

Frozen in Time. Prehistoric life in Antarctica.

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"No other continent on Earth has undergone such radical environmental changes as Antarctica" – This statement is the book's first sentence and, at the same time, the best recommendation of the book for a reader interested in our planet and life on earth. First three chapters ("The cold, barren land we call Antarctica", "A continent discovered" and "The fossil pioneers") introduce us to the basic geographical and geological characteristics of Antarctica and their gradual revelation with respect to paleontologically significant expeditions. In particular, the very readable third chapter shows how thoughts about paleogeography of southern hemisphere, where paleontology played irreplaceable role in the realm of time correlation and paleobiogeographical interpretation, evolved. The following nine chapters guide the reader through geological history of Antarctica and its creatures in time sequence from the Cambrian to the Pliocene. The chapter titles aptly follow this time sequence with respect to paleontological testimony.

Each chapter introduces first the planetary situation with location of earth plates and then describes in detail Antarctica in a given time frame. The chapter "Antarctica's oldest fossil" briefly explains the cause of outset of solid fossils in the Cambrian (so called Cambrian explosion) and explains the life in Cambrian and Ordovician seas. Chapter "The age of fish and ferns" carries the reader forward to the Silurian and especially to the Devonian Period which time is in the history of Earth known as intensive diversification of fish. One of the authors, John A. Long, is the expert in this area and discovered the evolutionary significant *Gogonasmus* species. He covers in 17 pages fish fauna of the Middle Devonian and its aspects of evolution (summarized in boxes "The origin of fish", "The diversification of jawed fish" and "Evolution of jawed vertebrates"). While records of the Antarctica Carboniferous Period are missing, the Permian Period is represented mainly by well preserved floristic remains. This is documented by "A time of southern coal swamps" chapter showing the formation of Pangaea and accompanying climate changes. This chapter is amended by a box explaining the biggest drama in history of macroscopic life on Earth – mass extinction at the end of the Permian Period. A thought on how could the mysterious *Lystrosaurus* survive this disaster is also included in this chapter.

Giant amphibians and hairy reptiles are main topic of Chapter 7 that introduces the reader to the cause of the split of Pangaea, as well as the role of the Triassic, in expansion of Mesozoic flora and fauna assemblages. In following two chapters ("Volcanic lakes and early dinosaurs", "When giant reptiles swam in southern seas") the readers witness progression or culmination of these processes during the Jurassic and Cretaceous periods in new configuration of Earth plates and during the domination of Dinosauria on dry land, Ammonoidea in seas, and Pterosauria in the air. Considerable attention is, among other things, given to Early Jurassic species *Cryolophosaurus ellioti* that is also often discussed relative to the issue of warm-bloodiness of Dinosauria. *Cryolophosaurus ellioti* represents, so far, the only representative of carnivorous allosauroids in southern hemisphere preceding by 50 million years similar evidence of their existence in northern hemisphere. Findings of mosasaurs and plesiosaurs from the

Late Cretaceous are also discussed in this chapter. For the invertebrate species, readers will be impressed by spectacular Cretaceous ammonites generally reaching considerable sizes, including uncoiled heteromorph species. Mass extinction at the end of the Cretaceous Period is discussed in a separate full-page box. Shelf sediments of Upper Cretaceous - Lower Paleocene record have been well accessible on Seymour Island and represent the most complete section of this age in the southern hemisphere. The study of fossils in rocks along this time frame shows that the intensity of extinction in high altitude is somewhat lower.

Chapter 11 "Killer birds, giant penguins and early mammals" describes how after extinction freed up living space is occupied by survivors, opportunistic, and migrant taxa species. This daybreak of the "brave new world" is mainly documented by very rich fossil assemblages on Seymour and Cockburn islands. Eocene La Meseta Formation is known worldwide for its diversity of corals, bryozoans, brachiopods, echinoderms, crustaceans, arthropods, and annelid worms. This information is complemented by subchapters discussing Paleocene and Neogene plants, fish fauna (above all shark teeth), and terrestrial and aquatic mammals. Birds are represented mainly by penguins and rarely also by remains or traces of non-volant species. The chapter is concluded by passages about terrestrial and aquatic mammals including valuable description of their evolution in southern seas. Chapter 12 "The big chill: from paradise to polar ice" explains the cool down of Antarctica from the beginning of the Neogene (onset of circumpolar current) and its effect on composition of flora and fauna. Chapter 13 "Life today in the frozen time" then logically brings the reader to current Antarctic environment and describes its today's specifications and impact of global warming. Final consideration "Antarctica - the future" offers prognosis of some changes in the configuration of continents in the future relative to the dynamics of plate tectonics. It does not, however, emphasize the fundamental condition of fulfilling of these prognoses – the stability of presumed factors. And satisfying this condition is highly disputable. All prognoses are, based on this point of view, problematic.

The book is concluded by four page "Endnotes" that reference literature cited in the text and explain some specific issues that would affect readability and clarity of the text. The entire text is completed by nine page "Glossary" that explains the most important technical terms. Precise "References and further reading" contains 1 041 book titles and represents practically complete summary of paleontological information about Antarctica in literature including important geological and historical studies. Over 250 high quality photographs, mainly of fossils, outcrops, and localities, accompany the text. Scientific illustrations are provided mainly by W. Stout and T. Winberg. A reader accustomed to "Burian and Augusta" type of illustrations will appreciate most likely the works of W. Stout.

Facit: This book, written by experienced authors-paleontologists Jeffrey D. Stilwell and John A. Long is an exceptional modern collection of Antarctica's geological and paleontological history. The book, thanks to its high readability and its conception, is accessible to informed lay persons, university students as well as to those interested to natural sciences in general.

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