

Preface

During the past two decades, geological explorations of the James Ross Basin, Weddell Sea, have revealed that this basin, located off the northeast tip of the Antarctic Peninsula (West Antarctica), contains one of the most important records of Late Cretaceous and Early Paleogene life in the Southern Hemisphere. The early explorer and scientist Otto Nordenskjöld (1905, p. 252), leader of the Swedish South Polar Expedition, envisioned the paleontologic and biogeographic importance of this basin “... *where, maybe, many animals and plants were first developed that afterwards found their way as far as to northern lands*”. These discoveries have not only provided new insights into the geologic history of Antarctica, but they have also provided answers to questions about life in Southern Hemisphere that have puzzled naturalists since Charles Darwin’s voyage on HMS *Beagle*.

The sedimentary sequence exposed in the James Ross Basin comprises a thick section of Coniacian, Turonian, Campanian, Maastrichtian, Paleocene, Eocene, and probably earliest Oligocene. They form the only marine sequence of this age interval that crops out in Antarctica. The high-latitude biota contained in both the Cretaceous and Paleogene beds is unusually rich and diverse and rivaled only by that from New Zealand and southeastern Australia.

After the Swedish South Polar Expedition (1901–1903), more than 40 years passed before the basin was scientifically visited again, this time by members of the Falkland Islands Dependencies Survey (now the British Antarctic Survey). The establishment of the Argentine station Marambio on Seymour Island in 1969 initiated the modern phase of geologic and paleontologic studies in the James Ross Basin.

The view that Antarctica and South America were connected by a long causeway between the West Antarctica (WANT) and southern South America in the Late Cretaceous through the late Paleocene, and that terrestrial vertebrates were able to colonize new frontiers using this physiographical feature, is almost certainly correct. One of the most intriguing palaeobiogeographical phenomena involving the last phase of the breakup of the supercontinent Gondwana concerns the close similarities and, in most cases, inferred sister-group relationships of a number of terrestrial vertebrate taxa recovered from uppermost Cretaceous and Paleogene deposits of Antarctic Peninsula (West Antarctica) and southern South

America (Magellanic Region and Patagonia). Dispersion of extinct vertebrates between South America and Australia across Late Cretaceous land bridges involving WAGGERS predicts their presence during that interval on the latter. However, although knowledge of Late Cretaceous vertebrates from West Antarctica (and the Antarctic Peninsula) is still severely limited, it has expanded substantially over the last two decades and includes discoveries of avian and non-avian dinosaurs. Plants and small- to medium-sized, obligate terrestrial mammals (e.g., marsupials and meridiungulates) gained broad distribution across West Antarctica land mass prior to fragmentation and were isolated on the Antarctic Peninsula before the end of the Paleocene.

From an evolutionary perspective the close relationships between terrestrial taxa found in the James Ross Basin are difficult to accommodate because, by the beginning of the Late Cretaceous (99.6 Ma), the major Gondwanan continental blocks (South America, Africa, Antarctica, Madagascar, the Indian subcontinent, and New Zealand–Australia) were well into the process of breakup and dispersion.

This paper deals with the hypothesis that the Antarctic Peninsula linked South America and West Antarctica in the Late Cretaceous until the beginning of the Paleogene and we review here through the plant and vertebrate fossil taxa the paleogeographical evolution of the southern continents and oceans for both earlier and later time intervals. This communication aims to explain the geological/geophysical problems inherent in the hypothesis and to explore the consequences for the biogeographical distributions of marine and terrestrial vertebrate faunas in West Antarctica.

Late Cretaceous/Paleogene West Antarctica Terrestrial
Biota and its Intercontinental Affinities

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