

THE NEW YORK STATE MUSEUM BIRD COLLECTION: A RESOURCE FOR EDUCATORS AND ORNITHOLOGISTS

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The New York State Museum (NYSM) is the oldest state museum in the United States, and its bird collection is one of the most historically and scientifically important in northeastern North America. The collection comprises over 14,000 skins, skeletons, egg sets (some with nests), spread wings, taxidermy mounts, whole anatomical specimens (alcoholics), and a small but growing collection of frozen tissues. In terms of size, NYSM is a distant third among bird collections in New York, behind the American Museum of Natural History (the world's largest, at well over one million specimens) and Cornell University's Museum of Vertebrates (ca. 50,000 specimens), but is near the top of all museums with respect to specimens from the state of New York. Beginning in September 2006, when I became curator of the collection, I have endeavored to establish an electronic database of our current holdings, with an ultimate goal of making our collection searchable on the internet. This database now comprises a total of 10,600 specimens, representing our holdings of skins (including spread wings), mounts, skeletons, and alcoholics through the year 2006. Our extensive egg/nest collection has not yet been incorporated into the database. In this paper I briefly describe the NYSM bird collection, highlighting its geographical coverage, historic importance, and value to New York's ornithologists and educators. I conclude with some thoughts on my goals for future growth and maintenance of the bird collection, and provide information for those wishing to use this public resource in their own teaching and research.

The Value of Bird Specimens

New York State Museum bird specimens are a permanent, public archive of avian diversity in New York State and beyond. Each specimen documents the occurrence of a species at a particular time and place, and is also an irreplaceable source of plumage, anatomical and life-history data. Salvaging and responsibly collecting birds remains an essential research method for studying the biology, ecology, systematics, and genetics of wild birds, and a well curated museum collection has great scientific utility and legacy (Remsen 1995, Suarez and Tsutsui 2004, Winker 2004).

Bird specimens and the data recorded on their tags are used by ornithologists to document changing bird distributions and to study a wide variety of patterns including feather replacement, diet, age structure, reproductive condition, seasonal movements, geographic variation, and comparative anatomy. Skeleton specimens are necessary for identification of fossil bones from paleontological and archeological sites (Reitz and Wing 1999). Skins serve as independently verifiable vouchers of record for published taxonomic revisions, and are indispensable in studies of avian systematics (Peterson *et al.* 2007). Skins are also important vouchers of hybrid phenotypes, documenting the occurrence and movement of hybrid zones, and of geographical phenotypes in studies of population genetics and species boundaries (Reudink *et al.* 2007). Egg sets were important in establishing the link between pesticide exposure and eggshell thinning in raptors (Ratcliffe 1967), and are now being used to document earlier laying dates in migratory species in correlation with global warming trends. Skins, skeletons and eggs are also sources of tissues that are now routinely used in biochemical analyses of DNA and stable isotopes (Mundy *et al.* 1997, Rocque and Winker 2005, Lee and Prys-Jones 2008). As these examples make clear, technological and theoretical advances continually result in new research questions that can be answered by museum specimens, questions that could not have been imagined by the naturalists who collected and prepared the specimens so long ago.

In addition to their many research uses, NYSM bird specimens are a valuable resource for educators teaching courses in ornithology, vertebrate zoology, and evolution. Skins and taxidermy mounts are good complements to field-based courses that teach species identification. Skins and skeletons are valuable demonstration material for teaching adaptations for flight, feeding adaptations, functional morphology, and vertebrate homologies.

Collection History

On April 15, 1836, New York governor William Marcy signed legislation that established the Geological and Natural History Survey, and appointed the first official staff, including one zoologist, James E. DeKay. This act realized the long-held goal of Governor DeWitt Clinton for a formal program to survey the State's geological and biological resources. In 1843 the legislature established the State Cabinet of Natural History as a repository for the resulting collections of specimens. Following DeKay's work on the original Survey, work in zoology lapsed for several decades. Many of DeKay's successors prepared small numbers of bird specimens, but most collection growth has been through the acquisition of private and academic collections. A plot of the cumulative number of specimens that have reliable dates (Fig. 1), shows periods of sharp growth that can easily be linked to important individual collections. Most were acquired decades after the collecting was done, so the trajectories in Figure 1 do not represent the actual temporal pattern of growth of the NYSM collection.

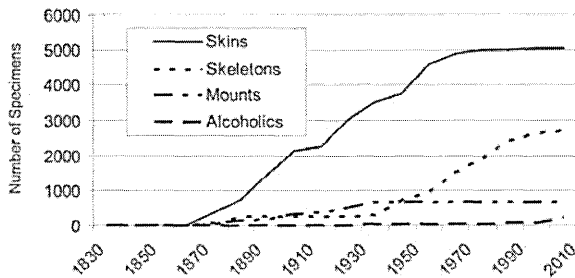


Figure 1. Growth of the NYS Museum bird collection from 1836 to 2006.

Important collections of bird skins from the early period from about 1870 to 1900 include those of Clinton Hart Merriam, J. E. Benedict, and the larger collections of Eugene P. Bicknell (380 birds, mostly from Bronx County), James H. Miller (335 birds from Lewis County), and C. C. Young (250 birds from the New York City area). Nearly all of the early growth in the skeleton collection is from the acquisition of the R. W. Shufeldt collection (250 skeletons from New Mexico and other western states). Most specimens from the 1920s and 1930s are from the huge Roy Latham collection, comprising over 1300 skins and mounts from Suffolk County. The growth in skin specimens between 1948 and 1971, is due to the two large collections of Steven W. Eaton of St. Bonaventure University, and William C. Dilger of Cornell University. The Eaton collection of over 1100 specimens includes skins, skeletons, and many specimens retaining a skin plus partial skeleton, primarily from Cattaraugus and Allegany Counties. Dilger collected nearly 500 birds throughout the State of New York. The growth in the skeleton collection that begins in the 1940s is due to the Eaton collection and to substantial contributions by J. C. Jones and E. J. Greenberg, both of whom collected mostly in Albany County.

Historically, a NYSM Curator of Zoology was responsible for all zoological specimens except insects. In the last few decades, the responsibility has been divided among multiple curators. In 2006, the position of Curator of Birds was established for the first time. Although some NYSM staff scientists were ornithologists, including Ralph S. Palmer (1942-1978), Edgar M. Reilly (1955-1983), and David W. Steadman (1985-1995), bird collecting and salvage by NYSM employees was minimal. Important exceptions are Dayton Stoner (1932-1944); Paul F. Conner (1960-1985), who collected a series of spread wings and tails; Steadman, who prepared and traded for many hundreds of skeletons; and Roland W. Kays (1995-2006, now NYSM Curator of Mammals), who contributed a small number of skeletons and alcoholics and who established the collection of frozen tissues for genetic analyses.

Geographic Coverage

Of the 10,600 databased specimens, 9483 have reliable locality data. Most specimens lacking locality data are taxidermy mounts formerly on exhibition at

NYSM and elsewhere. The vast majority of the bird collection (78%) is from the state of New York (Figure 2a), placing us third among all museums behind AMNH (ca. 20,000 from NY) and Cornell (ca. 14,500). The Buffalo Museum of Science (ca. 5000), the Smithsonian (ca. 4400), Harvard's Museum of Comparative Zoology (ca. 3400) and Chicago's Field Museum (ca. 1800) also have substantial holdings of birds from New York. The NYSM collection also includes specimens from 47 U.S. states and 39 foreign countries (Figure 2a). Geographic coverage within New York is highly variable (Figure 2b), with many counties represented by fewer than 20 total specimens of all species. Areas with the best representation include Albany and surrounding counties (representing the work of many collectors over the last 170 years), Southwestern NY (Eaton collection), Tompkins County (Dilger and others), Tug Hill Plateau (Miller collection), the New York City region (Bicknell, Young and others), and Suffolk County (Latham collection). Many important ecogeographic regions are badly under-represented, and all areas except for the capital region are completely lacking in data-rich "modern specimens" that include frozen tissues.

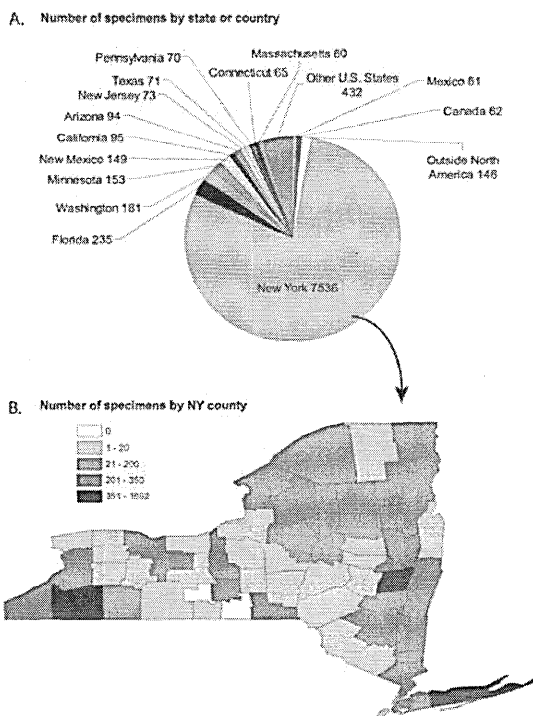


Figure 2. Geographic coverage of the New York State Museum bird collection, showing A) the number of specimens from states and countries represented by at least 60 specimens, and B) numbers of specimens from each county in New York.

21st Century Practices and Goals

Collected over the course of nearly two centuries of research and exhibition, the NYSM collection records the rich diversity, complex biogeography, and change over time in New York's populations of birds. It is our policy to foster use of the collections consistent with their preservation for the use of future generations. Scientists and educators wishing to use the collection need only contact the Curator and arrange a visit. Loans of specimens for research or education are made only to accredited research or educational institutions, not to individuals. Research loan requests are evaluated on the merits of the purposed research, with requests for destructive sampling, including consumptive sampling of frozen tissues, considered in light of the potential to compromise future analyses. Guidelines for loan requests can be found at:

www.nysm.nysed.gov/research_collections/collections/biology/ornithology/loan.html.

My mandate as Curator of Birds is to continue to document New York's avian diversity through continued collection and preparation of specimens, and to insure that the collection is maintained for continued use by researchers and educators. I hold state and federal permits for the continued collection and salvage of birds, and will accept salvaged birds donated by citizens as long as they are in good overall condition, have been kept frozen, and have accurate date and locality data. The modern specimens we prepare are data-rich, documenting patterns of feather replacement and wear, fat deposition, stomach contents, skull ossification, size of the bursa of fabricius, size and condition of gonads, colors of parts that may fade (iris, tarsi and toes, bill), mass, cause of death (if known), and presence of parasites. We endeavor to make the most of each bird by preparing a skin, spread-wing, partial skeleton, stomach contents (in alcohol), and a tissue sample (frozen at -80°C) from a single bird.

My primary goals for the bird collection are to make it a comprehensive sample of the bird life of New York State, and to make it more useful to the research community. To achieve these goals I have identified the following priorities for the collection in coming years: (1) Fill in geographic gaps within New York. Nearly every species has gaps throughout the state, and some regions are gaps for all species (Figure 2b). (2) Obtain vouchered tissue samples from every NY species. This would be an invaluable genetics resource for ornithologists interested in conservation, ecology and evolution of New York birds. (3) Catalog the egg and nest collection. This large and historically important collection is not yet searchable electronically. (4) Make the collection available on the internet by fully integrating with existing distributed databases such as ORNIS. These tasks will take many years to complete. I welcome New York's birders and other Kingbird readers to volunteer to prepare specimens or work in the collection, donate salvaged birds, or donate other resources in support of these important endeavors.

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