

## THE GREAT AMERICAN FAUNAL INTERCHANGE: REWRITING THE SCRIPT

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The Great American Faunal Interchange is currently viewed as primarily a late Pliocene/early Pleistocene event, wherein large numbers of savanna-adapted vertebrates moved north and south across the newly opened transtropical corridor, the Isthmus of Panama. It has been postulated that later movements across the isthmus were pulsed by episodes of Pleistocene glaciation. New data suggest that this interpretation is incomplete and reflects a weak fossil record in critical areas of Central and South America.

Recently, a partially articulated gomphothere was found in the Tertiary Solimões Fm. exposed along the Madre de Dios River in southeastern Peru. This formation is overlain by a stratum that is dated faunally as Upper Miocene (Huayquerian SALMA). The length of time between the deposition of the two formations is unknown, but it is probably not extensive at this site. This specimen demonstrates that proboscideans were in South America long before their next appearance in upper Pliocene/lower Pleistocene deposits of Argentina.

This new gomphothere is temporally and geographically situated to be derived from the "rhynchorostrine complex," and to be an early representative of the Cuvieroninae, the subfamily that encompasses all South American proboscideans. If the dental pattern of this species is viewed as plesiomorphic for the Cuvieroninae, then the pattern developed in later cuvieroniids followed one of two paths. An increase in tooth length and the addition of lophids and cuspules led to the more complex pattern seen in *Stegomastodon* and *Notiomastodon*. In the opposite direction, an increase in tooth length and loss of lophids and cuspules, i.e., the simplification of the dental pattern, led to *Haplomastodon* and *Cuvieronius*. It is reasonable to postulate that much, if not all, of the evolution of South American gomphotheres occurred in South America, rather than separate lineages entering at different times from North America. Instead of having been a one-way, north-to-south range extension, one, two or perhaps even three of the South American gomphotheres may have re-invaded North America during the Pliocene.

The Acre Conglomerate is a vertebrate fossil-bearing stratum that has produced numerous, rich local faunas in southwestern Amazonia. It has also been identified as far north as Colombia, where its fossiliferous nature has been noted. A Pleistocene age was assigned to this deposit by many because it contained fossils of taxa that were presumed to have crossed the transtropical corridor in the Pleistocene. These taxa include gomphotheres, camelids, tayassuids, and tapirs. The majority of the remaining taxa are typical of South American Huayquerian faunas. New stratigraphic data, the late Miocene gomphothere from Peru, and the absence of cricetines in a rich microrodent fauna, support the hypothesis that the Acre Conglomerate, in fact, dates from the Huayquerian. In this interpretation, the North American taxa present in that deposit are members of the late Miocene paleofauna and with the gomphothere were part of the earliest wave of immigrants into South America.

The current paradigm, based on fossil vertebrates collected from temperate regions of North and South America, may accurately depict the movement of savanna species during the Pliocene and Pleistocene. It does not describe the movements of tropical species. Based on new material and a re-evaluation of old data, it can be said that tropical forest vertebrates, rather than savanna-adapted vertebrates, heralded the beginning of the Great American Faunal Interchange at a much earlier date than is now accepted. In our view, hypotheses of interchange dynamics have been handicapped by a necessary reliance on negative evidence, i.e., the absence of tropical forest taxa in the fossil record. The dynamics of the early interchange will be clarified only as more localities are discovered in the tropical forests of Central and South America, not by more fossils from Argentina or the United States.