



Dinosaur Provincial Park: A Spectacular Ancient Ecosystem Revealed,
Philip J. Currie and Eva B. Koppelhus, eds., 2005. Indiana University Press,
648 p., Hardcover, USD 49.95, ISBN 0-253-34595-2.

Barnum Brown of the American Museum of Natural History spent the 1911 field season excavating dinosaur fossils along the Red Deer River in Alberta, Canada, with great success. To counter the prospect of the best Canadian dinosaur fossils being prepared and exhibited in New York City, the Geological Survey of Canada retained the services of Kansas paleontologist Charles H. Sternberg and his sons Charles M. and Levi for the 1912 season. George Sternberg worked with Barnum Brown in 1912, joining his father and brothers for the 1913 field season. The resulting explorations revealed one of the world's richest dinosaur fossil collecting regions in terms of preservation, number of fossils, diversity of taxa, and most importantly, accessibility of collection area. Preserved as Dinosaur Provincial Park in 1955 and listed as a UNESCO World Heritage site in 1980, this area continues to yield fossils of a diverse Upper Cretaceous ecosystem.

This edited volume is an ambitious project released as part of the commemoration of the 50-year anniversary of the establishment of Dinosaur Provincial Park. It is an attempt to reconstruct the regional ecosystem, as it existed 75 million years ago. As expected, this book provides a great amount of information on the history of excavations and dinosaurs found in the park. Dinosaurs represent only a small part of the story, however, and a variety of reviews paint a broad picture of the flora and fauna of the park during the Cretaceous. Pulling together 28 chapters from so many diverse areas of study requires a structured approach. Currie and Koppelhus have organized the book into three parts. The first part, "Background," covers the history of research in the park and park geology. "Flora and Fauna," the second part, explores the park paleobiota in 18 chapters. The third part, "Interpretations," integrates and extends ideas from the first two parts into an overall view of the park ecosystem.

The first part starts the book off briskly, with a review of research in the park by Philip Currie. The passion that Dr. Currie has for the park is evident, as the expeditions and major discoveries of dinosaurs in the park are recounted, along with how the park has been developed over the past half century. He shares numerous personal anecdotes from his years in the park in this narrative. This chapter also serves as a history of the development of the research program at the Royal Tyrrell Museum of Paleontology, the institution with which the editors were affiliated until 2005.

The most engaging article in the book, in my opinion, is the second chapter, "Identifying Lost Quarries," by Darren Tanke. This article illustrates the advantages and disadvantages of working in an area with such a long history of collection. The ability to collect different types of data from the same site over long periods of time represents an obvious advantage for the paleoscientist. Disadvantages are that early quarries were often unmarked, and locality data was entered in field notes mostly in relation to other landmarks. Therefore, finding lost quarries is important to shore up data from previously collected dinosaur fossils with data gathered using modern technologies, including improved locality data, fossils from other groups of organisms, and improved documentation of the site geology. Charles M. and Levi Sternberg sought to document sites on topographic maps and mark the quarries. Some quarries were never rediscovered, however, and over the intervening years, eroding sediments covered up many markers. Tanke documents efforts to relocate historical quarries by reviewing field notes, comparing photographs of known expeditions with current landscapes, and analyzing newspaper scraps and other garbage found at the sites.

The second part of the book provides information on the park paleobiota required to reconstruct the ancient ecosystem. As expected, "Flora and Fauna" contains extensive information (104 pages) about the eponymous dinosaurs of the park, including ornithischians and theropods (including birds). Not only are fossil dinosaur skeletons discussed, but there are informative chapters on eggshells and trace fossils (primarily footprints). The surprise of this part is the even-handed manner in which the fossils from other groups of organisms are discussed. A full 232 pages is devoted to descriptions of palynomorphs, plants, mollusks, fishes, lissamphibians, turtles, choristoderes, squamates, plesiosaurs, crocodylians, pterosaurs, and mammals from various locations in the park. Each of these chapters is a succinct literature review, coupled with several revelations of new information. Generally, the authors discuss what the literature for each group of organisms reveals about the park at various points in time. This approach is crucial to generating a complete picture of life in the park some 75 million years ago. Separating the reviews of each group of organisms into self-contained units makes that information more accessible to the researcher or student taking a narrower view of the paleobiota of the park.

Part III, "Interpretations," builds on information discussed earlier, along with taphonomic modes found in the park and the utility of survey grade GPS to reconstruct this Campanian ecosystem. Welcome to global climate change, Cretaceous style, complete with a North Carolina climate at about paleolatitude 55° north! The deposits found in the Oldman Formation in the park reveal an alluvial plain about 76 million years ago, with a great diversity of dinosaurs. Moving up through the Dinosaur Park Formation, evidence accumulates for global warming in the advance of the Western Interior Seaway. The resultant formation of coastal plain, in addition to alluvial plain, during this time accounts for the asymmetric distribution of dinosaur taxa in the park. Analysis of ceratopsian bonebeds by David Eberth and Michael Getty reveals several mass-death events due to ceratopsian drowning in floods on the plains. The Lethbridge Coal Zone at the top of the Dinosaur Park Formation, reviewed in Chapter 26, shows several pulses of seawater into the park area, eventually giving way to a fully marine environment about 74.8 Ma, as evidenced by the deposits and fossils of the Bearpaw Formation.

The final chapter, "The Geographic and Stratigraphic Distribution of Articulated and Associated Dinosaur Remains," by Philip Currie and Dale Russell, comes closest of any article in the book to fully describing the appearance of the park at the time that the exposed sediments were deposited. The book, however, seems to be one article short of fully achieving its goal of revealing "a spectacular ancient ecosystem" as promised in the book title. I would like to have seen a final chapter that pulled the information on the paleobiota of the park together in an imagining similar to that quoted from Charles H. Sternberg at the beginning of Chapter 28. What would we have seen if we hovered over one place in the park? How would this have changed over the roughly two myr of sedimentation represented in the park? This information is present in the book, just not all in one summary chapter. While such a summary would make the book more meaningful to the casual reader, the final three chapters do an admirable job of wrapping up the narrative.

The editors have achieved a uniform design for the book through judicious use of figures. The black and white diagrams accompanying each article are clearly drawn. The drawings of geologic sections help make the stratigraphic approach of the book very effective. Black and white photographs of fossils pay attention to lighting and contrast, clearly revealing the surface features of the fossils. Color plates of paintings of dinosaurs in the middle of the book help capture the setting of the park during the Late Cretaceous. The color photos of palynomorphs in this section reveal features that are lost in the black and white photographs in Chapter 6, "Campanian Palynomorphs."

An added feature of the book is the companion CD of geospatial park data, pictures from various quarries, and a map of quarry locations. The CD opens in standard web browsers, and navigation is fairly simple. This feature should prove to be a valuable asset for future park researchers. Universal Transverse Mercator coordinates and elevations for all excavated quarries are given, with a description of excavated specimens. Unexcavated quarries are noted, but the sites are protected by coordinates that have been rounded off. The coordinates for contacts between the Oldman Formation and Dinosaur Formation in the park are also provided. This geospatial information should allow the findings reported in this book to be replicated or extended by future researchers.

All in all, this is an excellent title. It illustrates wonderfully how fusing together the geography, geology, biology, stratigraphy, taphonomy, ecology, and paleontology of a single area can generate an understanding of that area that is richer than the sum of the individual strands. Its price makes it easily accessible to the student, teacher, or researcher of ancient ecosystems. *Dinosaur Provincial Park: A Spectacular Ancient Ecosystem Revealed* would be a great addition to the book collection of any paleontologist.

Brian L. Hoffman
Department of Natural and Physical Sciences
Park University
Parkville, Missouri 64152, USA
brian.hoffman@park.edu