christopher Augerson of the Coach Museum, Chateau de Versailles.

Suppliers

Klucel™ G:
Aqualon Ltd
Genesis Centre
Garrett Field
Birchwood
Warrington
Chesire WA3 7BH

Plastozote™:
Zotefoams Ltd
ERP Division
Mitcham Road
Croydon
Surrey CR9,3AL
United Kingdom

Vinamul™ 3252:
Vinyl Products Ltd
Mill Lane
Carshalton
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OLD TREATMENTS AND THE USE OF CELLULOSE ETHER ADHESIVES

In 1994, one hundred and twelve objects treated at the Canadian Conservation Institute (CCI) and presently housed in eighteen different museums across Canada were reviewed. The objects inspected were mostly ethnographic and had been treated at CCI between 1974 and 1985. The aim of the survey was to see if any problems had arisen due to certain conservation methods or materials used in the treatment of the objects as well as to develop an appreciation for the subsequent role the museums may have played in the current condition of the artifacts. The conservation work on sixty percent of the objects inspected in this survey had suffered no visible alterations in the ten to twenty years since treatment. Almost without exception, the remaining forty percent showed alterations of only a very minor nature such as a gap along the edge of a fill, the lifting of several quills on a porcupine quill decorated object, or a few small spots of iron corrosion. It was apparent that in the vast majority of cases the conservation interventions were doing the job intended of them across a fairly wide range of materials and artifact types; the conservation materials used had not led to any direct harm or deterioration.

During the survey, one of the categories of materials inspected was adhesives. Adhesives of one sort or another were used in almost every treatment reviewed in the survey. These included a large number of poly(vinylacetate) emulsions and resins, cellulose ethers, liquid hide glues, a few examples of epoxies, Acryloid™ B-72 (methylmethacrylate/ethacrylate co-polymer resin), nitro-cellulose adhesives, Lascaux ™ 360 HV (butyl methacrylate/butyl polyacrylate emulsion), sturgeon glue, gelatin and Rhoplex™ AC 33 (ethyl acrylate/acrylate emulsion). Of these adhesives, only the poly(vinylacetate) (PVA) emulsions and the cellulose ethers were encountered with enough frequency to begin to show interesting trends. Thirty-four PVA emulsion glue joins were inspected and of these, only four had failed. Fourteen glue joins made with cellulose ethers were inspected and, of these, ten had failed.

Cellulose ethers are considered to be relatively weak adhesives which have the ideal qualities of ease of application and reversibility. A variety of cellulose ethers have been available to conservators; the water-soluble varieties including methylcellulose, hydroxypropylcellulose, ethylhydroxyethylcellulose, methyl-hydroxypropylcellulose, ethyl-

hydroxyethylcellulose and sodium carboxymethylcellulose; and the organic solvent-soluble types including ethyl-cellulose and ethylhydroxyethylcellulose. Over the years, the Ethnology Laboratory (now the Objects Laboratory) at the Canadian Conservation Institute has used a number of these cellulose ethers in a variety of ways and on a number of different substrates. Of the objects examined which had been treated with cellulose ethers, methylcellulose was by far the most frequently used (twelve times). Klucel™ G (hydroxypropylcellulose) and Ethulose ™ (ethylhydroxyethylcellulose) were each used once.

Methylcellulose had been used in several ways; usually at 3-5% to butt-join edges of basketry, or applied to Japanese tissue used as a backing across broken elements on basket repairs or split birchbark. Methylcellulose and ethylhydroxy-ethylcellulose (Ethulose™ 400) had also been used in combination with macerated Japanese paper to make a combination fill and adhesive known at CCI as "basket goo". This material could be applied to the edges of breaks, the paper fibres acting to provide additional strength. Occasionally, methylcellulose was used to adhere lifting quills to birchbark as well as lifting and split sections of both birchbark and cedarbark. Hydroxypropylcellulose (Klucel™ G) also had been used to adhere delaminating and splitting cedarbark.

Often the failures of the cellulose ethers seemed to be related to situations where the glue joins may have been under stress. For example, methylcellulose had been used to adhere a black paper lining to the interior of a small leather dressing case. One edge of the leather dressing case had curled back until it was slightly out of proper alignment; the glue join had failed. In this case it was appropriate for the glue join to fail as the paper lining may have otherwise torn. In porcupine quill decoration, the quills are usually held in place by pinching both ends of the quill into the substrate (often birchbark). Often one end of the quill breaks and springs up and away from the surface like a drawbridge while still held at the other end. To reattach the lifting quill, adhesive is applied to the underside and at the broken tip. The quill is then pushed down into proper alignment and allowed to dry under a slight weight. In some instances, quills had been glued with methylcellulose and in one case a number of lifting quills had been adhered with ethylcellulose. Examples of the failure of both of these adhesives were seen which had allowed the quills to spring up again, leaving them vulnerable to damage when handled.

Two similar, turn of the century, Northwest Coast, twined spruce root baskets from the same museum also were examined because both had been repaired with cellulose ether adhesives. Both baskets required treatment in 1984 at CCI because previous repairs involving stitching at right angles across splits in the baskets were ugly and not very effective. Each basket was then conserved by a different conservator, but similar techniques using cellulose ether adhesives and Japanese tissue were employed. One of the baskets (Tlingit) showed an approximate failure rate of about 50% of the glue joins applied in 1984. According to the treatment record, these repairs had been made using "methylcellulose and paper fibre basket goo" as well as "Ethulose 400 and paper fibre". Although no definitive recipe for "basket goo" exists, it was usually made by placing methylcellulose adhesive and small torn pieces of a medium weight Kurotani handmade Japanese paper into a blender to break up the paper fibres and blend them into the

adhesive. Unfortunately, the report was not more specific so it is difficult to tell how the adhesives were used and whether it was the methylcellulose or the Ethulose (ethylhydroxyethylcellulose) or both, that had demonstrated a tendency to fail. The other basket (Haida) showed no failure of the glue joins at all. The basket had been repaired using "basket goo" made solely with methylcellulose. This Haida basket had also been treated using more adhesive and the paper fibres of the "basket goo" appeared to be somewhat longer (presumably the paper had not been macerated in the blender quite as long, leaving a higher percentage of longer paper fibres). In effect, the treatment of the Haida basket seemed to have been somewhat "over built" in comparison to its Tlingit companion. When the baskets were examined in 1994, they had been through two storage moves at their institution which may explain the adhesive failure of the Tlingit basket. While the choice of a weak adhesive makes sense if it helps prevent damage to adjacent material, this advantage must be weighed against the potential for failure and subsequent loss of some of the repaired elements.

At the ICOM Committee for Conservation meeting in Edinburgh in September of 1996, the Ethnographic Conservation Working Group agreed to take a closer look at these adhesives during the subsequent three years to see if the results described in this survey are supported across a wider sample, or are simply an anomaly. I would ask that, where possible, members of the Working Group take a little time to go through previous cellulose ether adhesive treatments done between ten and twenty years ago. Please be sure to note the following: the substrate, the type of cellulose ether used and its concentration, a physical description or diagram of how it was used, and some background about the storage, display and handling the object may have received since it was conserved. It is also very important to look at success and not just failures. Please forward this information to me so it can be compiled for presentation at the next triennial meeting and for publication in the ICOM Ethnographic Conservation Newsletter.

While the examination of cellulose ether adhesives should be an interesting venture in itself, a very useful benefit of such a review is that it forces one, while trying to compare "condition now" with "condition then", to quickly come to grips with the adequacies, or lack thereof, of previous treatment documentation methods. A treatment report is always clear to the individual who writes it, but will it be clear to a colleague who reads it next year or to someone reading it fifty or one hundred years from now? If it is not, everyone's time has been wasted and one of the key ethical foundations of the profession has been eroded.

After examining over 100 treatment dossiers, the following suggestions as to how to improve documentation can be made:

- Fewer words, and more diagrams and sketches should be used.
- Reports should be typed and not handwritten.
- Consideration should be given to using some sort of colour reference system such as Munsell if fading is expected to be a problem. These systems are not without fault but it is better than making no reference at all. Thirty references relating to

inpainting were checked during the survey and it was difficult to say anything meaningful about them as it was impossible to tell if the colours had changed or not.
- Diagrams or photographs of detail sections should be referenced to their exact location on the object; otherwise it may be difficult to find their location in the future.
- Accession and catalogue numbers on the documentation must be recorded accurately or it may be difficult to associate artifact and treatment documentation in the future.
- The first time a brand name product is mentioned in a treatment report it should include a brief description of its chemical composition, where this is known. Eighty years from now a conservator may be puzzling over a treatment report and wondering what Rhoplex™ AC33 was.

Good luck and I look forward to hearing about your failures and successes.

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CONSERVATION TREATMENT OF MINKISI

The Rijksmuseum voor Volkenkunde in Leiden, Netherlands, carried out a number of "pilot projects" to test options for future conservation projects. These projects fall within the framework of the Delta Plan, an idea of the Netherlands government to improve the condition of the country's museum collections. In one of these projects, several Minkisi objects were examined and treated.

Minkisi are from the Congo region in Africa and can be described as containers to which magical substances were added. Though made from various materials and in a variety of forms, our conservation project primarily dealt with human figures carved from wood. A good description of Minkisi is the following: "Spikes and nails are inserted into the bodies of Kongo figures from Zaire and stand for the agreements and oaths made in the presence of the carvings. The effectiveness of carved figures derives from the medicines packed into their abdominal cavities and into the horns attached to the figures. The ingredients inserted into these figures contain portions of animals {that} possess a specific type of physical power... which defines the desired action {of the medicine}. Ingredients include bones, flesh, fur or claws of a lion, leopard or monkey; earth from the tracks of elephants; scales of a dangerous snake or the sexual organs of a crocodile; excreta of lightning, described as a hard wax-like substance found among the roots of a tree struck by lightning, as well as bones, flesh, nails, etc. of sorcerers, suicide victims, warriors (Hersak

1986:129). To further enhance the power of these figures, the carvings are embellished with antelope, buffalo, or bush bock horns; spotted cat, lizard, and snake skin; various bird feathers; as well as raffia cloth, metal bells, nails, beads, strips of copper."[1]

The Rijksmuseum voor Volkenkunde has approximately 120 of these figures in its collection. Fifty-nine were selected for reinstallation in our new galleries. During the condition survey, a total of nineteen different materials were recorded on the objects; wood, resin, pigment, metal, textile, and vegetable fibers were the most common. Others were skin/fur, porcupine quill, teeth, feathers, bones, claws, glass, mirrors, beads, ceramic, clay and shell. Vegetable fibers were used on the Minkisi for string or woven fabric. Plant material such as seeds and twigs were used for necklaces or rattles. The textiles were generally made from cotton, or occasionally wool. The materials of the majority of the Minkisi surveyed had deteriorated to different degrees and numerous original parts were lost, but most of what remained was in stable condition. However, for exhibition about one third needed some aesthetic and/or stabilization treatment. Numerous types of problems were identified. A common problem was flaking of surface layers which were made from a combination of materials, such as pigment, resin and earth. Larger resinous parts on these Minkisi, such as medicine cases, had cracked and lost small fragments or had become detached from the wood. Embrittlement of the vegetable fibers resulted in breakage, instability and loss. Dyed cotton was often faded and had small holes, was torn and frayed, or was brittle. All the metal parts which were examined had corroded, but the corrosion did not seem to be active. It seemed likely that the corrosion occurred when the object was still in use.

Old photographic documentation revealed that many of the figures once had smaller items attached to them, such as nails and blades, but these had become detached and lost while in the care of the Museum. On many figures still having these small pieces attached, they were only loosely held. Minkisi that had been in other collections before they came to this Museum exhibited other problems. Collection numbers and labels had been applied during their history causing different changes to the surface appearance. Old restoration work also caused damage to the object or was now considered aesthetically unacceptable. Early insect damage could be seen on almost all of the objects. They were generally very dusty and dirty. Treatments carried out on ten Minkisi included surface cleaning, consolidation of flaking paint and of the resin and visual improvement of old restorations. Missing pieces were searched for but not found. During treatment of the Minkisi two materials (a pigment and the resin) were of special interest, and required further investigation before completing work for the reinstallation. The red pigment, described by Fetischen in the literature as "tucula"[2] or "ngula"[3], had been used on four of the figures. Red coloured wood was ground and mixed with palm oil[3]. On our figures the red colour had changed to a beige/brown. Areas protected from light retained the red colour. These areas were visible under the protective cover of a loincloth or under a faded surface layer of the pigment. During testing it was discovered that certain solvents such as acetone and isopropanol had a dramatic effect on the discoloured pigment, converting it back to a bright red tone. The actual cause of this change could not be fully investigated during the brief time of this exhibition project. No objects were converted to the brighter color as the original state is not known. This is an area for further research.

A resin which was commonly used in the Congo area and which may have also been used on the Minkisi is called "bulungu" resin2 in the literature. Under the microscope, the resin used on these objects has a dark-reddish colour and a fine craquelure on the surface which, from a distance, gives a whitish appearance. Under ultraviolet light it gives a greenish fluorescence. It is easily soluble in diacetone alcohol, soluble in acetone, slightly soluble in ethanol and isopropanol, and not soluble in toluene.

Little information on these materials is available but I am hoping some readers of this newsletter might be able to suggest some possibilities. Does anyone have any analytical information or treatment experience (particularly consolidation of loose parts) which may help me with this? Thank you in advance for thinking about this; I look forward to exchanging information.

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MATERIAL CULTURE

TRADITIONAL ART OF MAKING CLAY FIGURE DEITIES FOR COMMUNITY WORSHIP

Introduction

Material culture can be contemplated as the largest segment of culture. It comprises manufacturing techniques, use and subsequent history of an object and describes its inherent philosophical concept. Material culture can be understood as social history and usually includes a considerable input from the applied arts. It has been used to interpret artefacts constructed by human beings through a combination of raw material and technology. Material culture is studied because it can make a unique contribution to understand the working of individuals and societies. Object technologies of indigenous cultures should be recorded where traditional technology remains. The Bengali art of

making *pratima*, the life-like clay images of the Gods and Goddesses, is gradually changing in forms, features and techniques. Mechanical devices are now applied to move the limbs of the deities as traditional styles and decorations are substituted with modernistic ideas. The making of *pratima* is a fine art in itself. The work is done with great care and fineness with much attention to every detail; it involves much time, patience and delicacy. Because of their superior quality, they have received world-wide recognition and found their way into museums abroad.

History of Pratima Puja

The worshiping of *pratima* was not much in vogue in Bangladesh and its neighbouring area of West Bengal (India) before the 18th century. The community worship commenced in these areas from about 1790 by Hindu society of this region. *Barawari puja*, or the community worship, is held under the guidance of the *Puja committee* consisting of 12 to 20 elected members. The committee solicits subscriptions in all the surrounding villages, takes initiative, and organizes all the activities of the *puja* celebration. In Bangladesh, and in the eastern part of India, thousands of puja *Mandaps*or pavilions are erected annually for worshiping the clay images. The most popular deities of the region are *Durga*, *Sarwasati*, *Lakshmi*, *Kali*, etc.. The aesthetic and iconic features of clay images are interesting and different from other media such as terra cotta, stone and metals. Thousands of clay modelers are engaged in this work during the festival time and their activity can be observed in remote villages as well as in metropolises throughout the country.

Pratima Maker and Description of Deities

The introduction of clay image worship created the need for clay modelers. It is a hereditary vocation in a community known as *pal*; they belong to a lower Hindu caste called *Kumar* or *Kumvokar*. They are devout followers of the Hindu religion and they worship Hindu Gods and Goddesses. Their personal and family life is greatly influenced by their religious ideology and affiliation. From time immemorial the occupation of this caste has been to make earthen vessels and the figurative representations of divine manifestations described in Hindu sacred books. These tangible representations of divine attributes are worshiped on prescribed days throughout the year. After worshiping for certain days, the ceremonial immersions of these idols are held. The *pratima* used for worship is not fired so that the clay could be absorbed into running water.

The worship of the Goddess *Durga* is the great festival of Bengali Hindus held every year in September. *Durga*, a form of the great Goddess "Energy", that pervades the universe, is represented as having ten hands engaged in killing the "Evil principle". Her husband, the great *Siva*, occupies a place on the top of the framework. This festival is specially in honour of his consort. She has her children with her. On the extreme right is *Ganesha*, the God of Wisdom, and next to him is the *Lakshmi*, Goddess of Wealth, Property and Good Fortune. On the extreme left is *Kartikeya*, the God of War, who rides on a peacock; next to *Kartikeya* and to the left of *Durga* is *Saraswati,* the Goddess of Arts and Science, standing on the lotus. She has a day specially dedicated to her in February, when she is worshiped by school boys and artisans.

Raw Materials

Clay is the most important raw material used in giving shape to the figures of deities. Clayey earth, *etel mati*, is the normal type of clay used for this purpose. It is black or grey in colour and the proportion of sand in composition is low. Pure *etel mati* is sticky to the touch and suitable for modeling the shape of the head, hands and feet and to cover the whole with a smooth, carefully shaped surface. Apart from clay, bamboo, rice straw, husk and jute cuts are necessary materials for constructing the framework for the models. For the painting, basic colours, glues and adhesives are required. Textiles, hair, eyelashes and ornaments are indispensable items for the decoration of deities. Peacock feather, shola, paper and metals are also used in making armour and weapons and ornaments.

Tools and Accessories

The artists' tools and implements for clay modeling are very simple, consisting of the beater, the scraper, brushes and a few others. All the tools can be carried in a hand bag. The tools have their local names such as, *Ucha*, which is a semicircular piece of bamboo used for surface finishing; *Pitna*, a wooden beater of about 25 cms x 8 cms used for beating and shaping the surface; *Chiari*, made of bamboo 11 cms x 1 cm is used for decorating clay figures; it is a pen-like tool, flat on the bottom and round on the top, pointed at one end and rounded on the other. Sometimes even an iron knife with a two-sided handle is used. Besides these tools, artists use a few other accessories like water pots, sand containers, cane or bamboo baskets, jute twine and jute sacks. These are available in every rural house. For the construction of the framework for modeling the deities, bamboo, wood, iron nails and some carpentry tools are also required.

Process of Making Pratima

The entire process of making *pratima* can be divided into certain well defined steps according to the nature of its exertion:

1. Construction of modeling structure.
2. Processing of the clay mixture
3. Shaping of the figure
4. Moulding
5. Drying
6. Painting
7. Decoration and ornamentation.

- Construction of the modeling framework is begun with the frame made of bamboo and wood. The sturdy frame is covered with rice straw bound into form with twine.
- A blend of *bele mati* (sandy clay) and *etel mati* are mixed in a 1:1 proportion and 2% cut jute (by weight) is added to the mixture. Water is then poured and the mixture is made into paste by kneading and thus making it workable.
- In the next step, the framework is covered with the blended clay mixture and allowed to dry for two weeks. If cracks appear, they are mended to make the object tight. After drying, it becomes absolutely tight and the matted mass of straw weaves a fibrous web through the hardening clay. Then pure *etel mati*, sticky and tough, is used for modeling, to shape the limbs and to cover the whole with a smooth,

carefully shaped surface. Then the *pratima* is given a coat of *bele mati* mixed with filaments of jute. In order to make it beautiful, another coat of *etel mati* coating is given so that colouring can be done perfectly.

- The faces, limbs and ornaments of the deity figures are generally made with moulds to save time. The moulds may be prepared in parts and in each mould piece the required quantity of clay is firmly pressed to get the intended shape and look. Clay paste is used for joining together the moulded parts.
- The dehydration of the formed figures is slowly done in the normal temperature of a closed room for about a week. They are then brought out of the room and heated in the sun.
- Normally the pigments for painting the figures are purchased from the local shops in powder form. The whole work of colouring, including the preparation of the colour, is done by the modeler himself. Sand paper is used for smoothing the surface. A white colour is given as a priming coat with a paste of boiled tamarind seeds and chalk powder. Then the figures are painted in different bright colours. Starch paste is prepared by boiling *Sagu dana* (dried pellets from the plant extract of Metroxylon sagu Rottb. [Fam. Palmae]). *Sagu* is mixed with the paint to give a bright effect; copal varnish is also used. Generally, the Goddess *Durga* is painted in light orange, *Saraswati* in white, *Ganesh* in pinkish white, *Kartikeya* and *Lakshmi* in yellowish, and *Kali* in black.
- In the final stage, pieces of real clothing, hair, musical instruments, armour and weapons, etc. are placed in their specified positions and tinsel ornaments adorn *pratima* to enhance the beauty.

When the *pratima* is finished, the priest comes and invokes the particular divinity for that figure to come down from heaven and accept the offerings prepared by the humble worshiper. After the offerings have been made and the prescribed time for the deity's stay upon earth has expired, it is again respectfully asked by the priest to go back to its heavenly abode. The *pratima* is then a lump of clay, like the body of a living organism after life has departed from it. It is then consigned into water.

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PUBLICATIONS OF INTEREST

Heritage Eaters: Insects and Fungi in Heritage Collections

by Mary-Lou Florian, August 1997
James & James (Science Publishers) Ltd.
35-37 William Road
London NW1 3ER
United Kingdom
Tele: 44-171-387-8558
Fax: 44-171-387-8998
e-mail: orders@jxj.com
ISBN: 1-873936-49-4 (softcover)
£25.00/$40.00 US, 164 pages

The publisher's summary reads as follows:

Insect and fungal pests can threaten heritage collections wherever they are stored, whether in a public museum or a private home. In order to identify a specific problem, eliminate it and prevent it occurring again, it is necessary to understand the interrelationship of three components: the materials of the heritage objects, the environment of the objects and aspects of the biology of the insects and fungi. This book presents this essential information.

The insects discussed include the common museum or household pests and some species specific to special geographical locations. The fungi discussed are cosmopolitan airborne fungi which cause surface damage and those which cause specific internal deterioration of materials such as wood, paper and textiles.

The biodegradable proteinaceous and cellulosic materials of heritage objects in human history and natural history collections are also covered. Environments considered range from complex air-conditioned buildings to simple, temperature controlled homes.

Museum, archival and heritage-site staff and owners of private collections will find this book of great value to enable them to make informed decisions for the identification, prevention and eradication of fungal and insect problems.

Pottery by American Indian Women: The Legacy of Generations

by Susan Peterson, 1997
Abbeville Press
488 Madison Avenue
New York, NY 10022
USA

Tele: 800-ART-BOOK
Fax: 212-577-5579
ISBN: 0-7892-0353-7 (hard cover)
$55.00 US, 224 pages

This publication accompanied the exhibit of the same name at the National Museum of Women in the Arts in Washington, DC. The publication highlights Southwest Pueblo potters. It begins with an historical account of the early potters and concludes with contemporary artists. The pottery techniques are described in detail, as well as personal and professional histories of the artists. Photographs of the exquisite pottery as well as photographic illustrations of the working techniques are presented.

Beauty from the Earth: Pueblo Indian Pottery from the University Museum of Archaeology and Anthropology

by J.J. Brody, 1990
Publications Department
University Museum of Archaeology
and Anthropology
Philadelphia, PA 19104
USA

Tele: 215-898-4124
Fax: 215-898-0657
ISBN: 0-924171-05-7
$19.95 US, 100 pages

In the late 1980's, renowned Southwest Indian art scholar, J.J. Brody, was invited to curate a traveling exhibit of Pueblo pottery from the University Museum, University of Pennsylvania. Drawn from the Museum's extensive holdings of approximately 3500 pots, the exhibit reflects the composition of the collections: about half 19th century and half ancestral Pueblo (proto-historic and Anasazi). As an extension of the exhibit, an excellent catalogue was authored by Brody, with a brief but informative contribution by Curatorial Assistant, Rebecca Allen, on the formation of the Museum's Pueblo pottery collections. As a thoughtful and ground-breaking scholar who has lived and worked in the Southwest for decades, Brody knows this subject intimately. His expertise is evident in this concise overview of the complexities of Southwest pottery- making, collecting, and technological and stylistic development. Pottery selected for the exhibit is reproduced in the catalogue, along with interesting photographs of sites, pueblos and collectors.

For conservators who seek an introduction to Pueblo pottery and some of the issues that surround them, this catalogue provides a helpful introduction. In addition to the main body of text, Brody provides a short, separate section on pottery technology in which pottery making in the pueblos is described and illustrated. Clay processing, paint types, slips, finishing and firing techniques are succinctly described. Finally, Allen's summary of collecting methods, particularly for archaeological materials, is enlightening.

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MUSEUM AND NATIVE PEOPLES ISSUES

PROCEDURAL GUIDELINES FOR PROCESSING REPATRIATION CLAIMS OF COLLECTIONS AT THE ARIZONA STATE MUSEUM

In 1990, the Native American Graves Protection and Repatriation Act (NAGPRA) became Public Law 101-601 in the United States.1 Congress assigned responsibility for implementing NAGPRA to the Secretary of the Interior, who in turn delegated much of it to the departmental consulting archaeologist and the archaeological assistance division of the National Park Service. The law, primarily covering five categories of Native American resources, enables federally recognized tribes to request that certain objects held by publicly funded institutions be returned to culturally affiliated tribes. The five categories are: sacred objects, objects of cultural patrimony, human remains, associated funerary objects, unassociated funerary objects. Once a formal claim for a repatriation transaction is received, both the museum and the tribe are obliged to follow the steps outlined by NAGPRA.

The process of repatriating an object or objects under NAGPRA is complex and requires careful orchestration in order to avoid embarrassing and time consuming errors. Guidelines are needed to make sure that consistent steps are followed for each repatriation transaction and to ensure that museum records are accurate and complete. A repatriation process can take months, and personnel changes are not uncommon due to sickness, vacation, leave, or termination of employment. Also, many of the tribal representatives appointed to work on NAGPRA concerns may change as a result of tribal elections. Procedural guidelines were developed by the Arizona State Museum (ASM) and are used by all Museum staff involved in repatriation issues to ensure that the process can remain consistent and thorough.

Repatriation claims may be initiated by a phone call, a visit, or a written request as a response to the summaries sent out in 1993. These written summaries were part of an earlier requirement of NAGPRA that mandated that all museums and universities receiving federal funds create written summaries of their Native American sacred and ceremonial objects and associated funerary remains for potentially affiliated native groups by November 16, 1993. These same institutions were required to provide written inventories

of all Native American human remains and associated funerary objects by November 16, 1995.

Tribal representatives may make several visits to the Museum to take photos or videos or to get copies of catalog cards of collections to show tribal members not traveling to the Museum. During this initial visitation and consultation period, tribal representatives unfamiliar with the Museum may need assistance. Consequently, all ASM employees need to know how to direct tribal inquiries to the appropriate staff. In response to potential problems of the multiple tracking requirements of processing NAGPRA claims, ASM staff members, Conservator Nancy Odegaard and Ethnological Collections Specialist Tom Kolaz, created a tracking check sheet (included at the end of the newsletter) that enables everyone involved in the repatriation process at the Museum to be aware of an upcoming repatriation and the stage of the repatriation process for any given day. Information about the collection under claim is gathered for the benefit of both the Museum and tribe. However, this research is not an attempt to explain, qualify or dispute the claim. This process allows the Museum to give full disclosures to the tribe about the Museum history of the object, including exhibitions, publications, alterations, or pesticide treatments. A thorough review of the object and all related museum records also clarifies and updates the information in a summary that meets current professional standards.

The check sheet developed for repatriation claims at the Arizona State Museum is an important tool for many reasons. The check sheet allows better communication with tribal representatives because it can easily and accurately reflect the current status of the repatriation. Since a repatriation can take several months to come to fruition it is important to know all parties involved with the repatriation and the circumstances of the request both within the Museum and the requesting tribe. This check list identifies the tribal representative who contacted the Museum regarding a repatriation. In fact, the Museum has often had to send out multiple summaries and records on collections to individuals within the same tribe. The sheet makes it possible for any of the Museum staff involved in the repatriation process to answer questions regarding an upcoming claim.

From a collections management perspective, the check sheet helps track and clarify the information that needs to be collected, interpreted or generated about the object or objects in a claim. This may involve bringing the curatorial records up to current professional standards. This also could mean adding a description to what is otherwise just a ledger entry or assist in distinguishing details such as description and measurements from multiple objects or parts under one catalog number. The check list facilitates the coordination efforts of other Museum departments such as registration, conservation, and photography, all of which play important roles in preparing the objects for the requesting tribe.

For the conservator, the checklist procedures provide the Museum's records with accurate updated information on artifact composition and technology as they relate to an objects identification and interpretation. A review of or testing for possible pesticide contamination may also be important if the object is to return to cultural use. An understanding of alterations, including restorations, display mounts, and the addition or

deletion of parts is important in presenting the complete museum history of an object. Finally, the conservator assists in developing a systematic record of any damages that resulted from its time at the Museum.

Since 1990, the Arizona State Museum has had numerous visits from tribal representatives to view collections for possible repatriation. The NAGPRA law has had the positive effects of opening the doors of the Museum to individuals such as elders, religious leaders, and others who otherwise may not have considered coming to see collections. It has also enabled tribal representatives to become involved in aspects of the Museum beyond the repatriation process, and opened lines of communication between tribes and the Museum. Staff preparation for these visits has improved the knowledge of the collections and has improved the information held in various record formats. Inaccurate, misunderstood or ethnocentric information has been reconsidered and addressed. The visits have resulted in numerous NAGPRA repatriations and other repatriations under the Arizona State Laws that protect cultural resources.

The current version of the Arizona State Museums NAGPRA Repatriation Request Sheet includes a section for recording information on the (1) initial request, (2) documentation, (3) ASM assessment and response, (4) Federal Register waiting period, (5) repatriation logistics, and (6) the post-repatriation documentation.

A full text of NAGPRA, the Rules, and minutes of the Review Committee Meetings may be found at http://www.cast.uark.edu/other/nps/nagpra

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LABORATORY HIGHLIGHTS

CONSERVATION AT THE ARIZONAL STATE MUSEUM

Since 1893 the Arizona State Museum (ASM) has been collecting, preserving, researching and interpreting the cultures of the greater Southwest, including Arizona and Northern Mexico. It is the oldest anthropological museum in the region, and has been located at the University of Arizona since 1893. As a state agency, the ASM is the archaeological repository for state lands. It sets the standards for archaeological research and curation for the state, issues archaeological permits, and maintains the Arizona site survey file. The ASM is also responsible for the protection of cultural resources under the Arizona Antiquities

Act including investigation of violations such as vandalism; it also manages repatriation transactions for materials from state lands.

The Museum collections include materials relating to the prehistoric Hohokam, Mogollon, and Anasazi cultures, as well as the living American Indian cultures of the area. There are over 150,000 cataloged archaeological objects, over 16,000 ft3 of bulk accessioned archaeological materials, and over 40,000 ethnographic objects in the collections. In addition, the museum houses an extensive photo archives and research library.

The Conservation Laboratory of the ASM is equipped for a wide range of conservation treatment types and for the technical study of ethnographic and archaeological objects. The Laboratory consists of approximately 1000 ft2 of subdivided space and provides sufficient work space for four conservators. Aside from offices and work space, there are areas of specialized use for photography, computers, microscopes (stereo zoom and polarizing), chemical processes (including standard lab equipment for chemical analysis, cleaning and treatment), and resource materials.

The mandates of the Conservation Laboratory as a program within the Collections Division of the ASM are to provide services such as information and guidance on preventive and treatment conservation to archaeologists, tribes and the citizens of Arizona in its capacity as a state agency, to develop projects and programs that preserve the collections of the ASM, to provide educational training, and to conduct research in its capacity as a unit of the University. The ongoing tasks of the lab include: processing collections for loans and exhibits; collections care through treatment, storage improvements, integrated pest management, and collections analysis; and the training of interns and students in the fields of conservation and museum studies. The lab takes a strong preventive conservation approach, which is documented in its collections care curriculum, *Training for Collections Care and Maintenance*, Vol. I: Archaeology and Ethnology, published by the National Institute for Conservation of Cultural Property in 1990.

The emphasis of many projects of the Conservation Laboratory has been on conservation research, treatment and training. Notable research projects have included: the research and development of micro-climate exhibit cases in the recently installed permanent exhibit, "Paths of Life"; the analysis of laundry bluing as a pigment used on objects; the technology and composition of pigments used on ancient clay-covered, coiled baskets; and the study of a specialized technology of Hohokam ceramics. An ongoing research project has involved the collection, compilation, and confirmation of a set of materials characterization tests useful to conservators. The findings from this research are currently being prepared for publication.

Treatment projects have included: a systematic collections improvement project that involved the examination, photo-documentation, historical research, re-housing, and treatment of the systematic anthropological collection of archaeological perishable materials from the Southwestern United States, Northwestern Mexico and South America; a condition assessment and technical study of soluble salts in the Museum's Hohokam and Casas Grandes pottery collection; a condition assessment and treatment for the Mexican

mask collection; and a follow-up study of the treatment of Mexican masks involving the reactivation of paint films as an alternative to consolidation with adhesives.

A training project currently in progress is a cross-cultural exchange conservation fellowship and apprenticeship program. A post-graduate Conservation fellow and two American Indian apprentices are participating in hands-on teaching of conservation methods and techniques with an exchange of cultural perspectives regarding ethics, treatment and other conservation issues.

In sum, as the Conservation Laboratory of the ASM moves into the 21st century, its primary directive beyond serving the ongoing needs of the Museum and the University of Arizona is to improve both the physical conditions for artifact preservation through preventive conservation and the intellectual access to the collections through more extensive material and technical studies. In relation to conservation treatment, a "matrix" approach is taken that develops and takes form as the conservation progresses. The treatment decision process not only considers the condition of objects but also evaluates the nature of systematic research collections, the impact of legal and ethical issues, and cultural context as important aspects. By recognizing the unique and diverse aspects of anthropology collections, the conservator who uses a matrix approach is better equipped to work with archaeologists on sites, with curators and exhibit designers in museums, and with claimants (or descendants of an object's maker) in carrying out the multiple activities frequently involved in the conservation of objects as they exist in an ever broadening and more political context.

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ARTICLES

COOPERATION AMONG INSTITUTIONS; A VITAL TOOL

Editors' Note: *After receipt of this contribution, contact with the author became impossible because Zambia is in a state of emergency. The author's colleague and friend, Arne Bakken, agreed to provide additional information and guidance for editorial changes. It is hoped that James Sichiweza would approve this version of his contribution.*

The Nayuma Museum is situated in the western part of Zambia on the sloping margin of the eastern side of the great Barotse floodplain, the N'gulu in local language. The upper part of the Zambezi River, above the Victoria Falls, has formed this very large plain which stretches for 120 miles along the river. The peoples of the plain and surrounding areas are made up of 25 tribes of about six different cultural groups. Peoples of the tribes are called Barotse and are subjects of the Paramount Chief of the dominant Barotse tribe. The Barotse Royal Establishment is made up of the Paramount Chief called the *Litunga*, his Prime Minister called *Ngambela* and various ministers called *Indunas*. Each Induna has a traditional name according to the functions he performs within the Royal Establishment.

The Nayuma Museum is a regional, non-governmental community institution run by the Barotse Royal Establishment. Mr. Manyando Mukela, Vice President of ICOM, is the Museum's director. The Museum is built in the village of Limulunga just on the other side of the road from the winter palace of the Litunga. This is where the Litunga takes refuge in the period when the plain is flooded after the rains. He is brought from Lealui, the village of his summer palace on the plain, to Limulunga. This event, which usually takes place in February or March every year, is one of Africa's most famous ceremonies. It is called Kuomboka, which literally means to wade out of water. On a large barge more than one hundred feet long, called the Nalikwanda, the Litunga is paddled by a group of his best men in traditional costumes accompanied by the sound of the royal drums. The Museum is situated right where the royal barge docks. This truly great ceremony goes on for several days and draws thousands of participants and spectators from all over the country and abroad.

The initiative to create the Nayuma Museum was taken by the Litunga himself, early in the 1980's. The founding concept for the Museum was to create a cultural center for the documentation of the material and spiritual cultures of the peoples populating the Western Province of Zambia. The Litunga approached the Norwegian Agency for Development Co-operation (NORAD) for support which had an ongoing water project in the area. Initially, some small buildings were constructed and collecting of objects began. The Museum concept was worked out by the Danish historian Anne Lise Klausen and the German architect Ulla Kroeber. They worked closely with the Barotse Royal Establishment and with the appointed Indunas. Plans and drawings for the museum were made and in 1984 the Paramount Chief, Yeti IV, and his prime minister the Ngambela, paid a visit to Norway in order to present the plans and to find financial funding for the completion of the Nayuma Museum Project. NORAD agreed to finance the project, and the Ethnographic Museum at the University of Oslo was assigned as a professional counterpart to the Nayuma Museum in a so-called sister museum relationship.

During the years of 1984-87 the present main gallery was built. It was designed in a U-shape, with offices and sales shop under one roof. Local materials were used for building materials; the walls were constructed of locally made concrete blocks and the roof was made from thatch that was supported on wooden poles. Because this construction provided poor shelter against dust, insects and varying climatic conditions, consultants from the Ethnographic Museum in Oslo suggested the construction of an underground storage area. The idea was that the conditions underground would reach an equilibrium

with the conditions outside and thus form a naturally controlled environment for the objects in store. The underground storage area measures 144 square metres with a volume of 360 cubic meters. Later, to provide more working facilities for the museum staff, a building was erected on top, in the same style as the main gallery.

The idea of using passive environmental controls for the underground storeroom was approved by experts at ICCROM, but unfortunately the technical expertise consulted by the project sponsors at the time, did not agree. Instead, modern air conditioning machinery was installed to control humidity in the underground store. It seemed, at the time in 1986, that the idea of passive environmental control systems was a bit premature. Unfortunately, when the air conditioning machines were running, heat was given off which produced a rise in temperature inside the storeroom causing a drop in the relative humidity. The museum building was finished in 1987 and soon afterwards the relationship between the two sister museums dwindled and no further evaluation was made of the climate in the underground store.

Ten years after construction, the museum began experiencing problems due to the nature of the building. Gaps had developed between the roof and the walls which allowed dust, insects, and pollution to contaminate the museum and the collections. Water seepage from the outside had stained the walls and altered environmental conditions inside the museum. The natural light that was allowed to enter the museum and that was not UV filtered was also considered a problem.

In 1995 a request was made by the Nayuma Museum to NORAD for technical assistance to address the museum problems especially in connection with the thatched roof. The Nayuma Museum did not have conservators on staff and again requested assistance from the Ethnographic Museum in Oslo. A team of specialists from other museums in the country was created. The Zambian National Museums Board (NMB) suggested recruiting two persons from the Livingstone and Moto Moto Museums respectively, where they had conservators who had graduated from ICCROM's Africa project, the PREMA programme. In addition, a conservation architect from National Heritage Conservation Commission (NHCC) was recruited to address the problems with the building structure. Funding was provided by NORAD and the Nayuma Museum hosted a two week Conservation Workshop which took place in November/December 1995. It was coordinated by Mr. Arne Bakken, Chief Conservator at the University Ethnographic Museum in Oslo.

The other participants in the workshop were:

Mr. Lisulo Mucanza, Induna Muyumbana, Barotse Royal Establishment
Mr. Mwala Inambao, Conservator, Livingstone Museum, Zambia
Mr. Rueben Lifuka, Conservation Architect, NHCC, Lusaka, Zambia
Mr. James Sichiweza, Conservator, Moto Moto Museum, Mbala, Zambia
Ms. Monde Mukela, Architect, Nayuma Museum
Ms. Gracious Liseli, Conservation responsible, Nayuma Museum
Mr. George Liwena, Assistant in conservation, Nayuma Museum

The objective of bringing together conservators from different museums and different countries, was to share individual knowledge and experience in an effective manner. Such collaboration was necessary for the Nayuma museum project that needed concrete, down to earth, but professionally acceptable solutions. The principal of preventive conservation was mandated as the underlying theme for all conclusions and decisions for remedial action. The purpose of the workshop was to analyze the following subjects:

A. The conditions of the museum building and its effects on conservation.
B. The conservation requirements of the museum collection.
C. The climatic conditions in the underground storage area.

The workshop participants were divided into three groups according to expertise and each group included participants from the Nayuma Museum. Induna Myumbana from the Barotse Royal Establishment, with his knowledge of carpentry, was assigned as an overseer of the groups. Each day of the workshop began with a plenary meeting in order to review the previous day's work and to discuss the assignments for the day. In this way it was possible to spread conservation awareness among the Nayuma staff, an important point because the museum itself would have to carry out the suggestions of remedial action suggested by the expert team.

1. Architects group

The main concern of this group was the thatched roof structure and the insect infestation in the wooden supports. The thatching material allowed large amounts of wood dust and other droppings from insect activity to fall onto the exhibition below. Also, there were gaps between the roof and the top of the walls and other openings which allowed excessive air infiltration and consequently airborne dust entered the exhibition hall. In addition, the architects group discovered an inadequate water supply to toilets and fire hoses which caused water seepage problems and unacceptable microclimates in the gallery. The suggestions listed below were conclusions reached as a result of the plenary discussions of all participants in the workshop:

a) Reconstruction of the roof using clay tiles in a colour that would not deviate too much from the traditional thatch used on houses in the surrounding village.
b) Use wood panels for ceiling and floor covering that would act as a climatic buffer and would be easier to clean than the existing, rough clay brick floor. "Insect proof" wood was recommended.
c) Suggestions were made for sealing the "gaps" in the building structure and moving the firehouses and the toilets away from the exhibition hall.
d) Appoint the National Heritage Conservation Commission (NHCC) as project consultants under the control of Nayuma Museum.

2. General conservation concerns group

This group set out to examine the general conservation requirements of the objects in the museum's collection both in the exhibition gallery and in store. Without going into great detail the suggestions by the group were as follows:

a) Provide necessary training of conservation staff perhaps by funding one person from the museum staff to attend one of ICCROM's national courses. In addition, arrange more workshops for Zambian conservators with the purpose of improving the conservation routines by developing written instructions for use in conservation matters.
b) Ensure cleaning of objects and deinfestation against insect attack by deep freezing.
c) Provide better supports for objects on exhibition and in store.
d) Develop instructions for improved "house keeping" routines, and instructions for the use of the storeroom. Improve the reporting routines by establishing a conservation log, etc.

3. Climate study group

This group set out to examine the overall climatic conditions for the objects in the museum and especially in the underground store. An annual climatic study in the underground storage area was implemented. This study will be conducted without using the air conditioning machinery and will last for a period covering all four seasons. The findings of this group will be published later.

Conclusions

Collaboration among group members created a very rare learning environment and a good opportunity to gain work experience, especially for some of us who were newly trained. The findings and recommendations were first discussed with the Induna Muyumbana for approval before passing them to the museum director and the Barotse Royal Establishment. The workshop was concluded by the submission of reports of our findings and recommendations for both the collection and the museum building. The reports submitted to NORAD also proposed a 5 year project for future funding. Fortunately, the Nayuma Museum was subsequently informed that its proposed project had been accepted and funded by NORAD. Now we can boast of a 5 year conservation project at the Nayuma Museum!

The Nayuma Museum conservation project has clearly demonstrated that cooperation among institutions, combined with teamwork among professionals, is a vital tool. Such cooperation also proved very successful in securing additional funding. The project that was initiated specifically for a single institution, the Nayuma Museum, has now given "birth" to another larger survey project including all the National Museums of Zambia. A survey of the subjects of research and collecting, collections documentation, conservation, and exhibition and education will be conducted with experts from Norway and Zambia, with specialists in the different core areas of museum work. Again NORAD has offered funding for such a survey in order to establish a five year museum development program. NORAD should be recognized for its willingness to support the important task of saving the cultural heritage of Zambia.

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PREMA IN SOUTH AFRICA

In response to the last Newsletter, No. 16, Oct. 1997, I was delighted to read your article outlining the PREMO and PIMA programmes. As the first South African to have benefited from the 1995 PREMA (PREvention In Museums In Africa) International University Course designed for the specific needs of Sub-Saharan African Museums, I would like to take this opportunity to comment on this invaluable PREMA project and to briefly describe some comparable programmes taking place in Africa.

As a participant from the newly created democratic South Africa, the timing of this training was very good. South Africa is developing a new vision for a national museums structure by inviting all museum personnel who work in national institutions to draw up a proposal for restructuring. It is the wish of many South African museum staff that the PREMA project be an active partner in this process of restructuring. Why? Simply because the vision and excellence of the training body is flexible and sensitive to the specific nature of the challenges that face the museum professional in this region. Without a profound understanding of the context, as well as the nature and environment of our collections, no project will be sustainable and effective in the long term.

Sub-Saharan Africa shares many of the same challenges faced by Pacific Island Museums. Many African Museums are located in tropical climates where the expense and need for an uninterrupted electricity supply rules out the option of climate control as a standard solution to many conservation issues. We fortunately do not need to survive a cyclone every ten years but most of us have survived civil wars in our lifetime and "chaotic economic and cultural change". The telephone and fax services can be unreliable and postal communication is often slow, so communication can be difficult and expensive if one is reliant on courier services for matters of urgency. Similarly, we have a shortage of skilled staff, and conservators in particular. These frustrations along with low wages and poor funding can contribute to lack of motivation. However, I am in the privileged position to report that my exposure to fellow African colleagues, after the years of political isolation of South Africa, has revealed that despite this adversity, a seasoned and authoritative network of skilled African professionals exist who have a shared vision and the "know-how" to upgrade our museums and create showcases of our national heritage. This is largely a result of the PREMA programme that has focused much of this commitment.

Most African museums and collections were created in celebration of hard earned independence from a colonial past, but many heroic beginnings have gradually faded away as showcases of national pride and have become neglected monuments of low state

priority. Essentially it is up to current staff to challenge this situation and change the perception of the museum. Many of us have found that even with the benefit of further training and the advantage of having PREMA National Training Courses hosted in our museums, we are also required to"wear many hats" to be truly effective. The PREMA 1990-2000 Programme is in the process of handing over the responsibility of continuing the legacy of its vision for training, co-operation and pragmatism to the new generation of professionals by the year 2000. The latest PREMA projects have included a Project Development Workshop and a future workshop on Fund Raising, since these issues have emerged as priorities. For a more detailed report on the project, I refer you to the paper presented at the ICOM-CC 11th Triennial Meeting in 1996, "PREMA: A Training Strategy for a Change or Let's Stop Building Castles in the Sand", and the PREMA Newsletter available at the following address:

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Please note that the PREMA courses are presented in French and English.

As further training opportunities go, this year the Robben Island Training Programme is launching a Post-Graduate Diploma Course in Museum and Heritage Studies in partnership with the University of Cape Town and the University of the Western Cape. This is an important step in developing training opportunities for museum professionals in this region. It is hoped that in time this course will help catalyse opportunities for further exchange as the course attracts other Africans, both as students and as lecturers. Certainly course work will include training in collection management and preventive conservation.

Finally, as a beneficiary of the support and seasoned expertise offered by PREMA and the African professionals associated with the project, I wish to add my gratitude to the international support from funders and professionals that have sustained the PREMA project. It is my added wish that our state departments and our museum directors continue to support this quiet transformation and that more of my fellow South Africans will benefit from this network of expertise and experience. We have the potential for a myriad of exchanges of knowledge as South Africa and her neighbouring states share similar histories and therefore complementary collections.

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LABELING ETHNOGRAPHIC OBJECTS

The diversity of materials that comprise ethnographic objects can make labeling them with catalog and/or accession numbers highly problematic. Consider the following issues before selecting an approach to labeling:

- Must the number be "permanent" with the proviso, of course, that it can be removed easily if necessary?
- Do staff members remove tags before placing items on exhibit?
- Do exhibit designers object to visible numbers?
- Are your collections stored under water pipes, in a basement, or any other area where they might be damaged by water?
- Are some of your collections perma- nently stored in liquid?
- Are insects a problem in your museum?
- Do you need a simple inventory control tool?
- Are you using a computer database? Or hand-written accession logs? Or both?
- Do you agree that any form of damage to an object is unacceptable? (Some museums accept a certain level of damage in the name of inventory control.)
- Who is applying the numbers? Are they skilled craftspeople or occasional volunteers?

Rather than one solution for labeling all ethnographic materials (or any museum materials), proper labeling requires a palette of options for a skilled practitioner. You must choose between writing on the surface of an object or attaching something, such as a tag, to an object. For example, the least damaging, and best able to survive a water-related disaster, is a tag. However, there are choices about the type of tag to use, too. And what do you do if your object has no holes, knobs or handles on which to attach a tag? Also, a tightly attached tag may cause distortion, breaks or surface wear.

Tags

Some museums successfully track their collections using only acid-free tags. This approach works when the museum registrar can control the activities of art handlers, exhibit designers and others who may handle objects. Tags may work, too, if there are clear institutional rules that everyone abides by because the museum director believes in them and actively enforces them. However, the less control you have, the less likely that tags will survive for long. Don't waste your money on tags if the entire museum staff does not respect their purpose.

There are several tag types. The most common is the white, acid-free paper tag with white cotton string. This tag comes in a variety of sizes and shapes and has a number of advantages and disadvantages. Among the advantages are the soft string, the ease of applying numbers in ink, and the pH neutral nature of the acid-free paper stock that is used. Always test each new shipment with a pH pen or pH strips before using. Among the disadvantages are the white fibers that cotton string can leave on artifacts and the

propensity for oil to wick from objects through the cotton string to the paper, causing ink to run. In addition, these tags are noticeable (which some museum professionals consider unacceptable), they provide a food source for insects, and they do not withstand prolonged immersion in water. Some suppliers use synthetic strings, though this is not noted in their catalogs. Always test tag strings before using. A cotton string produces ash when burned, but a synthetic string melts. Avoid nylon string; it deteriorates and damages artifacts.

Tag and Tie Options

Be creative and do not accept white cotton string as your only tie option. If this string is objectionable, consider the alternative of cotton embroidery floss in colors that match your objects. Remember to test for color fastness. Dip the embroidery thread in water and press it against blotter paper, white paper, or cotton toweling using weights. Let it dry, then check for any color that transferred. If you think that other liquids or oils might come in contact with the thread when it is attached to an object, test the thread in each of these, too, for color fastness.

For outdoor objects or oily objects (such as birds, grease dishes and seal skin), choose a tie that will not wick or deteriorate. The same approach is needed for museums with chronic pest problems or that store objects in less than ideal locations. One option is Teflon monofilament, which is available as *Glide* unwaxed dental floss in the United States. Do not substitute other dental flosses. They are multi-filament nylon and will deteriorate. A museum in Canada orders skived (a method of cutting Teflon into thin sheets) Teflon - an inert fluorine compound - from the manufacturer precut into set widths. The museum feeds the Teflon through a *Dymo* labeler and easily prepares tags for outdoor use and for wet archaeological pieces. Narrow strips of Teflon also work well for ties.

A less expensive tag material for outdoor or wet use is Tyvek, a polyolefin. Although longevity may be a problem due to the inclusion of possible additives such as anti-static coatings, small museums on limited budgets recycle white fibrous Tyvek mail envelopes or Tyvek House Wrap from construction sites to make tags. If budgets permit, buy Tyvek from a reputable supplier, without any additives. It can be purchased as a soft fabric or a stiff "paper." The soft version makes an excellent tie, the stiffer version is easier to write on. Tyvek materials tend to carry a slight static charge, which could be problematic and should be tested if you are considering using the material on an object with flaking pigments or fragile paint. Also, some inks may float off the Tyvek surface when wetted; test before use.

Metal tags, such as aluminum plant tags, work well in a dry climate or insect-infested area. They do not require a writing ink; accession information is pressed into the surface with a pencil or *Dymo*labeler. However, they must be considered carefully as they may scratch object surfaces and promote corrosion (metal to metal degradation).

Metal wire and nylon ties -- such as fishing line, some plastic lock straps, many strings and most dental floss -- must be isolated from objects with polyethylene plastic tubing. Otherwise they will cut into surfaces and when they deteriorate, will cause damage to that area of the object. Tubing alone can also be used as a tie. However, do not use poly (vinylchloride) (PVC) tubing (*Tygon* is one brand name) for anything under any

circumstances whatsoever. PVC tubing is tempting because it is soft and flexible, however it deteriorates forming chloride byproducts such as hydrochloric acid.

Some of the plastic ties that come with garbage bags may be inert plastics. Check with a local supplier, or do a burn test comparing them with a known, acceptable plastic. Zap straps, zippies or interlocking straps sold in computer stores and in automotive and electrical stores may be another option. Most of these are nylon, meaning you cannot use them directly on objects. Some are polyethylene or polypropylene and can be used; read the package labeling carefully.

Consider coated wires. Some telephone wire is coated with polyethylene, an inert plastic. As with all plastics, test or read the package before using. If the plastic wire is hideously bright, it can be toned down with acrylic paints. Seal the ends with wax or by melting the plastic closed, so that the metal does not scratch or corrode and stain the object.

Do not use a rigid, strong tie or tag in contact with an object that has a soft, fragile surface. Try to make sure that the tie or tag is as soft or softer than the object so that if the two were rubbed together the tie or tag would be abraded, not the object.

Surface Applications

If you decide to apply catalog numbers directly to objects, rather than using tags, there are three methods to consider: (1) applying a label to the surface; (2) writing directly on the surface; and (3) applying a barrier coat, then the number.

There are some basic rules for applying labels and numbers onto object surfaces:

(1) For objects made of more than one material, choose the least porous surface. (Metal, shell, glass or ceramic are better than wood or leather.)
(2) Avoid numbering over paint or pigments.
(3) When in doubt, use a tag.
(4) Do not apply a stiff material to a flexible surface.
(5) Disasters happen. Remember, barrier coats and labels will float off objects immersed in water. Use tags as a backup system.

Applying a Label to Surface

Labels with pressure sensitive adhesives are generally discouraged. Commercial labels, no matter what the supplier promises, will deteriorate with time. Many have a rubber-based adhesive that will yellow. Some, especially those touted as "acid-free," have acrylic adhesives that will cold flow into your object and can be impossible to remove with time. Labels made by a conservator, using a known adhesive formulation, may work in the short term, but could cause trouble with time. Few polymer-based adhesives really stand the test of time. Only wheat or rice starch paste, following formulations used to repair paper for centuries, can be recommended. Be careful with this method; excessive water may stain organic materials. However, pH neutral rice paper labels applied with a starch paste prepared with minimal water, successfully adheres to most leather, Native tanned hides,

tapa and baskets. This works well unless the hide is extremely oily. The paper adheres best if it has been wet torn, not cut, making the edges fibrous.

Labels can also be sewn onto a woven textile in good condition. DO NOT SEW a label onto leather, hides, brittle textiles or baskets. Sewing into these artifacts creates irreparable holes and tears. Use a nonadhesive cotton tape or Tyvek and as few stitches as possible. Do not knot the sewing thread, attach it by looping through itself on the label, before sewing into the textile.

Writing Directly on the Surface

In rare instances, less damage is caused by writing a catalog number directly on the surface of an object than applying a number to a barrier coat. A soft pencil (#2 or HB) is recommended for marking the reverse of a paper object. Write in an unimportant area and do not press hard enough to create indentations. If the paper is soft, like crepe paper used for Buddhist funeral figures, use a softer pencil. Plastic objects should have nothing applied to them. However, if staff insist on applying numbers, write directly on plastic objects with a fine wax pencil, a water soluble *All-Stabilo*pencil, or acrylic paint applied with a fine brush. Do not apply the number near important manufacturer marks in case the number precipitates surface damage. The number may become irremovable with time.

Applying a Barrier Coat

The rationale for using barrier coats is that a clear lacquer layer will prevent inked numbers from bleeding into an object and allow for easy removal if necessary. However, this theory becomes invalid if the barrier material damages the object or the ink bleeds through the barrier. A wide variety of clear coating materials has been used over time. Here are a few commonly used barrier coats, with comments as to their properties:

(1) Clear nail polish has poor aging properties because its primary ingredient is cellulose nitrate. It stains and damages surfaces as it yellows and darkens. It eventually peels off. Despite these problems, nail polish continues to be used by many museums because it is easy to obtain and to apply. It is not recommended for use because it will damage your collection.

(2) Acryloid/Paraloid B-72 resin has the best aging properties of any barrier coat material. It is usually used as a 25 % solution (weight to volume) in acetone, toluene, a mix of acetone and toluene, or ethanol. The solvents will damage plastics and painted surfaces. This material will be absorbed into porous surfaces and will be difficult to remove completely. It has poor working properties: it becomes gummy and stringy requiring the addition of solvents. Many catalogers complain that it requires a long time to dry (toluene releases gradually from this resin). High relative humidity may affect its properties. Acetone solutions often bubble, making them impossible to write on. It forms a brittle barrier film. If used in unventilated areas, the solvent fumes, especially toluene, are a health risk to the cataloger. Because of all those factors, use Acryloid/Paraloid B-72 only on unpainted, non-porous surfaces in well-ventilated rooms. Place the solution in a brush top bottle, such as an empty, clean nail polish bottle, for easy application. If it bubbles, use a slower evaporating solvent in the solution, such as toluene.

(3) Acryloid/Paraloid B-67 resin will yellow slightly with time. The resin dissolves slowly in Naptha, mineral spirits, Stoddard solvent, petroleum benzine, or white spirits (all similar petroleum distillates). These solvents are less likely to solvate painted surfaces. They will dissolve oils and waxes. The resin has better working properties than the Acryloid B-72 resin, however there have been some complaints about slow drying. Typically, the barrier coat dries within minutes. The barrier coat will be difficult to remove - it does not rapidly dissolve in any solvent. But it will eventually dissolve in one of the solvents mentioned above. As with Acryloid/Paraloid B-72 resin, the barrier film is brittle. TEST first, before using Acryloid/Paraloid B-67 on painted or unpainted non-porous surfaces. Do not use on wax figures. Again, apply only in a well-ventilated room.

(4) Poly (vinylacetate) (PVA) Emulsions & Acrylic Dispersions will yellow with time. Some ten year old samples are quite yellow. Because they are water-based barrier coats, they are the safest to use. But water may damage or stain many organic materials, so use these materials judiciously. The PVA makes a flexible coating that works well on flexible objects. PVA's, however, have a low glass transition temperature and may cold flow or become tacky in warm climates. Therefore, these resins are not recommended for numbering objects in the tropics. Commercial PVA's have unknown additives, altering their aging properties. Acrylic dispersions and emulsions will yellow slightly. They make more brittle films than PVA's and have higher glass transition temperatures. They are more appropriate for use in the tropics. Many commercial acrylic emulsions, such as acrylic artist's medium, have ammonia additives that will damage metals. Acrylic gloss media have fewer additives and should yellow less than a matte media. One benefit of matte media is that it creates a slightly rough surface on which a pencil can be used to write the catalog number. When you have a choice, use an acrylic dispersion rather than a PVA and apply to non-porous, non-water sensitive materials. Remember, although these resins are applied in a water solution, they require solvents for their removal. Do not use them on surfaces that will be damaged by solvents.

(5) Aquazol (PEOX Dow Chemical 2-ethoxy-2-oxazoline) is a water-based removable barrier coat. It is soluble in water, methanol, ethanol, acetone, propylene glycol, methylene chloride, and MEK. Aquazol is not recommended if water damage is a threat to your object. It may work well as a top coat or in certain situations where solvents cannot be used. Recently introduced to conservators, investigations continue on this material.

Applying the Number

Catalog numbers can be applied to objects with a quill pen, a fine brush, or an empty felt tip marker (*TRIA* by Letraset). All three require practice and skill. The quill pen may scratch a surface because it has a metal nib. The brush is the most difficult to use, but the softest for artifact surfaces. The *TRIA* marker is an empty felt tip pen with three different nibs designed for use with dye-based inks. Unfortunately, pigment-based inks, which are more light stable, will clog the felt. When the *TRIA* marker works, it works well. Otherwise, it is frustrating to use. The fine quill pen works best if the cataloger is experienced in its use. I do not recommend drafting pens; a common brand is *Rapidiograph*. These metal pens scratch surfaces, clog often and their ink formulations vary.

After the pencil, the second best writing material is carbon black acrylic paint or ink with tested aging properties. For a white ink, use rutile titanium dioxide pigmented white acrylic paint. Do not use an ink unless you know it is acrylic and pigment based. "India Ink" formulations vary from manufacturer to manufacturer and often contain dyes. For tags, use dark pencil or a light-fast felt tip pen, as noted below. If the collection is wet, tags numbered in pencil last longest.

Commercial felt-tip pens are occasionally used to number objects but they are not recommended. When you use them, you have no control or knowledge of what you are applying to an object. Ink formulations change without notice, and each ink contains a soup of chemicals: solvents, binders, dyes and pigments. Solvents may migrate through a barrier coat, many dyes will not survive light exposure, and binders may form acidic byproducts as they age. Only the pigments, if they are present (few felt tip pens use pigments because they clog the felt applicator), will survive. That said, the two most commonly used commercial pens are *Sharpie* and *Pigma* pens. Never use these pens to write on barrier coats or directly on object surfaces. *Pigma* pens will not write well on plastic substrates, including the barrier coat resin. Both work well on tags. Test their light fastness by writing on a piece of Tyvek and clipping it to a clothes line for three months in the summer. If the writing survives, it should stand the test of time

If you choose to use a white patch with black numbering ink instead of white lettering on a dark object, use the same white acrylic paint mentioned above and apply it on top of the base coat. Never apply white acrylic paint as a base coat. Do not use commercial products, such as *White-Out*, for a white patch. Many of these products age poorly and formulations change without notice. Alternatively you can prepare your own white patch material using rutile titanium dioxide pigment, toluene, and 25% Acryloid/Paraloid B-72. Again, always apply the white patch on top of a clear base coat.

Finally, choose someone with good, clear handwriting to write your catalog numbers. This may not be your registrar. Be honest, it is important that these numbers be clear to future staff, too.

Top Coat

Some museums protect the applied catalog number with a second barrier coat. The theory is that this will prevent the number from abrasion and loss during normal wear and tear of object handling. Top coats and base coats may be different. In fact, I suggest that the materials used to apply the catalog number and the top coat dissolve in the same solvent while the base coat is unharmed because it dissolves in a different solvent. This allows a catalog number to be reapplied without stress to the object.

A SELECTION OF OBJECTS AND HOW TO NUMBER THEM

Baskets**:** (1) wheat starch paste, pH-neutral fibrous paper labels, pencilled number or (2) an acid-free tag placed inside the basket

Tapa**:** (1) wheat starch paste, pH-neutral fibrous paper labels, pencilled number or (2) pencil written directly on the surface ***Feathers*****:** test dye stability, then Acryloid/Paraloid B-

72 base coat on quill with black or white acrylic paint
Hides**:** (1) tag preferred, otherwise (2) wheat starch paste, pH-neutral fibrous paper label, pencilled number
Buckskin**:** (1) tag preferred, otherwise (2) wheat starch paste, pH-neutral fibrous paper label, pencilled number
Gut**:** (1) tag preferred, otherwise (2) Rhoplex N-580 acrylic dispersion, pH neutral fibrous paper labels , pencilled number
High-fired Pottery**:** Acryloid/Paraloid B-72 base coat with black or white acrylic paint
Shells**:** Acryloid/Paraloid B-72 base coat with black acrylic paint
Wood**:** Acryloid/Paraloid B-72 base coat in an inconspicuous place (will stain the wood) with black or white acrylic paint
Oily wood**:** Tyvek tag with Teflon tie preferred. If writing on surface, clean label area with a petroleum distillate, then use Acryloid/Paraloid B-67 base coat with black or white acrylic paint
Glass**:** Acryloid/Paraloid B-72 base coat with black or white acrylic paint
Painted wood or metal**:** Acryloid/Paraloid B-67 base coat with black or white acrylic paint
Metal**:** Acryloid/Paraloid B-72 base coat with black or white acrylic paint
Plastic**:** (1) tag preferred, otherwise (2) write directly on the surface, using *All-Stabilo* water soluble pencils, no barrier coat

Conclusion
Whatever techniques you use, consider it to be a micro-conservation treatment. Record on your accession cards exactly what materials you used and where you used them when labeling the item. And, if you know, record how it can be removed. Your successor will thank you years hence.

Special thanks to Ruth Norton, Lori van Handel, Gayle Clements, Marianna Munyer, Terri Siegel, Terri Schindel, Julia Fenn, the Canadian Conservation Institute and UK's MDO. The information in this article is the result of work by many individuals and organizations over the past ten years.

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The Ethnographic Conservation Newsletter of the Working Group on Ethnographic Materials of the ICOM Committee for Conservation is available free of charge to those with a professional interest in the care and research of ethnological collections. It is published twice a year with a mailing in October and April.

Authors are asked to submit articles in English only. A Guidelines for Authors is available from the address below or from your regional coordinator. We request that contributions be provided in a typed format - typed in standard typeface, on 8 1/2 by 11 white paper, one side only, and double-spaced. Electronic contributions via Internet will also be accepted. Submissions can be sent in an e-mail message or as an attachment in ASCII text format ONLY and not more than 80 characters wide.

PLEASE PROVIDE CHEMICAL COMPOSITION IN ADDITION TO THE BRAND NAMES OF COMMERCIAL PRODUCTS AND CON-SERVATION MATERIALS, SINCE COMMON NAMES AND TRADEMARKS VARY INTERNATIONALLY.

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Please forward inquiries regarding the newsletter to:

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