

The hunt for the dawn monkey: unearthing the origins of monkeys, apes, and humans

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Living anthropoid primates include New World monkeys, Old World monkeys, apes, and humans. Anthropoids differ substantially from other living primates in terms of their anatomy, behavior, and ecology. Anthropoids have larger brains; they tend to live in large, socially complicated groups; all anthropoids aside from the modern owl monkey are active during daytime; and anthropoids aside from humans move around the forest or on the ground mainly by walking quadrupedally, rather than by leaping from vertical supports. Humans differ from other anthropoids mainly because of our well-known adaptations for bipedality and our enlarged brains; otherwise, fundamental aspects of our anatomy were inherited from our anthropoid ancestors.

The profound differences between anthropoids and other living and fossil primates have made the search for anthropoid origins one of the most longstanding and controversial issues in paleoanthropology. Traditionally, paleontologists have placed the origin of the anthropoid lineage in Africa. Because anthropoids are usually thought to be more advanced than other primate lineages, many students of anthropoid origins have argued that anthropoids must have taken longer to evolve. Modern anthropoids tend to be larger than most lemurs and tarsiers, and many workers have suggested that a major trend in early anthropoid evolution was an increase in body size. As a result, some scholars have argued that anthropoids must have evolved from the largest known Eocene primates, which were lemur-like adapiforms such as the recently described (and now widely discredited) German fossil primate *Darwinius*.

Over the past two decades, paleontological discoveries of tiny, ancient, and very primitive anthropoids in Asia (China, Myanmar, Thailand, and Pakistan) have revolutionized the study of anthropoid origins. *Eosimias*, a roughly 45 million year old primate from China, was the first of these important new fossils to be discovered, and it remains one of the better known examples of the group today. *Eosimias* was a small primate weighing roughly 150 g in life. It retained many primitive features that are absent in most other living and fossil anthropoids, as would be expected in a fossil anthropoid of such great antiquity. Transitional fossils such as *Eosimias* are almost inherently controversial, because some scientists will inevitably seize upon its primitive (non-anthropoid like) features to argue that it is not an anthropoid at all. However, detailed study of *Eosimias* has shown that it possesses numerous characters that are found only in other anthropoids. These anatomical features indicate that early anthropoids had already adapted to a diurnal lifestyle, that they moved about the trees in a monkey-like fashion, and that they were specialized for eating relatively tough, fibrous vegetation.

This lecture recapitulates the long and arduous scientific struggle to reconstruct the early history of the anthropoid lineage. Based on our newly acquired knowledge of early Asian anthropoids such as *Eosimias*, it now appears that: (1) anthropoids arose in Asia rather than Africa; (2) the earliest anthropoids were tiny, as small as (or even smaller than) the smallest living primates; (3) the anthropoid lineage diverged from other primate lineages very early in the Cenozoic, at least by the beginning of the Eocene (55 million years ago); and (4) how and when anthropoids spread from their Asian birthplace

to Africa and South America remains one of the great mysteries of our distant evolutionary history.