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9-27-2005

### Mammalogy at Texas Tech University: A Historical Perspective

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Bradley, Lisa C.; Sucheki, John R.; Amman, Brian R.; Brant, Joel G.; Genoways, Hugh H.; McAliley, L. Rex; Baker, Robert J.; Mendez-Harclerode, Francisca; and Bradley, Robert D., "Mammalogy at Texas Tech University: A Historical Perspective" (2005). *Mammalogy Papers: University of Nebraska State Museum*. 101.

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# OCCASIONAL PAPERS



## *Museum of Texas Tech University*

Number 243

27 September 2005

### MAMMALOGY AT TEXAS TECH UNIVERSITY: A HISTORICAL PERSPECTIVE

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The mammalogy program at Texas Tech University officially was established in 1962, when Robert L. Packard joined the faculty of the Department of Biological Sciences. As the institution's first mammalogist, Packard took the initiative to develop a strong program of mammalian research and education. Influenced by the successful program built by his mentor, E. Raymond Hall, at the University of Kansas, Packard modeled similar goals for Texas Tech University. Those goals included a strong emphasis on both undergraduate and graduate education and research, with several mammalogy faculty members, and the establishment and growth of a large and active mammal collection.

The success of the mammalogy program at Texas Tech University, over the course of its 43-year history, is directly attributable to five primary factors: the

development and growth of the Recent Mammal Collections of the Natural Science Research Laboratory (NSRL); the expertise and dedication of the diverse faculty and staff of the Department of Biological Sciences and the NSRL; the contribution of Research Associates and others who have worked cooperatively with the mammalogy faculty; the success of the graduates of the program who continue to benefit the science of mammalogy with on-going research and education programs at universities, museums, state and federal agencies, and private-sector businesses around the world; and administrative support from Texas Tech University for the program, as well as financial support from benefactors such as federal and state agencies, corporations, foundations, and private individuals. Herein, we have organized our discussion of the history of mammalogy at Texas Tech University by those five categories.

### THE NATURAL SCIENCE RESEARCH LABORATORY AND THE RECENT MAMMAL COLLECTIONS

#### Historical Perspective

A key component of Texas Tech University's mammalian research and education program has been the activities associated with the growth of its exten-

sive mammal collection. In 1962, Packard established the collection with approximately 350 specimens that he brought to Texas Tech University from Stephen F. Austin State College, where Packard had been a faculty member for three years. The collection, initially

housed on the second floor of the Science Building, was moved in 1970 to the basement of the Museum of Texas Tech University. However, there was an immediate need to establish appropriate facilities to house the mammal collection, along with the other natural history collections of the Museum. Thus, the Natural Science Research Laboratory was conceived, and the University dedicated the funds to build a wing onto the existing museum complex to house the NSRL. According to Robert J. Baker, Director of the NSRL, the original drawing for the building floor plan was sketched on a napkin at his kitchen table during a meeting attended by Baker, Packard, Dillard C. Carter, and J Knox Jones, Jr.

Initially, the Natural History Collections housed in the NSRL included mammals, birds, reptiles, amphibians, fishes, invertebrates, and the paleontology collection. In 1979, the invertebrate collection was transferred to the Department of Plant and Soil Sciences and combined with that department's entomology collection. In 1997, the entire invertebrate collection was reacquired by the NSRL. This collection was augmented by approximately 40,000 specimens in 2001-2002 when the U.S. Fish and Wildlife Service deposited their collection of confiscated specimens. In 1996, the paleontology collection received autonomy and became a separate division under the Museum umbrella, and was moved to the basement of the Museum. Since that time, the NSRL has housed only Recent specimens.

Although the early Natural History Collections of the NSRL were diverse, representing most phyla of the animal kingdom, the primary research focus of the NSRL always has been mammals. This reflects the collection-based mammalogical research focus of the faculty of the Department of Biological Sciences. In recent years, this emphasis had left the reptile, amphibian, and fish collections underutilized at Texas Tech University. Similarly, the mammal and bird collections of the Texas Memorial Museum of the University of Texas at Austin were underutilized due to that museum's strong focus on herpetological research. To make more effective use of these resources, ensure the collections were properly curated, and to make specimens more readily available to scientists and students, Robert J. Baker and Gary F. Edson, Director of the Museum of Texas Tech University, and Ed C. Theriot, Director of the Texas Memorial Museum, agreed to an

exchange of the NSRL's reptile, amphibian, and fish collections with the Texas Memorial Museum's bird and mammal collections. This exchange occurred in 2001. The collection acquired by the NSRL consisted of nearly 7,000 mammals, 1,700 birds, 800 clutches of eggs, and nearly 300 taxidermy mounts. The Texas Memorial Museum collection was primarily the result of work by noted Texas naturalist W. Frank Blair and his students, and the collection included many specimens of historical significance. As the NSRL mammal collection prior to the exchange had consisted primarily of recently collected material (1959 forward), the addition of the Texas Memorial Museum collection added a valuable historical component concerning the mammalian fauna of Texas. Although the trade reduced the overall vertebrate diversity of the NSRL collection, this realignment of specimens with faculty strengths not only benefited both universities and improved the care of both collections, but it also served to strengthen the biodiversity programs that provide critical natural history information to society.

A major event in the success of the NSRL program and the collections was the acquisition of Texas State Line Item funding, initiated in 1996, to develop and expand a biological database and to inventory mammals on state-owned properties. The successful funding of this initiative was led by the efforts of Robert J. Baker; Gary F. Edson; Nick Parker, Leader of the Texas Cooperative Fish and Wildlife Research Unit; John M. Burns, Provost of Texas Tech University; and Donald R. Haragan, President of Texas Tech University. Senator John T. Montford was instrumental in procuring funding through the state legislature for this initiative. Senator Montford later became Chancellor of Texas Tech University and remained supportive of the mammalogy/bioinformatics program. The primary goals of the Line Item Funding were to conduct a biological inventory of state properties to provide an archived record of the mammalian biodiversity that was present in Texas at the turn of the 21st century, and to develop an electronic database of Texas mammals that could be accessible to state biologists and those in leadership roles in the development of wildlife management and conservation policies. More than 20 students have been trained and more than 2,800 specimens have been collected as a result of the Line Item funding from the State of Texas. As of August 2005, more than 50 publications had been generated that utilized these specimens.

The growth of the NSRL collections necessitated a complete remodeling of the NSRL building in 1997-1998. During those renovations, which were supported by a National Science Foundation grant, collection areas, office areas, and preparation areas were isolated from each other to maximize safety and efficiency and to minimize potential contamination problems. A new room, equipped to house up to 11 ultra-cold freezers, was designated for frozen tissues.

Since those renovations were completed in 1998, the traditional mammal collection has grown by more than 25,000 specimens, and the collection of frozen tissues has exceeded the current capacity of the freezer room, necessitating the temporary housing of additional ultra-colds in an adjacent room. The rapid growth of the mammal collections in the past seven years, and expectations for continued growth in the years to come, spurred the recent commitment of Texas Tech University to construct a new wing of the NSRL building. The funds for this expansion generously were donated by the Ben E. Keith Company. The expansion will more than double the existing size of the NSRL facilities to accommodate the growing collections as well as provide additional space for research and teaching activities, student offices, and an expanded library. Ground breaking for the new wing occurred in April 2004, and construction was completed in June 2005.

#### The Recent Mammal Collection

Currently (August 2005), the Recent Mammal Collection contains more than 100,000 specimens and more than 220,000 samples of genetic materials. The collection is subdivided into three components: 1) the Traditional Mammal Collection (approximately 84,000 specimens) of skins, skulls, and skeletons; 2) the Fluid-preserved Collection (approximately 16,000 specimens), containing specimens preserved in alcohol; and, 3) the Genetic Resources Collection (more than 220,000 samples), which includes frozen tissues, tissues in lysis buffer, DNA and RNA samples, and blood samples. In our discussion below, we have combined the Traditional and Fluid-preserved Collections under one topic.

*Traditional and Fluid-preserved Collections.*—Since its establishment in 1962, the mammal collection at Texas Tech University has experienced a rapid growth rate, spurred by the active research programs

of the mammalogy faculty and students. From 1962 to 1975, the collection grew from a few hundred specimens to more than 25,000 specimens. By 1988, the collection had doubled to 50,000 specimens; the NSRL marked this occasion with a public celebration of the official cataloging of the 50,000th specimen on 12 February 1988 (selected in recognition of Charles Darwin's birthday). The mayor of Lubbock at the time, B.C. "Peck" McMinn, attended the celebration and proclaimed the day "Natural History Research Day." Nine years later, on 12 February 1997, the NSRL held a similar celebration to mark the cataloging of its 75,000th mammal specimen. Six years later, the 100,000th NSRL mammal specimen was cataloged at a celebration on 20 June 2003, during the 83rd annual meeting of the American Society of Mammalogists (ASM), which was hosted by the mammalogists of Texas Tech University.

The mammal collection currently is one of the fastest growing mammal collections affiliated with an academic institution. In 1997, the collection was the 13th largest in the country and the fifth largest collection among academic institutions (Hafner et al. 1997). It is the largest and most actively utilized mammal collection in Texas. The current NSRL collection of over 100,000 mammal specimens includes 17 holotypes (Table 1) and contains representatives from 21 orders and 90 families of extant mammals (Wilson and Reeder 1993). At least 65 species recognized as endangered or threatened by the United States Fish and Wildlife Service are represented by specimens in the collection (USFWS 1999). The collection includes representatives from all continents, although the majority of the specimens are from the southwestern United States, Mexico, Central America, South America, and the Caribbean. Currently, biotic surveys being conducted in several Latin American countries, including Mexico, Honduras, Ecuador, and Paraguay, ensure additional growth from the Neotropics.

The NSRL is committed to the continued growth of the collections by traditional methods of field collecting, both in the U.S. and abroad, and through less conventional methods, such as the acquisition of specimens through exchanges with other institutions, and cooperative agreements with state and federal fish and game agencies, state and federal health agencies, and other entities. An example of traditional fieldwork, with a modern-day twist, that has added a valuable

Table 1.—Mammalian holotypes housed in the Natural Science Research Laboratory, Texas Tech University. \*Specimen repatriated to Museo de Zoología, Pontifica, Universidad Católica del Ecuador.

Catalog#	Holotype specimen
TTU 9093	<i>Glossophaga commissarisi bakeri</i>
TTU 9774	<i>Tonatia saurophila bakeri</i>
TTU 12664	<i>Uroderma bilobatum davisi</i>
TTU 19872	<i>Geomys bursarius knoxjonesi</i>
TTU 19900	<i>Chiroderma improvisum</i>
TTU 19902	<i>Eptesicus guadeloupensis</i>
TTU 25893	<i>Glossophaga soricina handleyi</i>
TTU 36169	<i>Rhogeessa genowaysi</i>
TTU 36223	<i>Glossophaga commissarisi hespera</i>
TTU 39120	<i>Tonatia saurophila maresi</i>
TTU 44458	<i>Cratogeomys castanops dalquesti</i>
TTU 59413	<i>Sigmodon fulviventer dalquesti</i>
TTU 60269	<i>Myotis evotis jonesorum</i>
TTU 81617	<i>Peromyscus schmidlyi</i>
TTU 82790	<i>Reithrodontomys bakeri</i>
TTU 85292*	<i>Lophostoma aequatorialis</i>
TTU 100000	<i>Notiosorex cockrumi</i>

component to the NSRL collection is the research conducted since 1994 by Ronald K. Chesser, Robert J. Baker, and associates in Chornobyl, Ukraine, at the site of the 1986 Chornobyl Nuclear Reactor IV meltdown. The NSRL now houses a collection of 1,850 radioactively contaminated mammal specimens collected during that research. To our knowledge, the Chornobyl Radioactive Vertebrate Collection is the only such collection. The collection contains traditionally prepared specimens as well as tissue and blood samples. This collection is housed in a dedicated Radioactive Collection room in the NSRL. At least 30 publications have resulted from this research and document the importance of such collections (see biographies of Baker and Chesser for citations).

Other examples of recent and on-going research that have contributed to the growth of the collections include zoonoses studies conducted in cooperation with several other universities and various federal and state agencies, such as the Centers for Disease Control, Texas Department of Public Health, California Department of Health, and the U.S. Army. These research opportunities have contributed significantly (over 4,000 specimens during the last six years) to the growth of both the Traditional and the Genetic Resources Collections.

*Genetic Resources Collection.*—In 1967, the NSRL was among the first academic institutions to establish a “frozen tissues” collection, which is now standard for most natural history museums. For many years, the traditional protocol was to preserve samples of liver, heart, kidney, and muscle tissues. In the late 1990s, the curators of the NSRL expanded the idea of “standard tissues” to include lung and spleen tissues, as well as blood samples. Further, as the value of archived materials for molecular research has grown, the NSRL collection has expanded to include other forms of archived materials, including nobuto strips with dried blood, tissues archived in lysis buffer, tissues archived in ethanol, and DNA and RNA samples. To reflect the changing nature of this collection, it is now known as the Genetic Resources Collection. Texas Tech University is recognized nationally for this collection, and many museums have based the development of their collections on the model established by Texas Tech University.

In 1989, the Genetic Resources Collection of the NSRL consisted of approximately 25,000 samples from 10,000 specimens. Currently, the collection houses more than 220,000 samples from more than 65,000 specimens and 900 species, making it one of the largest such collections in the world. Recognizing that access to voucher specimens can be crucial for future verification of source material, the NSRL has made efforts to assure that the vast majority of the voucher specimens from which genetic materials are obtained are housed at the NSRL. Since 1999, the NSRL has made an average of 85 loans per year from this collection, and the rate of loans continues to increase. Further, the significance of this collection will continue to increase as technological advances in molecular biology allow for more refined studies (e.g., systematic, genetic, forensic, ecotoxicological, and epidemiological) of the biology of the voucher specimens.

#### Publication Series

The NSRL produces three scientific publications: *Occasional Papers, Museum of Texas Tech University* (established 1972), *Special Publications, Museum of Texas Tech University* (established 1972), and *Museology* (established 1975). These publications were initiated through the efforts of J Knox Jones, Jr., while

he was serving as Director of Academic Publications. *Occasional Papers* are short to moderate length scientific papers; *Special Publications* are book-length scientific publications; and *Museology* includes works related to the care and management of museum collections. As of August 2005, these three periodicals totaled 299 publications, 242 of which are *Occasional Papers*, 47 are *Special Publications*, and the remaining 10 are *Museology*. In recent years, the publication rate has grown as a result of the productive research programs of the NSRL staff and associates. For example, the number of *Occasional Papers* published from 1997 through August 2005 was triple the number published during the previous eight years.

#### Collection Management Enhancements

While maintaining a strong commitment to traditional field methods and conventional research, the mammalogists at Texas Tech University have been active in developing and implementing advances in technology to improve the care and curation of the Recent Mammal Collections. In recent years, a primary focus of Robert J. Baker, as Director of the NSRL, has been the development and implementation of cutting-edge technologies to meet the current and future demands of professional mammalogists. Changes implemented at the NSRL in recent years include: the computerization of each collection in a searchable data-

base; the implementation of a bar-code system that allows for quick identification and cataloging of samples; the electronic capture of data in the field; and the assignment of global positioning data to precisely determine collection localities for all specimens. Since 1998, the NSRL staff and associates have published at least seven papers directly related to informatics and the use of technology in the life sciences, data management, and systematic collections (Allen et al. 2001; Baker et al. 1998; King et al. 2000; Knyazhnikitskiy et al. 2000; Monk 1998; Monk and Baker 2001; Parker et al. 1998).

In 2001, Texas Tech University was one of 17 North American institutions to commit to the MaNIS project. MaNIS is an acronym for Mammal Networked Information System. With support from the National Science Foundation, these institutions are developing a network of distributed databases of mammal specimen data. The objectives of MaNIS are to: facilitate open access to combined specimen data from a web browser; enhance the value of specimen collections; conserve curatorial resources; and use a design paradigm that can be easily adopted by other disciplines with similar needs (Wieczorek 2001). Texas Tech University and the NSRL are excited about this opportunity for natural history museums to come together to build and support a biodiversity informatics infrastructure in an open, collaborative manner.

### FACULTY AND STAFF OF THE DEPARTMENT OF BIOLOGICAL SCIENCES AND NSRL

As the first mammalogist at Texas Tech University, one of Packard's first goals for the program was to recruit additional mammalogists in an effort to build a productive program of research and education. Packard began by recruiting Robert J. Baker, who joined the Texas Tech University faculty in 1967. This began a continued trend of growth and expansion as additional mammalogists joined the faculty of the Department of Biological Sciences and later the staff of the Natural Science Research Laboratory. Typically, new faculty members were sought out and recruited by existing faculty. For example, Baker nominated and recruited J Knox Jones, Jr., who came to Tech in 1971 as Dean of the Graduate School and Professor of Biological Sciences. In the same year, J Knox Jones, Jr., brought in Dillard C. Carter from Texas A&M as

Associate Dean of the Graduate School and Professor of Biology. Jones also was largely responsible for the appointment of Hugh H. Genoways in 1972 as the first Curator of Mammals for the NSRL, and for bringing Clyde Jones into the program in 1982 as Director of the Museum and Chairman of the Museum Science Department. Robert J. Baker, J Knox Jones, Jr., and Clyde Jones also played various roles in the appointments of Ronald K. Chesser, Michael R. Willig, Robert D. Owen, Robert D. Bradley, and David J. Schmidly. Texas Tech University has been fortunate to have other quality researchers join the mammalogy faculty, including Carleton J. Phillips when he was hired as Chairman of the Department of Biological Sciences in 1998. Most recently, Jorge Salazar-Bravo joined the Biological Sciences faculty in 2003.

The mammalogists of Texas Tech University have been active in describing new species and subspecies of mammals in the scientific literature. Robert L. Packard, Robert J. Baker, J Knox Jones, Jr., Hugh H. Genoways, and Robert D. Bradley have described more than 60 taxa of Recent mammals. Since 2002, five new species-level taxa of Recent mammals have been described by Baker, Bradley, and associates (Baker et al. 2002, 2003, 2004; Bradley et al. 2004a, 2004b). The description of new mammalian taxa inevitably will continue as further research is conducted utilizing the NSRL Genetic Resources Collection, employing molecular methods and the application of the genetic species concept (Bradley and Baker 2001).

Following are brief biographies of key personnel who have contributed substantially to the science of

mammalogy and to the growth of the mammal collections at Texas Tech University. Most of these individuals are traditional mammalogists, whereas others specialize in fields other than mammalogy, but have contributed significantly to mammalian education and research at Texas Tech University. Most of the individuals profiled below have served on the faculty of the Department of Biological Sciences. Many have served as Curators, Collections Managers, and/or Research Associates of the NSRL. The publication records of these individuals total more than 1,900 papers and at least 50 books. Biographical accounts are presented in order of arrival at Texas Tech University with the dates of service provided in parentheses.

### ROBERT L. PACKARD (1962-1979)

Robert L. Packard was born in 1928 in Lincoln, Nebraska. He obtained his B.S. from the University of Nebraska in 1951 with a double major in Botany and Zoology. After two years of service in the U.S. Army as an officer in the ordinance corps, Packard attended graduate school at the University of Kansas where he received his M.A. in 1955 under Rollin H. Baker. He received his Ph.D. from the University of Kansas under the guidance of E. Raymond Hall in 1960.

Packard was an Assistant Professor of Biology at Stephen F. Austin State College for three academic years (1959-1962). In 1962, Packard took a position in the Department of Biological Sciences at Texas Tech University (then known as Texas Technological College) as the university's first mammalogist. While at Texas Tech University he held the positions of Assistant Professor (1962-1965), Associate Professor (1965-1967), and Professor of Biology (1967-1979). Packard also served as Assistant Dean of the Graduate School (1967-1968), Coordinator of Research for the Museum (1971-1975), Curator of Mammals (1962-1971), and Director of the Junction Center Campus (1975-1979). He served as president of the Southwestern Association of Naturalists (1972-1973) and as chair of the Local Committee for the annual meeting of the American Society of Mammalogists held at Texas Tech University in June 1976. Throughout his

career in the biological sciences Packard was active in publishing, beginning with his first manuscript in 1950 as an undergraduate (*Notes on the nesting of the black-crowned night heron at the Valentine National Wildlife Refuge, Nebraska*) to his last, published in 1979 (*Demographic patterns of small mammals: a possible use in impact assessment*). Packard published 61 papers during his career, with 40 of those occurring during his tenure at Tech. Packard described six taxa of Recent mammals: *Baiomys musculus handleyi*, *Baiomys musculus pullus*, *Baiomys taylori canutus*, *Baiomys taylori fuliginatus*, *Ochrotomys nuttalli floridanus*, and *Ochrotomys nuttalli lisae*. He is a co-author on the description of a fossil species, *Baiomys intermedius* (Packard and Alvarez 1965), and the renaming of a whale, *Feresa occulta* (Jones and Packard 1956).

Packard was instrumental in developing the groundwork for the Texas Society of Mammalogists (TSM). This was one of his most cherished dreams, and Robert Baker notes that Packard first outlined his vision of a Texas mammal society to Baker during the ASM meetings in Long Beach, California, in June 1966. Packard's vision included presentations by students, a lecture by an invited keynote speaker, and participation by each of the mammalogy programs in Texas, with each institution reporting on research activities, grants, and each graduate student's thesis or disserta-



tion project. His primary agenda was to enhance the quality of mammalogy in the state by increasing communication between the various universities, programs, and individuals involved in mammalian research and education.

Unfortunately, Packard never saw his plan for a Texas Society of Mammalogists come to fruition; on 8 April 1979, Packard passed away from colon cancer. His passing might have been a death knell for the Texas mammal society, as well. However, many Texas mammalogists wanted to see Packard's dream become a reality. On 20 November 1981, Arthur G. Cleveland, of Texas Wesleyan University, convened an organizational meeting of the society at Texas Tech University's Junction campus. Twenty-nine participants were in attendance at that meeting, with Arthur Cleveland and John C. Patton (then at Baylor University) serving as *ad hoc* presiding officers. The attendees appointed a committee of four – Robert E. Martin (University of Mary Hardin-Baylor), Frank W. Judd (Pan American University), Brian R. Chapman (Corpus Christi State University) and Arthur Cleveland – to prepare a constitution for the society. The first official meeting of the Texas Society of Mammalogists took place February 19–21, 1983, with Robert J. Baker serving as the *ad hoc* presiding officer. The society has met annually every year since 1983 at the Texas Tech University Junction Campus. Texas is the only individual state in the U.S. with a scientific society devoted to mammalogy. In 1984, the Texas Society of Mammalogists honored Robert L. Packard by establishing the Robert L. Packard Award for the best student paper in natural history research (the Packard Award was later designated for the Best Overall student paper). In 1985, Packard was recognized as part of the first

class of Honorary Members of the Texas Society of Mammalogists. As of today, Packard is the only individual recognized posthumously.

Packard was known as an excellent teacher both in the field and in the classroom. He was particularly committed to field biology, and to the introduction of undergraduate students to that experience. He was well known for his field trips, where graduate and undergraduate students, often non-biology majors, were encouraged to experience the hard work and satisfaction of conducting field research such as trapping rodents, especially kangaroo rats. Packard was recognized for his contributions to undergraduate education by several awards, including the Distinguished Teaching Award from Standard Oil of Indiana (1971), the Sigma Delta Chi Teaching Award (1972), and the Outstanding Undergraduate Teaching Award from Mortar Board (1974). In addition, the Southwestern Association of Naturalists honored Packard's teaching skills with the establishment of the Robert L. Packard Outstanding Educator Award.

Packard's leadership included the direction of the first Ph.D. student in biological sciences to graduate from Texas Tech University; Herschel Garner's dissertation, *Population Dynamics, Reproduction, and Activities of the Kangaroo Rat, Dipodomys ordii, in Western Texas*, was completed in August of 1970. In total, Packard directed 19 master's students and eight Ph.D. students to completion while at Texas Tech University, all of who conducted mammalian-based research (Table 2). A synopsis of Packard's career and publication record is provided in Jones (1981) and Martin and Chapman (1984).

### ROBERT J. BAKER (1967-PRESENT)

Robert J. Baker was born in 1942 in Warren, Arkansas. Baker received his B.S. degree from Arkansas A&M College in 1963. In 1965, he obtained his M.S. degree from Oklahoma State University, completing his work under Bryan P. Glass. Baker then attended the University of Arizona in Tucson where he obtained his Ph.D. in 1967 under the guidance of E. Lendell Cockrum. In addition, Baker spent the sum-

mers of 1967 and 1968 in a postdoctoral position at M.D. Anderson Hospital in the lab of T. C. Hsu.

In 1967, Packard recruited Baker to join the Department of Biological Sciences at Texas Tech University as Assistant Professor. Baker was promoted to Associate Professor in 1971 and Professor in 1975. In 1979, Baker was named Paul W. Horn Professor,

Table 2. Graduate students of Texas Tech University faculty associated with the Department of Biological Sciences and/or Natural Science Research Laboratory. An asterisk (\*) indicates the thesis or dissertation research of the student had a mammalogy or systematic collections focus. Several students (no asterisk) received a non-thesis (NT) M.A. degree in Museum Science, but conducted mammalogical research independently; other students generated theses and dissertations in other zoological categories, but participated in mammal-related research projects.

Major Advisor	Student Name	Degree Completed	Year Completed
Robert L. Packard	* William B. Grabowski	M.S.	1964
	* Duane Ikenberry	M.S.	1964
	* Paul G. Desha	M.S.	1964
	* Herschel W. Garner	M.S.	1965
	* Robert B. Drotman	M.S.	1967
	* Frank Schitoskey, Jr.	M.S.	1967
	* David J. Schmidly	M.S.	1968
	* Daniel R. Womochel	M.S.	1968
	* Frank W. Judd	M.S.	1968
	* Robert C. McReynolds	M.S.	1968
	* Joyce W. Mize	M.S.	1969
	* Paul R. Ramsey	M.S.	1969
	* Jimmy D. Roberts	M.S.	1969
	* Brian R. Chapman	M.S.	1970
	* Gerald L. Johnson	M.S.	1972
	* Michael H. Droge	M.S.	1976
	* Peter V. August	M.S.	1976
	* Michael C. Krenz	M.S.	1977
	* Timothy L. Tandy	M.S.	1978
	* Herschel W. Garner	Ph.D.	1970
	* Walter H. Conley	Ph.D.	1971
	* Robert W. Wiley	Ph.D.	1972
	* Graham C. Hickman	Ph.D.	1974
	* Robert E. Martin	Ph.D.	1974
	* Kenneth G. Matocha	Ph.D.	1975
	* James B. Montgomery	Ph.D.	1979
	* John W. Clarke	Ph.D.	1979
Robert J. Baker	* Dale Berry	M.S.	1969
	* Omer J. Reichman	M.S.	1970
	* William J. Bleier	M.S.	1971
	* Brent Lee Davis	M.S.	1973
	* Stephen L. Williams	M.S.	1973
	* Ira F. Greenbaum	M.S.	1975
	* John E. Cornely	M.S.	1975
	* Margaret O'Connell	M.S.	1975
	* Edward Pembleton	M.S.	1975
	* John C. Patton	M.S.	1976
	* Rebecca A. Bass	M.S.	1978
	* Laurie Erickson	M.S.	1979
	* Anette Johnson	M.S.	1979
	* Paul Young	M.S.	1979
	* Karen McBee	M.S.	1980
	* Mike Arnold	M.S.	1981
	* Ben Koop	M.S.	1982

Table 2 (cont.)

Major Advisor	Student Name	Degree Completed	Year Completed
Robert J. Baker	* Cora Clark	M.S.	1983
	* Kimberlyn Nelson	M.S.	1984
	* Hae Kyung Lee	M.S.	1985
	* Albert Kumirai	M.S.	1989
	* Kevin L. Bowers	M.S.	1992
	Mary Maltbie	M.S.	1992
	* Shelly Witte	M.S.	1993
	Susan Carron	M.S.	1995
	* Sergio Tiranti	M.S.	1996
	* Ted W. Jolly (co-advised with R. D. Bradley)	M.S.	1997
	* April Bates	M.A.	1997
	Ellen Roots	M.S.	1998
	* Britney Hager	M.A.	1998
	* Cole Matson	M.S.	1999
	* Oleksiy Knyazhnytskyi (co-advised with R. R. Monk)	M.A.	1999
	* Nicole Lewis-Oritt	M.S.	2000
	* Reagan D. King	M.A.	2000
	* Amy Halter (co-advised with R.R. Monk)	M.A.	2001
	* Mark O'Neill	M.S.	2001
	* Emma Mae Pamela Dawson	M.A.	2001
	* Yelena Dunina	M.S.	2003
	* Mariko Kageyama (co-advised with R. R. Monk)	M.S.	2003
	* Rene Fonseca	M.S.	2004
	Holly Bjorum	M.A. (NT)	2005
	* Adam Brown	M.S.	In Progress
	* Peter Larsen	M.S.	In Progress
	Juan Pablo Carrera	M.A.	In Progress
	Tamara Enríquez	M.A.	In Progress
	* James Hoyt Bowers	Ph.D.	1973
	* Jerry W. Warner	Ph.D.	1973
	* V. Rick McDaniel	Ph.D.	1973
	* William J. Bleier	Ph.D.	1975
	* John W. Bickham	Ph.D.	1976
	* Ira F. Greenbaum	Ph.D.	1978
	* Terry L. Yates	Ph.D.	1978
	* Rodney L. Honeycutt	Ph.D.	1981
	* Margaret A. O'Connell	Ph.D.	1981
	* Mike Haiduk	Ph.D.	1983
	* Fred B. Stangl, Jr.	Ph.D.	1984
	* Mazin B. Qumsiyeh	Ph.D.	1986
	* Craig S. Hood	Ph.D.	1986
	* David C. Kerridge	Ph.D.	1987
	* Ronald A. Van Den Bussche	Ph.D.	1989
	* Meredith J. Hamilton	Ph.D.	1989
	* Alec Knight	Ph.D.	1991
	* Robert D. Bradley	Ph.D.	1991
	Calvin Porter	Ph.D.	1992
	* Jonathon L. Longmire	Ph.D.	1993
	* Joaquin Arroyo-Cabrales	Ph.D.	1994
	* Cheryl A. Schmidt	Ph.D.	1995
	* James Andrew Dewoody (co-advised with R. K. Chesser)	Ph.D.	1997
	* Mary Maltbie	Ph.D.	1997

Table 2 (cont.)

Major Advisor	Student Name	Degree Completed	Year Completed
Robert J. Baker	* R. Richard Monk	Ph.D.	1997
	James Cathey	Ph.D.	1997
	* Burhan Ghariebeh	Ph.D.	1997
	* Kateryna Dmytrivna Makova (co-advised with R. K. Chesser)	Ph.D.	1999
	* Anton Nekrutenko	Ph.D.	1999
	* Kelly Allen (co-advised with N. C. Parker)	Ph.D.	2000
	* Brenda E. Rodgers	Ph.D.	2000
	* Jeffery K. Wickliffe	Ph.D.	2002
	* Federico Hoffmann	Ph.D.	2002
	* Deidre Parish	Ph.D.	2003
	Adam Fuller	Ph.D.	2004
	* Hugo Mantilla	Ph.D.	2004
	* Emma Dawson	Ph.D.	2005
	* Sergio Solari	Ph.D.	In Progress
	* Vicki Swier	Ph.D.	In Progress
	* Heather Meeks	Ph.D.	In Progress
	* Michelle Knapp	Ph.D.	In Progress
	Norma Salcedo Mautua (co-advised with R. Strauss)	Ph.D.	In Progress
J Knox Jones, Jr.	* John C. Hafner	M.S.	1976
	Joaquin Arroyo-Cabrales	M.A. (NT)	1987
	* Russel Pesaturo	M.S.	1989
	* Dallas Eugene Wilhelm	Ph.D.	1977
	* William D. Webster	Ph.D.	1983
	* Robert R. Hollander (co-advised with C. Jones)	Ph.D.	1988
	* Moira van Staaden (co-advised with R. K. Chesser)	Ph.D.	1989
	* Larry L. Choate (co-advised with C. Jones)	Ph.D.	1991
	* Richard W. Manning (co-advised with C. Jones)	Ph.D.	1991
Dilford C. Carter	* C. Stanley Rouk	Ph.D.	1973
	* Patricia Dolan	Ph.D.	1982
Hugh H. Genoways	Stephen L. Williams	M.A. (NT)	1975
	R. Laurie Robbins	M.A. (NT)	1975
	David K. Dean	M.A. (NT)	1976
	Robert C. Dowler	M.A. (NT)	1976
	Rene Laubach	M.A. (NT)	1976
	M. Houston McGaugh	M.A. (NT)	1976
	Michael L. Bishop	M.A. (NT)	1977
	Catherine H. Carter	M.A. (NT)	1977
	Sara E. W. Franken	M.A. (NT)	1977
	Thomas E. Herman	M.A. (NT)	1977
	David O. Lintz	M.A. (NT)	1977
	M. Elizabeth McGhee	M.A. (NT)	1977
	Eddie C. Rowland	M.A. (NT)	1977
	Michael J. Smolen	M.A. (NT)	1977
	Stephen T. Sousa	M.A. (NT)	1977
	Pierre Swanepoel	M.A. (NT)	1977

Table 2 (cont.)

Major Advisor	Student Name	Degree Completed	Year Completed
Stephen L. Williams	Andrea Veatch	M.A. (NT)	1993
	Laura Branstetter	M.A. (NT)	1994
Ron K. Chesser	* David McCullough	M.S.	1985
	* Susan Noble	M.S.	1986
	* Kevin Willis	M.S.	1987
	Janis Files	M.S.	1987
	Rebecca Meyers	M.S.	1988
	* Susan Winde	M.S.	1989
	* Eric Jordan	M.S.	In Progress
	* David McCullough	Ph.D.	1991
	* Moira Van Staaden (co-advised with J. K. Jones, Jr.)	Ph.D.	1989
	* Andrew Dewoody (co-advised with R. J. Baker)	Ph.D.	1997
	* Kateryna Makova (co-advised with R. J. Baker)	Ph.D.	1999
Clyde Jones	Stephen McDonald	M.A. (NT)	1986
	Pat Brown	M.A. (NT)	1987
	Mary Candee	M.A. (NT)	1987
	Tommy Eaton	M.A. (NT)	1987
	Brenda Cooke	M.A. (NT)	1988
	Nancy Hildreth	M.A.	1988
	Patsy Jackson	M.A. (NT)	1988
	Lorelei Mount	M.A.	1988
	Mark Murphy	M.A. (NT)	1988
	David Zuflacht	M.A. (NT)	1993
	* Dawn Kaufman (co-advised with M. R. Willig)	M.S.	1994
	Deidre Parish	M.S.	1994
	* Maryann Lynch	M.S.	1995
	* Kristie Jo Roberts	M.S.	1998
	* Robert R. Hollander (co-advised with J. K. Jones, Jr.)	Ph.D.	1988
	* Paisley S. Cato (co-advised with D. J. Schmidly)	Ph.D.	1990
	* Larry L. Choate (co-advised with J. K. Jones, Jr.)	Ph.D.	1991
	* Richard W. Manning (co-advised with J. K. Jones, Jr.)	Ph.D.	1991
	* Jim R. Goetze	Ph.D.	1995
	* Franklin D. Yancey, II	Ph.D.	1996
Michael R. Willig	* Randy Colbert	M.S.	1986
	Debbie Kyroutac (co-advised with J. C. Zak)	M.S.	1988
	Elizabeth Sandlin	M.S.	1989
	Debbie Bean	M.S.	1990
	Javier Alvarez	M.S.	1991
	* Dianne Hall	M.S.	1992
	David Herrmann (co-advised with R. W. Sites)	M.S.	1992
	John Cary	M.S.	1992
	Özlen Konu (co-advised with D. L. Moorhead)	M.S.	1992
	* S. Kathleen Lyons	M.S.	1994
	* Dawn Kaufman (co-advised with C. Jones)	M.S.	1994
	Michele Secrest	M.S.	1995
	Alec B. Shaner	M.S.	1995

Table 2 (cont.)

Major Advisor	Student Name	Degree Completed	Year Completed
Michael R. Willig	* Richard N. Stevens	M.S.	1996
	Brian Croyle	M.S.	1997
	* Michael Cramer	M.S.	1998
	Carla G. Guthrie (co-advised with D. L. Moorhead)	M.S.	1998
	Donald A. Yee	M.S.	1999
	* Paulo Marcos Gorresen	M.S.	2000
	Kelly Johnson	M.S.	2000
	* Jeffrey Law	M.S.	In Progress
	* Joseph Felts	M.S.	In Progress
	* Brian Klingbeil	M.S.	In Progress
	* Lily Arias	M.S.	In Progress
	* Michael R. Gannon	Ph.D.	1991
	Gerardo R. Camilo	Ph.D.	1992
	Javier Alvarez	Ph.D.	1997
	Dianne L. Hall	Ph.D.	1997
	Stephen B. Cox	Ph.D.	1999
	Jeffery C. Roberts	Ph.D.	2002
	* Richard D. Stevens	Ph.D.	2002
	Chris P. Bloch	Ph.D.	2004
	* Stephen Presley	Ph.D.	2004
Robert D. Owen	* Celia López González	M.S.	1993
	* Lorinda L. Sheeler-Gordon	M.S.	1996
	* Steven T. Mezik	M.S.	1997
	* Hu Wang	M.S.	2001
	* Alisa A. Abuzeih	M.S.	In Progress
	* Tyla Holsomback	M.S.	In Progress
	* Celia López González	Ph.D.	1998
	* Carl W. Dick	Ph.D.	2005
	* Daniela Miotti	Ph.D.	In Progress
Robert D. Bradley	* Noe de la Sancha	Ph.D.	In Progress
	* Charlene L. Mauk	M.S.	1996
	* Sarah Hrachovy (co-advised with M. A. Houck)	M.S.	1997
	* J. Jeffrey Root (co-advised with S. Demarais)	M.S.	1997
	* Ted W. Jolley (co-advised with R. J. Baker)	M.S.	1997
	* Lottie L. Peppers	M.S.	1998
	* Stacy J. Mantooth	M.S.	1999
	* Irene Tiemann-Boege	M.S.	1999
	* Melinda Clary	M.S.	2000
	* John R. Suchecki	M.S.	2003
	* Serena A. Reeder	M.S.	2003
	* Lisa K. Longhofer	M.S.	2004
	* B. Dnaté Baxter	M.S.	In Progress
	* Ryan Chambers	M.S.	In Progress
	* Nevin Durish	M.S.	In Progress
	* Cody W. Edwards	Ph.D.	2000
	* Darin S. Carroll	Ph.D.	2002
	* Brian Amman	Ph.D.	2005

Table 2 (cont.)

Major Advisor	Student Name	Degree Completed	Year Completed
Robert D. Bradley	* Francisca Mendez-Harclerode	Ph.D.	2005
	* Michelle L. Haynie	Ph.D.	In Progress
	* John D. Hanson	Ph.D.	In Progress
R. Richard Monk	* Oleksiy Knyazhnytskyi (co-advised with R. J. Baker)	M.A.	1999
	* Hye Kyoung Kang	M.A.	1999
	* Susan E. Fishman-Armstrong	M.A.	2000
	* Amy S. Halter (co-advised with R. J. Baker)	M.A.	2001
	* J. Heath Garner	M.A.	2002
	* Mariko Kageyama (co-advised with R. J. Baker)	M.A.	2003
	* Jeongheui Lim	M.A.	2003
David J. Schmidly	* Christine Hice	Ph.D.	2003
Carleton J. Phillips	* Joel G. Brant	Ph.D.	2005
	* Robert S. DeBaca	Ph.D.	In Progress
Jorge Salazar-Bravo	* Joseph Carmichael	M.S.	In Progress
	* Jonathan Dunnum	Ph.D.	In Progress

the highest faculty position awarded at Texas Tech University. Baker also held the position of Associate Chairperson of Biological Sciences (1985-1986). Currently, Baker is Horn Professor of Biology as well as Director of the NSRL and Curator of Mammals and Vital Tissues (Genetic Resources), positions he has held at the Museum since 1976.

Baker has developed a broad interest in mammalian research, including chromosomal evolution, systematics, zoogeography, and ecotoxicology. He has become an international leader in chromosomal research and its applicability to species concepts, diversity, speciation, and systematics. Baker's other research interests include genetic consequences of environmental pollution, conservation genetics, cultivar identification, DNA zip codes, genome organization, *in situ* hybridization and chromosomal architecture, mobile DNA, molecular genetics, molecular systematics, contact zones between chromosomal races, speciation, and American leaf-nosed bats. Since 1994, Baker has actively conducted research, with Ron Chesser and oth-

ers, at the site of the Chornobyl Nuclear Reactor disaster (Baker et al. 1996; Baker and Chesser 2000).

Throughout his career Baker has been active in publishing, with more than 320 publications including five edited books and four obituaries. Baker has described 10 taxa of Recent mammals: *Uroderma bilobatum davisii* (Baker and McDaniel 1972), *Chiroderma improvisum* (Baker and Genoways 1976), *Eptesicus guadeloupensis* (Genoways and Baker 1975), *Geomys bursarius knoxjonesi* (Baker and Genoways 1975), *Rhogeessa genowaysi* (Baker 1984), *Rhogeessa hussoni* (Genoways and Baker 1996a), *Carollia sowelli* (Baker et al. 2002), *Notiosorex cockrumi* (Baker et al. 2003), *Lophostoma aequatorialis* (Baker et al. 2004), and *Oryzomys andersoni* (Brooks et al. 2004). Of the two described as subspecies, *Geomys knoxjonesi* is currently recognized as a distinct species (Baker et al. 1989) and *Uroderma bilobatum davisii* appears to be reproductively isolated from the remainder of *Uroderma bilobatum* (Hoffmann et al. 2003). Baker's contributions to research were acknowledged by the American

Society of Mammalogists with the presentation of the C. Hart Merriam Award in 1980 and by the Southwestern Association of Naturalists with the presentation of the Donald W. Tinkle Research Excellence Award in 1993. In 1990, Baker was recognized as a Fellow of the Texas Academy of Sciences. His rendering of long and dedicated service to the American Society of Mammalogists was recognized with the presentation of the H.H.T. Jackson Award in 1994. Baker was granted Honorary Membership by the Texas Society of Mammalogists in 1997 and by the American Society of Mammalogists in 2005. Also in 2005, Baker was presented with the Barbara Bowman Award from the Texas Genetics Society for the Texas Outstanding Geneticist.

Baker has been involved intensely in the education of graduate students while at Tech. Baker has been recognized for his work with students, in the classroom as well as in the lab and in the field, by several awards, including the Joseph Grinnell Award for Excellence in Education in Mammalogy in 2000 from the American Society of Mammalogists, the first annual TTU Association of Biologists Award for Excellence in Graduate Education in 2001, and the South-

western Association of Naturalists Robert L. Packard Outstanding Educator Award in 2002. In 38 years at Texas Tech University, Baker has directed 41 Master's students and 35 Ph.D. students to completion (Table 2). Currently, Baker has eleven graduate students (two M.S., two M.A., and seven Ph.D. candidates).

Baker has been dedicated to supporting professional organizations, including serving as Editor for General Notes (1972-1973), Editor for Feature Articles (1974-75), Journal Editor (1985-1987), and Managing Editor of the *Journal of Mammalogy* (1982-1984, 1992-1993). Baker also served as editor of the *Occasional Papers* and *Special Publications* of the Museum, Texas Tech University (1975-1984, 1992-present). He has served as President of the Southwestern Association of Naturalists (1981-1982), the Texas Tech University chapter of Sigma Xi (1989), the Texas Society of Mammalogists (1990-1991), the American Society of Mammalogists (1994-1996), and the Texas Genetics Society (2003). Recently, Baker was chair of the Local Committee for the 83rd annual meeting of the American Society of Mammalogists held at Texas Tech University in June 2003.

### **J KNOX JONES, JR. (1971-1992)**

J Knox Jones, Jr., was born in 1929 in Lincoln, Nebraska. He received his B.S. in Zoology from the University of Nebraska in 1951 and his Master's degree in Zoology in 1953 from the University of Kansas under the direction of Rollin H. Baker. In 1953, Jones entered the U.S. Army and served on active duty in the United States, Korea, and Japan until 1955, and as a reservist until 1965. In 1955, Jones returned to the University of Kansas to pursue a Ph.D. under the direction of E. Raymond Hall. Upon completing the Ph.D. in 1962, Jones was appointed Assistant Professor of Zoology and Assistant Curator of Mammals at the University of Kansas. He subsequently was promoted to Associate Professor and Associate Curator (1965-1968), then Professor and Curator (1968-1971). Jones also served the Kansas Museum of Natural History as Assistant Director (1965-1967) and Associate Director (1967-1971).

In 1971, Jones was hired by Texas Tech University as Dean of the Graduate School and Professor of Biological Sciences. In 1974, he was promoted to Vice President for Research and Graduate Studies, a role he maintained until 1984. In 1986, Jones was named Paul Whitfield Horn Professor of Biological Sciences and Museum Science. Jones served the Museum of Texas Tech University as Research Associate (1972-1984), Acting Director (1971-1972), and Curator (1984-1992).

Jones also served Texas Tech University as Director of Academic Publications (1971-1984), during which time he initiated the museum publications series *Occasional Papers*, *Special Publications*, and *Museology*. He served as editor for these series from 1984 until his death in 1992. Jones also served as Managing Editor for *Evolution* (1965-1966), *Journal*



of *Mammalogy* (1967-1973), and *Texas Journal of Science* (1985-1992), and Jones served as President of the American Society of Mammalogists (1972-1974) and the Texas Society of Mammalogists (1985-1986).

Jones' research interests, from his graduate years through his tenure at Texas Tech University, included the systematics, taxonomy, and distribution of mammals in the U.S. (particularly the Great Plains), Mexico, Central America, and the Caribbean Islands. Jones described five species and 28 subspecies of mammals (one species and nine subspecies during his tenure at Tech), including *Feresa occulta* (Jones and Packard 1956), *Desmodus stocki* (Jones 1958), *Reithrodontomys spectabilis* (Jones and Lawlor 1965), *Reithrodontomys paradoxus* (Jones and Genoways 1970), and *Glossophaga mexicana* (Webster and Jones 1980). Three mammals were named in Jones' honor (*Geomys bursarius knoxjonesi*, *Onychomys torridus knoxjonesi*, and *Blarina brevicauda knoxjonesi*). There are also six ectoparasites and one endoparasite species named for J Knox Jones, Jr.

Among Jones' most significant contributions to mammalogy was the *Checklist of Mammals of North America North of Mexico*, first published in 1973. Demand for that checklist was so great that it was necessary to reprint the publication. The checklist

soon became a series, and seven editions of the *Revised Checklist of Mammals of North America North of Mexico* (1975, 1979, 1982, 1986, 1992, 1997, 2003) have now been published.

Jones was the recipient of numerous awards from the various societies he served, including the C. Hart Merriam Award (American Society of Mammalogists, 1977), Hartley H. T. Jackson Award (American Society of Mammalogists, 1983), Texas Scientist of the Year (Texas Academy of Science, 1992), Donald W. Tinkle Research Excellence Award (Southwestern Association of Naturalists, 1992), and Honorary Membership (American Society of Mammalogists, 1992; Texas Society of Mammalogists, 1992). A prolific writer, he published 376 works including 15 authored or edited books. While at Tech, Jones directed three Master's and six Ph.D. students (Table 2).

Jones passed away 15 November 1992 while still on the faculty at Texas Tech University. Before his death, he established the J Knox Jones, Jr. Memorial Scholarship to be awarded annually to graduate students at Texas Tech University that have demonstrated excellence in mammal-based research. Additional biographical information regarding J Knox Jones, Jr., is available in Genoways and Baker (1996b) and Findley et al. (1996).

### DILFORD C. CARTER (1971-1990)

Dilford C. Carter was born in 1930 in Abilene, Texas. Carter received his B.S. and M.S. degrees from Southern Methodist University. He earned his Ph.D. from Texas A&M University in 1962 under the direction of William B. "Doc" Davis. From 1962 to 1971, Carter was on the faculty of Texas A&M University and staff of the Texas Agricultural Experiment Station, and he also served as Curator of Mammals of the Texas Cooperative Wildlife Collection. Carter came to Texas Tech University in 1971 as the Associate Dean of the Graduate School and served in that capacity until 1983. Carter also was Director of Texas Tech University Press (1976-1984), Editor of *Academic Publications* (1972-1984), and Director of *PrinTech* (1985-1990).

Carter's colleagues and peers often refer to him as the world expert on molossid bats. He specialized in collecting bats and other mammals in the American tropics. Carter was strongly committed to fieldwork and to introducing students to field biology. He led many field trips to Mexico that were taught as Museum Science courses. Two significant accomplishments while at Texas Tech University were receiving (with J Knox Jones, Jr.) a Smithsonian Foreign Currency Grant for studying mammals in Croatia, and his publication, along with his Ph.D. student Patricia Dolan, of the *Catalogue of Type Specimens of Neotropical Bats in Selected European Museums* (Carter and Dolan 1978). Carter also served as editor, along with Baker and J Knox Jones, Jr., of the three-part series, *Biol-*

ogy of Bats of the New World Family Phyllostomatidae (Baker et al. 1976, 1977, 1979). Carter described at least five mammalian taxa, including *Vampyrops nigellus* (Gardner and Carter 1972), *Vampyrops brachycephalus* (Rouk and Carter 1972), and *Tonatia silvicola occidentalis*, *Tonatia silvicola centralis*, and *Tonatia*

*evotis* (Davis and Carter 1978). Carter directed two Ph.D. students of mammalogy while at Tech (Table 2). Carter retired from Texas Tech University in 1990 and currently is involved in private business enterprises in Lubbock.

### HUGH H. GENOWAYS (1972-1976)

Hugh H. Genoways was born in 1940 in Scottsbluff, Nebraska. He obtained a B.S. in Biology from Hastings College in 1963. In 1971, Genoways obtained his Ph.D. from the University of Kansas. He was directed in his doctoral studies first by E. Raymond Hall and then by J Knox Jones, Jr.

In 1972, Genoways became Curator of Mammals at the Museum of Texas Tech University. He subsequently became an Adjunct Assistant Professor for both the Department of Biological Sciences and the School of Medicine from 1973 to 1976, and served as the Acting Coordinator of Research for the Museum in 1975-1976. Genoways also was active in the establishment of the Museum Science Program at Texas Tech University, becoming a Lecturer in 1974. Genoways supervised 16 master's students in the Museum Science Program (Table 2) during his five-year association with Texas Tech University. Genoways has been a Research Associate of the NSRL since 1999.

Genoways' research interests include the systematics, biogeography, and ecology of New World mammals, especially rodents and bats. He has described one genus, eight species, and 12 subspecies of mammals, including *Reithrodontomys paradoxus* (Jones and Genoways 1970), *Liomys spectabilis* (Genoways 1971), *Ancyrocyotis rasmusseni* (Sutton

and Genoways 1974), *Eptesicus guadeloupensis* (Genoways and Baker 1975), *Chiroderma improvisum* (Baker and Genoways 1976), *Tonatia schulzi* (Genoways and Williams 1980), *Molossops neglectus* (Williams and Genoways 1980), and *Rhogeessa hussoni* (Genoways and Baker 1996a).

Genoways has published 228 scientific papers and has authored or edited 14 books. Genoways was managing editor of the *Journal of Mammalogy* from 1974 to 1978, and was editor of *Museology* for Texas Tech University from 1975 to 1976. He served as President of the American Society of Mammalogists (1984-1986) and the Southwestern Association of Naturalists (1984-1985). In 1987, Genoways received the C. Hart Merriam Award from the American Society of Mammalogists, and he was named an Honorary Member of the society in 2002. In 2004, Genoways received the H. H. T. Jackson Award of the American Society of Mammalogists in recognition of his outstanding service to the society.

In 1976, Genoways was hired as Curator of Mammals at the Carnegie Museum of Natural History. In 1986, he became Director of the University of Nebraska State Museum, and served in that position until 1994. Currently, he is the Chair of the Museum Studies Program and Professor of Museum Studies at the University of Nebraska-Lincoln.

### STEPHEN L. WILLIAMS (1975-1976, 1990-1995)

Stephen L. Williams was born in 1948 in Midland, Texas. He attended Texas Tech University, and in 1970 he obtained his B.S. in Zoology with a minor in Geology. In 1973 he received a M.S. in Zoology with a minor in Botany under the guidance of Robert

J. Baker. He received a M.A. two years later in Museum Science under the direction of Hugh H. Genoways. Upon his graduation in 1975, Williams became the Collection Data Analyst at the Museum of Texas Tech University. In 1976, Williams became Col-

lection Manager of the Section of Mammals, Carnegie Museum of Natural History in Pittsburgh, Pennsylvania. He served in that position until 1990, when he returned to Texas Tech University as Collections Manager and Adjunct Professor of Museum Sciences. He chaired the graduate committees of two Master of Arts students while at Texas Tech (Table 2).

Williams left Texas Tech University in 1995 to pursue his current position as Assistant Professor of Museum Studies at Baylor University. Williams received his Ph.D. in Conservation in October 1999 from Göteborg University, Göteborg, Sweden. Williams is active in several professional organizations and served as President of the Society for the Preservation of

Natural History Collections (1990-1992). He has extensive field experience in the United States, Mexico, and Suriname, as well as many other international localities. Williams has described six mammalian taxa: *Molossops neglectus* (Williams and Genoways 1980), *Tonatia schulzi* (Genoways and Williams 1980), *Geomys personatus davisii* (Williams and Genoways 1981), *Aselliscus tricuspidatus koopmani* (Schlitter et al. 1983), and *Tonatia saurophila bakeri* and *Tonatia saurophila maresi* (Williams et al. 1995). Williams has more than 130 publications, including three books, in mammalogy and museology; his publications are exemplary in exploring methods and procedures to improve care of mammal collections.

#### RONALD K. CHESSEY (1981-1989, 2001-PRESENT)

Ronald K. Chesser was born in 1951 in Carnegie, Oklahoma. He graduated with a B.S. from the University of Oklahoma in 1973. In 1976 he completed a M.S. degree at Memphis State University under the direction of Michael Harvey. He obtained his Ph.D. under the direction of Gary D. Schnell at the University of Oklahoma in 1981. Chesser came to Texas Tech University as an Assistant Professor in the Department of Biological Sciences in 1981. While at Texas Tech, Chesser contributed substantially to the Museum Science program, especially in database management and computerization of the collection. In 1987, he was promoted to Associate Professor. In 1989, Chesser accepted a position at the Savannah River Laboratory at the University of Georgia. Chesser served that institution in several different capacities until 2001, when he returned to Texas Tech University as Professor to head a biological informatics initiative in the Department of Biological Sciences.

Much of Chesser's research has focused on spatial and temporal dynamics of nuclear and organelle genes. He also has been interested in detailing the behavioral ecology of organisms and the influence of behaviors on the mode and tempo of evolution within and among populations through the use of theoretical models. In addition, Chesser's research includes the effect of radiation and other chemical hazards at Chernobyl, Ukraine, and in other regions of the world. His recent publications documenting the internal and external dose of native mammals at Chernobyl (Chesser et al. 2001) and recreating the radioactive plumes at Chernobyl (Chesser et al. 2004) are landmark works relevant to basic biological science and national strategic planning for nuclear power plant accidents and terrorism. While at Tech, he has supervised six masters and four doctoral students and currently he has one M.S. student (Table 2). He also has directed five postdoctoral students. Chesser has published more than 120 papers and one book.

#### CLYDE JONES (1982-PRESENT)

Clyde Jones was born in 1935 in Scottsbluff, Nebraska. After graduating from Hastings College with a B.A. (1957), he entered graduate school at the University of New Mexico under the direction of James S. Findley. He received both his M.S. (1960) and Ph.D.

(1964) degrees from this institution with his research centering on the microtine rodents and bat populations of the Mogollon Mountains of New Mexico. In 1965, Jones began teaching as an Assistant Professor at Tulane University in New Orleans, Louisiana. His major

research interests while at Tulane included the distribution of bats in southern Louisiana and the bats, rodents, and primates of Rio Muni, West Africa. His publications regarding the primates of Rio Muni, West Africa (Jones and Riopelle 1973, 1974) are considered classic.

Jones was Chief of the Mammal Section of the Bird and Mammal Laboratory at the National Museum of Natural History from 1970 to 1973. He was Director of the National Fish and Wildlife Research Laboratory, National Museum of Natural History; from 1973 to 1979. He then served as Director of the Denver Wildlife Research Center in Denver, Colorado, from 1979 to 1982.

As a result of a reorganization of the U.S. Fish and Wildlife Service in 1982, Jones was offered an administrative position in Washington, D.C. Rather than accept that position, Jones preferred to continue his field-based research, and he decided to accept the position of Director of the Museum of Texas Tech University. Jones served as Director of the Museum until 1985, and served as Chairman of the Museum Science Department until 1987. Since 1987, Jones has served as Professor in the Department of Biology and as Curator of the NSRL. Jones also was Associate Chair of the Department of Biological Sciences from 1987 to 2002.

In 1999, Jones was awarded Texas Tech University's highest faculty award, the Paul Whitfield Horn Professorship. Other awards presented to Jones

while at Texas Tech University include the Award of Excellence (Texas Tech University Press, 1993), Outstanding Researcher (Texas Tech University, 1995), the Hartley H.T. Jackson Award (American Society of Mammalogists, 1997), and Honorary Membership (Texas Society of Mammalogists, 1995; American Society of Mammalogists, 2003). In 2003, the Texas Society of Mammalogists honored Jones by establishing a new student award, for Best Poster Presentation, as the Clyde Jones Award.

Jones served as President of Texas Society of Mammalogists (1987-1988), Managing Editor for the *Journal of Mammalogy* (1984-1990), and in various other capacities for the American Society of Mammalogists, Texas Society of Mammalogists, Chihuahuan Desert Research Institute, and the Biological Society of Washington.

Jones' research interests while at Tech include the taxonomy, systematics, distribution, ecology, and biogeography of Recent mammals, particularly in the Chihuahuan Desert. Jones has published over 180 scientific papers including five books. Jones described one mammalian subspecies, *Myotis fortidensis sonoriensis*, and elevated *Myotis lucifugus occultus* to a species (Findley and Jones 1967). He has directed 14 master's students and six doctoral students to completion while at Texas Tech University (Table 2). Jones retired from teaching in 2003, but as Professor Emeritus he remains active in research in the Department of Biological Sciences and the NSRL.

#### MICHAEL R. WILLIG (1983-PRESENT)

Michael R. Willig was born in 1952 in Pittsburgh, Pennsylvania. He graduated from the University of Pittsburgh in 1974 with a Bachelor of Science degree in Biology. He received a Ph.D. in Biology in 1981 from the University of Pittsburgh under the direction of Michael A. Mares.

Willig began his career at Texas Tech University in 1983 as an Assistant Professor and was promoted to Professor of Biology in 1993. He was Chairman of the Department of Biological Sciences from 1995 to

1997, and Director of the Institute for Environmental Studies from 1994 to 1996. Willig has served in a number of editorial capacities including: Associate Editor for the *Journal of Mammalogy* (1991-1994), Associate Editor for *Special Publications* of the American Society of Mammalogists (1999-2001), Associate Editor for *Frontiers in Ecology* (2002-2004), Associate Editor for *Mastozoologia Neotropical* (1993-present), and Editorial Board member for *Biological Conservation* (2003-present).

While at Tech Willig has served as major advisor to 24 masters and nine doctoral students (Table 2), and he has directed 11 post-doctoral associates. Willig has published 134 manuscripts and four books. He has extensive field research experience in Paraguay, Peru, Puerto Rico, and Brazil. His research interests include quantitative approaches to ecological, biogeographic, and systematic questions based on manipulative and observational experiments or modeling exercises. He has a broad taxonomic interest, including several invertebrate groups, but his main mammalogical interest is bats. He received the Barney E. Rushing Faculty Distinguished Research Award from Texas Tech University and the George Miskisch Sutton Award

in Conservation Research from the Southwestern Association of Naturalists. Willig has described two mammalian taxa (*Tonatia saurophila bakeri* and *Tonatia saurophila maresi* [Williams et al. 1995]).

While remaining on faculty at Texas Tech University, Willig served the National Science Foundation as Director in the Ecology Program (2000-2002), and currently serves as Director of the Division of Environmental Biology (2004-present). These positions include the management and leadership of the premier funding programs for basic research in ecology, evolution, and systematics in the United States.

#### ROBERT D. OWEN (1983-1989, 1991-PRESENT)

Robert D. Owen was born in 1948 in Tulsa, Oklahoma. He graduated from the University of Oklahoma in 1976 with a Bachelor of Science in Zoology. He received a Ph.D. in 1987, also in Zoology, from the University of Oklahoma under the direction of Gary D. Schnell.

Owen was hired by Texas Tech University in 1983 to serve as Museum Collection Manager at the NSRL, where he remained until 1989. From 1989 to 1991, he was an Assistant Professor in the Department of Biology at the University of Missouri-Kansas City. He returned to Texas Tech University in 1991 as an Assistant Professor of Biological Sciences and was promoted to Associate Professor in 1997. He has served as a major advisor to six masters and four doctoral students at Texas Tech University (Table 2).

Owen has published 55 manuscripts and has received two Fulbright Scholarships for lecturing and research in Paraguay. His research interests include mammalian systematics, zoogeography, evolution, and zoonoses, with emphasis on Neotropical fauna. Owen has described two mammalian taxa; a subspecies, *Pygoderma bilabiatum magna* (Owen and Webster 1983), and *Koopmania*, a genus of Stenodermatine bat (Owen 1991). Other interests include the implementation of multivariate statistical methods in systematics and evolution, philosophy and methodology in vertebrate phylogenetics, and morphological correlates of genetic phenomena in mammals and bioindicators of environmental disruption and contamination.

#### ROBERT D. BRADLEY (1994-PRESENT)

Robert D. Bradley was born in 1960 in Carthage, Missouri. He graduated with a Bachelor of Science degree from Texas A&M University in 1983. In 1986 he completed a Master of Science degree at Texas A&M under the direction of David J. Schmidly. He obtained his Ph.D. in 1991 under the direction of Robert J. Baker at Texas Tech University. Bradley held two postdoctoral positions, the first with David M.

Hillis and James J. Bull at University of Texas at Austin (1991-1992), and the second with Rodney L. Honeycutt at Texas A&M University (1992-1994). Bradley joined the faculty of Texas Tech University in 1994 and currently serves as Associate Professor in the Department of Biological Sciences and Curator of Mammals at the NSRL.

Bradley served as President of the Texas Society of Mammalogists (2002-2003) and as Associate Editor for the *Journal of Mammalogy* (2001-2005). While the focus of Bradley's research is mammalian systematics and molecular evolution, his research interests are fairly broad and encompass topics such as hybrid zones, chromosomal evolution and speciation, the origin and evolution of rodent-borne viruses, epidemiology and zoonoses of mammalian-borne viruses, the growth and utilization of natural history collections, bioinformatics, and the utility of the Genetic Species Concept (Bradley and Baker 2001). Bradley has continued the tradition of field-based research at Texas Tech University by teaching the Field Methods course of the Museum, a course that was first implemented by Packard. Several of the courses involved trips to Mexico (1995, 1997, 2000, 2005) and Honduras (2001, 2004) and have included many graduate and under-

graduate students, as well as faculty from other institutions, such as Ron Van Den Bussche and Meredith Hamilton of Oklahoma State University. Bradley's research program includes a strong commitment to the tradition of collecting voucher specimens with associated tissues. Bradley has directed four doctoral students and 11 master students to completion, and currently he has three master's student and two doctoral students (Table 2). He has published 98 papers. Bradley has described two new mammalian species (*Reithrodontomys bakeri* [Bradley et al. 2004b] and *Peromyscus schmidlyi* [Bradley et al. 2004a]), and has propose that 10 others be elevated from subspecific to specific status (*Peromyscus beatae*, *P. sagax*, *P. levipes*, *Geomys knoxjonesi*, *G. streckeri*, *Neotoma leucodon*, *N. picta*, *N. isthmica*, *Sigmodon toltecus*, and *S. hirsutus*).

### R. RICHARD MONK (1995-2003)

R. Richard Monk was born in 1963 in Spanish Fork, Utah. He obtained his Bachelor of Science in Zoology in 1987 from Brigham Young University. At Texas Tech University he earned a masters degree in Museum Science in 1990 and a Ph.D. in Biology in 1997 under Robert J. Baker. His dissertation research involved the development of databases for systematic collections. During his time at Texas Tech University, Monk was a Curatorial Assistant (1989-1990, 1993-1995), Collections Manager (1995-1996), Assistant Curator (1996-1997), and Curator of Collections and Adjunct Professor (1997-2003). Monk was a key

component in the development of database applications for the NSRL collections. In June 2003, Monk chaired the 18th annual meeting of the Society for the Preservation of Natural History Collections, which was hosted by the Museum of Texas Tech University. Monk taught several classes in Museum Science and Biology at Texas Tech University, and he advised seven students that earned post-graduate degrees at Tech (Table 2). Monk has published 13 manuscripts. He currently serves as Curatorial Associate in the Department of Mammalogy at the American Museum of Natural History in New York.

### DAVID J. SCHMIDLY (1996-2002)

David J. Schmidly was born in 1943 in Levelland, Texas. He obtained his Bachelor of Science degree from Texas Tech University in 1966. Two years later he completed a Master of Science degree at Tech under the direction of Robert L. Packard. He obtained his Ph.D. in 1971 under the supervision of Donald F. Hoffmeister at the University of Illinois-Champaign/Urbana. After completing his Ph.D., he joined the faculty of the Department of Wildlife and Fisheries Sciences at Texas A&M University and eventually held

two major administrative positions; Head of the Wildlife and Fisheries Sciences Department (1986-1992), and Chief Executive Officer and Campus Dean of Texas A&M at Galveston (1992-1996). In 1996, Baker urged Schmidly to return to his *alma mater* of Texas Tech University as Graduate Dean, as well as Professor of Biological Sciences and Curator of Mammals for the NSRL. Schmidly was quickly promoted to Vice President for Research and Graduate Studies, then to President of Texas Tech University in 2000. Schmidly served

in that capacity until 2003, when he accepted the position of President and CEO of the Oklahoma State University system.

Schmidly's research interests include the systematics, taxonomy, and natural history of Nearctic/Neotropical mammals, with special interests in the conservation of wildlife diversity in Texas, the southwestern U.S., and Mexico, and the marine mammals of the Gulf of Mexico. His publication record includes 99 scientific publications and seven books.

Among the most noted of Schmidly's books are the fifth (1995; co-authored with William B. Davis) and sixth (2004) editions of *The Mammals of Texas*. *The Mammals of Texas* is considered a standard reference for Texas mammalogists, and the book is used as a textbook or primary reference material by many of the universities and colleges in the state that teach mammalogy courses. Another book, *Texas Natural History: A Century of Change*, published in 2001 by the Texas Tech University Press, chronicles the history of

mammalogy in Texas and the changes in the natural history of Texas mammals as a result of human influences in the 20th century.

Schmidly has served as President of the Southwestern Association of Naturalists (1980-1981) and the Texas Society of Mammalogists (1985-1986). In 2003, he was elected to the Texas Hall of Fame for Science, Mathematics, and Technology, and he was the inaugural recipient of the Harvey Weil Professional Conservationist Award. He served as Editor of the *Journal of Mammalogy* for three years, and served on the Board of Directors for ASM from 1978-1999. Schmidly was the first recipient of the Donald W. Tinkle Research Excellence Award by the Southwestern Association of Naturalists in 1988. In 1999, the Texas Society of Mammalogists named Schmidly an Honorary Member. In 2003, the American Society of Mammalogists recognized his contributions to education in mammalogy with the Joseph Grinnell Award. While at Tech, Schmidly supervised one doctoral student (Table 2).

#### CARLETON J. PHILLIPS (1998-PRESENT)

Carleton J. Phillips was born in 1942 in Muskegon, Michigan. He graduated from Michigan State University with a Bachelor of Science degree in Zoology in 1964. He received a Master of Science degree in 1967 under the direction of E. Raymond Hall. In 1969 he obtained his Ph.D. in Zoology from the University of Kansas under the direction of J Knox Jones, Jr. Phillips served in various faculty and administrative capacities, including Department Chair and Graduate Program Director for the Department of Biology at Hofstra University and Chair of Biological Sciences at Illinois State University, before coming to Texas Tech University in 1998 as Chair of the Department of Biological Sciences (1998-2002) and Professor of Biological Sciences (1998-present). Phillips was promoted to Assistant Vice President for Research in 2002. From June 2003 to September 2004, Phillips served as a William C. Foster Fellow in the Office of Proliferation Threat Reduction (PTR), Nonproliferation Bureau at the U.S. Department of State. From December 2003 through June 2004 he also was Special Advisor on Nonproliferation to the Coalition Pro-

visional Authority in Iraq (Office of National Security Affairs). Presently, he is an advisor to the State Department on Proliferation Threat Reduction and Professor of Biological Sciences at Texas Tech University.

While working in Baghdad and Basra, Iraq (October 2003-June 2004), Phillips and Dr. Alex Dehgan developed the Iraq International Center for Science and Industry (IICSI), which is a program to redirect to civilian work the Iraqi scientists, engineers, and technicians who previously were employed in nuclear, chemical, and biological weapons programs and delivery systems. Phillips also worked with Iraqi universities on the broader issue of reconstruction of science and technology in Iraq. He helped create the Iraq Radioactive Source Regulatory Authority, the Iraq Nonproliferation Programs Foundation (a planned precursor to a future Iraq National Science Foundation), and advised the Iraq Interim Government National Security Affairs Advisor on treaties and conventions related to nuclear, chemical, and biological weapons.

Phillips received the C. Hart Merriam Award for Excellence in Research from the American Society of Mammalogists in 1999 and *Tributes of Appreciation* for service to the nation from the Secretaries of State and Defense and from Presidential representative L. Paul Bremer in 2004. Phillips has more than 140 scientific publications. A historical perspective on the history of academic field mammalogy in North America (co-edited with Clyde Jones) was published by the Texas Tech University Museum in 2005 (Phillips and Jones 2005). Phillips' research interests include general mammalian biology, comparative ultrastructure and molecular and cellular evolution, as well as biogeography and population molecular genetics. The majority of Phillips' scientific articles since 1985 (more than

60) focused on comparative ultrastructure, molecular evolution of secretory products, and histochemistry of mammalian salivary glands. He pioneered field technology for preserving tissue samples for laboratory transmission electron microscopy. As a result, he and Dr. Bernard Tandler have compared cell structure in more than 300 species of mammals and described several new secretory cell organelles and unique evolutionary modifications associated with diet or reproductive isolation. Phillips' current scholarship includes national biosecurity issues and national security and strategic planning on biological weapons defense, dual use technologies, and infectious agents associated with wild mammal reservoirs. He has supervised one doctoral student to completion (Table 2).

#### **JORGE SALAZAR-BRAVO (2003–PRESENT)**

Jorge Salazar-Bravo was born in 1964 in La Paz, Bolivia. He obtained his B.S. in 1988 from the Universidad Mayor de San Andres, Bolivia. In 2000, Salazar-Bravo earned his Ph.D. in Biology from the University of New Mexico under the direction of Terry L. Yates. He was Acting Assistant Curator of Mammals at the Museum of Southwestern Biology, University of New Mexico, from 2000 to 2001. In 2001, Salazar-Bravo was hired as a Visiting Assistant Professor in the Department of Biology and Curator of Mammals of the Museum of Southwestern Biology at the University of New Mexico. Salazar-Bravo came to Texas Tech University in 2003 as an Assistant Pro-

fessor in the Department of Biological Sciences to strengthen the program in the study of mammalian reservoirs associated with zoonotic diseases.

His research interests include virus/host coevolution and the interplay between ecology and disease, as well as systematics, biogeography, evolution, and conservation of Neotropical and Nearctic mammals. He has extensive field experience in South America, Central America, and the southwestern United States. Salazar-Bravo has published 36 scientific papers, and currently he is mentoring one M.S. and one Ph.D. student (Table 2).

#### **CONTRIBUTIONS OF RESEARCH ASSOCIATES AND OTHERS**

Numerous professionals other than mammalogy faculty have contributed to the mammalogy program at Texas Tech University in various ways over the past 40+ years. Such contributions include the development and administration of related programs (such as the Museum Science program), the direction of graduate students who conducted mammalian research, service on the committees of mammalogy graduate students, the contribution of mammal specimens to the NSRL collections, and collaborative research efforts with NSRL staff and faculty. These individuals typically have come from disciplines other than mammal-

ogy, such as museum science, paleontology, ornithology, herpetology, entomology, parasitology, endocrinology, ecology, and wildlife biology. Some have been faculty of the Department of Biology, some have been faculty of other Texas Tech University departments, and some have been associated with other universities or institutions.

Most of the individuals discussed in this section, and many others, have been officially recognized as Research Associates of the NSRL. Table 3 provides a list of the Research Associates of the NSRL from 1970



to present. Research Associates of the NSRL are “professionals, who may or may not be employees of Texas Tech University, who are associated in a professional manner with the collections and/or the personnel of the NSRL.” They are appointed on an annual basis by the Director of the Museum. The responsibilities of a Research Associate include carrying out field and laboratory research activities in association with the professional staff of the NSRL, carrying out research and scholarly activities utilizing the collections of the NSRL, and promoting the NSRL through the production of research and scholarly activities. The students of Research Associates often utilize the NSRL to complete the requirements for graduate degrees. Since 1970, the collaborative relationships between the NSRL and the Research Associates have been profitable for Texas Tech University, the Museum, the NSRL, and the science of mammalogy. While it is beyond the scope of this paper to discuss individually all of the Research Associates of the NSRL and others who have contributed to the mammalogy program, we have chosen here to recognize a select few who have been particularly influential in the growth and success of the mammalogy program at Texas Tech University.

Mary Elizabeth King was Curator of Anthropology and Professor of Anthropology and Museum Studies from 1971 to 1978. She also served as Acting Chairperson of the Museum Studies Department. King co-founded the Museum Science Program with Craig Black and Hugh Genoways.

Craig C. Black was a vertebrate paleontologist. He came to Texas Tech University in 1972 as Director of the Museum and Professor of Geosciences. He was a major force in the development of the Museum Science Program at Texas Tech University, and oversaw the construction of the NSRL building.

Robert W. Wilson also was a vertebrate paleontologist. He was a Visiting Professor in Museum Science and Geosciences at Texas Tech University from 1975 to 1977. Wilson specialized in the study of the Order Rodentia.

Nick C. Parker came to Tech in 1988 as leader of the federal Fish and Wildlife Cooperative Research Unit. He worked with Robert J. Baker, Gary F. Edson, and John M. Burns to secure line item funding for the Museum in a biological database initiative. Parker was the driving force in the cooperative study between Texas Tech University and Texas Parks and Wildlife that produced *Texas Parks and Wildlife for the 21st Century* (Schmidly et al. 2001).

Richard E. Strauss joined the faculty of the Biology Department in 1992. He specializes in biometry and multivariate statistics. Although Strauss’ interests are primarily associated with fishes, he has directed one mammalogy graduate student, and he has served on numerous graduate committees of mammalogy students. Strauss works enthusiastically and tirelessly to strengthen the experimental design and statistical analyses of graduate students’ theses and dissertations.

A select few of a long list of other professionals who have contributed to the mammalogy program at Texas Tech University include William R. Atchley, Fred C. Bryant, John M. Burns, J. C. Cross, Stephen Demarais, Llewellyn D. Densmore, Jerran T. Flinders, George W. Fulk, Raymond C. Jackson, Eileen Johnson, Marilyn A. Houck, Mildred Lowe, Robert W. Mitchell, Danny B. Pence, Stuart L. Pimm, Francis L. Rose, Michael K. Rylander, Russell W. Strandtmann, Donald W. Tinkle, and Robert J. Warren.

## GRADUATE EDUCATION

Although a few mammal-focused Master’s theses were completed prior to 1962, Robert L. Packard’s arrival in that year generally is recognized as the true beginning of the graduate mammalogy program at Texas Tech University. The first Ph.D. in Zoology with a mammalogy focus was granted to Packard’s

student, Herschel W. Garner, in 1970. From 1954 through 2005, the Department of Biological Sciences granted at least 91 M.S. and 69 Ph.D. degrees that involved mammalian research. In addition, the Museum Science Program at Texas Tech University is one of the few programs in the nation offering a

*Table 3.—Research Associates of the NSRL, 1970-2005.*

Name	Current affiliation
Arroyo-Cabrales, Joaquin	Instituto Nacional de Antropología e Historia, México
Baker, Robert	Texas Tech University
Bickham, John W.	Texas A&M University
Bogan, Michael A.	USGS, Fort Collins
Carter, Dillford	Texas Tech University (retired)
Cathey, James C.	TAMU Extension Center, Uvalde
Chesser, Ron	Texas Tech University
Choate, Jerry R.	Fort Hays State University
Cockrum, E. Lendell	University of Arizona (Prof. Emeritus)
Dalquest, Walter	deceased
Fulhorst, Charles	University of Texas, Medical Branch, Galveston
Genoways, Hugh	University of Nebraska-Lincoln
Gharaibeh, Burhan	University of Pittsburgh
Goetze, Jim	Laredo Community College
Hamilton, Meredith	Oklahoma State University
Hoffmann, Federico	University of Nebraska
Hoffmann, Robert S.	Smithsonian Institution
Honeycutt, Rodney L.	Texas A&M University
Hood, Craig C.	University of Loyola
Jackson, Raymond C.	Texas Tech University
Jannett, Jr., Frederick	University of Minnesota
Jones, Cheri A.	University of Colorado, Denver
Jones, Jr., J. Knox	deceased
Kendall, Ron	Texas Tech University
Manning, Richard	Southwest Texas State University
Mares, Michael	University of Oklahoma
McMurry, Scott	Texas Tech University
Milazo, Mary Lou	University of Texas Medical Branch, Galveston
Mollhagen, Tony R.	Texas Tech University
Muniz-Martinez, Raul	Instituto Politécnico Nacional, México
Nash, Robert	deceased
Owen, James	Universidad Salvadoreña Alberto Masferrer, El Salvador
Owen, Robert	Texas Tech University
Packard, Robert L.	deceased
Parker, Nick	Texas Tech University (retired)
Patton, James L.	Univ. of California at Berkeley
Pence, Danny P.	Texas Tech Health Sci. Center
Phillips, Carlton J.	Texas Tech University
Quintana, Miguel	U.S. Army, Fort Lewis, Washington
Qumsiyeh, Mazin	SiParadigm Inc., New Jersey
Rodgers, Brenda	West Texas A&M University
Sanchez-Hernandez, Canelio	Universidad Nacional Autónoma de México
Sansom, Andrew	Texas State University, River Systems Institute
Schlitter, Duane	Texas Parks and Wildlife
Schmidly, David	Oklahoma State University
Simmons, Nancy	American Museum of Natural History
Stangl, Frederick	Midwestern State University
Tesh, Robert B.	University of Texas, Medical Branch, Galveston
Tiranti, Sergio	Universidad Nacional de La Pampa, Argentina
Van Den Bussche, Ron	Oklahoma State University
Willig, Michael	Texas Tech University
Williams, Stephen	Baylor University
Wilson, Don	Smithsonian Institution
Yates, Terry	University of New Mexico

Master's degree in Museum Science with a Natural History specialization. Since 1997, the Museum Science Program has produced 13 Master's students whose theses specialized in mammalian studies or systematic collections management. At least 28 students since 1975 have utilized the Recent Mammal Collections while obtaining a non-thesis Master's degree in Museum Science.

During the early years of the mammalogy program, the theses and dissertations produced by graduate students primarily involved classical taxonomic, ecological, behavioral, physiological, and reproductive studies and employed conventional methodology (e.g., morphometrics, allozymes). In recent years, dissertation and thesis research projects typically have employed advanced techniques and subject matters such as molecular systematics, biological informatics and data management, global positioning, epidemiology, and chromosomal evolution.

Graduates from the mammalogy program at Texas Tech University continue to benefit the science with on-going research and education programs at universities, museums, state and federal agencies, and private-sector businesses around the world. Just a few examples of the institutions employing Texas Tech University mammalogy graduates include: Baylor University, Brigham Young University, Lamar University, Louisiana State University, Loyola University, Oklahoma State University, Penn State University, Purdue University, Stanford University, Texas A&M University, Texas Tech University, University of New Mexico, Yale University, American Museum of Natural History, U.S. National Museum of Natural History, Centers for Disease Control, U.S. Fish and Wildlife Service, Glaxo Wellcome Biotech, Lexicon Genetics Inc., St. Jude Children's Research Hospital, Therion International, and World Wildlife Fund.

#### ADMINISTRATORS AND BENEFACTORS

A critical factor to success in academia that is often under appreciated, or even maligned, is the university administration. Relative to the mammalogy program and the NSRL at Texas Tech University, the university administration has been a powerful and positive force. Although the vision for the program came from the faculty, without the support and commitment of the administration, the mammalogy program undoubtedly would not have accomplished so much in its relatively short history. The administrative chain of command for the NSRL and the Museum falls outside of the normal university structure, and therefore it was often necessary to have administrative support for our programs to be given a high priority for funding and to facilitate growth and success.

Presidents of the university that have been supportive through many venues include Grover E. Murray (geology); Lauro F. Cavazos (education); Robert W. Lawless (business administration); Donald R. Haragan (atmospheric science); and David J. Schmidly (mammalogy). The support continues today through President Jon S. Whitmore (theater arts). Donald R. Haragan assisted the NSRL in the development of the

biodiversity Line Item initiative, and made it possible for the mammalogists of the Biology Department to collaborate among colleges to develop interdisciplinary programs. David J. Schmidly contributed to the development of the new Experimental Sciences building, the cooperative nature of which will promote more effective use of the data in the biodiversity database. Schmidly also provided key support to the dedication of the Ben E. Keith donation to the expansion of the NSRL.

Texas Tech University recently reorganized its administrative hierarchy and created a chancellor's position. Both individuals who have served in that position have had a positive impact on activities associated with the NSRL. Chancellor John T. Montford was a key proponent of the biodiversity Line Item initiative and even co-authored two papers on the interactions of bioinformatics and natural history databases. Chancellor David R. Smith worked with Museum Director Gary Edson and the NSRL administration to ensure the completion of the new wing of the NSRL building.

Several levels of the university administration have supported the NSRL and its activities through the years. J Knox Jones, Jr., as Vice President for Research and Graduate Studies, provided vision and commitment to the publication series of the Museum as well as the construction of the original NSRL building. John M. Burns, who served both as Chairman of the Biology Department and Provost of the University, is another individual who has remained committed to the success of the mammalogy program. Burns continually facilitated cooperative and positive interactions between the faculty and staff of the NSRL, the graduate and undergraduate programs in the Department of Biology, as well as the university. Burns also was instrumental in obtaining new museum cases to accommodate the transfer of the University of Texas Memorial Museum mammal and bird collections to the NSRL. Additionally, Vice President for Research Robert M. Sweazy has been a continual source of support and assistance in obtaining matching funds for grants and graduate student support.

Museum Directors also have been a continual source of support for the NSRL and its activities. Directors of the Museum since the NSRL was established were Craig C. Black, Clyde Jones, and Gary F. Edson, all of who were critical to continued growth. The current faculty and staff of the NSRL have an excellent working relationship with Director Gary Edson, and he continues to be a strong advocate for

the NSRL's growth and needs. Edson recently secured a grant from the Helen DeVitt Jones Foundation for the purchase of new cases to accommodate the NSRL expansion. Biology Department Chairpersons also have been especially supportive, including John Zak and Carl Phillips, as well as John Burns.

In addition to the faculty positions and other sources of financial support provided by Texas Tech University, there have been a wide variety of entities that have provided funding for faculty, staff, and student salaries, equipment, fieldwork, and laboratory research projects. In addition to the typical National Science Foundation grants and NIH grants, other government agencies such as the Department of Interior and Department of Energy have funded aspects of the Museum and the Department of Biology as part of funded research by faculty. State agencies, particularly the Texas Parks and Wildlife Department, also have funded many mammal research projects by NSRL and Biology faculty, staff, and students. The private donations of James E. Sowell, who funded the Sowell Expeditions to Ecuador and Honduras (2001 and 2004), provided not only a critical component of the growth of the collection but also supported the education of students concerning biodiversity issues. As mentioned previously, the Ben E. Keith Company provided funds for the new NSRL wing, and the Helen DeVitt Jones Foundation provided monies for the purchase of specimen cases.

## CONCLUSION

Texas Tech University has made a substantial commitment to the continued growth of Robert L. Packard's vision, and in this paper we have reviewed the 43-year history of the Mammalogy program, especially as it relates to the Natural Science Research Laboratory. Texas Tech University has had a substantial number of faculty and students who have been active mammalian researchers and who have contributed to the growth of the NSRL mammal collection to over 100,000 specimens, resulting in thousands of scientific publications. A source of pride for the program is the success of our students as mammalogists, museum scientists, natural historians, and conservationists. The addition of a new wing to the NSRL as a

result of the Ben E. Keith donation and continued support from the Museum and University administration are viewed as valuable resources to continue to build a stronger program in Mammalogy and Museum Science. As there is an increase in the application of natural history data with recombinant DNA technology, global positioning information and biological informatics, the resources associated with this program will become more valuable to society for aesthetics, economic development, as well as decisions important to wise conservation of our natural resources. It is the goal of the Museum, the NSRL, and the mammalogy program to provide this critical information to decision makers, scientists, and to society.

## ACKNOWLEDGMENTS AND PERSPECTIVES

The authors wish to thank the following individuals for providing assistance with this historical account: M. E. King Black, D. C. Carter, J. B. Chavez, R. K. Chesser, C. S. Cory, G. F. Edson, H. J. Garner, A. S. Halter, M. L. Haynie, M. A. Jones, T. E. Lee, D. T. Maze, R. R. Monk, R. D. Owen, C. J. Phillips, J. Salazar-Bravo, D. J. Schmidly, S. L. Williams, and M. R. Willig. We also would like to thank two anonymous reviewers for valuable comments concerning earlier drafts of this manuscript.

This has been an awkward paper to write because many of the individuals profiled in this manuscript are also on the author line. The benefit, however, of having so many people involved in writing and documenting the history of mammalogy at Texas Tech is that comparative discussions about significant events and the contributions of individuals have been by a larger committee. As a whole, the authors beg forgiveness for any biases resulting from being “too close to the flame.”

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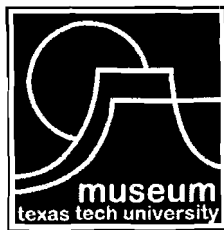
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**ISSN 0149-175X**

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