NEWS

Westward Ho! for Early Anthropoids

Between March 17 and 19, The School for Advanced Research in Santa Fe, New Mexico, hosted a short but intense, seminar/workshop on "The Colonization of Africa by Early Anthropoid Primates." The seminar, organized by Chris Beard (Kansas), involved two full and intense days of presentations and discussions, followed by a field trip to Paleocene and Eocene localities in northern New Mexico's San Juan Basin.

Africa has been a major center for the evolution of anthropoid primates over at least the last 35 million years. Most major groups of living anthropoids, including platyrrhines, cercopithecoids, hominoids, and hominins, almost certainly originated there. However, over the past few decades, increasing fossil evidence has indicated that anthropoids as a group originated in Asia and subsequently emigrated to Africa,[1–4] despite the presence of a Tethyan Seaway separating the two continents until the Early Miocene. The focus of this seminar was to discuss the nature, number, and timing of possible overwater dispersals by early anthropoids from Asia to Africa and the relative ages of early anthropoid fossils from Algeria, Tunisia, Libya, and Egypt.

In the initial presentation, Alexis Licht (Kansas) set the stage with a presentation on "Geological and Paleoclimatic Background for Anthropoid Dispersal." Drawing on his recent publication on Asian monsoons,[5] he discussed the paleogeography of Africa and Eurasia during the Eocene and Oligocene and the evidence of climatic changes during that time. He argued that monsoonal climates were present in Asia during much of the Eocene, but were driven by atmospheric CO_2 pressure rather than by the uplifted Tibetan Plateau, which usually is credited with causing the current Asian monsoons. Licht suggested that the middle Eocene Climatic Optimum (MECO) at approximately 41 million years ago would likely have been an ideal time for dispersals from Asia to Africa because of the geographical positions of Middle Eastern tectonic blocks and the likelihood of high water volume flowing southwest from large Asian rivers toward Africa in conjunction with prevailing westward currents.

Gregoire Metais (Museum National d'Histoire Naturelle, France) discussed the "Potential Role of Turkey as a Biogeographic Crossroads for Eurasian and African Mammals During the Paleogene." Modern Turkey has an intricate geological history. Recent paleontological work by Metais and colleagues, as well as earlier researchers, indicates a complex paleontological record of fossil mammals. The fauna found in red beds in many parts of the country contains a mix of African, Asian, and Gondwanan taxa with seemingly conflicting faunal and geological ages that could represent any time interval between the late Paleocene to the middle Eocene.

Jean-Jacques Jaeger (Poitiers) offered a real potboiler in his presentation, "Asian Origins of Anthropoid Primates," in which he suggested that at least six clades of fossil primates found in Africa or Europe have separate Asian origins. These include the anthropoid groups parapithecids, oligopithecids, propliopithecids, and pliopithecids. In his view, Asia is also the likely source of several groups of strepsirrhines. He argued that all current cladograms of anthropoid evolution are wrong and that the anthropoid fossil record of Africa was the result of multiple colonizations from Asia.

John Fleagle and Erik Seiffert (Stony Brook) reviewed the rich record of fossil anthropoids from the Fayum of Egypt. They discussed the history of discovery and the stratigraphic positions of the more than twenty early anthropoid taxa from those deposits. They emphasized the diversity of taphonomic and sedimentary characteristics of the different quarries, discussed the chronological dates of the stratigraphic section, the adaptations of the many species, and the ongoing debates about the phylogenetic relationships of different taxa.

Chris Beard (Kansas) reviewed the evidence of anthropoid evolution in Africa and Asia, then addressed the importance of over-water dispersal in primate evolution. He argued that the phenomenon that is often called "sweepstakes dispersal" is not random (and thus should perhaps be referred to as a special case of filter dispersal). Rather, over-water dispersal by vegetation rafts is facilitated by the presence of large rivers and prevailing currents. The ability of primates to be so successful at dispersal is increased by such factors as small size, riverine habitat preferences, and gregarious behavior.

Yaowalak Chaimanee (Poitiers, France, and Thailand) discussed "Fossil Tarsiers and Tarsier-like Primates from Asia and Africa." She reviewed the history of discovery and the biogeography of tarsier-like primates in both Asia and Africa, including the recently described *Hesperotarsius* from Pakistan. She also noted potential problems with the nomenclature of fossil tarsiers, often placed in the genus *Tarsius*, in light of the recent recognition of three distinct genera of living tarsiers. In her view, *Afrotarsius* from the Fayum of Egypt is quite distinct from living tarsiers and other fossil tarsiers and is, more likely, an early anthropoid.

Laurent Marivaux (Montpellier) provided several posters addressing "The Significance of Eocene Sites in Algeria and Tunisia for Understanding the Initial Anthropoid Colonization of Africa." He also discussed the newly identified taxon *Amamria*, as well as *Algeripithecus* and *Djebelemur,* which are currently identified as early strepsirrhines.

Primates are not the only taxa that dispersed from Asia to Africa during

Figure 1. Participants in the SAR Seminar on "The Colonization of Africa by Early Anthropoid Primates". (Color figure can be viewed in the online issue, which is available at wileyonlinelibrary.com.)

the Paleogene. Several presentations discussed hystricognathous rodents, a group of Asian origin that is abundant in the African fossil record and also dispersed from Africa to South America, where they were even more successful. Pauline Coster (Kansas) discussed "Phylogenetic and Biogeographic Implications of Early Anomaluroid Rodents." There are several species of these large, mostly gliding rodents in Africa today, but remarkably little is known about their behavior and ecology. The living *Zenkerella* is particularly distinctive in lacking a patagium. Fossil anomalurids, which are known from several Paleogene sites in North Africa, could potentially be useful as biostratigraphic markers. Hesham Sallam (Mansoura Egypt) offered a presentation on "Earliest Hystricognathous Rodents from North Africa," with special emphasis on the Fayum, where there is an extensive fossil record. He described the dental and cranial anatomy, as well as the stratigraphic distribution, of numerous taxa from many sites in the Fayum sequence. In his view, the Libyan site of Dur at Talah is temporally equivalent to the Qasr el Sagha Formation in the Fayum.

William Sanders (Michigan) discussed the "Biogeography and Biostratigraphy of early African Proboscideans and Embrithopods." In contrast to the rich, continuous, and well-dated Afro-Arabian Miocene proboscidean fossil record, there is no consensus about the age of primitive western Asian and eastern European embrithopods. This is a critical question with regard to understanding whether these afrotheres originated in Africa or Eurasia. Moreover, the Afro-Arabian Paleogene proboscidean fossil record is less speciose and has a large gap spanning the entire middle Eocene.[6] The occurrence of embrithopods and proboscideans from Dur at Talah, especially in comparison with taxa at Bir el Ater and in the Fayum sequence, is inconsistent with a Bartonian age for the site, and supports a late Eocene or even early Oligocene age more in line with Sallam's biostratigraphic interpretation of the rodents. In a presentation entitled, "Early African Bats and Their Biostratigraphic and Biogeographic Implications," Gregg Gunnell (Duke) provided a fascinating overview of bat biology. He reviewed the global fossil record of bats on different continents through the Cenozoic, described some extraordinary biogeographic patterns for these flying mammals, and emphasized the role of Gondwanan land masses in the diversification of crown-group bats.

Overall, the seminar provided an opportunity for a small group of researchers from many different parts of the world to get together and discuss an exciting, controversial, and difficult topic in primate evolution. Together, they focused on identifying ways to move forward toward a better understanding of primate paleobiogeography.

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