

9.3 Early Anthropoids Evolve and Thrive

Beginning in the Oligocene epoch and coinciding with a period of widespread plant and animal extinctions, an episode of rapid global cooling occurred. With this shift in climate came new habitats and newly diverse primate taxa. The fossil record representing the evolution of these taxa is as remarkable in the Oligocene as the fossil record is in the Eocene. However, whereas Eocene primate fossils have been found in a wide variety of settings around the world, most of the Oligocene primate fossils have come from one primary region, the Fayum Depression (see “How Do We Know: The Fayum Depression”). Spanning about 8 million years of evolution, roughly 37–29 mya, the fossil record consists of a wide and abundant variety of plants and of animals. From these remains, scientists have



of animals. From these remains, scientists have constructed a detailed picture of the environment in northeast Africa (**Figure 9.12**).

In sharp contrast to the desert landscape of the Fayum today—it is among the harshest and driest places in the world—the Late Eocene–Early Oligocene landscape was much like today’s Southeast Asia; namely, wet, warm, and tropical. The Fayum was long the focus for all organisms in the region. In addition to diverse primates, all sorts of animals lived there, including the ancestors of rodents (the earliest porcupines are from the Fayum), bats, hippopotamuses, elephants, crocodiles, and various birds. Plants are also represented by a diverse array of tropical taxa, such as mangroves, water lilies, climbing vines, figs, palms, and cinnamon. It must have been an amazing place.

The Fayum primates included various strepsirrhines and at least three groups of primitive (but unmistakable) higher primates: **oligopithecids**, **parapithecids**, and **propliopithecids** (**Figure 9.13**). The oligopithecids were the earliest, dating to about 35 mya. The later parapithecids, such as their namesake genus, *Parapithecus*, are among these early anthropoids, and they retained some primitive characteristics. For example, parapithecids had three premolars. This condition may directly link parapithecids to platyrrhines (which also have three premolars), but having three premolars is more likely the ancestral condition that precedes the divergence of platyrrhines and catarrhines.

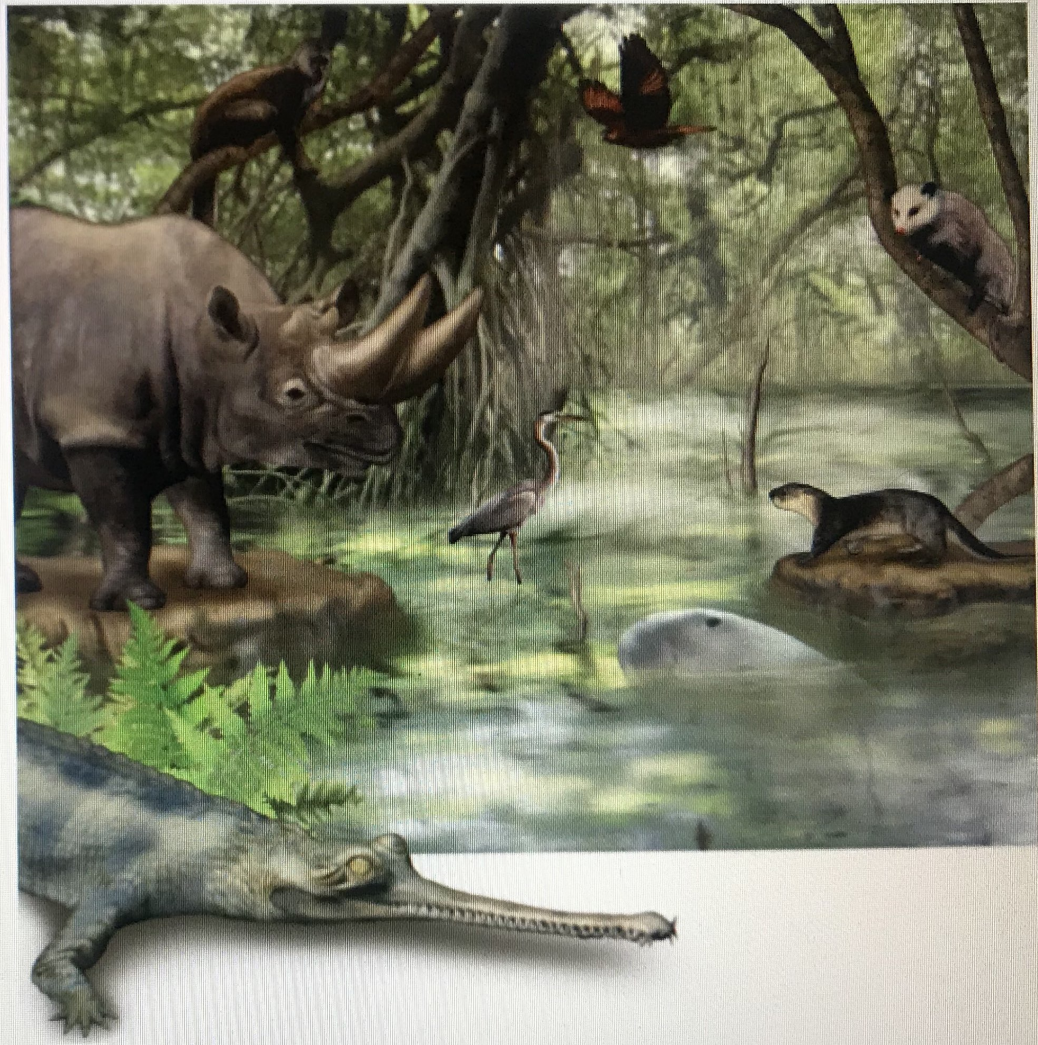


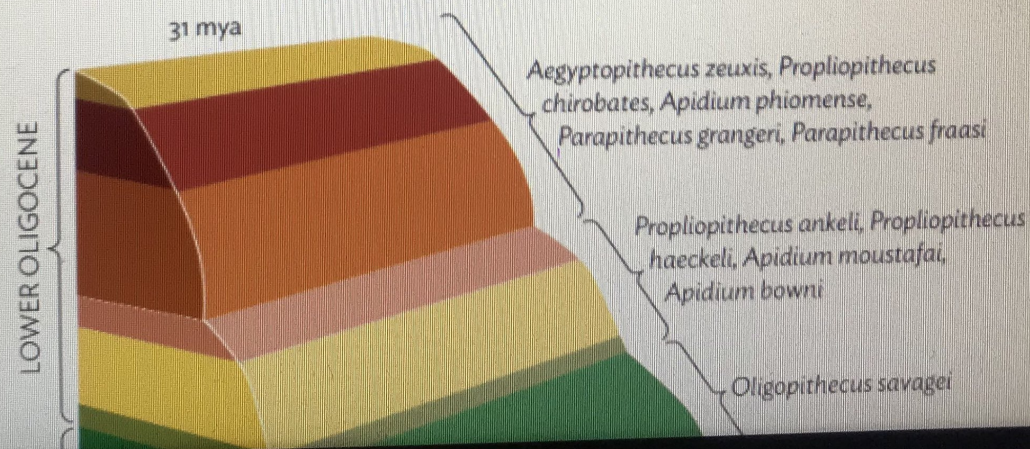
FIGURE 9.12

The Fayum Climatological and environmental reconstructions have provided a glimpse of what the Fayum was like when some of the earliest primates lived, at the end of the Eocene and the beginning of the Oligocene.

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The propliopithecids consisted of several genera, but *Propliopithecus* and *Aegyptopithecus*, both dating to between 32 and 29 mya, are the most common of this group of primates. The propliopithecids had a more derived dental formula of 2/1/2/3, one fewer premolar than the parapithecids had. In this and other respects, they were more catarrhine-like than the parapithecids. *Aegyptopithecus*, the largest of the Fayum primates (it weighed 6–8 kg [13–18 lb], or about the weight of a fox), is the best-known Fayum primate (**Figure 9.14**).

Aegyptopithecus had a sagittal crest on the top of the skull where a large temporalis muscle was attached (see Figure 6.31 in chapter 6). Its brain was small compared to those of later catarrhines. The front and hind limbs were of relatively equal size, suggesting that the animal was a slow-moving, arboreal quadruped, similar to the modern howler monkey. Its overall appearance indicates that *Aegyptopithecus* was a primitive catarrhine—and a likely contender for the common ancestor of all later catarrhines.



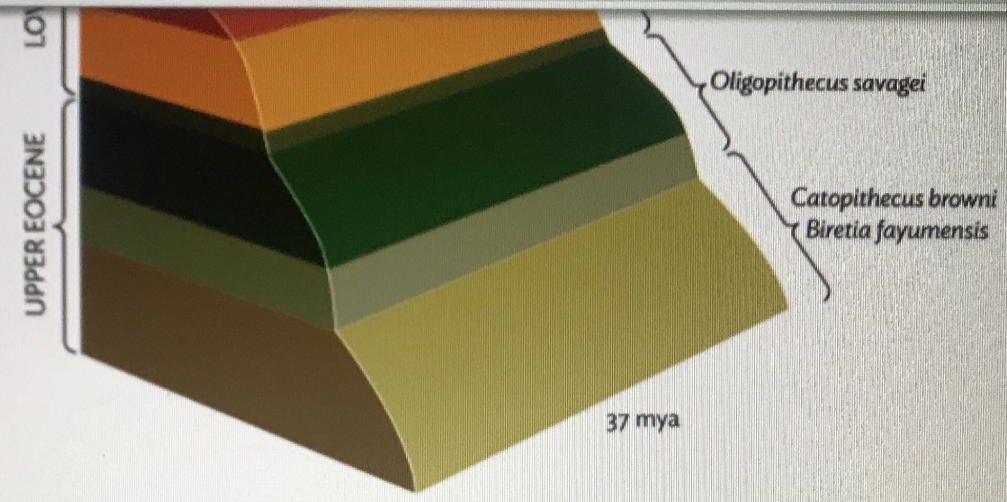


FIGURE 9.13

Primate Ancestors in the Fayum The earliest primate ancestor found in Fayum deposits is *Biretia fayumensis*. Various species of early prosimians and anthropoids have been recovered from Fayum deposits spanning the Oligocene.

I mentioned that not all early primates of the Oligocene are from the Fayum. Although the record of early catarrhines is best and mostly richly represented at the Fayum, at least one fossil representing an ancestor of monkeys, apes, and humans has been recovered from the modern country of Saudi Arabia (see locator map on p. 287). During the Oligocene, before the formation of the Red Sea, the continent of Africa and the Arabian Peninsula formed a single landmass. The remarkable radiation of primates in the Fayum suggests that similar habitats in Arabia supported similar kinds of primates. In their search for Oligocene fossils, the paleontologist Iyad Zalmout and colleagues found most of a skull of an early catarrhine, now known as *Saadanius*.

found most of a skull of an early catarrhine, now known as *Saadanius*. Dating to about 28 mya and postdating *Aegyptopithecus*, this primate shared a number of features with the Fayum catarrhines, such as dental formula (2/1/2/3); upper molars with low, rounded cusps; and shape of the face. However, it differs from Fayum primates in having the middle-ear anatomy typical of later catarrhine primates. In addition, a plethora of Early Oligocene primates has been recovered from northern China, Mongolia, and Pakistan, including a diversity of both strepsirrhines and haplorrhines, with the former dominating over the latter.

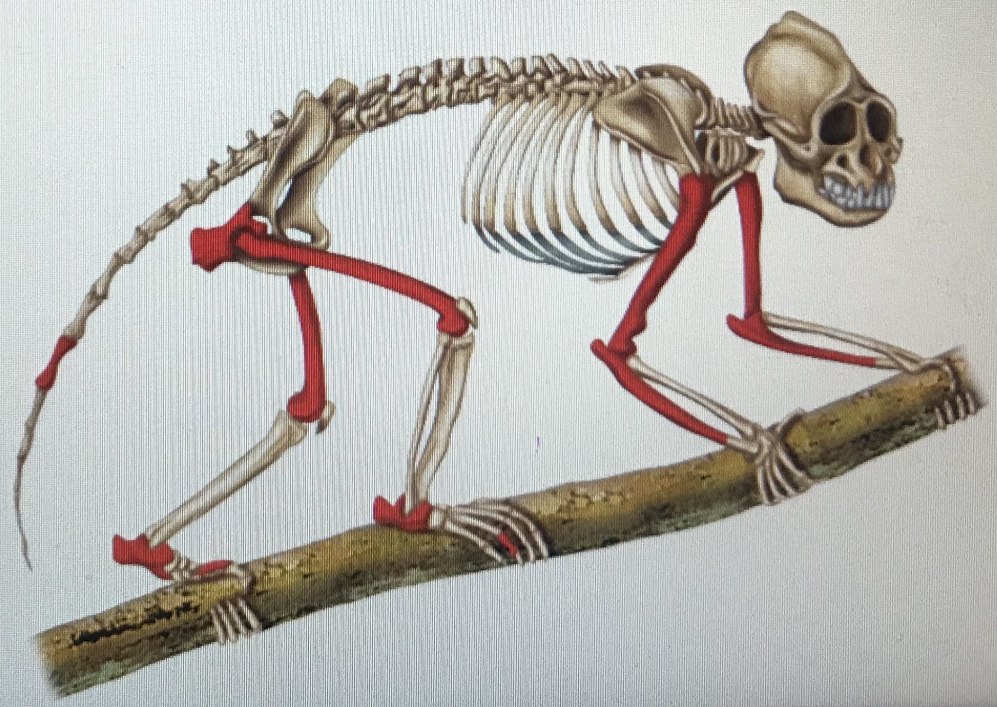




FIGURE 9.14

Aegyptopithecus Shaded red in this reconstruction are the postcranial skeletal fossils of *Aegyptopithecus* that have been found in Fayum deposits. These recovered elements provide important information regarding the animal's mobility and form of locomotion: arboreal quadrupedalism.

CONCEPT CHECK

When Were They Primates? Anatomy through Time

Primates have a number of anatomical characteristics that reflect both an adaptation to life in the trees and related behaviors. Contenders for primate status in the Paleocene generally lack these characteristics; two groups of closely related Eocene mammals—adapids and omomyids—have these characteristics.

Paleocene(66–
56 mya)



Eocene(56–34
mya)



Present



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	Paleocene(66–56 mya)	Eocene(56–34 mya)	Present
			
Characteristic			
Increased vision	No	Yes	Yes
Partially or fully enclosed eye orbits	No	Yes	Yes
Convergent eyes	No	Yes	Yes
Small incisors and large canines	No	Yes	Yes
Nails at ends of digits	No	Yes	Yes

Nails at ends of digits	No	Yes	Yes
Mobile, grasping digits	No	Yes	Yes
Short snout	No	Yes	Yes
Reduced smell	No	Yes	Yes
Increased brain size	No	Yes	Yes

Consistent with the fossil record, the molecular evidence shows that the first anthropoids originated in the Late Oligocene, likely between 30 and 25 mya (see chapter 8, “Genetic Dating: The Molecular Clock”). The discovery of two fossil primates in Tanzania documents the split that led to the emergence of modern apes and modern monkeys by 25 mya. In the Rukwa Rift Basin of western Tanzania, the American paleoanthropologist Nancy Stevens and her team discovered the earliest ape and earliest Old World monkey.



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Rukwapithecus is represented by part of a mandible and teeth, and its second molar shares features with the second molars of later fossil apes. *Nsungwepithecus* is represented by part of a mandible and just one molar. While the bilophodont cusps of that molar are not

fully modern, they are clearly cercopithecoid. As a representation of the split between apes and monkeys, this fossil record is modest, but it shows that ancestral apes and monkeys were present in East Africa at about the time most authorities expected.

The presence in the Arabian Peninsula and East Africa of the later Oligocene catarrhine underscores the strong likelihood that the ancestry of fossil and modern catarrhines is broadly based in the African–Arabian landmass during the later Oligocene.

