Evolutionary History of Antarctica

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1 Introduction

One of the most important breakthroughs in Antarctic geological research over the last three decades has been the elucidation of the continent's fossil record. Although fossils have been known since the very earliest days of scientific exploration in the south polar regions, it is only comparatively recently that their study has been placed within a firm scientific framework. Detailed taxonomic studies of many key groups have been completed and it is now possible, for the first time, to take a broad perspective of the history of life on our southernmost continent. A surprising diversity of fossil plants and animals has now been found in Antarctica; the story they tell is every bit as important to the development of our understanding of the broad patterns of the history of life on Earth as that from other continents.

Latest Proterozoic (Vendian; approximately 610–570 Ma) microfossils are known from the Watts Needle Formation of the Shackleton Range (Buggisch and Kleinschmidt 1991), and probably occur also within the basement complex of Northern Victoria Land (Playford 1989). However, our main concern in this study is with the Phanerozoic history of Antarctica, that is, the last 570 Ma (Harland et al. 1989). Fossiliferous Early Palaeozoic rocks (principally Cambrian in age; 570–510 Ma) are known from a variety of localities along the length of the Transantarctic Mountains (TAM) and within the Ellsworth Mountains (Fig. 1). Late Palaeozoic fossils (principally Devonian; 408–367 Ma) have been found at four main sites within the TAM and also in western Marie Byrd Land. Classic Gondwana fossils, such as *Glossopteris* and *Lystrosaurus* are linked to the Late Palaeozoic-Early Mesozoic (i.e. Permian-Triassic; 290–208 Ma) sedimentary rocks within the Beacon Supergroup of the central TAM; an important exposure also occurs within the Prince Charles Mountains of East Antarctica (Fig. 1). Late Mesozoic taxa (i.e. Jurassic and Cretaceous; 208–65 Ma) are particularly common in the Antarctic Peninsula region and Cenozoic (65–0 Ma) ones at peripheral localities such as the Vestfold Hills and Larsemann Hills, East Antarctica, and King George Island, South Shetland Islands (Fig. 1).

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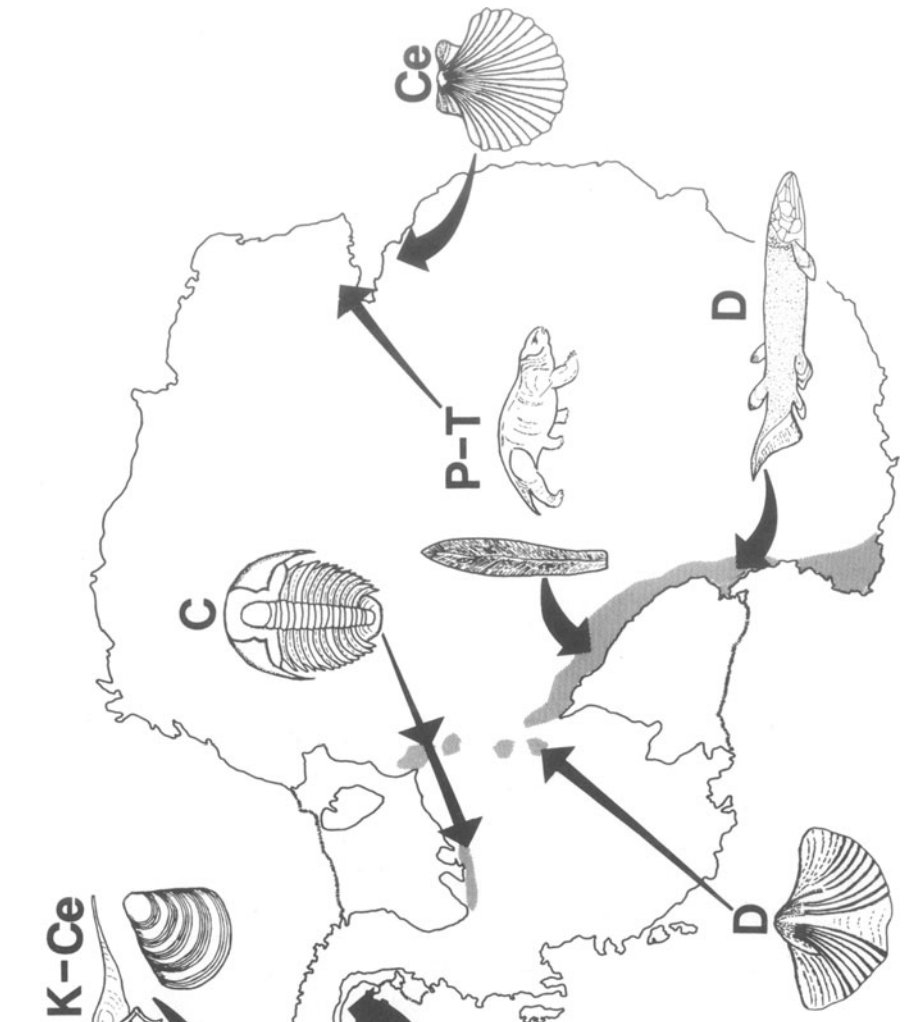

Fig. 1. A cartoon representation of some of the principal fossil localities in Antarctica; *C* Cambrian; *D* Devonian; *P* Permian; *T* Triassic; *J* Jurassic; *K* Cretaceous; *Ce* Cenozoic. Full locality maps can be found in Laird (1981; figs. 1, 3, 6), Thomson (1983; figs. 1–3 and 6–8) and Playford (1989; fig. 6.1)