



## Chapter 1

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Source: Bulletin of the American Museum of Natural History, 2003(279)  
: 1-17

Published By: American Museum of Natural History

URL: [https://doi.org/10.1206/0003-0090\(2003\)279<0001:C>2.0.CO;2](https://doi.org/10.1206/0003-0090(2003)279<0001:C>2.0.CO;2)

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# Chapter 1

## Richard H. Tedford: Field Man, Systematist, Professor, and Mentor

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### PROLOGUE

The field of vertebrate paleontology is rich in creative and insightful personalities who stimulate others to achieve higher goals than perhaps they would otherwise reach. Outstanding for the profession is the career of Richard H. Tedford, whose generous efforts have promoted the advancement of vertebrate paleontology by students and colleagues across the globe. We can measure the breadth of impact on the profession by his scientific productivity, but full appreciation of his colorful career comes through the perspective of those with whom he has worked, or shared a campfire or a beer after a day's fieldwork.

We have assembled some of these reveries, roughly in chronological order, but also by subject matter. Likely the reader will know who wrote what—but we all reflect on the whole career of Dick every time we attempt to encapsulate his work in a few short pages.

Dick Tedford is best known to most vertebrate paleontologists for his eclectic knowledge of paleontology, especially Neogene mammals. He has graced the halls of the American Museum of Natural History for nearly 40 years and there built a career marked by service to visiting scholars. He has developed the museum's incredible holdings of fossil mammals, especially the famed Frick collection, to make them available for scientific research. He has welcomed and en-

abled the research of scholars from across the globe, and thereby made many friends who seek to emulate that cordial and helpful manner. Dick's enthusiasm about mammal systematics embraces all theaters of evolution; hence he is as familiar discussing a Frick quarry sample of ungulates as he is a classical fauna from the Mediterranean. He genuinely enjoys talking paleo with all visitors, especially over coffee after lunch.

Dick Tedford is also a carnivore man. His passion for carnivores of any flavor is obvious, but he has made Canidae his hallmark group. Some of his most specialized systematic work is on the family, and his detailed canid phylogeny based on review of almost every relevant fossil collection is the authority to which all turn.

Dick's fieldwork has focused primarily on the United States, Australia, and China. Hence, many of his scientific publications reflect those interests. Central in all his field-based research is provenance information. The geological setting is a window to fossils as representing once-living organisms, and allows understanding of how remains accumulate. Controlling for environment of deposition validates observed assemblages and paleocommunity reconstruction. Superpositional relationships are first-order observations that require no assumptions about relative age. Observed stratigraphic ranges allow construction of biostratigraphy, which can be tested by repeated observations in

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other settings. Composite biostratigraphies, then, allow proposal of more theoretical biochronologies. For Dick, geological data rank among the most crucial of data sets concerning fossils. One thrust of his own field inquiry has been clarification of provenance information on existing older collections; he visits original collecting areas to sort out associations that are not clear in museum collections. Dick's inquiries have led to seminal theoretical papers on the interplay of fossils and chronology (Tedford, 1970; Lindsay and Tedford, 1990; Tedford, 1995).

DESIGN OF THIS VOLUME: That provenance data are relevant to reconstructing organismal paleobiology and are crucial underpinnings for biochronology is a theme of Tedford's research that repeats throughout his publications and those of his colleagues. It is the unifying theme of this volume. *Vertebrate Fossils and their Context* opens with a series of studies on carnivoran dispersals in honor of Dick Tedford. Tedford has analyzed distribution scenarios, with evaluation of dispersal as an operational mechanism, and, of course, geological context is crucial to these interpretations. Other carnivore papers in honor of Dick's career utilize biological and taphonomical context for interpretation.

E.H. Lindsay's chapter on biochronological concepts, inspired by Dick's modern approach to biochronology (Tedford, 1970), is followed by papers that develop regional biostratigraphic frameworks. These broad regions (southern California, New Mexico, Texas, Mexico) reflect less than half of Dick's own field ventures in North America.

A series of contributions explores specific groups, and each depends on attention to provenance. Each develops understanding of the taxon from a biological perspective by considering variation in modern analogues or quarry samples, be it the lowly *Miomys*, or classical *Merychippus*, or specialized artiodactyls.

Tedford's long-time codevelopers of the vertebrate record of Australia offer papers from that theater of evolution. Of course, Tedford has played a crucial role in developing a modern synthesis of the context of the vertebrate record in Australasia, and these papers honor his efforts.

The volume draws to a close with a set of

papers on microfaunal remains from Asia, employing context of taphonomy, biostratigraphy, and biogeography in their interpretation. Discovery of a new specimen of an enigmatic large-bodied catarrhine from the site of its original provenance adds drama. Finally, contributions from longtime cocurators at the American Museum of Natural History honor Dick's career. The Tedford bibliography was carefully assembled and updated by Judy Galkin.

#### A SYNOPSIS OF THE CAREER OF RICHARD H. TEDFORD

A Bachelor's degree in the field of Chemistry was conferred on Dick from the University of California at Los Angeles in 1951. Dick then was a Fullbright student at the University of Adelaide and South Australian Museum in 1953. He began graduate studies at the University of California, Berkeley, but in 1954, the U.S. Army and one Elizabeth Anne Henderson each claimed him. The former had him for 2 years; Beth had him for 43. Dick returned to university life at Berkeley, where he completed a Ph.D. dissertation in paleontology: *Fossil Macropodidae from Lake Menindee, New South Wales* (under R.A. Stirton). Even before completion of the degree in January 1960, Dick took a job in the geology department at the University of California in Riverside. While there, as lecturer, assistant professor, and then associate professor, Dick developed a number of field studies in southern California that continue to this day as research interests for him. As Malcolm McKenna relates, Dick's interest in the Goler Formation dates to 1952. Subsequent mapping by him serves as a continued basis for publications by field geologists on related units (Dove Springs and Cudahy Camp formations).

In 1966, Dick leaped into a new career as curator of fossil mammals at the American Museum of Natural History. He conducted a pioneering field venture in Afghanistan soon thereafter, and continued his research in Australia through a series of grants. More recently his field efforts have grown to include China, driven in part by the existence of unpublished material from the Neogene of China in New York, and by the need of com-

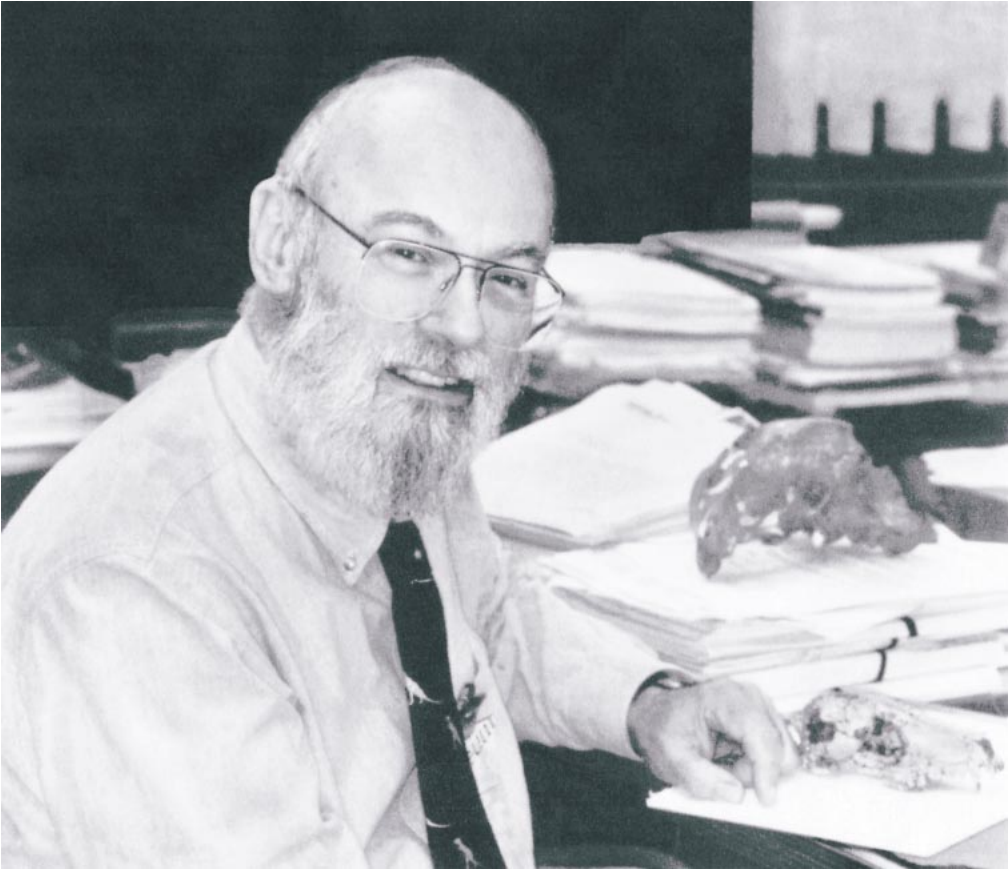


Fig. 1.1. Dr. Richard H. Tedford in the Department of Vertebrate Paleontology, American Museum of Natural History. Dick's AMNH career began in 1966 and included 15 years as chair.

prehending biogeographical interplay with Asia as a key to understanding North American biochronology. His research at the museum thus was field-based as well as systematic. Through the years he published widely on context of occurrence of faunas as well as phylogenetic analysis of Carnivora, Pinnipedia, and Cohort Marsupialia.

Importantly for paleontology and the American Museum, Dick arrived just as the Frick Collection of Cenozoic Mammals was about to open to the scientific community. Tedford made it a priority to develop this collection and make it available to the science of vertebrate paleontology because he recognized that the extraordinary breadth of it, including quarry samples approximating biocoenoses, held tremendous potential to launch the field into new areas of inquiry.

The fabulous species samples of horses, for example, formed the core of understanding of extinct horses as living entities and stimulated Dick's landmark "Hipparion" Conference in 1981.

In two heroic stints as chair of the Department of Vertebrate Paleontology (1976–1982 and 1989–1996), Dick gave 13 years to departmental administration (fig. 1.1). He was a first-class department head, and was continually sought as chair because he brought stability and objectivity to situations often encumbered by independent-minded curators and a sometimes resistant museum administration. He was repeatedly placed in difficult situations, and made all of the curators grateful for his diplomacy and rationality.

Since being hired in 1966, Dick has had a

long history of efforts in exhibition development. He was asked to prepare plans for renovation of the long-obsolete Osborn Hall of Late Mammals, plans that for decades were frustrated by an indifferent and quixotic administration. Some improvements were possible over the years, but deterioration and continuing obsolescence were the rule. Finally, in the early 1990's, when total renovation became reality, Dick and Malcolm were able to inspire the creation of one of the world's greatest exhibitions of mammal evolution. Their knowledge of the vast riches of the American Museum of Natural History collection produced a scientifically sound representation of mammalian history.

Even though Dick is best known for his scientific work, he has contributed to professional geology and paleontology on the national level. He was chair of the Earth Sciences Section, Southern California Academy of Sciences, 1964–1965. He served as president of the Society of Vertebrate Paleontology from 1979 to 1980. In the early 1980s he was a panel member on the Smithsonian Foreign Currency Program (Biology), which benefited many research programs in developing nations.

Dick's research at the American Museum of Natural History focused on Marsupialia and Canidae, but encompassed entire faunas and their succession, especially insofar as they were represented in the collections of that institution. In addition to the Mongolian and Chinese fossils acquired during the Central Asiatic Expeditions, and perhaps surprisingly, the Frick Collection included large samples of mammals from the Late Cenozoic of China. Childs Frick had funded Chinese collectors to build a representative collection comparable to what he was amassing for the great North American West. Dick began research on the material and its provenance, formulating questions about faunal associations that could not be answered from New York. By the early 1980s he began a research agenda with his friend and colleague Qiu Zhanxiang, with the goal of addressing research issues from the field. Preliminary field excursions led to successful grant writing and full scale expeditions in China from 1987 to 1991. This successful program built the first detailed biostratigraphy, clarifying

many context issues, for the late Neogene of eastern Asia.

All of this set the stage for Dick Tedford's continuing career in vertebrate paleontology. He continues to produce systematic works based on collections that were amassed, largely by his efforts. He is compiling manuscripts for a book on the results of his China expeditions. He is writing synthetic works on the paleontology on North America. Dick continues to welcome visitors to the American Museum and play the role of resident authority on Neogene mammals, ever enthused and ready to enrich the museum by the experiences brought by the visitors, and ever eager to share his long perspective on the history of vertebrate paleontology, especially as regards the Frick Collection.

## REFLECTIONS

MIKE WOODBURN: I arrived at Berkeley to begin Ph.D. studies under R.A. Stirton in the fall of 1960. During the course of that first year Stirt was well into his long-term investigation of what was to become a major cornerstone of the record of Tertiary mammals in Australia. When he returned from that year's field season, one of the first things he asked was how would I like to go to Australia next year—that's how I met Dick Tedford.

Our long-term association actually began the following June of 1962 when I accompanied Stirt to the San Francisco airport where we joined Dick and Beth Tedford for my first flight on an airplane (707) for the 15-hour trip to Sydney, and ultimately to Adelaide and Australia's winter. Over the years that Stirt and Dick had been working in and traveling around Australia on their quest for deposits that would produce Tertiary marsupials, they had made many acquaintances in the neo- and paleontological as well as geological communities, and so were invited to numerous venues whereby they could bring their Australian colleagues and members of the general public up to date on things. These delightful narratives (not stodgy lectures) generally were opened by Stirt, but about halfway through the proceedings, he'd turn things over to Dick. Stirt was a *raconteur par excellence*, and gave his au-

dience a very enthusiastic, enjoyable, and valuable presentation, but Dick put everything together in exquisite detail. From him I was treated to a fluent intermingling of all of the neontological, paleontological, and geological data that not only portrayed the stratigraphic and faunal succession(s), but also how these, and their geological setting, contributed to a growing understanding of the evolution of the continent. This was before I had even seen the cliffs with Cenozoic sediments at lakes Palankarina, Pitikanta, and Ngapakaldi.

That happened after we reached Adelaide and the South Australian Museum, one of the most chilblain-producing places in the world, and the staging point for fieldwork in the outback. A Stirton field camp was a happy place and the pesky flies even went to bed at night! When working in the quarries, one came face to face with the geology and stratigraphy, as well as fossils, all of which were new to me. With Dick's enthusiastic guidance, I began to get grounded in the data and details that had so effectively peppered his talks in the towns and now formed the basis for my growing appreciation of just what was going on in this aspect of Australian paleontology. Discussions in the quarry (and back in camp, too) ranged into the Cenozoic of North America, as well, including detailed and cogent comments on fossil horses. Again and again, I was treated to Dick's impressive ability to synthesize myriad information into a coherent summary that invariably led to implications and suggestions for further discussion or investigation.

Tedford's Australian work (1955, 1960) originally focused on the kangaroos (Macropodidae) of the late Pleistocene Menindee fauna, New South Wales. His monographic revision [1966] of *Sthenurus* stands as a major reference. Dick's diverse Australian interests led to a series of pioneering studies in the 1960s (some with Stirton, Woodburne, and A.H. Miller at the University of California) on the Neogene stratigraphy and biochronology of marsupial faunas there, mostly in South Australia, but including the now renowned Riversleigh fossil sequence of Queensland. These studies were precursor to a variety of largely phyletic evaluations of diverse diprotodontians, contributed to com-

pendia on Australia's mammals in the 1980s edited by Tom and Pat Rich (Museum of Victoria and Monash University), and by Michael Archer (Australian Museum and University of New South Wales). Prior to that, however, Dick produced one of the first zoogeographic appraisals of Australia's fauna in terms of the newly developing plate tectonic paradigm, and a persistent theme in all of his Australian work is an evaluation of the geologic and faunal responses to changing climatic and biotic patterns in the Australasian region throughout the Cenozoic Era.

In addition to his pioneering biochronological studies in Australia, Dick's record reflects an even longer devotion to that topic in North America. Beginning in 1954 in California (with contributions continuing to the 1990's), Dick exhibited a strong interest in faunas and strata of the Mojave Desert and adjacent districts of southern California. Upon taking up residence at the American Museum in 1966, Dick was able to access the splendid records and collections of the Frick organization and to address his continual quest for integrating the biochronological, geochronological, and biotic succession in the Cenozoic record of North America (fig. 1.2). This is exemplified by his leadership on the "Miocene" chapter of the 1987 *Cenozoic Mammals of North America*, but key subsets of this continuing overall effort are shown by his work in the Miocene faunal succession of the Española Basin of New Mexico and in the White River Group of Nebraska.

BOB HUNT: By about 1970, incorporating the huge Frick Fossil Mammal Collection into existing vertebrate paleontology holdings became a principal responsibility for Dick Tedford. With the collection came the Frick Lab and a new building. Dick's expertise in North American Neogene mammals meant that he had responsibility for much of the reorganization, documentation, and curation of the new Frick Building and its seven floors of collections.

New graduate students arriving at that time found an extraordinary group of mentors in Morris Skinner, Ted Galusha, and Beryl Taylor of the Frick Lab, together with curators Dick Tedford and Malcolm McKenna on the floor below. These individuals provid-

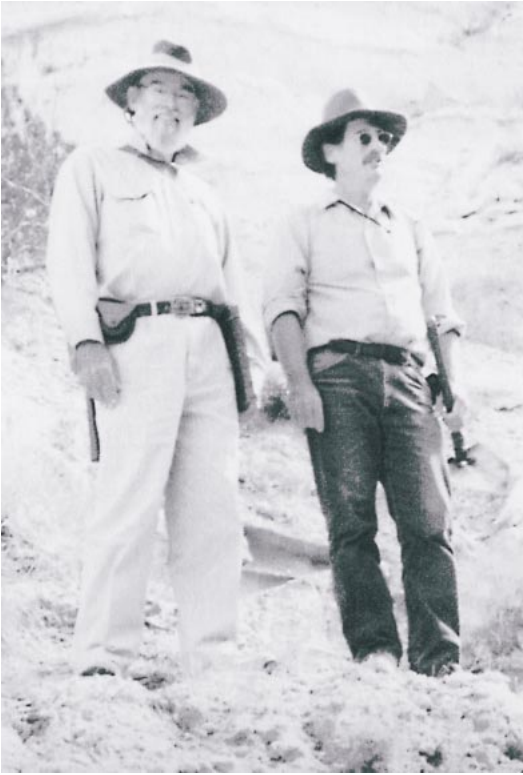


Fig. 1.2. Dick Tedford and Steve Barghoorn in the northwest Albuquerque Basin, New Mexico, during work on the Miocene Cerro Conejo Formation in 1993. Photo by Beth Tedford.

ed a background of experience and an intellectual environment that challenged and motivated students for the next several decades. Students and faculty would repair to the fifth floor office of Morris and Marie Skinner for lunch and mid-afternoon coffee attended by Dick and many others. Here in the “Tower Room,” one absorbed accounts of Frick field parties, Stirton-inspired Berkeley-tradition stratigraphic geology and biochronology, and a remarkable view of Central Park.

The acquisition of the Frick mammals by the museum opened a floodgate of opportunity for young researchers, and Dick’s presence as a guide to the later Cenozoic mammals was invaluable. His knowledge of mid- and late Cenozoic geology and paleontology of the western United States merged with the carefully documented stratigraphic collections and field experience of the Frick collectors and provided the basis for a synthesis

of the Oligocene through Pleistocene North American record. When a student visited Dick’s office with a question concerning placement of a fauna or a stratigraphic problem, he or she invariably received a collegial explanation of regional geology together with a hand-drawn detailed stratigraphic section summarizing the fauna, rock sequence, and structure, and often some good tales of earlier investigations. On his return from field surveys with the Frick crew in the 1960s and later, documenting the geologic setting of the Frick collecting localities, his field notes and measured sections could have been published intact. Students absorbed not only his methods and insights in those office visits, but especially also his positive attitude and demeanor. Many of us took from this relationship with Dick a particular appreciation of his personal qualities: his enthusiasm for his craft, the sharing of ideas and information, and the encouragement of anyone that came within his sphere of activity.

MARIAN GALUSHA: When two people have contributed so much enjoyment to one’s life, when personal friendships accompany and complement the “strictly” professional aspects of a relationship, it is an honor and a pleasure to share a personal viewpoint. This is supposed to be about Dick, but Beth must be included since she was an integral part of my association with them.

It was a historic day when Dick came to work in the American Museum of Natural History. Since my husband, Ted Galusha, was one of the major collectors of the Frick fossils, we always felt privileged that Dick took such a keen and informed interest in that outstanding, precisely documented collection. I began work in the museum at approximately the same time that Dick arrived; I would love to have worked for him but soon discovered I could not read his handwriting!! Now I can!

Dick and Ted held many, many discussions in the museum over countless specimens, stratigraphy charts, field notes, and everything relative to the collection. In 1976, Ted and I “retired” from the AMNH to continue research from the old family farm in Nebraska. Dick’s work for the museum took him all over the world, but our association with Dick and Beth continued—not for long

individual periods, but for intensive field trips, visits to the major quarries and collecting sites, the Niobrara River drainage in western Nebraska, the Dry Mountain area near Safford, Arizona, and the Rio Puerco drainage of New Mexico.

Dick and Beth's visits to Nebraska for concentrated field work at old localities and prospecting new outcrops were always stimulating. Dick's intense interest in the fossils and sites was accompanied by a tremendous amount of knowledge he could always bring to bear at the height of any discussion. Love of the outdoors was not limited to fossils and geology. We might be found admiring and being excited about the lovely sunset-hued fall grasses covering the hills adjacent to and in the Niobrara River valley (this, of course, after visiting the Morava Ranch Quarry), or loading the truck with as many slabs of rock as were allowed, or watching the pin-tailed grouse and deer at the farm. Dick's perfect Manhattans always preceded more animated conversation over dinners and discussions well into the evenings. On the days that Beth and I stayed at the farm, I learned a great deal about Australia, her family, and her life there. She was extremely articulate and had a wonderful sense of humor.

Shortly after Ted's death in 1979, Dick asked me to come to New York for a short period each year for about seven years to index and collate Ted's field books on the New Mexico collecting areas. It was a life saver! I truly appreciate Dick's short visits to Nebraska, which have continued. Sometimes we search for an elusive contact and sometimes we do "arm waving geology" from the car (all for my benefit). Dick's interests in New Mexico and Childs Frick's "old collectors and collections" remain intact. He is a great friend.

LARRY FLYNN: My experiences with Dick were a product of the eighties. One pleasure was getting to know Marian Galusha a little bit. I came to the department in 1983 as the Carter Fellow, specifically to work on Frick small mammals from China. There are still wonderful, unprepared blocks of associated microfauna that need study; Dick proposed that they represent disaggregated owl pellets. Dick and Qiu Zhanxiang identified Yushe Basin, Shanxi Province, as the field area with

the most potential to study composite biostratigraphy in China spanning Pliocene time. Until this work, much of what was known of the Late Neogene of eastern Asia was based on collections made a half century earlier in that very region by Swedish and French paleontologists. Dick and Zhanxiang, with other friends in the Institute of Vertebrate Paleontology and Paleoanthropology, Beijing, as well as Neil Opdyke, Will Downs, and me, conducted formal field campaigns from 1987 to 1991 to reconstruct stratigraphic ranges against the magnetic time scale. Our project was fruitful because of the efforts of many, fostered under the cordial and encouraging atmosphere maintained by Dick and Zhanxiang.

We had many wonderful experiences: varied Chinese cuisine, interesting local characters, truculent drivers, the unique Yushe Hotel (I have a picture of Dick's bathtub filled with black water—before he took a bath!—I guess he skipped it that night). Daily, we relaxed with beers before dinner—it is important to rehydrate. Will loved two things (well, more than two. . .), the local wine (shaji derivative, I think) and the local vinegar. Dick produced the same fine style of field notes and drawings that he perfected in Nebraska. He kept the team on keel, insisting on precise provenance data. His example taught many of the heightened value in a collection, given good data. The small mammal program was a great success—we developed many superposed microsites on which to base a new biostratigraphy. Small mammal diversity was quite high—quite different from what had been known based on "large" small mammals like porcupines, beavers, and zokors (myspalacines).

Subsequent to the field project, we have continued to develop the data toward publication of a monograph. Dick has concentrated on Carnivora with Zhanxiang. In this effort he has been joined by Xiaoming Wang. Xiaoming came to the museum after I went on to Harvard. Xiaoming, in characteristic enthusiastic and intelligent style, has helped to synthesize much of Dick's candid research in recent years. Under consultation from Dick, and with Qiu Zhuding, Xiaoming, and Will, we have extended our work on Chinese micromammal biostratigraphy into the early



Miocene of Lanzhou Basin, Gansu Province. Dick paved the way for a new generation of Sino-American collaborations, one which we continue to explore.

GINA GOULD, A STUDENT'S PERSPECTIVE: When asked to contribute to the opening of this volume, in what should be the most personal of all the submissions in a festschrift, I was both proud and deeply touched to be considered among Dick Tedford's many friends and colleagues that would jump at the opportunity to honor him. Admittedly somewhat daunted by the task because I had never written such a tribute before, this first one was going to be for Dick Tedford, an icon for two generations of vertebrate paleontologists. In preparation I read numerous festschrift forewords, which for the most part, read like expanded curriculum vitae, a format that would not do justice. Fortunately, Larry gave me the opportunity to write about my experience with Dick from the perspective of a student, which necessarily relieves me of responsibility for narrating Dick's academic success and affords the opportunity to write about Dick Tedford as mentor and friend, the Dick Tedford I admire most. For those of you who will read this in years to come, it is this Dick Tedford that made him so beloved by his friends and colleagues, not just because he was a great scientist; the latter was a secondary benefit.

I have known Dick Tedford for 15 years. For many that might not seem like such a long time; for me it is my entire academic career, and even time before that. My first professional visit to the AMNH was in 1987, as the Project Coordinator for the renovation of the Osborn Hall. Just out of Peace Corps and wondering what to do next with my life, I met Dick Tedford, the Curator of the Hall of Late Mammals. Already in its first year of planning, Dick and Lowell Dingus were in the process of developing an exhibit of the most extraordinary fossil mammal collection in the world, and the first to be presented within a cladistic framework. This was a daunting task because at the AMNH, exhibits are a curator's legacy, and it is no modest legacy. Permanent exhibits are usually open for at least a generation (the Osborn Hall exhibit had already been on display for over 40 years), and at the AMNH, an exhibit can ex-

pect literally tens of millions of visitors over its lifetime, including visiting scientists from all over the world. Mistakes don't generally go unnoticed for long.

I first met Dick Tedford in his office (full of long tables on which were perpetually stacked piles and piles of reprints) on the ninth floor in what was then the Department of Vertebrate Paleontology. After a brief introduction by Lowell, the three of us walked down the then freshly painted olive-green hallway (yes, its true, someone actually painted it that color) and took the VP elevators down to the employee cafeteria for lunch, an activity that would soon become a ritual at 11:45 A.M., at least twice a week—a ritual that I am sure most of Dick's friends and visitors have experienced with him at least once. After lunch (Dick usually had one of the hot entrees), we made our way up to the Curator's lounge on the fifth floor in the turret on 77th Street for daily coffee and conversation. In those days, the lounge was always well visited after lunch by Dick's contemporaries: Sid Anderson, Karl Koopman, Malcolm McKenna, Les Marcus, Norman Newell, Niles Eldridge, Ian Tattersall, and so on, and the occasional visitor like me. The conversation would fluctuate between species ranges (both vertically and horizontally), to species concepts, and to phylogenetic reconstruction. For most first timers, especially nonacademics, it could be an intimidating experience. In his indomitable way, Dick casually included me in the conversation using information he had extracted from me during lunch, and made my first introduction to the residents of the "Tower" an "interactive" experience instead of one of a wallflower. It was his natural diplomacy and warmth that first impressed me, qualities that had impressed so many of his colleagues and friends before me, and which most likely have led to his great success in establishing and maintaining two lifelong research collaborations in Australia and China.

Over the years to come during my tenure at the AMNH, Dick and I would open every drawer in almost every cabinet on six of the seven floors of fossil mammal collections. Well before I became a graduate student of vertebrate paleontology, Dick introduced me to horned mylagaulids, nimravids, entelo-



Fig. 1.3. Dick Tedford in the field, along the Ceja del Rio Puerco, Canyada Benevides, New Mexico, June 3, 1988, sketching field drawings of outcrops. He is mapping what was then considered an unnamed member of the Zia Formation of the Santa Fe beds. Later, these beds would be defined as the Cerro Conejo Member of the Arroyo Ojito Formation. The background shows Benevides Diatreme, a Pliocene collapsed caldera. Photography and details by Dick's field collaborator Steve Barghoorn, who writes "I particularly like this 'unauthorized portrait' of RHT, catching his habit of meticulous recording of stratigraphy, structure and mapping in the field, in typical garb and gear, and at the moment plotting in details of Quaternary alluvial fill in the vicinity."

donts, notoungulates, borophagines, and other extinct mammals that most of the world has no idea ever existed. Nor did I, until Dick opened the drawers. It was early on in my apprenticeship with Dick that I became aware of his encyclopedic knowledge of almost anything knowable in vertebrate paleontology. While on one of our many forays into the collections, Dick picked up an isolated rhino tooth, identified the species, gave its age, where it was found, and who found it without ever once looking at the label. Then he went on to describe everything ever written about rhino evolution and biostratigraphy since the 1890s! He was so darned unassuming during the entire soliloquy, sipping

bad coffee, while I just listened to him in wide-eyed wonderment at the vastness his intellectual pursuits. It would be from Dick that I would learn what it means to be a "gentleman scholar." These qualities are now those of another era of scientists, one in which, for the most part, natural science research was conducted using only the skills of observation and paper and pencil (believe it or not, I was at the AMNH when the first desktops came into the Department!).

During and since my tenure at the AMNH, as an exhibit specialist, graduate student, and a colleague, Dick's door has always been open, and he is always ready for an intellectual challenge. He has never failed to greet

me with a smile on his face, a twinkle in his eye, and a hearty hello for an old friend. As impressive as his academic achievements are, I suspect for most of us who call him friend and colleague, we are equally, if not more impressed by his more personal qualities and have benefited both from his friendship and his tutelage.

RETROSPECTIVE: Dick Tedford's scientific career has not only produced a corpus of scholarly work that epitomizes the best in paleontological science (fig. 1.3), but also exerts a strongly important impact on his students, peers, and colleagues. Those of us who have had reason to pursue research in Cenozoic mammals at the American Museum bear witness to the unselfish enthusiasm with which Dick contributes his impressive and unequalled knowledge of the stratigraphic and phyletic data contained within that collection, as well as his impressive understanding of the zoogeographic significance of those collections within and beyond North America.

Dick continues to generate original research at the American Museum of Natural History at the same time as he is synthesizing major initiatives of his career. His research on Canidae is being published in a series of monographs coauthored with Xiaoming Wang, and he pushes forward on a monographic treatment of fossils from Yushe Basin, China. Dick's study of his beloved Santa Fe Group, New Mexico, and its fossils is a perennial endeavor with Steve Barghoorn. Dick continues to welcome visitors and include them in discussions of observations on fossils. Although retired, he still helps shape the museum's research agenda on Neogene mammals. Beth passed away, but he finds new balance outside the museum with his wife Vivian. This helps to shape the whole man, the Dick Tedford that Gina refers to, the Dick Tedford to whom this volume is dedicated.

#### ACKNOWLEDGMENTS

This volume is a collection of papers written in honor of, but mainly inspired by, Dick Tedford. The topics are diverse but reflect only partially the diversity of Dick's interests. The creative, insightful, and patient ef-

forts of each of the contributors and the reviewers are gratefully acknowledged. Support for this volume came from the many friends of Dick Tedford at the American Museum of Natural History. In particular, Mark Norell and Alejandra Lora helped in many ways. Judy Galkin carefully assembled the bibliography. Finally, publications editor Brenda Jones skillfully guided this volume through its infancy and maturation. Her attention to detail and taste in presentation enhance *Vertebrate Fossils and their Context* as a final product. It was a pleasure to work with all involved in this project.—LJF

#### RICHARD H. TEDFORD BIBLIOGRAPHY

- Archer, M., R.H. Tedford, and T.H. Rich. 1987. The Pilkipildridae, a new family and four new species of? petauroid possums (Marsupialia: Phalangerida) from the Australian Miocene. *In* M. Archer (editor), *Possums and opossums, studies in evolution*, Vol. 2: 607–627. Sydney: Surrey Beatty and the Royal Zoological Society of New South Wales.
- Barghoorn, S.F., and R.H. Tedford. 1993. Road log: Neogene geology of the Española Basin, New Mexico. *In* S.G. Lucas and J. Zidek (editors), *New Mexico Museum of Natural History and Science Bulletin* 2: 169–178.
- Baskin, J.A., and R.H. Tedford. 1996. Small Arctoid and Feliform Carnivorans. *In* D.R. Prothero and R.J. Emry (editors), *The terrestrial Eocene-Oligocene transition in North America*: 486–497. Cambridge: Cambridge University Press.
- Callen, R.A., and R.H. Tedford. 1976. New late Cainozoic rock units and depositional environments, Lake Frome area, South Australia. *Transactions of the Royal Society of South Australia* 100(3):125–168.
- Clemens, W.A., and R.H. Tedford. 1954. Faunal lists for selected fossil vertebrate localities in the Sespe Formation of southern California. Berkeley: University of California, Department of Paleontology, 8 pp., maps (mimeographed).
- Dingus, L., R. Tedford, E. Gaffney, M. Novacek, and E. Delson. 1994. *Mammals and their extinct relatives. A guide to the*

- Lila Acheson Wallace Wing. New York: American Museum of Natural History, 100 pp.
- Flynn, J.J., N. Neff, and R.H. Tedford. 1988. Phylogeny of the Carnivora. In M.J. Benton, (editor), *The phylogeny and classification of the Tetrapods, Vol. 2: Mammals: 73–115*. Oxford: Clarendon Press.
- Flynn, L., Z-x. Qiu, N.D. Opdyke, and R.H. Tedford. 1995. Ages of key fossil assemblages in the Late Neogene terrestrial record of northern China. *Geochronology Time Scales and Global Stratigraphic Correlations, SEPM (Society for Sedimentary Geology) Special Publication 54: 365–373*.
- Flynn, L.J., R.H. Tedford, and Z-x. Qiu. 1990. The Yushe Chronofauna: faunal stability in the Pliocene of North China. *Journal of Vertebrate Paleontology 10(Supplement to No. 3):23A*.
- Flynn, L.J., R.H. Tedford, and Z-x. Qiu. 1991. Enrichment and stability in the Pliocene mammalian fauna of North China. *Paleobiology 17(3):246–265*.
- Galusha, T., N.M. Johnson, E.H. Lindsay, N.D. Opdyke, and R.H. Tedford. 1984. Biostratigraphy and magnetostratigraphy, Late Pliocene rocks, 111 Ranch, Arizona. *Geological Society of America Bulletin 95(6):714–722*.
- Hunt, R.M., Jr., and R.H. Tedford. 1993. Phylogenetic relationships within the aeluroid Carnivora and implications of their temporal and geographic distribution. In F.S. Szalay, M.J. Novacek, and M.C. McKenna (editors), *Mammalian phylogeny: placentals: 53–73*. New York: Springer Verlag.
- Lindsay, E.H., and R.H. Tedford. 1990. Development and application of land mammal ages in North America and Europe, a comparison. In E.H. Lindsay, P. Mein, and V. Fahlbusch (editors), *European Neogene mammal chronology: 601–624*. New York: Plenum.
- Lozinsky, R.P., and R.H. Tedford. 1986. Stratigraphy of the Santa Fe Group (Oligo-Pleistocene) in the Gabaldon Badlands, north-central New Mexico. *Geological Society of America Abstracts with Programs 18(5):391*.
- Lozinsky, R.P., and R.H. Tedford. 1988. Stratigraphy of the Santa Fe Group (Oligo-Pleistocene) in the Gabaldon Badlands, North-Central New Mexico. *Geological Society of America Abstracts with Programs 19(5):391*.
- Lozinsky, R.P., and R.H. Tedford. 1991. Geology and paleontology of the Santa Fe Group, southwestern Albuquerque Basin, Valencia County, New Mexico. U.S. Bureau of Mines and Mineral Resources, *Bulletin 132:1–35*.
- Marshall, L.G., R.F. Butler, R.E. Drake, G.H. Curtis, and R.H. Tedford. 1979. Calibration of the Great American Interchange. *Science 204:272–279*.
- Marshall, L.G., W.A. Clemens, R.J. Hoffstetter, R. Pascual, B. Patterson, R.H. Tedford, and W.D. Turnbull. 1977. *Acyonidae Ameghino, 1889 (Mammalia): proposed suppression under the plenary powers. Z.N.(S.) 2159. Bulletin of Zoological Nomenclature 33(3/4):212–213*.
- Marshall, L.G., and R.H. Tedford. 1978. *Caenolestidae Trauessart, 1898, and Palaeonthentidae Sinclair, 1906 (Mammalia) proposed conservation under plenary powers. Z.N. (S.) 2214. Bulletin of Zoological Nomenclature 35(1):58–64*.
- Mitchell, E., and R.H. Tedford. 1973. The Enaliarctinae: a new group of extinct aquatic Carnivora and a consideration of the origin of the Otariidae. *Bulletin of the American Museum of Natural History 151(3):201–284*.
- Nicholson, T.D., B. Schaeffer, T. Galusha, M.C. McKenna, M.F. Skinner, B.E. Taylor, and R.H. Tedford. 1975. The fossil mammal collections of the American Museum of Natural History. *Curator 18(1):16–38*.
- Prothero, D.R., and R.H. Tedford. 2000. Magnetic stratigraphy of the type Montediablan Stage (Late Miocene), Black Hawk Ranch, Contra Costa County, California: Implications for regional correlations. *PaleoBios 20(3):1–10*.
- Qiu, Z-x., and R.H. Tedford. 1990. A Pliocene Species of *Vulpes* from Yushe, Shanxi. *Vertebrata Palasiatica 28(4):245–258*.
- Repenning, C.A., and R.H. Tedford. 1977. Otarioid seals of the Neogene. U. S. Geological Survey Professional Paper 992:1–93.

- Rich, T.H., M. Archer, and R.H. Tedford. 1978. *Raemotherium yatkolai*, gen. et sp. nov., a primitive diprotodontid from the medial Miocene of South Australia. *Mem-oir of the National Museum of Victoria* 39: 85–91.
- Stirton, R.A., R.H. Tedford, and A.H. Miller. 1961. Cenozoic stratigraphy and vertebrate paleontology of the Tirari Desert, South Australia. *Records of the South Australian Museum* 14(4):19–61.
- Stirton, R.A., R.H. Tedford, and M.O. Woodburne. 1964. A new Tertiary fauna from the Tirari Desert, South Australia. Abstracts, 60<sup>th</sup> Annual Meeting, Geological Society of America, Cordilleran Section: 61–62.
- Stirton, R.A., R.H. Tedford, and M.O. Woodburne. 1965. New Tertiary fauna from the Tirari Desert, South Australia. Abstract, Special Papers, Geological Society of America 82:281–282.
- Stirton, R.A., R.H. Tedford, and M.O. Woodburne. 1967. A new Tertiary formation and fauna from the Tirari Desert, South Australia. *Records of the South Australian Museum* 15(3):427–462.
- Stirton, R.A., R.H. Tedford, and M.O. Woodburne. 1967. Review of the Tertiary mammal-bearing deposits in Australia. Abstract, 39<sup>th</sup> Congress, ANZAAS, Melbourne, Section C, pp. K6–K7.
- Stirton, R.A., R.H. Tedford, and M.O. Woodburne. 1968. Australian Tertiary deposits containing terrestrial mammals. *University of California Publications in Geological Science* 77:1–30.
- Tedford, R.H. 1954. Association of man and extinct marsupials in New South Wales, Australia. Abstract, *Geological Society of America Bulletin* 65(12):110 and 1314.
- Tedford, R.H. 1955. Report on the extinct mammalian remains at Lake Menindee, New South Wales. *Records of the South Australian Museum* 11(3):299–305.
- Tedford, R.H. 1960. Carnivora, Liptopterna, Notoungulata, Perissodactyla, and Tubulidentata fossils. *McGraw-Hill Encyclopedia of Science and Technology*, New York: McGraw Hill.
- Tedford, R.H. 1960. The fossil Macropodidae from Lake Menindee, New South Wales. Summary of the dissertation submitted in partial satisfaction of the requirements for the degree of Doctor of Philosophy, University of California, Graduate Division, Northern Section, Berkeley.
- Tedford, R.H. 1961. Clarendonian Insectivora from the Ricardo Formation, Kern County, California. *Bulletin, Southern California Academy of Sciences* 60(2):57–76.
- Tedford, R.H. 1961. A Pleistocene mammalian fauna from northern Baja California. Abstract, Annual Meeting of the Southern California Academy of Science.
- Tedford, R.H. 1961. Tertiary land mammals from Australia. *Australian Mammal Society Bulletin* 4:14–18.
- Tedford, R.H. 1962. Oligo-Miocene marine-nonmarine relationships in Southern California. Abstract, Annual Meeting of the Southern California Academy of Science.
- Tedford, R.H. 1964. [Review of] G.T. James. Paleontology and nonmarine stratigraphy of the Cuyama Valley Badlands, California. *Quarterly Review of Biology* 39(2): 195.
- Tedford, R.H. 1965. Late Tertiary mammal succession, Mojave Desert region, Southern California. Abstract, American Association for the Advancement of Science, Section E: 18.
- Tedford, R.H. 1966. Clarendonian faunal succession, Ricardo Formation, Kern County, California. Abstract, Special Papers, Geological Society of America 87: 174.
- Tedford, R.H. 1966. A review of the macropodid genus *Sthenurus*. *University of California Publications in Geological Sciences* 57:1–72.
- Tedford, R.H. 1966. Later Tertiary mammal succession, Mojave Desert region, Southern California. Abstract, Special Papers, Geological Society of America 87: 318.
- Tedford, R.H. 1967. The fossil Macropodidae from Lake Menindee, New South Wales. *University of California Publications in Geological Sciences* 64:1–156.
- Tedford, R.H. 1967. Fossil mammal remains from the Tertiary Carl Creek limestone, northwestern Queensland. *Bulletin of the Australian Bureau of Mineral Resources* 92:217–237.
- Tedford, R.H. 1967. Ruben Arthur Stirton,

- 1901–1966. Australian Mammal Society Bulletin 2(4):92–93.
- Tedford, R.H. 1967. Quaternary vertebrates and environments, Lake Callabonna, South Australia. Abstract, Section 3, AN-ZAAS, Brisbane, May 1971.
- Tedford, R.H. 1968. Mammalian remains from the exploratory trench, Puntutjarpa rockshelter, Warburton Ranges, western Australia. Appendix II in Gould, R.A. 1968. Preliminary report on excavations at Puntutjarpa rockshelter, near the Warburton Ranges, western Australia. *Archaeology and Physical Anthropology in Oceania* 3:184–185.
- Tedford, R.H. 1969. Carnivora, Litopterna, Marsupialia, Notoungulata, Perissodactyla and Tubulidentata. (Revised and new articles.) McGraw-Hill Encyclopedia of Science and Technology. New York: McGraw-Hill.
- Tedford, R.H. 1970. Preface. In *Correlation by Fossils: North American Paleontological Convention*, Chicago, Proceedings F: 552.
- Tedford, R.H. 1970. Principles and Practices of Mammalian Geochronology in North America. In *Correlation by Fossils, North American Paleontological Convention*, Chicago, Proceedings F: 666–703.
- Tedford, R.H. 1971. Marsupials and global tectonics. Annual Meeting of the Geological Society of America, Washington, Abstracts with Programs 3(7):730.
- Tedford, R.H. 1973. The diprotodons of Lake Callabonna. *Australian Natural History* 17(11):349–354.
- Tedford, R.H. 1974. Marsupials and the new paleogeography. In C.A. Ross (editor), *Paleogeographic provinces and provinciality. Society of Economic Paleontologists and Mineralogists Special Publication* 21:109–126.
- Tedford, R.H. 1974. [Review of] D. Walker (editor). *Bridge and barrier the natural and cultural history of Torres Strait. The Quarterly Review of Biology* 49(2):167.
- Tedford, R.H. 1975. The relationship of pinnipeds to other carnivores. *American Zoologist* 15(3):826.
- Tedford, R.H. 1976. Relationship of pinnipeds to other carnivores (Mammalia). *Systematic Zoology* 25(4):363–374.
- Tedford, R.H. 1976. Miocene mammals, Frome Embayment, South Australia. 25th International Geological Congress, Section 7C, Abstract, Volume 1: 334.
- Tedford, R.H. 1978. History of dogs and cats, a view from the fossil record. In *Nutrition and management of dogs and cats*, Chapter M. 23, 10 pp. St. Louis: Ralston Purina Co.
- Tedford, R.H. 1979. North American marine and nonmarine correlation based on fossil mammals. *Geological Society of America Abstracts with Programs* 11(7):527.
- Tedford, R.H. 1981. Mammalian biochronology of the late Cenozoic Basins of New Mexico. *Geological Society of America Bulletin* 92:1008–1022.
- Tedford, R.H. 1981. [Discussion of] A. Nur and Z. Ben-Avraham. In G. Nelson and D.E. Rosen (editors), *Vicariance biogeography: a critique*: 367–370. New York: Columbia University Press.
- Tedford, R.H. 1981. Mammalian biochronology of late Cenozoic basins of New Mexico. Abstract, *Bulletin of the American Association of Petroleum Geologists* 65: 571.
- Tedford, R.H. 1982. Neogene stratigraphy of the northwestern Albuquerque Basin. *New Mexico Geological Society Guidebook, 33rd Field Conference, Albuquerque County II*: 273–278.
- Tedford, R.H. 1984. The diprotodons of Callabonna. In M. Archer and G. Clayton (editors), *Vertebrate evolution and zoogeography in Australasia*: 999–1002. Carlisle: Hesperian Press.
- Tedford, R.H. 1985. Late Miocene turn-over of the Australian mammal fauna. *South African Journal of Science* 81(5):262–263.
- Tedford, R.H. 1985. The Stirton Years, 1953–1966, a search of Tertiary mammals in Australia. In P.V. Rich, G.F. Van Tets, and F. Knight (editors), *Kadimakara. Extinct vertebrates of Australia*: 39–57. Lilydale, Victoria: Pioneer Design Studio.
- Tedford, R.H. 1991. Memorial to Frank Walker Johnson, 1909–1989. *Geological Society of America Memorials* 21:43–45.
- Tedford, R.H. 1991. Vertebrate paleontology

- in Australia: The American contribution. *In* P.V. Rich, J.M. Monaghan, R.F. Baird, and T.H. Rich (editors), *Vertebrate paleontology in Australasia*: 45–83. Melbourne: Pioneer Design Studio.
- Tedford, R.H. 1993. Riversleigh researchers, Part 5: Dick Tedford recalls his fossil finds at Riversleigh thirty years ago. *Riversleigh Notes* 21:2–3.
- Tedford, R.H. 1993. Lake Callabonna. “Vertebrate necropolis of gigantic extinct marsupials and birds.” *Program and Abstracts, CAVEPS’93*: 20.
- Tedford, R.H. 1993. Succession of Pliocene through medial Pleistocene mammal faunas of southeastern Australia. *Program and Abstracts, CAVEPS’93*: 20.
- Tedford, R.H. 1994. Succession of Pliocene through medial Pleistocene mammal faunas of southeastern Australia. *Records of the South Australian Museum* 27(2):79–93.
- Tedford, R.H. 1994. Key to the carnivores. *Natural History* 103(4):74–76.
- Tedford, R.H. 1994. Caught in time. *Natural History* 103(4):90–91.
- Tedford, R.H. 1995. Neogene mammalian biostratigraphy in China: past, present, and future. *Vertebrata Palasiatica*: 272–289.
- Tedford, R.H. 1998. The Lake Eyre Basin Pliocene and Pleistocene: geological and vertebrate faunal history. Abstract, *Vertebrate Paleontology Post-graduate Student Conference, Naracoorte, South Australia*: 15–16.
- Tedford, R.H., and R.M. Alf. 1962. A new *Megahippus* from the Barstow Formation, San Bernardino County, California. *Bulletin of the Southern California Academy of Science* 61(2):113–122.
- Tedford, R.H., M. Archer, A. Bartholomai, M. Plane, N.S. Pledge, T. and P. Rich, and R.T. Wells. 1977. The discovery of Miocene vertebrates, Lake Frome area, South Australia. *BMR Journal of Australian Geology and Geophysics* 2:53–57.
- Tedford, R.H., M.R. Banks, N.R. Kemp, I. McDougall, and F.L. Sutherland. 1975. Recognition of the oldest known fossil marsupials from Australia. *Nature* 255(5504):141–142.
- Tedford, R.H., and S.F. Barghoorn. 1993. Neogene stratigraphy and mammalian bio-chronology of the Española Basin, northern New Mexico. *In* S.G. Lucas and J. Zidek (editors), *New Mexico Museum of Natural History and Science Bulletin* 2: 159–168.
- Tedford, R.H., and S.F. Barghoorn. 1997. Miocene mammals of the Española and Albuquerque Basins, north-central New Mexico. *In* S.G. Lucas, J.W. Estep, T.E. Williamson, and G.S. Morgan (editors), *New Mexico’s fossil record 1*. *New Mexico Museum of Natural History and Science Bulletin* 11:77–96.
- Tedford, R.H., and S.F. Barghoorn. 1999. Santa Fe Group (Neogene), Ceja del Rio Puerco, northwestern Albuquerque Basin, Sandoval County, New Mexico. *New Mexico Geological Society Guidebook, 50<sup>th</sup> Field Conference, Albuquerque Geology*: 327–336.
- Tedford, R.H., and S.F. Barghoorn. 1999. Guidebook to the Tertiary record of Weld County, northeastern Colorado. *Denver Museum of Science and Nature*, 18 and 19 October: 31–47.
- Tedford, R.H., L.G. Barnes, and C.E. Ray. 1994. The early Miocene littoral ursoid Carnivoran *Kolponomus*: systematics and mode of life. *Proceedings of the San Diego Society of Natural History* 29:11–32.
- Tedford, R.H., and T. Downs. 1965. Age of the Punchbowl Formation, Los Angeles and San Bernardino counties, California. *Geological Society of America Cordilleran Section Abstract, 61<sup>st</sup> Annual Meeting*: 54.
- Tedford, R.H., L.J. Flynn, and Z-x. Qiu. 1989. Neogene faunal succession, Yushe Basin, Shanxi Province, PRC. *Journal of Vertebrate Paleontology*, 9(Supplement to No. 3):41A.
- Tedford, R.H., L.J. Flynn, Z-x. Qiu, N.D. Opdyke, and W.R. Downs. 1991. Yushe Basin, China: paleomagnetically calibrated mammalian biostratigraphic standard for the Late Neogene of eastern Asia. *Journal of Vertebrate Paleontology* 11(4):519–526.
- Tedford, R.H., and D. Frailey. 1976. Review of some Carnivora (Mammalia) from the Thomas Farm local fauna (Hemingfordian:

- Gilchrist County, Florida). *American Museum Novitates* 2610:1–9.
- Tedford, R.H., T. Galusha, M.F. Skinner, B.E. Taylor, R. Fields, J.R. Macdonald, T.H. Patton, J.M. Rensberger, and D.P. Whistler. 1973. Faunal succession and biochronology of the Arikarean through Clarendonian interval (Miocene Epoch), North America. *Geological Society of America Abstracts with Programs* 5(7):837–838.
- Tedford, R.H., and E.P. Gustafson. 1977. First North American record of the extinct panda *Parailurus*. *Nature* 265(5595):621–623.
- Tedford, R.H., and M.E. Hunter. 1984. Miocene marine-nonmarine correlations, Atlantic and Gulf Coastal plains, North America. *Palaeogeography, Palaeoclimatology, Palaeoecology* 47(1/2):129–151.
- Tedford, R.H., and N.R. Kemp. 1998. Oligocene marsupials of the Geilston Bay local fauna, Tasmania. *American Museum Novitates* 3244:1–22.
- Tedford, R.H., and J. Martin. 2001. *Plionarctos*, A Tremarctine Bear (Ursidae: Carnivora) from Western North America. *Journal of Vertebrate Paleontology* 21(2):311–321.
- Tedford, R.H., and C.J. Munson. 1999. Late Oligocene vombatid, Pimpa Fauna, South Australia. Conference on Vertebrate Evolution, Paleontology and Systematics 1999, Sydney, New South Wales: 21.
- Tedford, R.H., and M. Plane. 1976. Miocene mammals, Frome Embayment, South Australia. *In* International Geological Congress Abstract 25(1): 334.
- Tedford, R.H., and Z-x. Qiu. 1991. Pliocene *Nyctereutes* (Carnivora: Canidae) from Yushe, Shanxi, with comments on Chinese fossil raccoon-dogs. *Vertebrata Palasiatica* 29(3):176–189.
- Tedford, R.H., and Z-x. Qiu. 1996. A new canid genus from the Pliocene of Yushe, Shanxi Province. *Vertebrata Palasiatica*: 27–40.
- Tedford, R.H., M.F. Skinner, R.W. Fields, J.M. Rensberger, D.P. Whistler, T. Galusha, B.E. Taylor, J.R. Macdonald, and S.D. Webb. 1987. Faunal succession and biochronology of the Arikarean through Hemphillian interval (late Oligocene through earliest Pliocene epochs) in North America. *In* M.O. Woodburne (editor), *Cenozoic mammals of North America, geochronology and biostratigraphy*: 153–210. Berkeley: University of California Press.
- Tedford, R.H., J.B. Swinehart, R.M. Hunt, Jr., and M.R. Voorhies. 1985. Uppermost White River and lowermost Arikaree rocks and faunas, White River Valley, northwestern Nebraska and their correlation with South Dakota. *Dakoterra* 2(2):335–352.
- Tedford, R.H., J.B. Swinehart, C.C. Swisher III, D.R. Prothero, S.A. King, and T.W. Tierny. 1996. The Whitneyan-Arikarean Transition in the High Plains. *In* D.R. Prothero, and R.J. Emry (editors), *The terrestrial Eocene-Oligocene transition in North America*: 312–334. Cambridge: Cambridge University Press.
- Tedford, R.H., B.E. Taylor, and X. Wang. 1995. Phylogeny of the Caninae (Carnivora: Canidae): the living taxa. *American Museum Novitates* 3146:1–37.
- Tedford, R.H., and R.T. Wells. 1985. The monodactyl kangaroos. *In* P.V. Rich, G.F. Van Tets, and F. Knight (editors), *Kadimakara. Extinct vertebrates of Australia*: 249–252. Lilydale, Victoria: Pioneer Design Studio.
- Tedford, R.H., and R.T. Wells. 1987. Pleistocene fossil vertebrates from the “Dead Heart of Australia”. *DeVis Symposium, Queensland Museum Royal Society of Queensland*: 17–18.
- Tedford, R.H., and R.T. Wells. 1990. Pleistocene deposits and fossil vertebrates from the “Dead Heart of Australia”. *Memoirs of the Queensland Museum* 28(1):263–284.
- Tedford, R.H., R.T. Wells, and S. Barghoorn. 1992. Tirari Formation and contained faunas, Pliocene of the Lake Eyre Basin, South Australia. *The Beagle, Records of the Northern Territory Museum of Arts and Sciences* 92(1):173–194.
- Tedford, R.H., R.T. Wells, and D.L.G. Williams. 1986. Late Cainozoic sediments and fossil vertebrates. *In* R.T. Wells and R.A. Callen (editors), *The Lake Eyre Basin—Cainozoic sediments, fossil vertebrates, plants, landforms, silcretes and climatic implications*: 42–72. Australasian Sedi-



- mentologists Group Field Studies Series No. 4. Sydney: Geological Society of Australia.
- Tedford, R.H., and M.O. Woodburne. 1982. Litho- and biostratigraphy of the Barstow Formation, Mojave Desert, California. *In* J.D. Cooper (editor), *Geologic excursions in the California desert*: 65–76. Guidebook prepared for the 78<sup>th</sup> Annual Meeting of the Cordilleran Section of the Geological Society of America, Anaheim, California.
- Tedford, R.H., and M.O. Woodburne. 1987. The Ilariidae, a new family of vombatiform marsupials from Miocene strata of South Australia and an evaluation of the homology of molar cusps in the Diprotodontia. *In* M. Archer (editor), *Possums and opossums, studies in evolution*, Vol. 2: 401–418. Sydney: Surrey Beatty and the Royal Zoological Society of New South Wales.
- Tedford, R.H., and M.O. Woodburne. 1998. The diprotodontian ‘hypocone’ revisited. *Australian Journal of Zoology* 46:249–250.
- Turnbull, W.D., E.L. Lundelius, Jr., and R.H. Tedford. 1990. Fossil mammals of the Coimadai local fauna near Bacchus Marsh, Victoria. *Memoirs of the Queensland Museum* 28(1):223–245.
- Turnbull, W.D., E.L. Lundelius, Jr., and R.H. Tedford. 1992. A. Pleistocene marsupial fauna from Limeburner’s Point, Victoria, Australia. *The Beagle, Records of the Northern Territory Museum of Arts and Sciences* 92(1):143–172.
- Turnbull, W.D., E.L. Lundelius, Jr., and R.H. Tedford. 1993. Fossil vertebrate locality at Smeaton, Victoria. *Memoirs of the Association of Australasian Palaeontologists* 15:429–440.
- Wang, X., and R.H. Tedford. 1992. The status of genus *Nothocyon* Matthew, 1899 (Carnivora): an arctoid not a canid. *Journal of Vertebrate Paleontology* 12(2):223–229.
- Wang, X., and R.H. Tedford. 1994. Basicranial anatomy and phylogeny of primitive canids and closely related miacids (Carnivora: Mammalia). *American Museum Novitates* 3092:1–34.
- Wang, X., and R.H. Tedford. 1996. Canidae. *In* D.R. Prothero and R.J. Emry (editors), *The terrestrial Eocene-Oligocene transition in North America*: 433–452. Cambridge: Cambridge University Press.
- Wang, X., R.H. Tedford, and B.E. Taylor. 1999. Phylogenetic systematics of the Borophaginae (Carnivora: Canidae). *Bulletin of the American Museum of Natural History* 243:1–391.
- Wells, R.T., and R.H. Tedford. 1995. *Sthenurus* (Macropodidae: Marsupialia) from the Pleistocene of Lake Callabona, South Australia. *Bulletin of the American Museum of Natural History* 225:1–112.
- Woodburne, M.O., S.T. Miller, and R.H. Tedford. 1982. Stratigraphy and geochronology of Miocene strata in the central Mojave Desert, California. *In* J.D. Cooper (editor), *Geologic excursions in the California desert*: 47–64. Guidebook prepared for the 78<sup>th</sup> Annual Meeting of the Cordilleran Section of the Geological Society of America, Anaheim, California.
- Woodburne, M.O., and R.H. Tedford. 1975. The first Tertiary monotreme from Australia. *American Museum Novitates* 2588:1–11.
- Woodburne, M.O., and R.H. Tedford. 1982. Litho- and biostratigraphy of the Barstow Formation, Mojave Desert, California. *In* J.D. Cooper (editor), *Geologic excursions in the California desert*: 65–76. Guidebook prepared for the 78<sup>th</sup> Annual Meeting of the Cordilleran Section of the Geological Society of America, Anaheim, California.
- Woodburne, M.O., R.H. Tedford, and M. Archer. 1987. New Miocene ringtail possums (Marsupialia: Pseudocheiridae) from South Australia. *In* M. Archer (editor), *Possums and opossums, studies in evolution*, Vol. 2: 639–679. Sydney: Surrey Beatty and the Royal Zoological Society of New South Wales.
- Woodburne, M.O., R.H. Tedford, M. Archer, and N.S. Pledge. 1987. *Madakoala*, a new genus and two species of Miocene koalas (Marsupialia: Phascolarctidae) from South Australia and a new species of *Perikoala*. *In* M. Archer (editor), *Possums and opossums, studies in evolution*, Vol. 1: 293–317. Sydney: Surrey Beatty and the Royal Zoological Society of New South Wales.

- Woodburne, M.O., R.H. Tedford, M. Archer, W.D. Turnbull, M. Plane, and E.L. Lundelius. 1985. Biochronology of the continental mammal record of Australia and New Guinea., South Australia Department of Mines and Energy Special Publication 5:347–363.
- Woodburne, M.O., R.H. Tedford, M.D. Plane, W.D. Turnbull, and E.L. Lundelius. 1973. Biostratigraphy, chronology and the continental mammal record of Australia and New Guinea. *Geological Society of America Abstracts with Programs* 5(7): 869–871.
- Woodburne, M.O., R.H. Tedford, M.S. Stevens, and B.E. Taylor. 1974. Early Miocene mammalian faunas, Mojave Desert, California. *Journal of Paleontology* 48(1): 6–26.
- Woodburne, M.O., R.H. Tedford, and C.C. Swisher III. 1988. Lithostratigraphy, biostratigraphy and geochronology of the Barstow Formation, Mojave Desert, southern California. National Association of Geology Teachers, Field Trip Guidebook.
- Woodburne, M.O., R.H. Tedford, C.C. Swisher III. 1990. Lithostratigraphy, biostratigraphy and geochronology of the Barstow Formation, Mojave Desert, southern California. *Geological Society of America Bulletin* 102(4):459–477.
- Zimmerman, M.R., and R.H. Tedford. 1976. Histologic structures preserved for 21,300 years. *Science* 194:183–184.