
MAMMALS AND THEIR EXTINCT RELATIVES

A GUIDE TO THE LILA ACHESON WALLACE WING

LOWELL DINGUS

Project Director, Fossil Hall Renovation

RICHARD TEDFORD

Chairman and Curator, Vertebrate Paleontology

EUGENE GAFFNEY

Curator, Vertebrate Paleontology

MALCOLM McKENNA

Frick Curator, Vertebrate Paleontology

MICHAEL NOVACEK

Curator, Vertebrate Paleontology
Vice President and Dean of Science

ERIC DELSON

Research Associate, Vertebrate Paleontology

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CHAPTER 6

PRIMATES, BATS, AND INSECTIVORES: ARCHONTANS AND INSECTIVORANS

Flexible Ankles and Depressions on the Snout: Advanced Features of Archontans and Insectivorans

The archontans consist mainly of animals that live in trees, such as bats, monkeys, and apes. These animals have ankles built to allow flexibility in climbing and roosting. Humans share their evolutionary heritage with monkeys and apes, so are placed among the primates. Insectivores, such as moles, shrews, and hedgehogs, are primarily burrowers. They have a prominent depression on the side of the snout in front of the eye socket that houses the strong muscles that move the nose and lips.

Hands That Hold: Primates

Primates include living and extinct lemurs, monkeys, apes (including humans), and their close relatives. “Primate” comes from the Latin word for “first.” When the group was named in the eighteenth century, scientists put humans and their relatives, monkeys and apes, at the top of earthly life, in what they pictured as a “Great Chain of Being.” We now know that evolution is more like a bush with many branches, none of them higher or better in an evolutionary sense than another.

The earliest-known primate fossils are found in North America, suggesting to some researchers that the group may have arisen on that continent. All primates can grasp objects with their hands and feet but retain

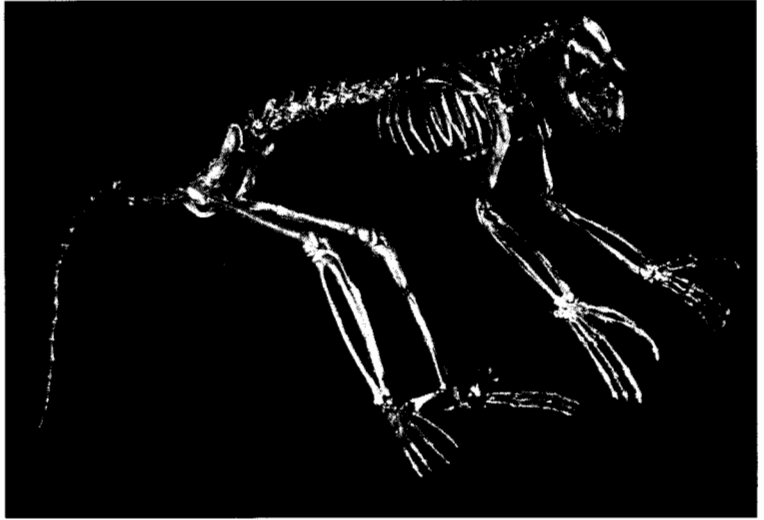


This alcove on the walk along the evolutionary tree for mammals explores the assemblage that includes insectivores, bats, and the group to which humans belong—primates.



Skeleton (cast) of *Notharctus tenebrosus*
"false bear"

Notharctus is one of the best-known early euprimates. It has many broad similarities to the living lemurs of Madagascar. However, it lacks the tooth comb. Also, its brain is relatively small. This partial skeleton was collected by an American Museum of Natural History party but not recognized as an important specimen until it was prepared back at the Museum. 49 million years ago
Grizzly Butte, Wyoming
Length: 3 feet
AMNH 127167



Skull and jaws (cast) of *Proconsul heseloni*
"before consul"

Proconsul was near the common ancestor of humans and other apes. It probably lacked a tail, and may have had the same advanced features in the shoulder and forelimb that allow gibbons and the great apes of Africa and Asia to hang from branches and move the upper body flexibly. 19 million years ago
Rusinga Island, Kenya, East Africa
Length: 5 inches
AMNH 39530



features of primitive mammals, including five fingers and toes. Many features of primates are important for living in trees. The eyes face forward, with overlapping fields of vision providing better depth perception. A large brain coordinates sensory input as well as complex movements of hands and feet. As in most mammals that eat fruit, leaves, and some insects, the molars of primates are usually low-crowned, with rounded cusps.

Lemurs, lorises, tarsiers, monkeys, and apes belong to a group called eu-primates, or "true" primates. Besides having eye sockets that are at least partly surrounded by bone (to prevent the eyes from being squeezed when the animal chews), they have flattened toenails and fingernails. Fossils of lemurs have been found in East Africa dating from about 20 million years ago, and in South Asia from 8 million years ago. They already had a tooth "comb," formed by protruding front teeth, for cleaning the fur, a feature found in the great variety of lemurs that live today in Madagascar.

Anthropoids: Monkeys and Apes

The "higher primates," or anthropoids, include monkeys as well as humans and other apes. All have relatively large brains and flat molars. The earliest fossil anthropoids, such as *Aegyptopithecus*, lived in Africa at least 35 million years ago. By about 33 million years ago, early relatives of humans, other apes, and monkeys of Africa, Asia, and Europe flourished in what is now Egypt. Monkeys of South and

Central America did not appear until later; their earliest-known fossils, about 26 million years old, are from Bolivia.

Between 15 million and 10 million years ago, two main lineages of ape-like primates evolved. The first, leading to the Asian orangutan, includes *Sivapithecus*. Fossils of this early ape have been found in Turkey, India, and Pakistan, in 12-million- to 7-million-year-old rocks. A second lineage eventually evolved in Africa into humans, chimpanzees, and gorillas. Possible early members of this branch have been found in Europe and Africa, dating from around 10 million years ago. Although there were many kinds of fossil apes, including *Proconsul*, none can be directly linked to living African apes.

Just as birds are dinosaurs in the sense that they descended from a common ancestor with dinosaurs, humans are apes because they descended from a common ancestor with other apes. Fossils of the early human relative *Australopithecus*, dating from 6 million to 1 million years ago, have been found in eastern and southern Africa. *Australopithecus* walked upright, but its brain was only somewhat larger than that of living apes of comparable body size. The genus *Homo*, to which modern humans belong, had a larger brain and first appeared in Africa about 2.5 million years ago, at the time of a major climatic cooling. The first stone tools made by humans also date from this period.

Furred Flyers: Bats

Very few kinds of vertebrates evolved powered flight. Bats are the only mammals that can truly fly. In contrast to birds, bats have no feathers, and the membrane of skin that forms the wing is supported by the elongated bones of all five fingers in the hand. The bat's wing also differs from that of pterosaurs, extinct flying reptiles in which the wing's outer half was supported only by the elongated bones of the fourth, or "ring," finger.

Many living bats use highly pitched sound waves, emitted from their mouth or nose, to navigate and hunt. These sound waves, which are usually above the range of human hearing, bounce off objects or prey. The bat hears the rebounding waves, which tell it where the object is. This process is called echolocation. The fossil record of bats extends back more than 50 million years. Even in early bats, such as *Icaronycteris*, the region of the skull containing the inner ear is expanded, a consequence of the evolution of echolocation.

Small Survivors: Insectivores

Insectivores are the smallest living mammals. The adult of one species of shrew weighs less than a dime, and its entire body is only about two and a half inches long. The immediate evolutionary roots of insectivores extend back between 65 million and 70 million years. Some fossil relatives of the group, such as *Leptictis*, appear to be distantly related to modern shrews, moles, and hedgehogs. Close relatives of living hedgehogs appeared about

60 million years ago, but moles and shrews did not appear until 40 million to 35 million years ago.

Insectivores have a variety of lifestyles and range from burrowing moles to semiaquatic shrews. Some of these shrews trap air in a fringe of fur on the foot. This forms a bubble, enabling the animal to "walk on water." Insectivores all have prominent depressions in front of the eye sockets that house touch sensors, as well as muscles that move the nose and lips. The mole, an accomplished burrower, uses its snout to shove dirt in and around its burrow.

Other Primates, Bats, and Insectivores on Display

Skeleton (cast) of *Plesiadapis cookei*
"like *Adapis*"
56 million years ago
Bighorn Basin, Wyoming
AMNH 129498

Skull (cast) of *Archaeolemur majori*
"ancient lemur"
2 thousand years ago
Southwest Madagascar
AMNH 30007

Skeleton (cast) of *Megaladapis edwardsi*
"giant lemur"
5,000 years ago
Madagascar
AMNH 15868

Skeleton of *Tarsius bancanus*
"elongated heel"
Recent
Borneo, Southeast Asia
AMNH 2458

Skulls and jaws, male and female (casts) of *Aegyptopithecus zeuxis*
"Egyptian ape"
33 million years ago
Fayum, Egypt
AMNH 129172/3/4/5

- Skull (cast) of *Dolichocebus gaimanensis*
 "long monkey"
 22 million years ago
 Chubut Province, Argentina
 AMNH 109004
- Skull (cast) of *Tremacebus harringtoni*
 "hole monkey"
 22 million years ago
 Chubut Province, Argentina
 AMNH 109007
- Skeleton (cast) of *Paracolobus chemeroni*
 "like *Colobus*"
 3 million years ago
 Baringo Basin, Kenya
 AMNH 129319
- Skull (cast) of *Theropithecus brumpti*
 "wild beast ape"
 3 million years ago
 Omo Valley, Ethiopia
 AMNH 100058
- Partial skull and jaw (cast) of *Sivapithecus indicus*
 "Siva ape"
 8 million years ago
 Potwar Plateau, Pakistan
 AMNH 129347
- Partial skull (cast) of *Homo erectus*
 "human"
 350,000 years ago
 Zhoukoudian, China
 ANTH 99.1/2640
- Skeleton of *Artibeus jamaicensis*
 "straight walker"
 Recent
 St. Croix, U.S. Virgin Islands
 AMNH 129101
- Skull of *Hipposideros schlosseri*
 "horseshoe"
 30 million years ago
 Quercy, France
 AMNH 55348
- Skeleton of *Pteropus lylei*
 "wing footed"
 Recent
 Bangkok, Thailand
 AMNH 129100
- Skeleton of *Erinaceus europaeus*
 "hedgehog"
 Recent
 Germany
 M 40055
- Skeleton of *Talpa europaea*
 "mole"
 Recent
 Locality unknown
 AMNH 129103
- Skull (cast) of *Proscalops secundus*
 "before mole"
 25 million years ago
 Eagle Nest Butte, South Dakota
 AMNH 13798
- Skeleton of *Cryptotis parva floridana*
 "hidden ear"
 Recent
 Lake Placid, Florida
 M 253696