

## ***PROLOGUE***

Despite all the recent media attention, the community of vertebrate paleontologists remains rather small. There are less than two thousand professional vertebrate paleontologists in the world. Most have been hooked on paleontology since they were kids, and we are no exception. The lure of spending our lives studying fossils of dinosaurs or other ancient animals with backbones represented an opportunity that neither of us was able to shake. In a sense, we've never had to grow up and get a "real job" like so many of our other childhood friends. During the field season, we can travel to exotic locales, where the chance of finding an exquisite fossil of some previously unknown animal always lies just around the next rocky outcropping. We feel very fortunate to have jobs where the treasure hunts of our childhood still continue.

Of course, it's not all fun. Like our paleontological colleagues before us and the students behind us, we have all endured countless courses and endless examinations, knowing full well that there might not be a job for us at the end of our educational travails. But, it's worth the risk. We all share the goal of spending our lives discovering and studying these ultimate antiques of evolutionary history. So, friendships are formed that often last a lifetime, especially during graduate school when all of one's skills and determination are put to the test.

It was during this phase of our lives, in the late 1970s and early 1980s, that we became close friends as classmates in the Department of Paleontology at the University of California, Berkeley. Both of us were drawn to Berkeley by the romance of studying dinosaurs at an institution with a long and distinguished paleontological heritage.

At the outset, it didn't seem to us that our Ph. D. projects had much in common. Tim focused his research on clarifying evolutionary relationships among mammals and reptiles, including dinosaurs. Lowell focused his studies on evaluating the geological and paleontological aspects involving the disappearance of dinosaurs 65 million years ago. Yet, as we completed our dissertations and moved on to other jobs, we realized that our efforts had dealt with the same issue--albeit from different evolutionary angles--dinosaur extinction. *Out of the Ashes* presents our personal perspective on this intriguing problem in Earth and evolutionary history.

This book approaches the issues surrounding dinosaur extinction as though they are elements in a scientific detective mystery, following a trail of geologic and paleontologic clues toward a solution. After reviewing some earlier ideas put forward to explain the demise of the dinosaurs, the first part presents two scenarios to contrast the most prevalent current explanations for the extinctions at the end of the Cretaceous. The second section then examines the question of whether all the dinosaurs really went extinct 65 million years ago. In both sections, it is clear that questions being raised today actually reflect back to debates that raged within the scientific community in the 19th century, when Darwin's theory of evolution first burst upon the scene. As graduate students and later as professionals, we have both had the privilege of participating in these fascinating scientific investigations. The experience has taught us invaluable lessons, not only about the history of life but also about how science is conducted. Our studies, tempered by the insightful contributions of hundreds of other dedicated scientists, have led us to form our own conclusions about the mysteries of dinosaur extinction. But in the end, our goal is to lay out the evidence involved in these investigations so you can judge for yourself what really happened to the dinosaurs.