
Biology in bones and jars

by Robert Minckley

Not very long ago, biology was taught on the chalkboard (with chalk!) and the textbook for the course was where students found pictures of cells, endoplasmic reticula, and polar bears with cubs. Laboratory courses had bones, whole specimens in jars, and cases and cases of slides with cross-sections of cells, roots, hairs, and other minutiae for students to examine.

As with all subjects, biology today is different both in what is covered and how it is presented. Digital images and PowerPoint presentations have replaced the chalkboard, and have reduced the need for textbooks. New technology has also changed the laboratory experience in some, but not all, respects. The University of Rochester has changed along with most other institutions, but its collections hold a valuable archive of how biology was taught in the past and work is underway to preserve it for use long into the future. This “preservation” has begun to unfold in just the past few months and an overview of progress to date is presented here.

Everyone should walk through the back corridors on the second floor of Hutchison Hall where you will see cabinets with skeletons and skulls of mammals, birds, fishes, and lizards (www.rochester.edu/College/BIO/specimen/specimen.html). They illustrate amazing adaptations to different ways of feeding, moving and finding mates. Some skeletons are posed in mid-climb, simulating their perch on tree branches. Others are mounted so the intricate detail is readily seen: the wing of a fruit bat skeleton clearly shows how the bones--those that in humans form hands--have been modified to support flight.

As we have recently rediscovered, the skeletons in the hall are a small portion of the material in the department's possession, and are the vestige of a very large collection that had been at the University until the late 1950's. Packed into a room no more than 90 square feet were more than 300 skeletons and taxidermy specimens, many more jars of specimens preserved in fluids, and boxes of fossils and vintage microscope slides from the 1800's. Some specimens are of species that are rare today, and others are of considerable lasting scientific interest. Most are from regions far distant from Rochester and New York State.

Where did all this material come from? Here is where our collection makes history come alive. The oldest material can be traced back to Henry A. Ward. Ward had an interest in natural history and especially geology, which led him to travel, attend college, and probably worry his parents (this last statement is pure conjecture). For a few years (1860-1865) he was a faculty member at the University of Rochester, but quit purportedly because there were too many faculty meetings (no comment from the author)! Teaching also interfered with his travels. Leaving an academic career, Ward began a company that prepared and sold specimens to universities, colleges and other educational entities. Early on, the buildings where the preparators cleaned and articulated skeletons and prepared the minerals for display were on the grounds of the University's Prince Street Campus (where the Memorial Art Gallery is still located). The company survives to this day and is called Ward Science and continues in the business of supplying biological and geological material to educational institutions.

An indication of the level of recognition Ward and his associates had worldwide is found in the story of Jumbo the elephant, an animal originally from Sudan that was one of the stars of the Barnum & Bailey Circus. P.T. Barnum himself had arranged with Ward that if and when Jumbo passed, Ward was to prepare the skeleton and the skin. The unfortunate day came when there was a train-elephant collision in Canada. Jumbo lost. As per the original agreement, the elephant was transported to Rochester and prepared. Ward did his part but did not anticipate how long it would take. A dispute over compensation



A slide mounted Hydrozoan (relative of corals) that occurs on the east coast of North America. The specimen's name (*Cladocarpus flexilis*) and the preparator (J.D. King) are listed on the left label and the date when the specimen was prepared (January 1888) is listed on the right label.

resulted in a firm response from Barnum (see the letter exchange here: <http://www.lib.rochester.edu/index.cfm?PAGE=3599>). Today, the result of this work—which was done here in Rochester—is the massive elephant skeleton found in the American Museum of Natural History (en.wikipedia.org/wiki/Jumbo).

Many specimens collected by Henry Ward himself or acquired later from his company made up a natural history museum that the University of Rochester maintained for many years. Its last home was Dewey Hall and a beautiful wooden door and stone transom still mark the Museum entrance.

Once the biology department moved to Hutchison Hall, the collection was dispersed. Much of the material was donated in the late-1950's to the Rochester Museum and Science Center on East Avenue, and some was later moved into storage in Hutchison Hall where few knew of its existence.

This brings us to the present. Although the biological specimens we have are no longer alive, they need attention and the material here in Hutchison has been long-ignored. As we explored the treasure trove of material, we found specimens still in hand-blown jars made sometime in the 1860's. Over the years, fluids had evaporated and some of the specimens had dried out completely. We prioritized these specimens for immediate attention and with the help of a local glass blower/sculptor, Lucas Jones, we have re-curated the specimens, made new seals for the jars, and have greatly extended the educational lifespan of the specimens.



Door in Dewey Hall that was the main entrance to the natural history museum here at the University of Rochester



Bullfrog



Puffer fish as found before restoration (left) and after restoration (right) in original hand-blown specimens jars made in the 1860's.



Baby Hammerhead Shark

Many of the skeletons and taxidermy specimens are also in need of restoration and a careful cleaning. Our plan is to temporarily move these into glass-fronted cases to minimize the possibility of further damage. In the future, we hope to secure funds that will allow us to rearticulate the broken parts and present cleaned and useful specimens to students, alumni, and the public in proper cabinets.

Why is this worth doing? There are many reasons, both practical and esoteric. Perhaps one of the most important is as a teaching tool so that people understand the range and limitations of materials that were available not long ago to students and professors of biology. And as people lose access to outdoor spaces and more of us live in crowded urban areas, the opportunity to see the colors and anatomy of diverse organisms from throughout the world can't be replaced digitally. We now have the capability to fill this void at the University of Rochester. For the naturalist in all of us, there is also the great satisfaction of

seeing such an array of beautiful (and not so beautiful) organisms in one place.

What began as an effort to reclaim some much-needed office space has led to a rediscovery of our departmental history, and a new vision of how old and new teaching collections can live side-by-side in the classroom and beyond. Many of the letters of Henry Ward and his company are housed at the Rare Books and Special Collections in Rush Rhees Library, and with the help of Melissa Mead (the University Archivist) we hope to link information on how and when the material was obtained with its scientific significance. Having the material displayed means we will need student and staff involvement at all levels including building and installing appropriate cabinetry and lighting, development of a database and a web site, and further research on the biology and conservation status of these animals. Clearly no one expected so much would eventually come out of a storage room of skeletons and jars, and there is much more to do.



Echidna, or spiny anteater skeleton, one of the few egg-laying mammals found today only in Australia and New Guinea.

