

Major Activities of the Division of Vertebrate Paleontology During the 1960s

By Mark Lay

The 1960s were a busy time for the Division of Vertebrate Paleontology in the National Museum of Natural History (NMNH). The ambitious paleontology exhibit hall modernization program begun in the 1950s was in full swing, with three new permanent vertebrate fossil exhibit halls opened and another in planning. The Division also moved into new office and storage spaces within the Natural History Building (NHB), and the Department of Geology (of which the Division was a part in 1960) was reorganized.

This article describes the major collecting expeditions conducted by the Division of Vertebrate Paleontology (VP) curatorial staff during the 1960s, the impact of the exhibit modernization program, and two major acquisitions to its holdings.

The Curators

At the beginning of the 1960s, there were three curators in the Division.

Charles Lewis Gazin joined the Smithsonian in 1932 as Assistant Curator of Fossil Mammals in the Division of Vertebrate Paleontology and was promoted to Curator of Vertebrate Paleontology in 1946. Dr. Gazin's primary research focus was on Tertiary and Quaternary mammals of North America, and over his career he published nearly 100 papers and led more than 25 collecting expeditions to the American West. In 1960, he was still deep in the throes of curating one of the new halls that had been planned in the modernization program – the “Hall of the Age of Mammals in North America”. This hall would feature fossils and redesigned exhibits covering each epoch from the Paleocene through the Pliocene (a span of time from roughly 66 Ma to roughly 2.6 Ma). The Pleistocene Epoch (roughly 2.6 Ma to roughly 11,700 years ago) was specifically excluded from his efforts, as plans called for a separate hall covering that period to be constructed later.

David H. Dunkle, who had joined the Smithsonian in 1946 as Associate Curator of Vertebrate Paleontology, had wide ranging interests but primarily focused particularly on fossil fishes, especially from the Paleozoic. He provided the scientific direction for the new “Hall of Fossil Fishes, Amphibians, and Primitive Reptiles” and in 1960 was putting on the last finishing touches. This hall provided the first comprehensive look at primitive fossil fishes and amphibians ever presented by the Museum. In particular the hall focused on the development of jaws and the changes that were necessary for animals to make the transition from life in water to life on the land. While thus concentrating on the development of fish and amphibians during the middle to late Paleozoic Era (roughly 470 to 250 Ma), the hall also included fossil fish from as late as the Miocene Epoch (roughly 23 to 5 Ma).

Nicholas Hotton III joined the Smithsonian in 1959 as Associate Curator of Vertebrate Paleontology. He was perhaps best known as an expert in Permian/Triassic non-mammalian synapsids, but he also published a popular book on dinosaurs. Like Gazin and Dunkle, Hotton also was tasked with scientific supervision of a hall renovation, in his case the overhaul of the dinosaur hall. Before Hotton's arrival, specimens in that hall were neither systematically nor thematically arranged and considerable new information was available. While the existing dinosaur skeletons could be repaired, remounted and otherwise reused (thus reducing the need for new specimens), Hotton did not get off easy. The hall itself was redesigned and reorganized, most of its explanatory text was rewritten, and a considerable number of

new specimens of early reptiles, mostly collected by Hotton, were added. The resulting “Hall of Dinosaurs and Other Reptiles” became one of the museum’s largest and most popular exhibit halls.

The hall renovations ensured that all three curators were on the lookout for suitable display specimens as well as specimens relating to their research. While many of the specimens needed were collected by the curators, significant time also was spent in identifying fossils already in the national collection that might be appropriate and arranging exchanges and purchases from other museums and organizations that might help further illustrate the diversity and development of life over roughly the last 470 million years.

The Early 1960s – Busy Times for All

Dr. Gazin left for Europe in mid-April 1960 to conduct museum research on Early Tertiary mammals and traveled through mid-October. He visited the more important museums and localities in France, Spain, Switzerland, Germany, Austria, Denmark, Belgium, and England. In France he visited a number of localities in the Paris basin with Dr. Louis Thaler (Université des Sciences et Techniques de Montpellier) and Donald Russell (then a doctoral student at the Institute de Paléontologie of the Museum National d’Histoire Naturelle, Paris) and proceeded to a number of localities near Montpellier. As the trip was intended for study, Gazin did no collecting. Meanwhile, back in the NMNH, major construction in his hall of fossil mammals was complete and the installation of exhibits had begun. Many of the larger mammal skeletons were installed, and laboratory preparation of the smaller mammal fossils was nearly complete. Although some work still needed to be done, the hall was unofficially opened to the public on June 30, 1960.

Deeply enmeshed in the planning for the modernized dinosaur hall, Dr. Hotton also had a busy 1960, making visits to the American Museum of Natural History, the Peabody Museum of Natural History at Yale University, the Carnegie Museum of Natural History, the Cleveland Museum of Natural History and the Field Museum of Natural History during the early part of the year, and conducting three collecting trips later in the year. His museum visits focused both on examining display issues – how both information and the large dinosaur specimens were presented - and the “engineering” issues the museums faced in erecting those displays. These visits proved to be extremely informative as he and members of the exhibits staff revised the layout, text and organization of the displays in the NMNH hall.



By May, Hotton was ready to return to the field. Accompanied by NMNH museum aide John Gassaway, he collected in Permian formations in Kansas, Oklahoma and Texas between late May and late June 1960. The pair explored outcrops of the Lower Permian Speiser Formation from Riley County to Cowley County, Kansas, and “obtained a good collection of little-known amphibians, including the greater part of an excellently preserved articulated skeleton of *Acroplous*”¹. This specimen was designated USNM 22528 and a cast was later put on exhibit. They worked their way through the parts of the Speiser Formation in Oklahoma and into the Lower Permian Arroyo Formation in Baylor and Archer Counties in Texas. They had limited success in Texas, but did discover a few new localities.

Dr. Dunkle did not conduct any lengthy field collection activities in 1960, instead remaining in the NMNH to finish up the large amount of work related to the unofficial opening of his new hall in late June. Indeed, Ellis Yochelson, in his book on the history of the National Museum, noted Dunkle “estimated that in the week before the alcove [hall] was opened he was summoned there at least once an hour because

someone had put down a model of a fish and could not remember whether it should point to the right or to the left when mounted.”² Three months after the hall opened, Dunkle began a temporary appointment with the Foreign Geology Branch of the United States Geological Survey (USGS), doing a two-year tour of duty in Pakistan as part of a joint USGS and Geological Survey of Pakistan effort designed to map the geological resources of Pakistan and to help teach paleontological research and laboratory methods. He returned to duty in the NMNH in December 1962.

Dr. Hotton also made a short trip to a borrow pit in Hampton, Virginia, in September 1960 to collect portions of a baleen whale skeleton from the Miocene/Pliocene sediments of the Yorktown Formation. Accompanied by Dr. Frank C. Whitmore, Jr. of the USGS, and NMNH museum aide Kurt Hauschildt, he was able to retrieve parts of the skull, the jaws, and significant elements of both the axial and appendicular skeleton (cataloged as USNM 22553 and later identified as the holotype of *Balaena ricei* Westgate & Whitmore, 2002). Additional parts of the skeleton were retrieved in May 1961 by Dr. Whitmore, NMNH exhibits preparator Don Guadagni and Holmes Semken, then a doctoral student with the University of Michigan who was studying at the NMNH.

Hotton returned to the field again in November 1960, examining three quarries in Upper Mississippian localities in the Bluefield Formation near Greer, West Virginia. He was accompanied by William E. Moran, who had formerly been part of the VP staff. A considerable number of fossils were found, in particular a partial skull and skeleton of a new primitive amphibian. This specimen, USNM 22573, was later described as the holotype of a new genus and species of anthracosaur, *Mauchchunkia bassa* (and the type of a new family, the Mauchchunkiidae). Unfortunately, it turned out that other specimens of this anthracosaur from the same locality were published slightly earlier by Alfred Sherwood Romer (Harvard University) under the name of *Proterogyrinus scheelei*, which is now the valid species name.

At about the same time, funding had finally been obtained and construction began in 1960 on an “East Wing” for the Natural History Building. At the time, offices and storage space throughout the Museum were extremely limited and cramped, and the new wing was greatly anticipated. The Department of Geology (of which the Division of Vertebrate Paleontology was a part) and its associated specimen storage racks and cases were slated to move into this wing essentially in toto. The move was actually a mixed blessing during the early 1960s. While the increased space (and new air conditioning) was greatly welcomed, the move also increased the curators’ workload temporarily. Among their other duties, curators were expected to ensure specimens were adequately protected for the move, and develop a moving plan, as well as laying out and designing their office space.

What is the Beaufort Group?

The Beaufort Group is a highly fossiliferous geological formation in South Africa, covering almost the entire Karoo. Sediments comprising the Beaufort Group are Upper Permian to Lower Triassic (240-190 Ma) in age. The Group is divided into biostratigraphic zones named after fossils peculiar to each. While the exact number and names of these zones remain under discussion, from youngest to oldest they currently are called the: *Cynognathus*, *Lystrosaurus*, *Dicynodon*, *Cistecephalus*, *Tropidostoma*, *Pristerognathus*, *Tapinocephalus*, and *Endothiodon* zones.

Continuing to focus on early reptiles and amphibians, both for his research and to support the new exhibit hall, Hotton left Washington in early February 1961 for a collecting trip to the Permo-Triassic Beaufort Group Karoo beds³ in South Africa. Accompanied by James W. Kitching, the field officer of the Bernard Price Institute for Paleontological Research at the University of the Witwatersrand in Johannesburg, Hotton had extraordinary success, and collected nearly 200 Permian and Triassic therapsid and various amphibian and reptilian specimens, representative of all levels of the Beaufort Group and including many

species not previously been represented in the USNM collections. The Smithsonian Annual Report for 1962 reported that “The fossils are of high quality, consisting of about 40 complete or partial skeletons with the remainder being skulls.”⁴ Two of the skeletons collected, the cynodont therapsids *Diademodon tetragonus* Seeley (USNM 23352) and *Thrinaxodon liorhinus* Broom (USNM 22812), were only recently taken off display in the “Mammalian Ancestors” exhibit as part of the preparation for the renovation of the paleo halls now underway.

Hotton estimated that he and Kitching covered more than 4,300 miles on this expedition, examining the well-known upper *Lystrosaurus* zone locality at Harrismith before proceeding to western Natal and the vicinity of Lady Frere in Cape Province. From there the two worked their way westward “gradually across the Karroo proper, all the way from Burgersdorp to Fraserburg Road, spending most of our time in the *Cistecephalus* and *Tapinocephalus* zones.”⁵ He noted that these two zones were phenomenally fossiliferous, and 6 hours at one locality in the latter zone yielded 19 dicynodont specimens. He returned to Washington at the end of July. The trip was considered extremely successful, and provided excellent coverage of both Permian and Triassic fauna in South Africa.



Dr. Hotton had completed essentially all of the planning for the new dinosaur hall before leaving Washington, and the existing hall was closed to the public in early 1961. The wall exhibits were removed, the large skeletons were moved to the center of the hall, and the smaller specimens were put in temporary storage, with construction starting shortly thereafter.

In May 1961, Dr. Whitmore, Don Guadagni and Holmes Semken returned to Hampton, Virginia, to finish collecting the baleen whale that Hotton began excavating in 1960. Although not much new was uncovered, their exploration showed the value of keeping ongoing good relations with local landowners: “...a morning of drinking “tea” (86 proof) with the pit owner resulted in his presenting the party with the first five cervical vertebrae (fused) from the skeleton, a good deal of which is already at the National Museum. He had been keeping them in his shed as a souvenir.”⁶ The party then moved to explore the Yorktown and St. Mary’s Formations in the banks of the James and York Rivers and collected most of the skull of a second large whale.

Although they had been unofficially accessible the year before, the new halls “The Age of Mammals in North America” curated by Dr. Gazin and the “Hall of Fossil Fishes, Amphibians, and Primitive Reptiles” curated by Dr. Dunkle, were officially opened to the public on June 6, 1961. Although there was still work to be done, the opening allowed the curators to more fully refocus their attentions on their research and collecting activities.

Dr. Gazin and Franklin Pearce of the VP Preparation Lab spent the 1961 summer field season collecting in Colorado, Wyoming, and Montana. Before beginning their collecting, they first traveled to Colorado to visit the quarry operations of the Smithsonian’s joint Pleistocene archeological/paleontological project

south of Littleton. Arriving on July 20, they remained at the site until July 24. Holmes Semken, who was now supervising the paleontological part of the project, believed they had obtained enough mammoth material for a good mount for the planned Pleistocene hall.

Gazin and Pearce then spent the next three weeks collecting in Colorado and Wyoming, where they collected at a variety of previously known Paleocene, Eocene and Oligocene localities in the Wind River Basin. They also discovered a new Paleocene locality in the Evanston Formation near Kemmerer, Wyoming, and worked it and a previously discovered locality near Fossil Butte for two weeks, shipping back to the NMNH a variety of small mammal skull fragments, jaws and teeth. Upon leaving Wyoming they headed for a lower Oligocene site near Pipestone Springs, Montana. Collection records show that they obtained a good variety of partial mammal remains, although no complete skeletons. On August 27, they returned to Littleton, Colorado and assisted in packing 4 tons of skeletal remains, mostly of the mammoth *Mammuthus columbi*, for shipping back to Washington.

Dr. Gazin left Washington again early the next year for Central and South America. Leaving Washington in the latter part of February 1962, he first visited Guatemala at the request of the Guatemalan government. While there he visited several fossil vertebrate localities, including an extensive Pleistocene locality near Zacapa containing bones of mastodons and giant sloths. From there he made a short visit to a Pleistocene locality north of Lake Managua in Nicaragua where he saw a number of specimens, including a variety of fossil horse, bison and mastodon teeth, as well as jaws from *Toxodon* (a large hoofed mammal common in South America during the Pleistocene). He then continued on to Argentina and Brazil, spending extensive time studying early Tertiary mammal specimens in museums in Buenos Aires, La Plata and Rio de Janeiro. He returned to Washington in May.



View of NHB (foreground) as seen from above the National Mall in 1963. The newly completed East Wing is to the right of the main building in this view.

By the summer of 1962, construction of the East Wing of the museum was finally complete, and all the curators were busy in the latter part of the year with the move of the Division from its varied locations in the NMNH to its new quarters. As noted by Ellis Yochelson: “On August 16, the new occupants began to move in. Nicholas Hotton believes that he was the first to establish an office in the new wing; he was on the north side of the first floor with the other vertebrate paleontologists. The move itself went extremely well, and though it was hard physical work and the whole process took about six months, everyone who participated recalls the time with pleasure. Curators lugged cases along with workmen. Not a single drawer was dropped.”⁷ While the inevitable reorganization and unpacking of items continued through the end of the year, most of the major work was complete by then.

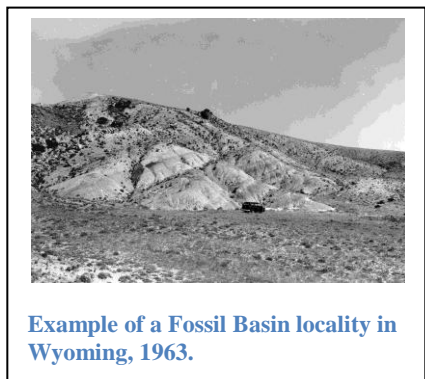
In addition to the move, Dr. Hotton spent much of the early and middle part of 1962 in exhibit hall related duties. Major construction of the new dinosaur hall had been completed by the end of June, and Hotton was still in the process of working with the exhibits staff, finalizing the “script” for the hall, designating specimens for display, and overseeing the scientific accuracy of the exhibits and dioramas. Even though this major hall would not open for another year, there was still much to do.

Hotton was visited by James Kitching from South Africa later in the year, and in late August they made a short trip exploring West Virginia and southwestern Pennsylvania in search of middle and late Paleozoic vertebrate-bearing deposits. They had some success, collecting two partial amphibian skulls from outcrops of the Middle Mississippian Greenbriar limestone near Greer, West Virginia.

The pair left Washington again in early October 1962, with plans to collect in the American West. They spent roughly a month in the field, during which time they visited a variety of vertebrate localities in the Oligocene White River Badlands and Upper Cretaceous Pierre Shale in South Dakota and Wyoming, the Upper Jurassic Morrison Formation in Colorado, the Triassic Chinle Formation at Ghost Ranch in New Mexico, and finishing up in the Permian and Triassic of Texas. Texas proved to be particularly productive in that they found “an untouched pocket of vertebrates in the Lower Permian along West Coffee Creek, Baylor County, Tex., which yielded four complete skeletons and five additional skulls of various amphibians and reptiles.”⁸ In particular, Hotton noted that the finds included good specimens of *Labidosaurus*, *Seymouria*, *Captorhinus* and *Eryops*. Much of the material found was gifted to the Bernard Price Institute for Paleontological Research in return for the great assistance they had given Hotton in South Africa the year before.

Dr. Hotton’s renovated and modernized hall “Dinosaurs and Other Fossil Reptiles” formally opened on June 25, 1963. The design and essentially all of the explanatory text for the revamped hall was updated. The new hall included all the mounts from the old hall, included a new dinosaur (*Gorgosaurus*) and, for the first time, a sequence of early mammal-like reptiles, many collected by Dr. Hotton. The renovation provided an opportunity to repair and update the existing mounted displays, and 17 dinosaurs and other reptiles were repaired and reinstalled, and 8 additional specimens were remounted or modified. Completely new exhibits including 14 skulls and skeletons not previously in the collection also were created.

Dr. Gazin spent July and most of August 1963 exploring sites in the middle Eocene Bridger Basin in Wyoming, with a few side trips to previously discovered localities in the Paleocene and early Eocene of the adjacent Fossil, Green River and Bison Basins. Although Gazin was originally accompanied by Franklin Pearce, Pearce became ill and left Wyoming to return to Washington on July 9. Gazin was



Example of a Fossil Basin locality in Wyoming, 1963.

searching primarily for smaller mammals and spent most of his time in the upper basin of Sage Creek and north of Cedar Mountain. He had good success, collecting approximately 350 specimens, including fossils from a variety of primates, rodents, insectivores, and carnivores. While there, Gazin was visited by Professor Heinz Tobien of Johannes Gutenberg-Universität in Mainz (and at the time a visiting professor at the University of California, Berkeley) and his wife and son, together with Dr. Donald Savage (University of California at Berkeley) and Dr. Donald Russell (Institut de Paléontologie, Muséum National d’Histoire Naturelle, Paris). The visit was not uneventful -- Dr. Gazin noted: “The pleasure of the reunion was marred only by the “exploding” of the windshield in

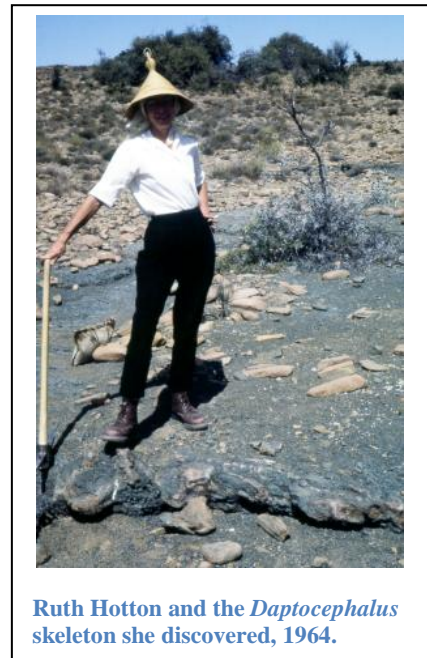
the car that Dr. Tobien had brought with him from Germany.”⁹ Gazin noted no casualties from this incident, but it was unsettling. He was later joined between August 1 and 3 by Dr. René Lavocat of the

Muséum National d'Historie Naturelle in Paris and Dr. Mylan Stout from the University of Nebraska. After a short side trip to Montana, Gazin returned to Washington.

Having finally returned from his assignment to Pakistan, Dr. Dunkle, assisted by museum technician Gladwin (“Tut”) Sullivan of the VP Preparation Lab, left Washington in early September, 1963, to conduct field collecting and stratigraphic work in northwestern Ohio, Nebraska, Iowa, and the Manzano Mountains of central New Mexico. While the Smithsonian Annual Report for 1964 reports that they returned with more than 300 specimens of fossil fish (mostly sharks, acanthodians, palaeoniscoids, and coelacanth), mostly from new localities in the upper Madera Formation (Middle Pennsylvanian through Early Permian) in New Mexico and a few *Leptolepsis* specimens from the Jurassic Todilto limestones, only one currently appears in collection records (USNM 23133). The pair also collected a small number of fish from the Pennsylvanian Wea Shale in Nebraska and Iowa, and various bones of arthrodires (extinct armored fish) and crossopterygians (lobe-finned fishes) from a Middle Devonian quarry in Ohio. The party returned to Washington in mid-October.

Also in October, Dr. Hotton again left Washington for field work in South Africa. After spending the first few weeks stratigraphically mapping the relatively unfossiliferous lower Permian Ecca Group, he then continued his earlier stratigraphic and ecological studies of the Permo-Triassic Beaufort Group in the Karroo region. Between November 1963 and May 1964, he and his family (wife Ruth, daughter Carol, and sons Nicholas IV and Albert) collected more than 300 partial and complete skeletons and skulls, primarily of anomodonts. (Anomodonts, a diverse group of therapsids, are very abundant in the Beaufort Group, and these specimens and others helped increase the understanding of the biostratigraphy and paleoecology of the Karroo deposits. In fact, combined with the measurements he took in this and his 1961 expedition, Hotton was able to publish in 1967 a seminal paper on stratigraphy and sedimentation in the Beaufort Group.)

In mid-1963, the plan to split the Department of Geology into two smaller departments – Mineral Sciences and Paleobiology – was approved, and the reorganization became effective on October 15, 1963. The Department of Paleobiology was further divided into four divisions: Invertebrate Paleontology, Vertebrate Paleontology, Paleobotany, and Sedimentology. Dr. Gazin was named the senior curator in Vertebrate Paleontology, with Drs. Dunkle and Hotton as associate curators.



Shortly thereafter, another vertebrate paleontologist was added to the Division. Associate Curator Clayton E. Ray joined the staff on December 18, 1963, assuming curatorial responsibility for the later Cenozoic mammals in the collections. As with the other curators, he also was tasked with renovating an exhibit hall and focused on what was to become the new Pleistocene hall, “Ice Age Mammals and the Emergence of Man”. At the time, the Museum did not have a dedicated Pleistocene hall, and a completely new design was needed. Dr. Ray not only advised on the preparation of the skeletal mounts, but also obtained the additional specimens needed for the hall by exchange, gift, or field collection.

Dr. Ray began planning for the new Pleistocene Hall early in 1964. Many of the larger specimens needed for the hall were already in hand and required only repair and remounting. However, he was still on the hunt for smaller specimens. He left on May 10, 1964, to examine Pleistocene deposits near Puebla, Mexico, collaborating with an archaeological team from the USGS, University of Puebla, and the

Peabody Museum. Only a few vertebrate specimens in his area of interest were discovered and he returned to Washington in late June.

Dr. Gazin and Franklin Pearce left Washington on June 22, 1964, in the Museum's "sparkling new four-wheel-drive Carryall"¹⁰ to conduct field work in New Mexico and Wyoming. In New Mexico, they explored the Paleocene lower Puerco and upper Torrejon Formations in the San Juan Basin. Leaving New Mexico on July 20, they headed for the Wind River Basin in Wyoming and focused on the early Eocene and Oligocene (Chadronian) around Bell Creek, Fossil Station and Cameron Springs. They remained in Wyoming through August 8, returning to Washington on August 14. They collected more than 450 small mammal specimens, consisting mostly of skull elements, jaws and teeth, but also including a complete skull of *Lambdotherium popoagicum* Cope (USNM 23212).

Dr. Dunkle and Tut Sullivan spent the latter part of the 1964 summer season collecting in the Manzano Mountains in New Mexico near the sites they explored in 1963. At least part of this time was spent with Charles B. Read and Donald Myers of the U. S. Geological Survey and Vincent Kelley and Stuart Northrup of the University of New Mexico, studying the Pennsylvanian and Permian sediments of the Magdalena Group. They collected more than 100 specimens, including 81 fossil fish, including some unusually complete skeletons of an acanthodian and a variety of palaeoniscoid fishes.

Dr. Hotton made a short trip exploring the Lower Permian of West Virginia in early November 1964. According to collection records, he returned with parts of an amphibian (USNM 23307) and a pelycosaur (USNM 23308).

The Middle and Late 1960s – The Pace of Collecting Slows

Dr. Gazin and Franklin Pearce spent the 1965 field season collecting in Wyoming. Arriving in Wyoming in early July, they focused on Eocene sites in the Bridger Basin and had "excellent results with the smaller mammals of the Bridger, particularly in the lower levels of the Formation, at various localities scattered about the basin."¹¹ Roughly 470 specimens were sent back to the Museum, "including the condylarth *Hyopsodus*; various primates, rodents, insectivores, and carnivores; and the ungulates *Orohippus* and *Helaletes*. Among the larger mammals represented are *Tillotherium* and the perissodactyls *Hyrachyus* and *Palaeosyops*."¹² Also found was USNM 244365, an excellent skull of the early primate *Notharctus*. Pearce left for Washington on August 7. Dr. Gazin remained in Wyoming to attend the Wyoming Geological Association field conference.

Dr. Ray did not make an extensive field collection trip during 1965, as much of his time was spent working on the new Pleistocene Hall. For instance, he spent two weeks in early March visiting other museums, examining their study collections and identifying suitable fossils for possible loan or exchange. An initial round of major construction was completed on the hall, and one of the *Eremotherium*, a mastodon, a mammoth and a group of horses from Hagerman, Idaho, were installed. Work (and meetings) related to the hall would consume much of his time through 1970.

Ray did manage to get to the field in 1966, spending much of February and March in Mexico, continuing his work in the Pleistocene deposits near Puebla. After returning to the US, he travelled to the American Museum of Natural History (AMNH) in early May to visit Dr. Malcolm McKenna, who graciously agreed to an exchange of fossils, with the AMNH providing a composite Alaskan mammoth (with bones personally selected by Dr. Ray), a musk ox, bison and some small mammals suitable for the Pleistocene Hall. The exchange later included a bison mummy from Alaska and some extraordinary glyptodont specimens from Arizona. Ray made a quick visit back to Puebla in late May and then returned to the US in early June. Later in the year, he was able to make a small number of quick trips to sites in Tennessee

and Virginia, and in November, conducted short visits to the Natural History Museum of Los Angeles County and the Field Museum in Chicago to explore fossils for possible exchange.

During that November trip, Dr. Ray also joined Dr. Charles Repenning and Dr. Frank C. Whitmore Jr (both with the USGS) in visiting a talented amateur named Douglas Emlong, based in Oregon, who had amassed a significant collection of fossils, primarily of marine mammals. Ray was significantly impressed with both the specimens and their associated documentation and in 1967 the NMNH purchased the entire “Emlong Collection”. The initial shipment of fossils from Emlong in early 1968 consisted of almost 600 specimens (some 40,000 pounds).¹³ Emlong continued to collect for the Smithsonian until his death in 1980, and today the collection numbers almost 1270 USNM catalog entries, mostly of marine mammals from Oregon, but also including marine mammals from California, Washington, and British Columbia, a variety of fish, marine turtles, birds, and a few land mammal specimens, all ranging from the Eocene through the Pleistocene in age. It represents one of the most significant vertebrate paleontological acquisitions that the museum made in the 1960s.

Dr. Gazin did not go to the field in 1966, but rather visited the Carnegie Museum, Princeton, Yale, and the AMNH to study their collections of Tertiary mammals, particularly in preparation of his monographic study on the Eocene mammal *Hyopsodus* (published in 1968).

Dr. Gazin and Franklin Pearce spent their summer of 1967 collecting season in the Bridger Basin in southwestern Wyoming. Arriving in Wyoming on June 30, they focused on Paleocene and Eocene areas around Cedar Mountain, Dead Cow Buttes, and Sage Creek, before moving at the end of July to prospect localities around Grizzly Buttes, Little Muddy Creek, Twin Creeks and Bitter Creek. They had excellent collecting, and brought back a number of good skulls, including a complete skull of the early primate *Smilodectes gracilis* Marsh (USNM 24892) and a complete skull and skeleton of the amphisbaenian reptile *Spathorhynchus fossorium* Berman (USNM 26317). Mr. Pearce left Wyoming for Washington August 12. Dr. Gazin went on to Los Angeles and returned to Washington September 5. He was named Senior Paleobiologist later that month, a promotion which allowed him to devote a greater amount of his time to research.



Franklin Pearce preparing the skeleton of a *Smilodectes* found in Wyoming in 1967.

Dr. Dunkle retired from the National Museum in March, 1968, to return to the Cleveland Museum of Natural History as Curator of Paleontology.

Dr. Gazin did not conduct a field collecting trip in 1968, instead visiting Yale, Amherst, Cambridge, Princeton, the American Museum of Natural History and the Natural History Museum of Los Angeles County.

Dr. Hotton, accompanied by his daughter Carol and Dr. Alan J. Charig of the British Museum (Natural History), spent July and the early part of August 1968 exploring reported dinosaur localities in Montana, Colorado and Wyoming. Not much was found, although he noted that follow-up might be worthwhile.

Dr. Ray spent two months in Europe during 1968. He began in London in late August, visiting the new mammal hall at the British Museum (Natural History) and joined Dr. Anthony Sutcliffe to view the Pengelly Cave Research Centre and the Torbryan Caves (both in Southwestern England). He proceeded from London to Italy, visiting the Museo Civico di Storia Naturale di Genova and later the Corbeddu Cave in Sardinia. He noted that the cave had a rich deposit of the rabbit-like lagomorph *Prolagus* and shipped back 385 kg of material collected from it and nearby caves. Proceeding to Malta on September

23, he collected and shipped a small number of blocks from the Pleistocene deposits at Mnaidra Gap. He then spent a week visiting caves in Mallorca and collected bones of the Pleistocene pygmy goat *Myotragus*. Mallorca was the end of his collecting activities for this trip, although he then proceeded to museums in Amsterdam, Warsaw and Krakow to examine specimens and displays and identify fossils that might be suitable for the Pleistocene Hall for possible exchange. He returned to Washington in late October. Later that year, he was promoted from Associate Curator to Curator of Late Cenozoic Mammals.



A Prolagus (USNM 167613) from Sardinia mounted for display.

A field party consisting of Dr. Gazin and his wife Elizabeth, Franklin Pearce and his daughter Sharon, and Sigmund (“Sig”) Sweda of the VP Lab traveled to the Bridger Basin in early July 1969. They focused on the middle Eocene exposures around Cedar Mountain, Sage Creek Basin, Church Buttes, Pinnacle Rock, Grizzly Buttes, and Little Dry Creek in Southwest Wyoming. Dr. and Mrs. Gazin remained with the party for about 5 days (July 12-16), and then continued on to California for vacation. Unfortunately, Sweda injured his ankle, and was forced to return to Washington on July 18. John Ott, also of the VP lab, flew out to replace Sweda, arriving on July 24. The Gazins rejoined the party on August 13, and after preparing the finds for shipment, all party members left August 17. Roughly 280 specimens, mostly of mammal fossils, were returned to the Museum. At the request of Dr. Hotton, the party also diverted to an area near Casper, Wyoming to collect some plesiosaur specimens (USNM 433271 and 534064).

Dr. Ray made no significant collecting trips in 1969, but did travel to both the Carnegie Museum and the American Museum to discuss displays and possible trades of exhibits material. Work continued on the Pleistocene Hall, and the VP lab continued to mount specimens for possible exhibit. The Annual Report of the Smithsonian for 1969 noted that preparation of several glyptodonts, a woolly mammoth, several peccaries, and a second *Eremotherium* mount were completed. Work on the Hall would continue into the 1970s.

Remington Kellogg

While somewhat outside the scope of this article, no discussion of vertebrate paleontology in the 1960s would be complete without acknowledging Remington Kellogg's contributions to the national collections and science.

Dr. Arthur Remington Kellogg joined the United States National Museum in 1928 as an assistant curator in the Division of Mammals (Department of Biology). His main area of study was the biology of marine mammals, particularly whales, and over time he became one of the world's foremost authorities on both modern and fossil whales.

Dr. Kellogg advanced through the ranks, becoming Curator of Mammals in 1941, Director of the National Museum in 1948, and Assistant Secretary of the Smithsonian Institution in 1958. Upon his retirement from the Smithsonian in 1962, at age 70, he was appointed an honorary research associate in the NMNH Department of Paleobiology. As his paleontological collecting and research activities had been somewhat constrained by his duties as a Museum and Institution administrator, this appointment allowed him to once again focus all his attention on his scientific work, and he returned to his studies in evolutionary marine mammalogy.

Between 1962 and 1965, he made a small number of short collecting trips to sites in Maryland and Virginia, focusing on the Miocene Calvert and Choptank Formations. In 1965, he began the massive job of reorganizing the extensive NMNH collection of fossil marine mammals, identifying and cataloguing specimens as necessary, and augmenting his previous lines of research. Over the next four years, he also was able to complete nine additional studies regarding Miocene fossil marine mammals. Upon his death in 1969, he willed his personal library to the NMNH, and the Remington Kellogg Library of Marine Mammalogy is considered an incredible resource, containing about 1,800 books and bound journals on all aspects of fossil and living marine mammals, including paleontology, morphology and phylogeny.¹⁴

**Summary of Major Vertebrate Fossil Collection Expeditions Conducted by the
National Museum of Natural History During the 1960s**

Year	Curator in Charge	Age/Formation of Primary Interest	Area of Primary Interest
1960	N. Hotton III	Lower Permian/Speiser and Arroyo Formations	Kansas, Oklahoma and Texas
1961	N. Hotton III	Upper Permian/Triassic Beaufort Group	S. Africa
1961	C. L. Gazin	Oligocene, Paleocene, Eocene	Colorado, Wyoming, Montana
1962	N. Hotton III	Permian, Triassic, Jurassic	Texas, Colorado
1963	C. L. Gazin	Eocene/Paleocene	Wyoming
1963	D. H. Dunkle	Pennsylvanian and Permian/Madera Fm. (N. Mexico), Jurassic/Todilto (N. Mexico); Pennsylvanian/Wea Shales (Neb., Iowa); Middle Devonian (Ohio)	New Mexico, Nebraska, Iowa, Ohio
1963	N. Hotton III	Upper Permian/Triassic Beaufort Group	S. Africa Karoo Region
1964	C. L. Gazin	Paleocene/Lower Puerco and Upper Torrejon Fm. (N. Mexico); Eocene and Chadronian Oligocene/ Wind River Basin (Wyoming)	N. Mexico, Wyoming
1964	C. E. Ray	Pleistocene	Mexico
1964	D. H. Dunkle	Pennsylvanian and Permian/Magdalena Gp.	N. Mexico
1965	C. L. Gazin	Eocene/ Bridger Basin	Wyoming
1966	C. E. Ray	Pleistocene	Mexico
1967	C. L. Gazin	Paleocene and Eocene/ Bridger Basin	Wyoming
1968	N. Hotton III	Jurassic	Montana, Colorado, Wyoming
1968	C. E. Ray	Pleistocene	Italy, Malta, Mallorca
1969	C. L. Gazin	Eocene/ Bridger Basin	Wyoming

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- ⁸ Smithsonian Institution. 1964. "Annual Report of the Board of Regents of the Smithsonian Institution Showing the Operations, Expenditures and Condition of the Institution for the Year Ended June 30, 1963". Page 51
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- ¹⁴ For more information on Remington Kellogg's life and career, see the Biographical Memoir "Remington Kellogg" by Frank C. Whitmore Jr., published by the National Academy of Sciences in 1975.