The Section of Mammals of Carnegie Museum of Natural History

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The Section of Mammals of Carnegie Museum of Natural History is discussed by Dr. Hugh Genoways, Curator, and Dr. Duane A. Schlitter, Associate Curator.

Mammals

The Section of Mammals at Carnegie Museum of Natural History is responsible for the care of the collections of Recent mammals, and research on these collections. "Recent mammals?!" The capitalized word "Recent" refers to the geological time period since the last ice age (about 10,000 years ago) until the present time. Mammals are that group of animals characterized by the presence of hair at least during some time of their lives, warm blood, and the production of milk. Therefore, our work really involves living mammals with which everyone is familiar; however, our work also does include study of such recently extinct species as the red wolf.

The specimens in the collection are of three basic types. The most common type of specimens consist of a skin and skull. From smaller mammals, the skin is removed from the animal, it is stuffed with cotton and allowed to dry. From larger mammals, the skins are tanned. The skulls are saved for study and are prepared by having the flesh removed by flesh-eating beetles, followed by cleaning with an ammonia solution. Some specimens consist of only skeletal material, usually complete skeletons. The last type of specimen consists of entire individuals preserved in formaldehyde and then stored in 70% ethyl alcohol.

The majority of the collection is stored in steel cabinets specially designed for this purpose. These cabinets can be stacked two or three high when the need arises. The large skeletons and specimens in alcohol are stored on open steel shelving. The specimens are filed in the cabinets and on the shelving in a set order. This is similar to systems used in libraries and is done for the same reasons. Libraries need to be able to find and return individual books quickly. We need to be able to find individual specimens quickly and to be able to find...
return them to their proper place in the collection. The specimens in collections of Recent mammals are filed progressively from the most primitive groups such as the egg-laying monotremes, opossums, and insectivores (shrews and moles) to the most advanced groups such as the carnivores and hoofed mammals. Within each group, the specimens are arranged by their place of geographic origin.

The first entry in the mammal catalog, a specimen of a kangaroo, was made on June 1, 1896. At this time both the bird and mammal collections were under the direction of W.E. Clyde Todd. In 1909, when more than 2,000 mammals had been cataloged, care of the collection was given to Mr. Todd’s assistant, O.J. Murie. Mr. Murie, who later achieved fame as a naturalist and author of such books as *The Elk of North America* and *Fauna of the Aleutian Islands and Alaska Peninsula,* cared for the collection between 1909 and 1917 during which time another 2,300 specimens were added. This included a significant collection made in Ethiopia, then called Abyssinia, by Childs Frick. Based upon this material Mr. Frick described six new species and one new genus. In 1917, George M. Sutton (now an internationally famous ornithologist and bird artist) assumed responsibility for the collection and added another 1,000 specimens by 1923.

In 1926, J. Kenneth Doutt began devoting some time to the mammal collection and in 1929 he was given a full-time position and the Section of Mammals was established. This began 43 years of full-time service to the Carnegie Museum of Natural History by Mr. Doutt. In 1930 and 1931, Mr. Doutt attended the University of California and obtained a Masters degree. Mainly through field expeditions led by Mr. Doutt, many to the western U.S., the collection grew from 7,500 to over 18,000 specimens between 1932 and 1940. Caroline A. Heppenstall began working in the Section as a volunteer in 1935. During the ensuing years she held various positions within the Section, being appointed Associate Curator in early 1973. She retired in 1977 but still serves as Associate Curator Emeritus.

In July 1946, following the war, and continuing
Sue McLaren examines the collection of horns for information about an African antelope.

Associate Curator Emeritus, Caroline A. Heppenstall, examining squirrel specimens from the southwestern states, in 1946.
until June 1951, the Section of Mammals participated in a survey of Pennsylvania mammals in cooperation with the Pennsylvania Game Commission through Pittman-Robertson funds. This survey netted approximately 18,000 specimens and provides excellent documentation on the distribution and ecology of mammals in the state. This material still serves as the basis for research and environmental impact studies.

Another extremely valuable collection was obtained from the Rev. A. I. Good and, to a lesser extent, his father over a 40-year period from the Cameroons in West Africa. The parishioners of Rev. Good collected mammals and other natural history specimens which Rev. Good sold to support his mission. Because much of this collection was made before forests in the area were destroyed, the collection is particularly important in documenting the undisturbed distribution of rodents and monkeys in this portion of Africa.

With the retirement of Curator J. Kenneth Doutt in late 1972, Dr. Duane A. Schlitter was hired in September 1973 as an Associate Curator. Dr. Hugh H. Genoways, Curator, joined the staff of the Section of Mammals in September 1976. Under their direction, one of the most significant events in the history of the Section was accomplished. In early November 1979, the offices, most of the collections, library, and preparation laboratory of the Section were moved into newly renovated facilities in the Carnegie Museum of Natural History Annex in East Liberty. This was the first time that all of these Section activities were brought together in one place. The new facilities are among the best anywhere in the country for storage and research on specimens of mammals.

The Collection
The research collection of the Section of Mammals now contains about 68,000 specimens of mammals of various types. This is the eighth largest collection of Recent mammals of the approximately 400 collections in North America. The Section holds 33 holotype specimens, which places it fourteenth among North American collections. Nearly 6,000 specimens per year are added as the direct result of research making this the fastest growing collection in the country at this time.

The collection is strongest in North American material, possessing one of the three best collections in the United States of eastern North American mammals. The collection of mammals from Pennsylvania and adjacent areas is the best available in the world, and collections from the eastern Arctic are the best of any United States museum. It would be impossible for anyone doing a research or environmental impact study on a geographic area of eastern North America, or studying a particular species of mammal occurring in this area, to do a complete study without using the Recent mammal collections of the Carnegie Museum of Natural History. In many instances, the best material available will be stored in this collection. From elsewhere in North America, the Section possesses excellent collections from the western United States including the states of Arizona, California, Colorado, Montana, Utah, and Oregon.

Outside of North America, the best collections are of mammals from Africa where the Section’s holdings from the Cameroons are the best in the world. This material is the result of the early collections received from Rev. Good and recent specimens acquired on expeditions headed by Associate Curator Schlitter. There is also an excellent collection of mammals from Ethiopia, containing Frick’s early specimens, and mammals collected by Schlitter during the course of epidemiological studies conducted by the University of Maryland School of Medicine. Other significant holdings are from Ghana, Central African Republic, Kenya, Uganda, Zaire, Namibia, and Republic of South Africa.

The holdings of mammals from South America are probably among the top five and continue to increase. Current research focuses on Suriname, Brazil, and Argentina, but there are significant older collections from the countries of Colombia and Bolivia.

All specimen data have been entered into a computer system for storage and retrieval. For each specimen a standard set of information is kept, including its scientific name, where it was captured, its sex, and who captured it. Our collection is the first of the major collections in North America to have the data for all specimens in a computer-based system.

Collection Procedures
A collection of mammals grows slowly — a specimen
at a time. The specimens reflect the ongoing research activities of the Curators and Research Associates, and are obtained by using traps, guns, and nets. They will be preserved in three basic ways as described previously.

Each incoming group of mammals resulting from a single field expedition is given a single accession number. This is the museum's way of keeping a record of new material and data associated with it. The specimens then go to the Section for further processing. The specimens are first arranged in the same manner that they are stored in the collection. The collection is then cataloged and each specimen receives a specific sequential collection number. This number is associated with all parts of the specimen and is our method of identifying them at all times.

Those parts of the specimen that do not require additional preparation are stored in sequence, while other parts are processed further. Portions usually needing more processing are the skeletal parts, which must have the flesh removed from them and be thoroughly cleaned. Once all parts of the specimen have been reunited, the specimen can be installed into the main collection along with other members of the species where it is now ready for research and educational purposes. The final step of processing is entry of the data into the computer-based storage and retrieval system.

Once specimens have been installed in the collection, curatorial operations turn from processing to maintenance. For skins, these procedures include fumigation, which keeps insect pests from causing damage. For specimens stored in fluid, this will involve only checking the alcohol level in the storage jars. Other maintenance procedures include preventing damage from light, atmospheric sediments, temperature changes, moisture, and other environmental factors.

Library and Laboratory

The Section of Mammals has its own new library in the Annex building — J. Kenneth Doutt Memorial Library of Mammalogy, named for the late curator. The library includes approximately 800 books and 20 journals dealing with all aspects of the biology of mammals, but with strength in the study of the relationships and distribution of mammals. The library has a collection of approximately 10,000

*It can be argued that the rarely-seen Snow Leopard, which lives high on the wind-whipped Himalayas of Central Asia, is the most beautiful of cats. Developing mammal exhibits such as this is one of the long range responsibilities of the Section. Mounted in 1942, this specimen was placed in its present case in 1962.*
Vivid displays of bluff and intimidation characterize male Mandrills such as this one, when they are confronted by intruders. The exhibit accurately portrays him on the ground, where he hunts for his food; unlike other monkeys, he seldom climbs trees. Scientific accuracy is a responsibility of the Section in developing educational material.

Nancy Parkinson uses the J. Kenneth Doutt Memorial Library of Mammalogy.

separates of articles published in scientific journals or by other museums. The basis of this collection was the personal library of J. Kenneth Doutt. Also incorporated into the Section library is the former library of the Boone and Crockett Club. This library contains approximately 1,000 volumes dealing with conservation, hunting, and distribution of mammals, particularly of Africa. These library facilities together with those in the Carnegie Museum of Natural History Library and the Carnegie Library of Pittsburgh gives the Section a research and reference source that is equaled at few places in the world.

The Section has two laboratory facilities — Preparation Laboratory and Systematics Laboratory. The Preparation Laboratory is where skeletons of all specimens are processed and some specimens to be included in the collection are made into study mounts (not taxidermy mounts).

The Systematics Laboratory is where equipment is used to compliment specimen-based studies. Here we have various microscopes, some magnifying objects up to 1400 times, which allow us to examine chromosomes, compare spermatozoa, or study and draw large objects such as skulls.

Research

Research in the Section of Mammals attempts to answer two basic questions: “What kinds of mammals are there and how are they related to each other?” (These types of studies are called systematics). “Where do the different kinds of mammals occur and why?” (These are distribution or zoogeography studies). Our research is “basic” research, that is, it is not directed at solving a specific problem for an applied purpose. However, because the answers to our questions are necessary before many other types of studies (ecological, epidemiological, environmental impact, and pest control) can proceed, we do become involved in many types of applied studies.

In Ethiopia and Papua New Guinea, for example, Associate Curator Schlitter has been a member of an epidemiological team studying diseases such as typhus, spotted fevers, and plague under the sponsorship of the United States Navy and National Institute of Health. His role in these studies was to collect the mammals which serve as the reservoir for the diseases or serve as the host of ectoparasites that
transmit the diseases. He must also identify the species of mammals collected because only a few species will be involved as hosts or reservoirs for the various diseases. With the knowledge of the species of mammals involved with a disease, we can predict where this disease may be a problem based upon the known geographic distribution and natural history of the mammals involved.

In Suriname, Curator Genoways has been involved in small mammal surveys of the National Parks and prospective park areas. This research is being sponsored by the Alcoa Foundation and is done in cooperation with the Foundation for Nature Preservation in Suriname. The objective here is to develop an inventory of the mammalian resources of Suriname, particularly park areas. This information will be used in preparing master plans for the preservation and development of the National Parks and other parts of the country.

The foreign field work of the Section has been concentrated in Africa and South America. Besides work in Ethiopia, Associate Curator Schlitter has collected in 13 other countries. A recent major field expedition took a party to the Cameroons in West Africa with funds from the M. Graham Netting Research Fund and the National Geographic Society. They revisited many old collecting localities of Rev. A.J. Good to obtain samples of mammals to compare with the earlier collections. In addition, new areas were sampled and new techniques such as obtaining chromosomes were employed to help increase our knowledge of this little-known part of the world. Elsewhere in Africa, Carnegie Museum of Natural History has studies underway in Ghana, Zaire, Namibia, and Republic of South Africa.

In addition to Suriname, the Section has sponsored work in Brazil, Bolivia, and Argentina in South America. The work in Brazil and Argentina was under the direction of Research Associate Michael A. Mares, who is interested in the adaptation of mammals to arid conditions found in parts of these countries. In the near future, field work will begin in Colombia in northern South America with a general survey of the mammals of the country.

All of our work, however, is not done in foreign lands because we believe that we have an obligation to do work “at home” as well. With a grant from the Landfall Foundation, we are preparing a book detailing the relationships and distribution of the “Mammals of Pennsylvania.” This book will be based upon the large number of specimens in our collection obtained in cooperation with the Pennsylvania Game Commission and specimens deposited in other museums, a total of 40,000 specimens. This book should be useful to naturalists, conservationists, resource planners, teachers, and wildlife managers; it has already proven useful in providing information on species that are being considered for threatened or endangered status in the state by the Pennsylvania Game Commission.

Using funds from the Edward O’Neil Museum Trust, we are conducting similar studies on mammals from Vermont and New Hampshire, and will move to other states in New England when this work is completed.

Among the common inhabitants of eastern North America are short-tailed shrews of the genus Blarina, these shrews are currently believed to represent but a single species. However, research supported by the National Science Foundation has shown that at least four species are involved in this complex. Because short-tailed shrews are closely tied to their local environment, they make excellent environmental indicators — not only now but in the past during the ice ages. Basic research into the history of the shrew provides the kind of ecological information which modern students of the environment can use in analyzing environmental change.

Research in museums generates new information, and this is communicated in several ways. For the public, exhibits and educational programs are developed, as well as information pamphlets. Besides generating the basic information, the scientific sections are responsible for the accuracy of material presented, training of personnel, and planning of programs with the educational and exhibit staff of the museum. For scientific colleagues, the Section of Mammals publishes the results of its research in the Annals and Bulletin of Carnegie Museum of Natural History and in other professional journals. It is upon these publications that the professional standing of the staff and Section are judged.

— Hugh H. Genoways and Duane A. Schlitter