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Propliopithecidae

The earliest-known definitive catarrhine primates, mainly known from Oligocene deposits in the Fayum region of



Above: *Propliopithecus haeckeli*, left and right mandibular bodies and teeth. Below: lateral view of the first-discovered (and still most complete) cranium of *Propliopithecus* (= *Aegyptopithecus*) *zeuxis*. Subsequent finds have shown that the face in this specimen is abnormally long. Cranium courtesy of Elwyn L. Simons.

Egypt. The first specimen was found early in the twentieth century by a professional collector, R. Markgraf, but more recent and much more extensive collections have been made by E.L. Simons, who has also recovered a great variety of other primates, mostly early anthropoids. The Fayum catarrhines have been given a number of names in the past, including *Propliopithecus haeckeli*, *P. ankelae*, *Aegyptopithecus zeuxis*, *Moeripithecus markgrafi*, and *Aeolopithecus chirobates*, but they should now be recognized as two to four closely re-

lated species of a single genus, *Propliopithecus*, grouped in a distinct catarrhine family.

These primates are known mainly from the Jebel Qatrani Formation in Egypt. The deposits making up this formation are exploited at a number of quarries, and *Propliopithecus* is known from Quarry V at 165 m above the base of the formation to Quarry M at 249 m above the base. Combining several radiometric dates on a basalt at the top of the formation with preliminary paleomagnetic calibration of the



Faces of male *Propliopithecus* (= *Aegyptopithecus*) *zeuxis*: left, young adult first-discovered individual, probably distorted; right, older adult. Courtesy of Elwyn L. Simons.

Fayum sequence, it is suggested that the propliopithecids date to 34–33 Ma, thus earliest Oligocene. Additional propliopithecid specimens have been reported from the Taqah locality in the Sultanate of Oman, on the central southeastern coast of the Arabian Peninsula; at the time, of course, this region was part of Africa. The relative age of the Taqah and Fayum deposits is somewhat controversial, but they are surely similar. The Taqah specimens were identified as *Moripithecus markgrafi*, and certain characters were said to validate this as a distinct genus, but it seems best for now to consider *markgrafi* as a species of *Propliopithecus*, known also from an uncertain level in the Fayum. A single tooth from the Oligocene of Malembe in Angola may belong here as well.

The species of *Propliopithecus* range from smaller than most extant catarrhines to animals the size of gibbons. They have skulls with moderately projecting faces, wide interorbital spacing, tall canine teeth, and molars with broad crowns and low rounded cusps. Brain size is small, and there is a marked constriction between the face and the braincase (postorbital constriction). There is no development of the auditory tube of the external ear, a character present in all other catarrhine primates. The molars have well-developed cingula, apparently thin enamel on the surfaces of the crowns, and overall are very apelike, which has led many authorities to include the group with the apes. It is now thought that all of these features are those that characterize the ancestral catarrhine condition; they were present in the common ancestor of all catarrhines and, therefore, cannot be said to be diagnostic of any one group within the Catarrhini.

The postcranial morphology of *Propliopithecus* is more distinctive. The arm bones are relatively stoutly built. The distal articular surface of the humerus indicates a stable elbow joint, precluding full extension of the arm. This is also indicated by the morphology of the proximal ulna, which has a primitively long olecranon process. The fingers and toes are strongly developed and adapted for powerful grasping, and, overall, the postcranial morphology suggests quadrupedal climbing as the principal method of locomotion. In this it would have been like present-day howler monkeys of the tropical forest of South America. Some of these characters are probably primitive for the catarrhines, and this is particularly true of the retention of such characters as the entepicondylar foramen and the dorsal epitrochlear fossa on the humerus; but, taken all together, and in conjunction with the relative robusticity of the limb bones, this morphology is probably somewhat derived compared with the ancestral catarrhine morphotype.

The evidence from the postcranial skeleton is in contrast to the morphology of the skull and teeth just described. It is a good illustration of mosaic evolution, whereby some parts of the body evolve more rapidly and in a different way than do other parts. Just because *Propliopithecus* is the earliest-known catarrhine, and is primitive in some respects, it cannot be assumed that it is somehow primitive in all respects or that it is itself primitive. It shares some characters uniquely with other catarrhine primates (e.g., the loss of the second premolar), and this is sufficient to indicate its place as a member of the Catarrhini; but, in other respects, it lacks key catarrhine adaptations, as in the ear. It must, therefore, be recognized as a

relatively primitive catarrhine, preceding the split between the two living superfamilies with which it shares no uniquely derived characters and, in fact, preceding the evolution of other somewhat less archaic extinct catarrhine groups.

The adaptation of the skull and teeth of *Propliopithecus* indicates that it lived on a diet of relatively soft food. It has neither the cutting edges to its teeth nor the strong musculature needed to cut up or crush tough or hard food, and it appears, therefore, that it must have had a diet consisting largely of fruit. Such a diet is consistent with the postcranial evidence that shows it to have been a slow and rather heavy-limbed climber in trees, which is where most fruit is found.

This is also consistent with the evidence available on the paleoenvironment in which *Propliopithecus* lived. Evidence from the sediments of the Jebel Qatrani Formation show them to have been laid down in low-lying lagoonal environments where the climate was probably hot and humid. The vegetation is known from the fossilized trunks of large tropical trees that are also commonly found in the deposits, and these show that the area surrounding the site was covered with tropical forests containing many large trees. These would probably have grown in a wet, hot climate without marked division into seasons. Still more information is available from looking at the other animals that are found in the same deposits as *Propliopithecus*. A large and varied mammalian fauna is present, and, although it is composed of animals very different from most living today, it is clear from the numbers of species, and from their adaptations, that the fauna as a whole indicates tropical forest.

Putting all of this together, we see the *Propliopithecus* species as small and monkeylike; they were adapted for climbing and lived in trees; they ate the fruit that grew on the trees; the trees were part of a lowland tropical forest growing close to the sea in a hot and humid climate, almost certainly not highly seasonal. This is a picture of a type of catarrhine primate that is the sister group to the living monkeys and apes and that is claimed by some authorities to be ancestral to all living monkeys and apes.

See also Anthropeida; Ape; Catarrhini; Diet; Fayum; Haeckel, Ernst Heinrich; Locomotion; Monkey; Oligocene; Parapithecidae; Pliopithecidae. [E.D., P.A.]

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