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Claudia P. TAMBUSI¹, JORGE I. NORIEGA¹, Andrzej GAŹDZICKI²
 Andrzej TATUR³, Marcelo A. REGUERO¹ and Sergio F. VIZCAINO¹

¹ Departamento Científico de Paleontología Vertebrados
 Museo de La Plata, Paseo del Bosque s/n
 (1900) La Plata, ARGENTINA

² Institute of Paleobiology, Polish Academy of Sciences
 Al. Żwirki i Wigury 93, 02-089 Warszawa, POLAND

³ Institute of Ecology, Polish Academy of Sciences
 Dziekanów Leśny, 05-092 Łomianki, POLAND

Ratite bird from the Paleogene La Meseta Formation, Seymour Island, Antarctica

ABSTRACT: Fossil bird remains assignable to ratites (palaeognathous birds) are described from the Paleogene strata of the La Meseta Formation of Seymour Island, Antarctic Peninsula. This record sheds new light on Gondwana's avian history.

Key words: Antarctica, Seymour (Marambio) Island, Paleogene, ratite bird.

Introduction

During the Argentine-Polish field party on Seymour (Marambio) Island, (northern Antarctic Peninsula) in austral summer of 1993–1994 the *tar-sometatarsus* of ratite bird was discovered in the upper part of the Tertiary La Meseta Formation (Tambussi *et al.* 1994).



This is a contribution to IGCP Project 301
Paleogene of South America

The Tertiary record of non-penguin birds from the Antarctic Peninsula is very sparse. Two seabird groups are known from the La Meseta Formation of Seymour Island: Pseudodontornithidae (Pelecaniformes: Odontopterygia) (*see* Tonni 1980, Tonni and Tambussi 1985) and Diomedidae (Procellariiformes) (*see* Tambussi and Tonni 1988). Also from the La Meseta Formation, Case *et al.* (1987) report a dubious phororhacoid. In addition, Covacevich and Rich (1982) described fossil bird footprints of Tertiary age from Fildes Peninsula of King George Island (South Shetland Islands), one of them possibly belonging to a three-toed ratite or phororhacoid.

The studied specimen is housed in the Museo de La Plata (Argentina) under the catalogue numer MLP 94-III-15-1.

Geological setting

The bird-bearing locality (ZPAL 4: 64°14'22,856"S, 56°38'43,917"W, 176 m a.s.l.; *see* Lusky *et al.*, *in press*) is on the north flank of a plateau, 40 m below the top, near the SSW end of the Argentine Air Force airstrip (Fig. 1). The ratite fossil bone was found in the upper part of the La Meseta Formation in unconsolidated, bioturbated, gray sand in Unit III of Elliot and Trautman (1982) or TELM 7 of Sadler (1988) at the level of the shell bank bearing the bivalve *Hiatella tenuis* (Wilckens), crinoid *Metacrinus fossilis* Rasmussen, 1979 and the gastropod

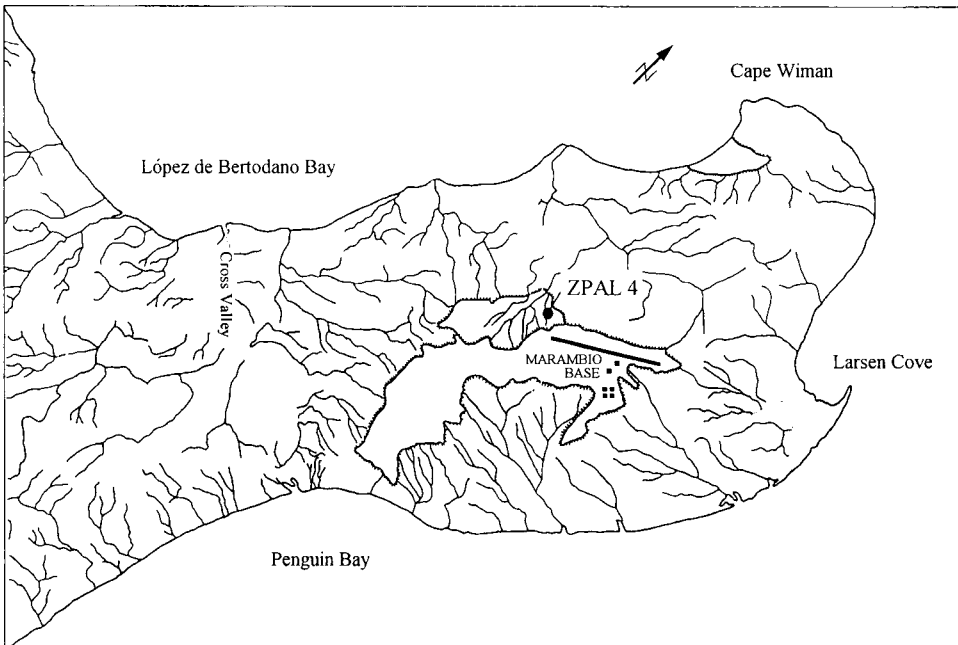


Fig. 1. Map of the northern part of Seymour (Marambio) Island showing the locality of described ratite bird (ZPAL 4).

Perissodonta laevis (Wilckens) – an index fossil of the *P. laevis* Zone in the upper part of the La Meseta Formation *sensu* Stilwell and Zinsmeister (1992). Other vertebrates recorded from this horizon include fishes (Jerzmańska 1988, Jerzmańska and Świdnicki 1992), penguins (Myrcha *et al.* 1990) and whales (Borsuk-Białynicka 1988). The abundance of penguin and whale bones together with associated biota and sedimentary structures, point to a nearshore, shallow-marine or a strandline setting (*cf.* Trautman 1976, Sadler 1988, Stilwell and Zinsmeister 1992).

Age

The age of the La Meseta Formation is generally thought to be Eocene on the basis of dinoflagellates (Wrenn and Hart 1988, Cocozza and Clarke 1992). However, several authors (Simpson 1971, Zinsmeister and Camacho 1982, Fordyce 1989, Gaździcki *et al.* 1992, *see also* Stilwell and Zinsmeister 1992) suggest that the upper units (TELM 6 and 7) may be early Oligocene. Recently, Bond *et al.* (1993) and Marensi *et al.* (1994), dated the middle part (TELM 4 and 5) of the La Meseta Formation as middle Eocene by correlation of the terrestrial mammals recorded at those units with their relatives from Patagonia. No terrestrial mammals have yet been reported from levels higher than TELM 5. Thus, the age of the upper part of the La Meseta Formation most likely ranges from middle Eocene to late Eocene or early Oligocene.

Paleontological note

The studied material consists of a distal fragment of right *tarsometatarsus* without trochlea IV (Fig. 2). Its morphology is that of giant flightless

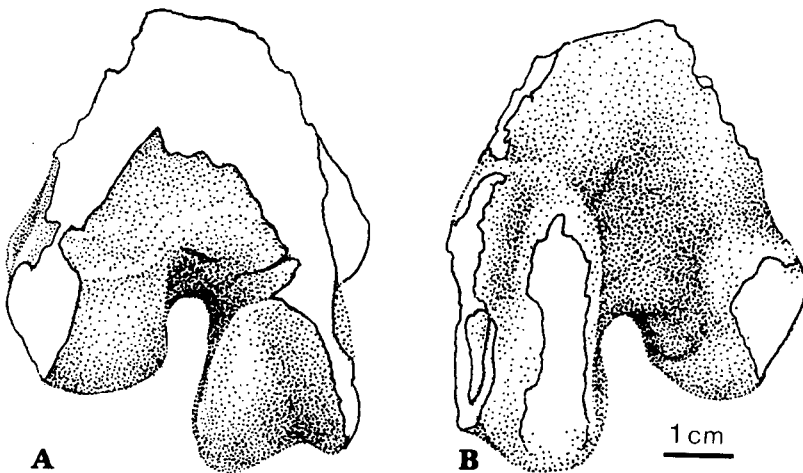


Fig. 2. Right *tarsometatarsus* of the ratite bird from the upper part of the La Meseta Formation (Unit III or TELM 7). A – posterior view, B – anterior view.

ground-dwelling ratite with a large and narrow trochlea III, projected moderately beyond trochlea II with straightened margins bordering a deep groove. Trochlea II has a wide articular surface and extends posteriorly more than trochlea III. The lateral margin of trochlea III allows us to infer that the intertrochlear space between trochleae III and IX extends proximally beyond trochleae II and III.

The above description indicates that the Antarctic specimen is undoubtedly an ostrich-sized ratite. However, in order to accurately establish its affinities within the group new specimens for detailed comparative study will be necessary.

Final remarks

The ratites are large flightless birds mainly distributed on the southern continents. They include the living rheas (in South America), ostriches (in Africa), cassowaries and emus (in Australia and New Guinea) and kiwis (in New Zealand), as well as the extinct moas (in New Zealand), mihirung birds (in Australia), elephant birds (in Madagascar) and several northern families with ratite affinities (*see* Harrison and Walker 1977, Houde 1988, Martin 1992). They constitute an apparently monophyletic assemblage (*cf.* Cracraft 1974, Prager *et al.* 1976, Feduccia 1980, Sibley and Ahlquist 1981, Olson 1985, Bledsoe 1988, Bock and Bühler 1990) whose origin may lie well back in the early Cretaceous of Gondwanaland (Cracraft 1973).

The discovery reported here strongly supports the notion that West Antarctica was used as a dispersal route by obligate terrestrial forms of ratites during the Mesozoic and early Paleogene, thus connecting different Gondwanan fragments. Nevertheless, the final paleobiogeographic interpretation of this find depends on a more accurate taxonomic assignment of the Antarctic ratite remains as well as on new findings.

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Resumen

Se dan a conocer los restos fósiles de un ave ratita (Aves, Palaeognathae) colectada en sedimentos paleógenos de la Formación La Meseta en la Isla Seymour (Marambio), Península Antártica. Este hallazgo aporta nuevas evidencias respecto a la utilización de Antártida Oeste como una ruta de dispersión durante el Paleógeno temprano.

Streszczenie

Opisano kość skokową nietotnego ptaka bezgrzebieniowego (Palaeognathae) z utworów paleogeńskiej formacji La Meseta z Wyspy Seymour (Marambio), Antarktyda (fig. 1–2). Znaleźisko to podkreśla więz paleoekologiczną Antarktydy Zachodniej z Ameryką Południową co najmniej do końca eocenu.