

# Contents

Acknowledgments	v
Introduction	1
Scope and Purpose	3
Caveat on Fossil Collecting	5
Section I	
The Many Faces of Paleontology	
The Background	11
About Fossils . . .	11
. . . and the Study of Fossils	15
Concepts in Paleontology	17
The History	31
Origins: Land and Life	31
The Panorama of Life	35
The Making of North America	61
Section II	
Fossil Localities Interpreted for the Public	
Fossil Localities Interpreted for the Public	71
Section III	
Sources of Additional Information	
Museum Exhibits	269
Publications	273
Courses and Field Experiences	289
Fossil Replicas	291
Index	293
Taxonomic Index	301

# Introduction

There is a special thrill that comes from studying fossils, from the view of ancient worlds that they afford us, from the understanding we gain of past, present, and even future time. This thrill can only be experienced by those willing to venture into the vastness of deep time<sup>1</sup> and to face the implications of deep time for human self-awareness.

In recent years, there has been a tremendous resurgence of interest in fossils among people of all ages; for young people in particular, dinosaurs have been the focus. Among scientists, too, interest in paleontology has been revived, and the role of paleontology is being reevaluated. No longer viewed as mere stamp collectors of the scientific world, paleontologists are seen providing unique insights into the complex interaction of evolving biosphere and lithosphere, atmosphere and hydrosphere.

Public interest in paleontology is fueling a demand for greater access to and information about fossils. But the voices of most paleontologists emanate from within the hallowed halls of institutions of higher learning and are often shrouded in arcane terminology. The present book is an attempt to bridge the gap between the two groups of fossil lovers, each curious about the history of life on earth. It is an invitation to explore deep time, to discover incredibly ancient worlds inhabited by fascinating organisms long since extinct.

---

<sup>1</sup>This appropriately emotive phrase from John McPhee, 1980, *Basin and Range*, has very quickly become incorporated into the vernacular of geology and paleontology.

# Scope and Purpose

*Old Bones and Serpent Stones* is written with two objectives in mind. It is primarily a guide to those fossil sites in western Canada and United States that are accessible to the public and, as such, is intended for the use of people who are, or will be, visiting those localities. The book is also intended for a general readership as a source of information about paleontology. In either case, it is meant to provide access to the often rarified atmosphere of science.

The general organization of the book reflects the duality of purpose. In Section I, various aspects of paleontology are examined; a discussion of concepts is followed by an historical account of life on earth and of the geology of North America, with emphasis on western North America. The topics that are presented reflect the interdisciplinary nature of the science of paleontology, and the sites that are listed as examples are ones that are described in Section II. In Section II, the fossil sites in western Canada and United States that are open to the public are documented. The sites are described one at a time, with both paleontological interpretation and practical information provided, and are arranged according to their geographical distribution.

Sources of additional information are compiled in a separate section. In particular, Section III includes a selected bibliography on topics in paleontology. The citations are intended to complement as well as supplement the concepts and interpretations presented in sections I and II. Some of the references cited are broad in scope; others are more specialized and can be used as stepping stones into the scientific literature. The reader is also referred to museums and field courses for a broader range of experiences.

The sites that are documented in *Old Bones and Serpent Stones* were selected according to three criteria:

- 1) Interpretation—Is there some source of information about the fossils and the fossil site readily available to the public, either at the site or in the vicinity?

2) Protection—Does the site have legal protection? Is the site protected from vandalism in any real, physical way that reinforces the legal protection?

3) Accessibility—Is the site open to the public? Is there reasonable public access?

Each site documented in Section II offers interpretation, each is protected, and each is accessible. The quality of the sites, the level of development, the degree and type of interpretation, and the access to fossils, however, are highly variable. Because the focus of the book is interpretive, sites where collecting is the focus and is encouraged, promoted, or facilitated—even where the collecting is legal—were deliberately excluded.

# Caveat on Fossil Collecting

*Old Bones and Serpent Stones* is a book about fossils. It is not, however, a book about collecting fossils. All of the sites that are documented are protected by law, and fossil collecting at any of them is strictly prohibited.

All but three sites are located on lands owned or managed by public agencies, and general public access is usually unrestricted. Visitors who go beyond the areas developed for fossil exhibit, especially hikers in back-country areas, are likely to see fossils weathering out of outcrop. Such discoveries should be reported to park rangers or agency staff who will undertake the responsibility for correctly collecting the fossil. In some cases, park rangers will encourage visitors to participate in the collecting process. On private land, the permission of the land owner is required both for access and for collecting. Nonetheless, in some jurisdictions, fossils that are found on private land or uncontrolled public land may belong to public institutions (e.g., state, provincial, or university museums).

Fossils are a natural resource, and they constitute a legacy for all of us. Scientific and educational value, however, accrues only to a fossil that has been properly documented and collected; otherwise, it is a mere curiosity. The laws controlling fossil collecting are intended to protect that value.