

This following is a case study of the disaster and recovery of The Lundy Collection of taxidermy animal trophies.

History of the collection and fire

The Lundy Wild Animal Trophy Collection. The term trophy collection is apt because it includes taxidermy life, shoulder, and head mounts, tusks, horns and antlers, hooves, rugs, fish, shells, and novelties. The collection was assembled by safaris in the 1960s and 1970s by Mr. Burrows T. and Mrs. Mabel L. Lundy, prominent North Carolina pork packers. These animal trophies were involved in a bacon fat fryer grease fire.

Burrows T., Mabel and their company, the Lundy Packing Company, raised and slaughtered pigs on a regular basis and were also very active in amassing their unique collection of Wild Animal Trophies. The collecting of the trophies took place primarily in Africa and in the Arctic with safari expeditions in the late 1960s and early 1970s. The collection is fairly diverse with Brown Bears, rhino, diker, and mountain goat, not to mention a few other oddities like a cape buffalo scrotum pouch and a pair of greater kudu bookends.

The Trophy Room mission statement, as outlined in the Lundy guide brochure to the Wild Animal and Marine Life Trophy Collection is as follows. This quote was written by Burrows T. and his wife, the hunters:

"...The true trophy hunter is a self-disciplined perfectionist, seeking a single trophy, a single animal, the ancient patriarch well past his prime, often an outcast from the herd, his productive years finished. This hunter is a mixture of Sportsman and Conservationist testing his skill and resources against the crafty instincts of the wise old ram, hunting with the intent to kill the very animal he admires and respects. If he is successful, he will enshrine the trophy in a place of honor, certainly a more noble and fitting end than dying on some lost and lonely ledge where the scavengers will pick his bones and his magnificent horns will weather away, and be lost forever."

The Lundy collection, a total of 192 pieces, was housed in a place of honor and viewed for many years within the Lundy Pork Packing Factory in an upstairs annex located above the bacon fryers and microwaves on the factory floor. The viewing room was also used as the auditorium for the pork packing plant.

In the late 1980s, after the passing of Mr. and Mrs. Burrows T. Lundy, the collection was donated to a small, private school, Campbell University, located in Buies Creek, North Carolina. The Lundy Family also donated a considerable sum of money to create a "museum" for the collection. The museum,

however, was still on paper and the collection was still at the plant when on the 13th of November 1995, the assemblage of taxidermy was involved in a grease fire.

The grease fire is said to have started in the bacon area of the plant which was located underneath the auditorium/trophy room--perhaps an inherently bad area for placement and proximity not to mention a fire hazard. The local newspaper, The Sampson Independent, covered the fire and the story and stated:

"it appeared as though someone threw water on the fire and it sloshed (ab)out. The fire got into the air handling system, which carried the fire throughout the building. The microwave and bacon rooms were destroyed by the fire as was the floor where Burrows T. Lundy's safari trophies were displayed."

Recovery details

After the fire had been extinguished, the collection was moved three blocks from the packing plant to a warehouse. These slides show some views of the warehouse contents. I was called just prior to the move to outline proper handling procedure and protocol. Because the floor of the viewing room had been burnt through, as had most of the roofing material, it was necessary to lift the artifacts from the walls, through the roof, by means of a crane. A strong individual was strapped and lifted. He was able to lift pieces out one at a time in his arms and/or in boxes. Instructions were given to wear protective gear including gloves and HEPA (high efficiency particulate air) filter masks (much taxidermy is treated with pesticides) and to hold the trophies by the neck or base and not by the horns--the horns are not always firmly attached. The trophies were transported by truck to a warehouse and placed on polyethylene sheeting. Some wet mounts had tissue or paper towel rolls or pallets placed under them as spacers to encourage airflow. Fans were turned on to assist in air circulation and fluorescent overhead lights left on to reduce chances of mold growth. The heat was turned off in the warehouse to reduce the chance of fast and drastic drying and embrittlement. The idea was to have a relatively slow drying to avoid shrinkage and rippling of the skin but not so slow that mold growth could occur.

Assessment and testing

My first visit and initial assessment took place two weeks after the fire. The consequences of the fire were burnt mounts and rugs, charred proteinaceous materials, gelatinization, desiccation and shrinkage of the skin from the heat and moisture, singeing of hair/fur, tears and losses in the skin and the darkening of the paint on several mounts. There were also extensive construction material deposits, and a great deal of soot and grease on the mounts. Testing was carried out at this time to produce protocol for cleaning and give time and cost estimates for each piece.

After testing, it appeared as though only 7% of the collection was in severely bad condition and would most likely never be viewed again. The remainder could be treatable and still viewed, conservation costs and insurance reimbursements notwithstanding, and if no political agenda was made to dissuade their presentation.

After evaluation was made comparing insurance value and conservation cost, factoring in the Lundy family's future giving potential, the animals were packed up and brought to my studio in Long Island City, New York. The pieces were kept shrouded in polyethylene sheet to avoid other contamination when cleaning and the transference of soot. The pieces in the collection were examined for their history, taxidermist labels, tested for pesticides, soot make-up and cleaning.

Because of the relatively young age of the collection, the history was easy to obtain. The taxidermists or taxidermy studios had all been recorded, as had general upkeep of collection--a bi-annual treatment with Pledge or Endust and an occasional cleaning with a commercial carpet or rug cleaner as well as a seasonal application of mothballs for insect infestation. The taxidermists were called to obtain information regarding procedures, mounting techniques, supports and treatments against infestation.

The animals were generally commercially tanned using an alum tannage and then oiled to make them supple before placing them on their pre-fabricated polyurethane forms. The skins were pinned, the hair coifed, and in some cases color enhanced with paints and/or tinted waxes.

As for details regarding insecticide or pesticide use, I had difficulty gaining any information when I talked with the taxidermy studios and told them I was a conservator working on a collection which had been in a fire. Thusly, samples of possible pesticides were taken and tested. Three separate types of testing were carried out: testing of specific areas on the mounts which appeared to have a crystalline deposit; wipe sampling off the surface of the mounts; and ambient air sampling. These tests were carried out by Public Service Testing Laboratories, Inc in New York. Visible crystalline deposits on the mounts were sampled and analyzed with EDS revealing arsenic. As per the NIOSH method 7900, wipe sampling recorded a level of 0.19 micrograms per square foot which was lower than the analytical method detection limit. And the air sampling testing revealed levels of arsenic which were less than 0.12 micrograms per cubic meter as compared to the OSHA limit of 10 micrograms per cubic meter--well below the acceptable limit. Regardless of the amounts or types of pesticide present, precautions were taken in handling and working with the mounts. Masks and gloves were worn as were protective jackets.

The soot was analyzed by Alex Shedrinsky of New York University. The composition represented pyrolysed products of polyurethane and polystyrene as well as polyester which had burned and mixed with carbon. This soot, however, also had specific remains from the fact that there was a pork grease fire and there was underlying grease which had accumulated over the years in the pork packing plant.

Cleaning protocol

Testing was carried out to determine the best methods of cleaning and the following chart was devised. All materials shown on the chart are generally used in conservation, however, sometimes their use was altered to achieve a desired end.

Dry

Vacuum and brush
Open cell polyurethane foam
Soot-removal aka chemical sponge
Art Gum eraser
Staedtler eraser
Groom/Stick
Webril Wipes
Cotton swabs

Wet

deionized water
isopropanol:water 70:30
water and Triton XL-80N (with rinse)
Stoddards solvent
ammonium citrate (with rinse)

(information on materials is listed at the end of the text)

The conservation tack tended to be slightly different depending on the type of material as well as the possibility for future exhibit. All the mounts were soot covered and greasy as a result of their housing environment and all the mounts were very sensitive to aqueous materials. All the animals had been commercially tanned and oiled somewhat altering the natural ratios of oil, fats and proteinaceous components. These limitations had to be incorporated into the cleaning protocols. Wanting to avoid swelling by hydration and esterification of the protein as well as a loss of lipids in the epicuticle, dry cleaning was always the first step.

The conservation commenced with the smallest and most straight forward treatment of the ashtrays and minimally soot covered pieces, in order to assess the soot and the tenacity. Vacuum and brushing proved impossible--most soot deposits were very greasy and would simply smear and not be lifted if vacuumed. And it was necessary to remove as much grease and soot as possible without grinding into the skin. The dry cleaning was most effective in this manner. Picreator Groom/stick (cis-isoprene rubber molecular trap) and Webril wipes (flannelized cotton) were generally the best materials for cleaning surfaces and were efficient in the preliminary stages of picking up the soot and superficial grease. Once an initial cleaning with dry materials was completed then wet processes could be carried out if possible

and necessitated. As cleaning progressed, various SEM photomicrographs were taken to gauge the level of clean.

Dry cleanings rarely completely cleaned the artifacts. Long chain aliphatic hydrocarbons like petroleum benzine, Stoddard solvent, and white gas that were considered because of their traditional use as cleaning materials. They were avoided, however, because of the ability to react with oils in the hair and proteinaceous materials as well as undermine the greasy layer and move it all around but not adequately lift the soot. This opinion was to change as the project proceeded and the more grease-drenched mounts were addressed. Water and water containing solvents also provided a possible solution to the soot problem. Great care had to be taken here because although the hair would become cleaner, aqueous solvents would cause the breakdown of the skin and large clumps of hair and skin could be lost. After all the testing, it was found that a cleaning with isopropanol:water 70:30 applied with cotton swabs was effective for cleaning mounts with little to medium deposits of soot and grease.

Restoration

After the cleaning, restorations were considered. The ashtrays and various footstools and teeth would be excluded from exhibit because the pieces touched upon a political incorrectness. The rugs were also primarily viewed in this manner. The head and shoulder mounts, however, were to be viewed perhaps in a diorama peaking out from behind branches, out of a pool of water, and or with the full sized mounts that could be living together in similar environs. With this in mind, therefore, the head and shoulder mounts received full restorations while the rugs did not.

Details of individual conservation treatments and findings

A polar bear mount had been caught in the grease fire and was soot covered as a result. It was decided to clean half of the bear at a time in order to assess the cleaning treatment. The soot was first cleaned with Webril Wipes and chemical sponges. The hair was lifted in sections of approximate 2 x 2 inch squares and all sides of the hair cleaned by mechanically lifting and swiping. This however, proved itself a bit more work because as the surface soot was being removed from the ends of the hair, the lower layers of hair became slightly greyed with soot, requiring more cleaning. After 1/2 of the bear was cleaned, wet cleaning testing was again carried out, it was decided that the fur could be more efficiently cleaned with isopropanol:water 70:30 with Triton XL-80N carried and removed from the surface with Webril Wipes. The cleaning, however, had to be in a highly controlled manner in order to keep moisture from wicking down the hair and effecting the skin and/or taking the soot down the shaft with the solvent. The cleaning agent was applied in a light circular motion to build-up foam and then the hair was immediately dried using the Webril Wipes in a pulling motion from the roots out to the tips. After the

hair was completely dry, it was wet up again this time using isopropanol:water 70:30 on Webril Wipes to remove residual detergent.

Other mounts were cleaned using slightly different materials following the initial dry cleaning. A hartebeest that had very short hair required a cleaning with Groom/stick and Webril Wipes, followed by erasing with Art Gum eraser. The eraser was applied in the hair direction and also at a slight diagonal to clean the sides of the hair shaft. The use of the erasers could only be carried out on mounts in good condition and with relatively short hair or no hair. The fur or skin was vacuumed after eraser use and a wet cleaning with isopropanol:water 70:30 followed to reduce residuals and further clean.

Approximately 9 months into the project, the testing of the mounts which was done routinely before treatment revealed that the use of the long chain aliphatic hydrocarbon was now more successful at cleaning. The mounts which were initially treated were far less soot and grease covered and now the more difficult pieces were being worked on. In addition, the grease had become so tenacious that only the reduction/removal of the grease would enable removal of the soot. An adjustment had to be made in the treatment plan to incorporate the long chain aliphatic hydrocarbon. Because the skins had been previously tanned, and new oils applied in the mounting process, the organic make-up had already been drastically altered. Undermining some amount of the oils was justified as being acceptable in order to clean the sooty deposits.

A Defassa waterbuck was cleaned using Stoddard solvent which was applied to Suction Block polyvinyl alcohol sponges and swiped across the surface of mounts picking up the greasy soot. Subsequent swipes were made each time picking up less and less blackened soot. Dry Webril Wipes then followed. A final isopropanol:water 70:30 cleaning after evaporation of the stoddards or petroleum benzine was then applied to further clean the hair.

The following example is of a restoration of the fur after cleaning. An alum tanned and mounted Western Kob (*Kobus Kob*) from Central Africa was caught in the fire and subsequent water damage resulted in gelatinization and shrinkage of the skin creating a loss on the proper right shoulder. After a cleaning with Groom/Stick, followed by dry Webrils Wipes, and an isopropanol:water swab treatment, a fill was made to the area of loss. A National Fiber Technologies, Ltd. synthetic fur was utilized to integrate the loss. Their most versatile synthetic fur sold is an in-stock white fur made from 18 denier nylon with a 4-way spandex stretch backing. It comes in three standard fur lengths. The short 2.5-5.0 cm length was used for the following restoration.

In order to utilize the fur fill material, a template was first made of the area of loss. This template was transferred to the synthetic fur and a fill section cut. The synthetic fur fill was trimmed and layered to match the hairs of the original fur. It was inserted into place using Rohm & Haas Acryloid F-10 in

acetone: the adhesive was applied directly to the substrate (a pre-fabricated polyurethane Western Kob mount). The synthetic fur was toned and colored with Magna colors by brush application.

Another fill material was used on a shoulder mount of an oribi. The oribi had been mounted on a polyform and the ears were fashioned from what appeared to be chicken wire and aluminum foil. The ear skin had shrunk and some mechanical damage probably the result of some percussive movement; it had tears and cracks in the skin as well as deformation of the ear form. The fur was cleaned as outlined before and then the restoration was undertaken. A backing of spun bound polyester was adhered to the underside of the tears with BEVA™ 371 film and the aid of a tacking iron. The fill material was then applied on top of the spun bound polyester platform. The fill material a mix of BEVA™ 371 film, 3M glass microspheres, and dry pigments was melted together with a hot spatula and applied to the area of loss. Texturing was carried out by imprinting with the hot spatula. The fill was painted with Winsor and Newton gouache colors to mimic the hair and glazed with Rohm & Haas Acryloid B-72 and dry pigments. Other fill treatments were carried out with Rohm & Haas Acryloid F-10, 3M glass microspheres, and dry pigments used in a similar fashion.

And so it went for 192 pieces taking over 20 months to conserve with four full-time conservators.

The conservation part of the project drew to a close in December of 1997. The artifacts had been cleaned and stabilized, some had been restored and all were ready for transport. The artifacts were packed by Fortress/FAE Worldwide and were placed in storage in New York in preparation for the trip to North Carolina at the museum's opening.

The new museum was tentatively scheduled to open in October 1999. The opening date was extended to September 2001. A new facility was built for the museum. Within it, the trophies are housed. The museum has a climate controlled environment, uv filtered lighting, and a HEPA filtered air handling system. New appraisals were made, insurance updated, and disaster mitigation plan put in place. The collection now has its own dedicated space in the Lundy-Fetterman School of Business on the Campbell University campus in Buies Creek, North Carolina.

Webril Wipes. Flannelized cotton. Manufactured by Veratec, Inc.

Soot-removal aka Chemical sponges. Vulcanized cis-1,4 polyisoprene sponges distributed by Steam-Ex of Long Island, NY.

Triton XL-80N. Non-ionic detergent. Manufactured by Rohm and Haas.

Groom/Stick. Cis-isoprene rubber molecular trap from Picreator Enterprises Ltd. 44 Park View Gdns, Hendon, London NW4 2PN, England.

Staedtler Mars eraser. Vinyl eraser.

Art Gum eraser. Sulfonated vegetable oil factice eraser.

Suction Block sponges. Polyvinyl alcohol sponges available from Peregrine Brushes & Tools, Wellsville, UT.

BEVA 371 film. A mixture of Elvax 150, AC 400, Laropol K80, Cellolyn 21, and paraffin manufactured by Conservator's Products.

Reemay. Spun bonded polyester fabric made by DuPont.

Hollytex #3529. Non-woven polyester fabric manufactured by Ahlstrom Filtration Inc., Mount Holly Springs, PA.

3M glass microspheres C15-250. Unicellular soda lime borosilicate glass microspheres manufactured by 3M St. Paul, Minnesota.

Heat spatula. For the greatest degree of success, an ERSA heated spatula with a small infilling spatula is suggested.

Manufactured by G. Engelbrecht Messgerate u. Apparaturbau 8195 Thanning Germany. U.S. availability through Olaf Unsoeld, Kolner L.L.C. 23 Grant Avenue, New Providence, NJ 07974.

Winsor & Newton gouache. Acrylic paints manufactured by Winsor & Newton, London, England.

Acryloid F-10, butyl methacrylate homopolymer supplied in 40% solids in mineral thinner: Amsco F at 9:1
manufactured by Rohm and Haas. Glass transition temperature 20 degrees C.

National Fiber Technologies, Ltd. Lawrence, MA 01840. 1-508-686-1497.

Bocour Magna Colors. Pigments in Acryloid F-10. Manufactured by Bocour Artist Colors, Inc. Garnerville, NY.