

Reanimating the Menagerie

Conservation of the North American Mammal Habitat Dioramas at the American Museum of Natural History

After 70 years on continuous display, the habitat dioramas in the Hall of North American Mammals at the American Museum of Natural History were showing their age. Under light levels much higher than those standard for art objects in most museum environments, many of the taxidermy specimens had faded to the point of scientific inaccuracy. Thermal damage and environmental fluctuations too had contributed to discoloration and embrittlement of the organic materials from which the dioramas were constructed. Though they were opened periodically over the years for minor touch-ups and cleaning, dust had accumulated on the surface of plants and animals. Cleaning solutions used on the light boxes above had leaked onto some of the background paintings, and in three dioramas the canvas was delaminating from its substrate.

The American Museum of Natural History's iconic dioramas have been described as "windows on nature"—portals transporting museum visitors from the concrete and glass of Manhattan to a snowy pine grove in Kaibob National Forest in Arizona or the bottom of a canyon in Yosemite.¹ But in the 1940s and 1950s when the dioramas were created, the areas depicted did not have the environmental protection that many do today. At that time, belief in the intrinsic value of the diversity of North American species and habitats was developing in response to growth in human settlement and un-

regulated hunting. In light of this concern, the dioramas were designed to educate and foster appreciation among New Yorkers, encouraging them to become stakeholders in this preservation effort.

The fulfillment of that aim was intimately tied to the dioramas' being rendered with a realism that transcends the materials of their construction to inspire wonder. Every detail of the scene, from the narrative moment implied in the postures of the taxidermy, to the environment in which the theater unfolds, to the temporal and geographic specificity of the background painting, was taken into account. The team who created them included skilled artists and craftsmen such as landscape painter James Perry Wilson, taxidermist Robert Rockwell, and foreground artist Raymond De Lucia. Alongside the Museum's curators, they conducted extensive research, visiting each site to assemble reference sketches, photographs, and specimens for exhibition.

By 2010, the deteriorated state of the North American Mammal dioramas had begun to undermine the impression of a direct and immediate encounter with nature. With funding from PlaNYC, a city-wide energy efficiency initiative, and an anonymous donor, the Museum undertook a 14-month renovation of the hall and its dioramas under senior project manager Stephen Quinn. Just as their original creation

was achieved through a broad-based collaboration, this project brought together the knowledge and talents of conservators, master taxidermists, artists



Julia Sybalsky examines a severely faded American bison, looking for cracks or tears in the skin, areas of hair loss, evidence of insect infestation, and any other damages that may be concealed by the animal's thick fur

¹Quinn, S. C., & American Museum of Natural History (2006). *Windows on Nature: the Great Habitat Dioramas of the American Museum of Natural History*. Harry N. Abrams.

and fabricators, scientific curators, and a team of volunteers. Alongside Museum conservators Judith Levinson '84, Lisa Elkin, Elizabeth Nunan, and Bethany Palumbo, as well as paintings conservator Harriet Irgang '85 from [Rustin Levenson Art Conservation Associates](#), I was privileged to be a part of this project as graduate Intern during my fourth year of study at the Conservation Center at NYU.

With over 40 dioramas and approximately 100 specimens to examine and treat, the management of conservation-related documentation presented obvious challenges in this project. Each mount, foreground element, and background painting was numbered, photographed, examined, sampled, and treated independently. A custom-built FileMaker Pro database was helpful in organizing and accessing technical data, condition assessments, treatment proposals and reports generated in the course of the renovation. Using an iPad with the FileMaker Go app, we were able to use the same database to complete this documentation *in situ* from inside the dioramas.

Issues of limited access presented further challenges to documentation and treatment. The diorama floors are built of plaster maché and wire mesh over a wooden substructure. Ground cover of grasses, plants, fallen leaves, mosses, loose soils, or

snow overlies the maché. In most cases that ground cover would be disrupted or crushed under a person's weight. Binoculars, laser pointers, zoom and macro camera lenses were all of use in examining components from a distance. In some cases a scissor lift could be extended a short distance across the diorama threshold above the ground cover. Whenever possible, we removed specimens for examination and treatment. However, ultimately it was necessary to provide a means for repeated entry and ongoing treatment *in situ*. To do so safely, wooden platforms were built with feet strategically placed to avoid fragile features (Figure 1). Sandbags distributed the weight of the structure and its occupants as they worked.

Central to the conservation effort was the development of safe techniques for cleaning and stabilizing the highly degraded organic materials inside the dioramas. Many of the foreground components are actual plants gathered in the field, then chemically treated and dried. Others were fabricated from materials like crepe paper, acetate sheet, wood and wax (Figure 2). Embrittlement was common among both types. Swabs, sponges and soft brushes could be used on robust examples, while compressed air and electrostatic dusters effectively displaced dust from paper leaves and plant specimens too fragile to touch (Figure 3). Particularly brittle



Figure 2 (Above). Detail of an azalea plant model in the coyote diorama with accumulated dust and grime
Trunk: collected in the field, painted
Petioles: Insulated wire
Flowers: The open blossoms are paper coated/impregnated with wax and painted, the closed blossoms are cast in solid wax and painted
Leaves: paper coated/impregnated with wax and painted



Figure 3 (Left). Conservation Fellow Bethany Palumbo cleans the azalea model in the coyote diorama

fur like that on the rump of the pronghorn antelope in the bison diorama was supported on blotter paper as isolated hairs were wiped clean. In another example, desiccated pine needles falling from a tree branch in the pine marten diorama were stabilized with a dilute adhesive, and those already detached were painstakingly re-adhered, one by one.

Throughout the course of the project, conservators enjoyed a rare opportunity for an exchange of knowledge with the project's master taxidermist, George Dante of [Wildlife Preservations, LLC](#). In addition to his background in this specialized art form, George brought a long history of experience restoring aged and damaged specimens. We each shared our toolkit of techniques and materials, adapting common conservation practices and traditional taxidermy methods to establish new treatment methodologies that



Figure 1. Platforms installed in the bison diorama provide access to taxidermy mounts while protecting fragile foreground elements on the floor of the diorama

Learn more about
the North American
Mammal Hall



Figure 4. Antelope jackrabbit BT; interior skin of ears was cut away during preparation, leaving an abrupt line along the cut edge and exposing the rough flesh-side of the back skin; prominent wrinkles on the ears catch the light and give the skin a dry, paper-like appearance, exacerbated by severe hair loss and yellowing of the skin



Figure 5. Julia uses a tape of cut ermine hairs sandwiched between spun-bond polyester textile to replace lost fringe on the edges of the jackrabbit's ears; this method is adapted from contemporary taxidermy restoration practices



Figure 6. The Antelope jackrabbit AT; George Dante inpainted the ears so that when placed under the diorama lighting, the exteriors appear furry and the interiors have the appearance of sunlight showing through translucent skin

are as stable and reversible as possible. In the case of the antelope jackrabbit, which displayed extensive wrinkling and fur loss on the ears, this meant using bulked Paraloid F-10 adhesive instead of epoxy putty to recreate a naturalistic, smooth surface. The fill material had the appropriate degree of slump and tack, did not require sanding, adhered well to the paper-thin, oily skin, and took paint very nicely (Figures 4 through 6).

Greatest among our challenges was finding a means to address the fading observed throughout the diorama taxidermy. While in many contexts re-coloring a discolored artifact could be considered an ethical breach upon its authenticity, returning these mounts to an accurate, lifelike appearance was critical to honoring the historical intent and aesthetic of the dioramas. Initial research uncovered little information about previous efforts to re-color faded mounts. Some institutions have used commercial hair dyes, while acrylic paints are commonly used among taxidermists. However, these methods were unsuitable for this project. We sought lightfast materials that could be applied *in*

situ, with no rinsing needed and minimal alteration to the texture of the fur, so that specimens can be cleaned, groomed, and possibly re-colored again in the future.

Based on microfadometry conducted by Paul Whitmore at Carnegie Mellon University and accelerated-aging tests carried out by Corina Rogge at Buffalo State University, we selected a group of solvent-soluble metal-complex dyes for use. For each mount, dye mixtures were developed to match the colors observed in study skins from the collection, reference photographs, and imagery in the background paintings. The dye was applied with an airbrush and could easily be wiped off with a cloth to achieve subtle blending effects or remove it completely. As George became more familiar with their application, he was able to convincingly achieve an impressive array of effects, from complex markings on the ring-tailed cat to highlighted tips in the fur of the Alaskan brown bear (Figure 7).

My experience as an intern working on the renovation project has provided an opportunity to take part in something very special: the renewal of a suite of

simulacra that have the power to invoke insight through the intimacy of an authentic encounter with nature. I am particularly proud to have made meaningful contributions to innovations that will inform the development of better methodologies for the care of taxidermy specimens and habitat dioramas. The success of this project depended on a generous exchange among the team members involved.

In coupling the skills of artists and master craftsmen with scientific research and the conservator's ethical framework, it was possible to restore the dioramas' vivid realism while prioritizing their longevity. May the dioramas in the Hall of North American Mammals continue to encourage stewardship among museum visitors for many years to come. •

—Julia Sybalsky

Julia is a fourth-year objects student



Figure 7. Master taxidermist George Dante recolors the Alaskan brown bear using Orasol dyes applied by airbrush

Learn more about
the North American
Mammal Hall
renovation project

Photo Credit: AMNH Natural Science Collections Conservation Department, NL Roberts