FOSSIL MAMMALS FROM THE CENTRAL CHILEAN ANDES: A NEW INTERVAL IN THE SOUTH AMERICAN LAND MAMMAL SUCCESSION, AND IMPLICATIONS FOR EOCENE-OLIGOCENE BOUNDARY EVENTS AND ANDEAN TECTONICS

WYSS*, A.R., Geological Sciences, Univ. California, Santa Barbara, CA 93106, U.S.A.; FLYNN, J.J., Geology, Field Museum, Roosevelt Rd. @ Lake Shore Dr., Chicago, IL 60605-2496 U.S.A.; SWISHER, C.C., III, Inst. of Human Origins, Berkeley, CA 94709 U.S.A.; CHARRIER, R., Depto. Geologia, Univ. de Chile, Santiago, CHILE; NORELL, M.A., Vertebrate Paleontology, American Museum, Central Park West @ 79th St., New York, NY 10024 U.S.A.

Biostratigraphically significant samples have been collected from six localities in post-Neocomian terrestrial deposits of the central Andean Main Range (34° 50' S latitude), Chile. Localities are distributed over an area of 13 km by 5 km, and span more than 2500 m of section.

Two eastern localities occurring lowest in the sequence yield a diverse suite of more than 20 taxa indicative of a new biochronologic interval between the Mustersan (?middle Eocene) and Deseadan (?late Oligocene-early Miocene) South American Land Mammal Ages (LMA); speculatively it also is older than the enigmatic Divisideran "LMA". Noteworthy occurrences include the first South American appearance of rodents, argyrolagoid marsupials, and interatheriine interathere and advanced notohippid Notoungulata, as well as the last appearance of polydolopid marsupials, and notopithicine and notostylopid Notoungulata. Four K-Ar and Ar^{40}-Ar^{39} analyses on a flow and tuff which directly underlie one locality yield ages between 35.6 $\pm$ 0.9 and 37.56 $\pm$ 0.14 Ma; the fossiliferous unit itself has produced four Ar^{40}-Ar^{39} dates between 31.7 $\pm$ 0.3 and 31.37 $\pm$ 0.08 Ma in one locality. Therefore, the new biochronologic interval appears to be earliest Oligocene in age, and is the oldest sequence representing Simpson's "Second Faunal Stratum". The "Tinguiririca" assemblage is the oldest South American mammalian fauna dominated by herbivores (in a diversity of taxa) with high-crowned or evergrowing teeth, documenting major changes caused by interaction between a major phase of tectonic uplift in the central Andes and global climatic changes near the Eocene-Oligocene boundary.

We recently recovered about one dozen skulls and jaws from several sites some 10 km west of, and 2500 m stratigraphically above, these lowest localities. The fauna from these new western sites appears advanced over the localities to the east, and probably is younger than about 20 Ma, based on stratigraphy and Ar^{40}-Ar^{39} dates from units overlying the eastern localities. The new faunas should help resolve controversy concerning the younger limit of the Deseadan LMA.

Discovery of the mammal faunas has profoundly altered understanding of central Andean geology: 1) we identified an unconformity between Jurassic marine/late Cretaceous clastic units and volcaniclastic mid-Tertiary deposits, indicating that a dramatic episode of volcanism previously attributed to the late Mesozoic is in fact 30 m.y. younger; 2) consequently, the late Cretaceous/early Tertiary is characterized by non-deposition or erosion, rather than by volcanic deposition as had been hypothesized earlier; and 3) our paleomagnetic results also indicate previously unrecognized, but significant post-Miocene clockwise tectonic rotation (up to 20°) of units in this part of the Andes.