

## FOREWORD

Antarctica — the central piece of Gondwanaland — contains an important record of past biota, environments and climates. Changes in the Antarctic environment during the Phanerozoic are reflected in the fossil record. Knowledge of the events leading to the isolation and cooling of Antarctica in the Cenozoic is necessary to the understanding of the evolution of both the fossil and the modern-day Antarctic biota. These paleobiological questions are discussed in this volume which represents the second in the series of *Palaeontologia Polonica* devoted to the Polish paleontological studies in Antarctica. The first one was published in 1987 (GAŹDZICKI 1987).

Most of the Polish paleontological research activity has been focused on King George Island in the South Shetland Islands (Text-fig. 1), where in 1977 the permanent Polish Antarctic Station *ARCTOWSKI* was established. The station provides facilities for geoscience studies on the South Shetland Island Archipelago and the Antarctic Peninsula sector (GAŹDZICKI 1987; BIRKENMAJER 1991; BIRKENMAJER and GAŹDZICKI 1991).

Following an agreement between the Instituto Antártico Argentino and the Polish Academy of Sciences, Polish scientists also carried out geological and paleontological research on Seymour (Marambio) and Cockburn Islands located off the northeast tip of the Antarctic Peninsula (Text-fig. 1) in the austral summers of 1985–1986, 1987–1988, 1991–1992, and 1993–1994 (see MYRCHA and TATUR 1986; DOKTOR *et al.* 1988; GAŹDZICKI *et al.* 1992; GAŹDZICKI and TATUR 1994; TAMBUSI *et al.* 1994a, b; POREBSKI 1995).

The first fossils from Antarctica were collected from Seymour Island in December 1892 during the voyage of the Norwegian whaling ship *Jason* under Captain C.A. LARSEN (see ZINSMEISTER 1988). During the famous Swedish South Polar Expedition of 1901–1903 to the Seymour Island area numerous Tertiary and Cretaceous fossils were gathered and the first geological map of the region was compiled by the geologist Dr. Otto NORDENSKJÖLD and his field party (NORDENSKJÖLD 1905; ANDERSSON 1906).

The fossiliferous marine rocks on Seymour Island represent the most complete, well-exposed sequence of the Upper Cretaceous–Lower Tertiary strata known in the Southern Hemisphere. Throughout most of the sequence macrofossils and microfossils are extremely abundant, diverse and well-preserved and have been studied largely by scientists from Argentina, the United States, and the United Kingdom (see FELDMANN and WOODBURN 1988; STILWELL and ZINSMEISTER 1992). Paleontologists from the Institute of Paleobiology of the Polish Academy of Sciences also participated in these studies (see this volume).

Regarding paleontology, over 90 papers have been published by the Polish team singly, as well as in co-operation with foreign fellow workers from Argentina, Germany, and the United States. The list of the paleontological papers by the Polish team (concerning Antarctica), which have been published in the years 1987–1995, is included in the reference list.

The results of the field work, which has been carried out on King George, Seymour, and Cockburn Islands, are contained in the nine papers which constitute this volume. The volume opens with two papers concerning Early Cambrian archaeocyaths and lingulate brachiopods from Antarctic glacial erratic boulders of King George Island, which are then followed by a sequence of seven papers presenting assemblages of corals, brachiopods, crinoids, echinoids, and plants and fishes from the Paleogene (Sobral and La Meseta Formations) of Seymour Island, as well as microfossils (foraminifera and ostracods) from the Pliocene *Pecten* Conglomerate of Cockburn Island. Each of the papers was reviewed by at least two specialists whose assistance is gratefully acknowledged.

Financial support for the Polish paleontological Antarctic studies (field work and laboratory study) was provided by the Polish Academy of Sciences (Research-Project MR.I.29–CPBP 03.03) as well as by the Institute of Paleobiology of the Polish Academy of Sciences (Warszawa) and the Alexander von Humboldt-Stiftung (Bonn, Bad Godesberg).

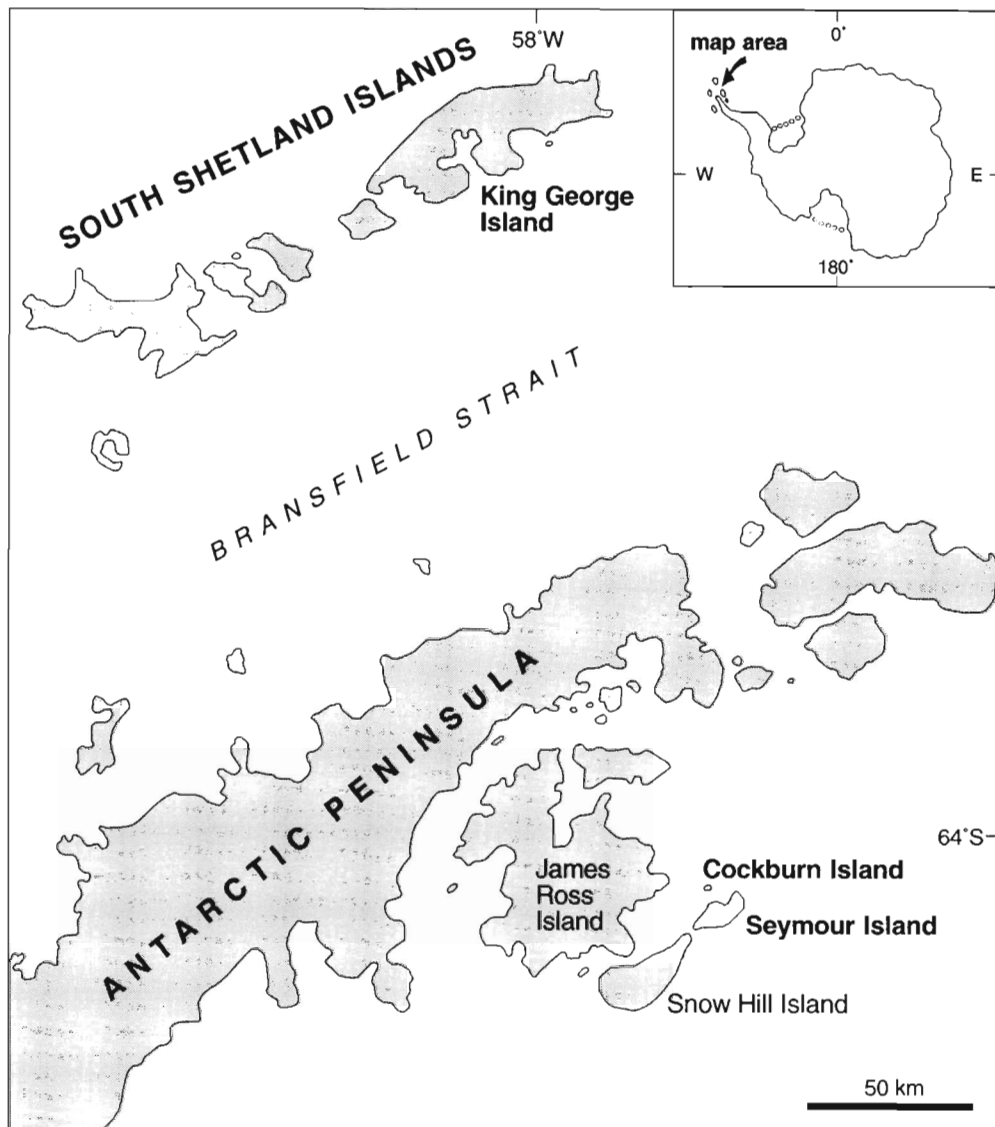


Fig. 1

Location map of King George Island in the South Shetland Islands Archipelago and Cockburn and Seymour Islands in the Antarctic Peninsula sector. Arrow on inset shows area of main map.

Three field seasons of paleontological work on Seymour Island were made possible through an invitation from Professor Dr. Carlos A. RINALDI and Dr. Rodolfo A. DEL VALLE (Dirección Nacional del Antártico, Argentina) to join their geological field parties. The logistic support provided by the Instituto Antártico Argentino (Buenos Aires) and Fuerza Aérea Argentina is gratefully acknowledged.

Special thanks are given to colleagues and friends from the Polish Antarctic Expeditions to the *ARCTOWSKI* Station, the Polish Geodynamic Expeditions to West Antarctica, and the Argentine–Polish Field Parties on Seymour Island, for discussions, assistance, and their friendly co-operation in the field work in Antarctica in the years 1985–1994.

Finally, I would like to thank the contributors for their papers and the staff of the Publishing Department of the Institute of Paleobiology for their patience and support during the preparation of this volume.

Andrzej GAŹDZICKI  
Instytut Paleobiologii PAN  
Aleja Żwirki i Wigury 93  
02-089 Warszawa, Poland

## REFERENCES

- ANDERSSON, J.G. 1906. On the geology of Graham Land. — *Bulletin of the Geological Institute, University of Upsala* **7**, 19–71.
- BAUMILLER, T.K. and GAŹDZICKI, A. 1994. Crinoids from the lower part of the La Meseta Formation (Eocene), Antarctica. — *XXI Polar Symposium Warszawa 1994*, 9–11.
- BIRKENMAJER, K. 1991. Report on the Polish geological investigations in West Antarctica, 1990/91. — *Polish Polar Research* **12**, 369–390.
- BIRKENMAJER, K. 1995. The Cape Melville Formation (Lower Miocene glacio-marine deposits) on King George Island, South Shetland Islands (West Antarctica): its basal and top strata. — *Bulletin of the Polish Academy of Sciences, Earth Sciences* **43**, 113–122.
- BIRKENMAJER, K. and DUDZIAK, J. 1990. Calcareous nannoplankton spectra from Early Tertiary continental and marine tillites of King George Island (South Shetland Islands, Antarctica). — *Bulletin of the Polish Academy of Sciences, Earth Sciences* **38**, 1–15.
- BIRKENMAJER, K. and DUDZIAK, J. 1991. Nannoplankton evidence for Tertiary sedimentary basement of the Deception Island Volcano, West Antarctica. — *Bulletin of the Polish Academy of Sciences, Earth Sciences* **39**, 93–100.
- BIRKENMAJER, K. and GAŹDZICKI, A. 1991. Polish Antarctic Bibliography: Earth Sciences (1960–1990). — *Polish Polar Research* **12**, 247–260.
- BIRKENMAJER, K. and ZASTAWNIAK, E. 1989a. Late Cretaceous–Early Tertiary floras of King George Island, West Antarctica: their stratigraphic distribution and palaeoclimatic significance. In: J.A. Crame (ed.) *Origins and Evolution of the Antarctic Biota*. Geological Society Special Publication **47**, 227–240.
- BIRKENMAJER, K. and ZASTAWNIAK, E. 1989b. Late Cretaceous–Early Neogene vegetation history of the Antarctic Peninsula sector. Gondwana break-up and Tertiary glaciations. — *Bulletin of the Polish Academy of Sciences, Earth Sciences* **37**, 63–88.
- BIRKENMAJER, K., GAŹDZICKI, A., GRADZIŃSKI, R., KREUZER, H., PORĘBSKI, S.J. and TOKARSKI, A.K. 1991. Origin and age of pectinid-bearing conglomerate (Tertiary) on King George Island, West Antarctica. In: M.R.A. Thomson, J.A. Crame and J.W. Thomson (eds) *Geological Evolution of Antarctica*, 663–665. Cambridge University Press, Cambridge.
- BITNER, M.A. 1991. A supposedly new brachiopod from the Paleogene of Seymour Island, West Antarctica. — *Polish Polar Research* **12**, 243–246.
- BITNER, M.A. 1995. Paleobiogeographical and paleoenvironmental significance of the brachiopod fauna of the Eocene La Meseta Formation, Seymour Island, Antarctic Peninsula. In: P. Copper and J. Jin (eds) *Third International Brachiopod Congress, Sudbury, Canada*. Abstracts, p. 10.
- BORSUK-BIALYŃCICKA, M. 1988. New remains of Archaeoceti from the Paleogene of Antarctica. — *Polish Polar Research* **9**, 437–445.
- DOKTOR, M., GAŹDZICKI, A., MARENSSI, S.A., PORĘBSKI, S.J., SANTILLANA, S.A. and VRBA A.V. 1988. Argentine–Polish geological investigations on Seymour (Marambio) Island, Antarctica, 1988. — *Polish Polar Research* **9**, 521–541.
- FELDMANN, R.M. and WOODBURN, M.O. (eds) 1988. Geology and Paleontology of Seymour Island, Antarctic Peninsula. — *Geological Society of America, Memoir* **169**, 1–566.
- GAŹDZICKA, E. and GAŹDZICKI, A. 1994. Recycled Upper Cretaceous calcareous nannoplankton from the *Pecten* Conglomerate of Cockburn Island, Antarctica. — *Polish Polar Research* **15**, 3–13.
- GAŹDZICKI, A. (ed.) 1987. Palaeontological Results of the Polish Antarctic Expeditions. Part I. — *Palaeontologia Polonica* **49**, 1–168.
- GAŹDZICKI, A. 1989a. Age of the *Chlamys*-bearing conglomerate (Paleogene) from King George Island in the light of micropaleontological data — *International Workshop on Antarctic Geochronology, München, Germany*. Abstracts, p. 16.
- GAŹDZICKI, A. 1989b. Planktonic foraminifera from the Oligocene Polonez Cove Formation of King George Island, West Antarctica. — *Polish Polar Research* **10**, 47–55.
- GAŹDZICKI, A. 1989c. Microfossil *Bolboforma* (Chrysophyta) from Tertiary glacio-marine sediments of King George Island, West Antarctica. — *Polish Polar Research* **10**, 581–586.
- GAŹDZICKI, A. 1991. Stromatolites from the Paleogene Polonez Cove Formation of King George Island, Antarctica: stratigraphic and paleoclimatic implications. — *Six International Symposium on Antarctic Earth Sciences, Ranzan-machi, Saitama, Japan*. Abstracts, p. 164.
- GAŹDZICKI, A. 1993. Geology and paleobiology of Cockburn Island, Antarctic Peninsula. — *XX Polar Symposium*. Lublin, Poland, 329–332.
- GAŹDZICKI, A. and HARA, U. 1994. Multilamellar bryozoan colonies from the Eocene La Meseta Formation of Seymour Island, Antarctica: a preliminary account. — *Studia Geologica Polonica* **104**, 105–116.
- GAŹDZICKI, A. and STOLARSKI, J. 1992. An Oligocene record of the coral *Flabellum* from Antarctica. — *Polish Polar Research* **13**, 265–272.
- GAŹDZICKI, A. and TATUR, A. 1994. New place names for Seymour Island (Antarctic Peninsula) introduced in 1994. — *Polish Polar Research* **15**, 83–85.
- GAŹDZICKI, A., GRUSZCZYŃSKI, M., HOFFMAN, A., MAŁKOWSKI, K., MARENSSI, S.A., HAŁAS, S. and TATUR, A. 1992. Stable carbon and oxygen isotope record in the Paleogene La Meseta Formation, Seymour Island, Antarctica. — *Antarctic Science* **4**, 461–468.

- GAŹDZICKI, A., GRUSZCZYŃSKI, M., HOFFMAN, A., MAŁKOWSKI, K., MARENSSI, S., HAŁAS, S. and TATUR, A. 1993. Evidencia isotópica de una posible glaciación en la Formación La Meseta (Paleogeno), isla Seymour (Marambio), Antártida. — *Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas*. Dirección Nacional del Antártico, Buenos Aires, p. 231.
- HARA, U. 1992. Cyclostomatous Bryozoa from the Polonez Cove Formation (Oligocene) of King George Island, West Antarctica. — *Polish Polar Research* **13**, 255–263.
- HARA, U. 1994. Bryozoan assemblage from the Lower Miocene Cape Melville Formation of King George Island, West Antarctica. — *XXI Polar Symposium Warszawa 1994*, 31–32.
- HARA, U. 1995. Bryozoans from the La Meseta Formation (Eocene), Seymour Island, Antarctic Peninsula. — *VII International Symposium on Antarctic Earth Sciences, Siena, Italy*. Abstracts, p. 181.
- JERZMAŃSKA, A. 1988. Isolated vertebrae of teleostean fishes from the Paleogene of Antarctica. — *Polish Polar Research* **9**, 421–435.
- JERZMAŃSKA, A. 1991. First articulated teleost fish from the Paleogene of West Antarctica. — *Antarctic Science* **3**, 309–316.
- JERZMAŃSKA, A. and ŚWIDNICKI, J. 1992. Gadiform remains from the La Meseta Formation (Eocene) of Seymour Island, West Antarctica. — *Polish Polar Research* **13**, 241–253.
- MYRCHA, A. and TATUR, A. 1986. Argentinian-Polish scientific cooperation in Antarctica (1984–1986). — *Polish Polar Research* **7**, 427–431.
- MYRCHA, A., TATUR, A. and DEL VALLE, R. 1990. A new species of fossil penguin from Seymour Island, West Antarctica. — *Alcheringa* **14**, 195–205.
- NORDENSKIÖLD, O. 1905. *Antarctica: or two years amongst the ice of the South Pole*. 608 pp. Macmillan Co., London.
- NORIEGA, J.I., TAMBUSI, C.P., JADWISZCZAK, P., MYRCHA, A., TATUR, A. and GAŹDZICKI, A. 1995. Los pinguinos (Aves: Sphenisciformes) del Terciario de la isla Seymour, Antártida: revisión y nuevos aportes. — *XI Jornadas Argentinas de Paleontología de Vertebrados, Tucumán 17 al 20 de Mayo de 1995*. Resúmenes, p. 12.
- POREBSKI, S.J. 1995. Facies architecture in a tectonically-controlled incised-valley estuary: La Meseta Formation (Eocene) of Seymour Island, Antarctic Peninsula. — *Studia Geologica Polonica* **107**, 7–97.
- STILWELL, J.D. and ZINSMEISTER, W.J. 1992. Molluscan Systematics and Biostratigraphy. Lower Tertiary La Meseta Formation, Seymour Island, Antarctic Peninsula. — *Antarctic Research Series* **55**, 1–192.
- STUDENCKA, B. 1991. A new species of genus *Panopea* (Bivalvia) from King George Island, Antarctica. — *Polish Polar Research* **12**, 363–368.
- TAMBUSI, C., NORIEGA, J., GAŹDZICKI, A., TATUR, A., REGUERO, M.A., and VIZCAINO, S.F. 1994a. The first occurrence of ratite bird in the Paleogene of Antarctica. — *XXI Polar Symposium Warszawa, 1994*, 45–48.
- TAMBUSI, C.P., NORIEGA, J.I., GAŹDZICKI, A., TATUR, A., REGUERO, M.A. and VIZCAINO, S.F. 1994b. Ratite bird from the Paleogene La Meseta Formation, Seymour Island, Antarctica. — *Polish Polar Research* **15**, 15–20.
- WRONA, R. 1989. Cambrian limestone erratics in the Tertiary glacio-marine sediments of King George Island, West Antarctica. — *Polish Polar Research* **10**, 533–553.
- WRONA, R. 1995. Early Cambrian biota from Antarctic erratics of King George Island, West Antarctica. — *Sardinia 95, 6th Paleobenthos International Symposium, October, 25–31, 1995*, Abstracts-Book, 54–55.
- ZASTAWNIAK, E. 1994. Upper Cretaceous leaf flora from the Błaszyk Moraine (Zamek Formation), King George Island, South Shetland Islands, West Antarctica. — *Acta Palaeobotanica* **34**, 119–163.
- ZINSMEISTER, W.J. 1988. Early geological exploration of Seymour Island, Antarctica. In: R.M. Feldmann and M.O. Woodburne (eds) *Geology and Paleontology of Seymour Island, Antarctic Peninsula*. — *Geological Society of America, Memoir* **169**, 1–16.

---

## REFEREES

Rosemary A. ASKIN (Columbus), Michael G. BASSETT (Cardiff), Gertruda BIERNAT (Warszawa), Stephen CAIRNS (Washington, D.C.), Thomas M. CRONIN (Reston), Françoise DEBRENNE (Paris), Ryszard GRADZIŃSKI (Kraków), David I. GRAVESTOCK (Eastwood), David M. HARWOOD (Lincoln), Wanda JESIONEK-SZYMAŃSKA (Warszawa), Peter D. KRUSE (Darwin), David L. MEYER (Cincinnati), Tatsuo OJI (Tokyo), Ellis F. OWEN (London), Andrzej PISERA (Warszawa), Margaret N. REES (Las Vegas), Ewa RONIEWICZ (Warszawa), Andrew B. SMITH (London), Robin C. WHATLEY (Aberystwyth), Rachel WOOD (Cambridge), Anthony D. WRIGHT (Belfast).