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BOOK REVIEW

Nature's Mirror: How Taxidermists Shaped America's Natural History Museums and Saved Endangered Species

Andrei, M. A. 2020. Nature's Mirror: How Taxidermists Shaped America's Natural History Museums and Saved Endangered Species. University of Chicago Press, Chicago, Illinois. ISBN-13: 9780226730318, price (cloth) $35.00; ISBN-13: 9780226730455; price (E-book) $10.00 to $35.00, 250 pp. + 60 halftones.

The science and art of taxidermy have a long, rich, and unappreciated history. Mary Anne Andrei's recent *Nature's Mirror* provides an extremely well-researched and written history of the field in North America, which developed primarily through Ward's Natural Science Establishment of Rochester, New York. Andrei very nicely makes the case that Ward's was the training grounds for generations of taxidermists, and several went on to become leaders in American institutions as well in the budding conservation movement. Andrei is a senior producer for Nebraska's PBS and NPR stations. Her research primarily focuses on environmental issues, and in-depth history documentaries. This is an excellent book and those interested in the science and art of taxidermy will enjoy reading it as much as I did.

Andrei traces the evolution of taxidermy in museums and the transition of several students of Henry August Ward into leaders in exhibit development in museums and zoos and the major conservation issues of the early 20th century. In this review, I tie together information from the book with some additional details that I hope will be of interest to the reader. In the 1860s, Henry Ward established at the University of Rochester what was among the largest museum collections in the United States. The story of Ward's is the history of museum and zoo exhibits, activism in conservation, and is still being told today. In this book, we learn how these young men went from naïve student naturalists to leaders in developing exhibits and driving forces in conserving wildlife, at times in competition with each other.

Modern museums have roots deep in the taxidermy tradition of the 17th to early 19th centuries, first in Europe and then in America. During this early period, animal specimens from exploratory expeditions were mounted in, more or less, natural poses by taxidermists who were employed to generate the public exhibits for museums and private collectors. Skins were often stuffed with rags, hay, or tow, they were greasy, had no insecticides applied, and consequently few still exist today. In many cases, the cranium and jaws were simply left in the skin to become part of the mount. Alternatively, and especially with larger species, the skull was removed, roughly cleaned, and replaced, and bone and muscle were built by excelsior and clay to give the desired lifelike head (Andrei 2020).

Between 1862 and 1906, Ward's Natural Science Establishment was the preeminent supplier of specimens to museums, colleges, and universities around the world. Andrei's review of the lives and assessment of accomplishments of these early taxidermists who were mammalogists turned conservation biologists, originally trained at Ward's in the late 1800s and early 1900s, is the story of museums, zoos, and conservation initiatives. Over their careers, they used their skills to develop amazing lifelike mounts, many still standing in major museums. They prepared a wealth of traditional scientific specimens that continue to contribute today to education, science, and conservation of the world's mammals.

Andrei develops *Nature's Mirror* through Ward's trainees who became among the most accomplished biologists of their day: Carl E. Akeley, William T. Hornaday, Frederic A. Lucas, Charles H. Townsend, and Frederic S. Webster. She summarizes some the accomplishments of these men as "chief taxidermists... at the Smithsonian Institution's U.S. National Museum [Hornaday, Lucas]... Milwaukee Public Museum [Akeley]... Field Museum in Chicago [Akeley]... Carnegie Museum in Pittsburgh [Remi and Joseph Santens, Webster]... At New York's American Museum, three different Ward's trainees ran the taxidermy department from 1900 to 1948, and another served as director [Lucas]... Several other Ward's taxidermists went on to directorships at the Milwaukee Public Museum [Ward's son, Henry L. Ward], the Bronx Zoo [Hornaday], the New York Aquarium [Townsend], the Brooklyn Institute of Arts and Sciences [Lucas], and the National Zoo [Hornaday]" (Andrei 2020:11). In addition, Townsend was head of taxidermy at the Philadelphia Academy of Natural Sciences. Andrei documents with extensive footnotes the lives of these early taxidermists turned conservation biologists who were originally trained at Ward's. A friendly but also quite competitive rivalry existed between museums in the United States and the lives and professional careers of these men broadly overlapped and intertwined.

Of the Ward's graduates, two deserve premier notice and both of whom are well described in the book. Carl Akeley (b. 1864, d. 1926) has been recognized the Father of American taxidermy and the finest taxidermist ever. He perfected the art of exhibit hall design and construction first as chief taxidermist at the Milwaukee Public Museum, then Field Museum, and finally the American Museum of Natural History. His Hall of African Mammals at the American Museum is rightly hailed as the finest natural history exhibit hall ever created. He perfected exhibit design that included carefully sculpted bodies to produce lifelike mounts in very accurate habitat settings, usually of animals and vegetation that he personally collected along with photographs and movie footage.

William T. Hornaday (b. 1854, d. 1937) was a pioneer in wildlife conservation and the architect of two of the most renowned zoological parks in the United States, the National Zoo in Washington, District of Columbia and the New York Zoological Park in Bronx (now Bronx Zoo). Hornaday (along with Lucas and Townsend) was responsible for a number of early wildlife protection laws in the United States, was instrumental in saving the northern fur seal from extinction, and authored 15 books and numerous articles about wildlife and the need for strong conservation measures.

The fate of the American bison seemed to stir Hornaday most deeply, perhaps because he had himself witnessed and contributed to the systematic slaughter of this species in the West. His 1889 book, *The Extermination of the American Bison*, established him as a prominent defender of these animals, and in the early 1900s, he founded the National Bison Society and promoted the establishment of the Wichita and Montana Bison Ranges. He was able to accomplish so much in part because of a close personal friendship with conservation-minded President Theodore Roosevelt.

Earlier however, Hornaday, as the chief taxidermist at the Smithsonian Institution, wanted to exhibit mounts of American bison before they went extinct and he would no longer be able to obtain any. To obtain specimens, in 1886 he organized an expedition to Montana's Flathead Valley where the last known herd in the United States occurred. William Harvey Brown, a student from the University of Kansas and experienced collector of large mammals in the West, was chosen to accompany him. The Smithsonian expedition was called "the Last Buffalo Hunt" and 22 animals were collected during the hunt. Hornaday's six mounts were exhibited at the Smithsonian's Natural History Museum for seven decades and are now on display at the Montana Museum of the Northern Great Plains, Fort Benton. At the University of Kansas, Lewis Lindsey Dyche was presented with three bison skins from this hunt and they remain on exhibit in the Biodiversity Institute today. Hornaday insisted that all taxidermy mounts coming out of his shop at the Smithsonian and those animals provided to Dyche be mounted as anatomically accurate as possible.

Hornaday is rightfully credited with leadership in taxidermy development and conservation initiatives; however, his accomplishments are colored by his views on race and immigration. Although he contributed substantially to the conservation of wild mammals, museum taxidermy, and zoo exhibits, his term as Director of the New York Zoological Park was marred by his unapologetic racist practices and events (see https://en.wikipedia.org/wiki/Ota_Benga).

Andrei chronicles the life-long cooperation between these students of Ward's throughout their careers, but also the intense competition between the eastern museums, as well as zoos, for the biggest and best. As director of New York Zoological Park, Hornaday wanted to highlight his North American bison exhibit and bison conservation initiatives by adding an adjacent exhibit of European wisents (*Bison bonasus*). Although Carl Hagenbeck (b. 1844, d. 1913), internationally known German animal dealer and trainer, is only briefly introduced in *Nature's Mirror*, one incident between Hornaday and Hagenbeck not covered sheds light on an early animal dealer and zoos. The one animal dealer who could supply wisents was Hagenbeck who sold exotic animals to zoos throughout the world. From him, Hornaday purchased a bull and some cows, hoping for a breeding group. After the cows failed to get pregnant, it was discovered that the bull had been castrated (or proud-cut vasectomy) prior to being delivered. He complained to Hagenbeck and another bull was obtained. Palpation "confirmed" that the scrotum contained testicles. Again, however, the cows didn't get pregnant, and it was discovered that carefully carved wooden balls had been inserted into the scrotum in place of the bull's testicles.

The story of Ward's is still being uncovered and documented and although *Nature's Mirror* acknowledges anthropological materials going through Ward's, this deserves some additional attention. As described in the book, Ward's acquired specimens, through their own collectors but also purchase, from all over the world. These included human remains, as well as objects of cultural patrimony, some considered sacred. One expedition's collections purchased in the early 1890s was from the ill-fated Menage Scientific Expedition to the Philippines Islands under the auspices of the Minnesota Academy of Natural Sciences, Minneapolis. When the expedition's financier, Louis F. Menage, went bankrupt in the Panic of 1893 financial crisis, the collectors were left stranded in the Philippines without support. Consequently, many of the 40 orangutans (*Pongo pygmaeus*) and anthropological materials collected were purchased by Ward's and re-sold to various museums, college, and university collections usually without associated data (Timm and Birney 1980; unpublished notes deposited at the Bell Museum, University of Minnesota, St. Paul).

This history, although not treated explicitly in the book, is important, especially in the current era of open science and tacit efforts to decolonize science. A recent independent and ongoing web initiative, "The Ward Project" (https://wardproject.org/about), is capturing information from their files and other historical documents, with the object of making data readily available to all. The website tells the story of Ward's, its people, collections, publications, maps, and is intended to create a resource for institutions and researchers on specimens purchased from Ward's and those who seek background information on the taxidermists, specimens, publications, and other aspects of the original company's history.

The art and science of taxidermy have evolved considerably since the first rough attempts to preserve animals. The story of Ward's is one of the fascinating chapters in the evolution of museums, biodiversity education, and conservation history and Andrei's *Nature's Mirror* is an especially useful resource in the 21st century, as we attempt to reconcile the history of this science which is in many ways at odds with today's best ethical practices. Today's museum and zoo visitors are still benefiting from the efforts of these early taxidermists turned leaders in public education and conservation biology. *Nature's Mirror* is a finely crafted, well-documented doorway into the world of the early larger-than-life characters, the often healthy competition between museums and zoos to develop their exhibits, and conservation battles of the early 20th century.

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