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The Great Basin: A Natural Prehistory

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(Additional Comment)

It is unfortunate that the Working Group included nobody from outside western Europe and North America (one member was based in Chile for a year and a half and two other have done glaciological research in South America). That came about because the Working Group comprised glaciologists who volunteered at a mass balance workshop in Norway in 2008 that included few attendees, and no volunteers, from the rest of the world. The Working Group did have useful correspondence with several Russian experts, but since this Glossary and its recommendations will undoubtedly become a new world standard, a broader, worldwide representation in its construction would have been gratifying.

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THE GREAT BASIN: A NATURAL PREHISTORY. By Donald K. Grayson. Berkeley and Los Angeles: University of California Press, 2011. 418 pp. $75.00 (hardcover). ISBN: 978-0-520-26747-3

This book is the revised and expanded edition of the author's 1993 book, THE DESERT'S PAST: A NATURAL PREHISTORY OF THE GREAT BASIN. I found this book to be a well researched and written account of very many things natural in the Great Basin, of interest to a variety of scientists and laymen. The book is broken into six parts, some of which are subdivided into several chapters.

Part 1 sets the background for the region. The first chapter deals with the early explorations in the region that led to the conclusion that no rivers flowed out of it, they only stay within. It was Frémont who coined the term ''The Great Basin'' in 1843. The following chapter discusses the various ways to define the Great Basin, such as being based on hydrographic, physiographic, or floristic data.

Part 2 is entitled ''Some Ice Age Background.'' First is a good discussion of the Bering Land Bridge, the geological conditions (e.g., ice volume and sea level positions) necessary to form it, and migration across it. The author goes over key archaeological sites, information needed to correctly identify such, and concludes that people were in North America by 12.5 Ka, before Clovis time. The next chapter centers on an in-depth discussion of the extinction of mammals. Every argument is thoroughly and carefully laid out. His conclusion is that there is little evidence that people caused it, and that the time was near 11 Ka. It is here that I was first impressed with his excellent knowledge of the diverse fields he covers and brings together—such as geology, archaeology, and the flora and fauna.

Part 3 covers ''The Late Ice Age Great Basin.'' To make the reading more interesting, he intersperses recent history where appropriate, such as the use of the incredibly level surfaces of late Quaternary salty lake beds to set land speed records (763 mph in a vehicle and 152 mph on a bike!), and a discussion of problems faced by the Donner Party that eventually led to their gruesome camp at the foot of the Sierra Nevada. The discussion of the pluvial lake histories is current and detailed and demonstrates his in-depth knowledge of the geography of the region. I am prejudiced toward mapping and would have included a discussion of Roger Morrison's maps in the Lake Lahonton area, as they are exceptionally detailed and are the kind of work that is the key to any correct interpretation. With so many lakes oscillating in elevation over time, a few more figures might have helped the reader keep them in order.

The glacial history coverage seemed a bit short, and could have benefited from a figure of regional paleoglacier extent, if an appropriate one is available. The author follows with a good discussion of how the lake and glacial records can give insight into past climates. I have some knowledge of the references used in this chapter, and if their selection is any indication, I am confident that the references listed on 54 pages at the end of the book are well thought out and current.

The next chapter covers past vegetation. Much of the record comes from packrat middens, which is nice, because the plant remains are visible and radiocarbon dating can be applied. He even recounts how some hungry early explorers did not know what these deposits were and tried to eat them! Other data come from the analyses of pollen and other fossils in lake and pond deposits. He clearly lays out the kind of record each yields. The story that emerges is complex and detailed across this huge area and was hard for me to keep straight. However, there was a lack of summary vegetation maps or charts, but maybe this lack indicates how difficult they are to construct. The discussion is interspersed with comments on what the reconstructed vegetation says about past temperatures and precipitations over time. For example, Death Valley could have been 14-25° F colder and 3–4 times wetter during the last full glacial.

Next is a chapter on late Pleistocene vertebrates. The list of these is large and includes mammals, birds, rabbits, marmots, gophers, and pikas. He discusses the dating problems of many sites containing these, their geographic distributions, migrations and extinctions, and concludes they did not all disappear at once.

Part 4 consists of one chapter on the Holocene. Here again he displays the breadth of his knowledge as he interweaves the record of such phenomena as packrat middens, pollen, and mammals in an attempt to provide a region-wide climatic picture. For us old timers it was good to have the update on Ernst Antev's climatic model published in 1948 that had a profound impact on subsequent workers. This is where the term ''*Altithermal*'' was introduced, and in my field, we were forever searching for that Altithermal soil.

Part 5 covers prehistoric archaeology, and the most accepted record starts with Clovis sites, but he goes on to describe other sites. He gives an in-depth treatment of point styles, their ages, and what they mean. Ways to depict population size is given, and this is related to food sources, and even the expenditure of calories to produce food, how the density of grinding stones is related to climate, and the use of seeds for food. Also included are such diverse subjects as the evolution of languages, the finding of alpine sites, the introduction of the bow and arrow, and the role of climate change. This is an amazing amount of material to keep track of, and he does it well.

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The last part is short and covers the Great Basin as encountered by the early Europeans, and looks into the future. Finally, he hunts through the environmental record for an analog of the future, and concludes this is no easy task.

There are a few other observations I want to add. One interesting choice is the use of English units of measure throughout. I believe the reason for this is stated in the preface—he wrote the book for those with little knowledge about the environmental history of the region, rather than for hard-core professionals. That aside, scientists of the disciplines covered (e.g., geologists) can learn a lot about other aspects of the natural history of the region (e.g., ecology) by reading this book.

Another deviation from the norm is to not include references in the text, except in rare instances. In lieu of references, at the end of each chapter are ''chapter notes'' which go over all information sources used, written in an interesting style. I believe this decision helps with the readability of material unfamiliar to many.

The style of writing is good and keeps the readers' interest. Commonly he talks about the pertinent workers either by last name or first and last name. This gives the impression that Grayson personally knows these workers, and in many case he well might. He also is good at covering all aspects of an argument, and for many he offers his opinion. And, at times he gets downright folksy, as when he talks of donating blood to mosquitoes.

As I read the book I kept thinking how I would use it, as I never taught such a course. However, the Quaternary group in our department commonly took extensive field trips, with a few into the Great Basin. What I would do now is have students pick topics unfamiliar to them but covered in the book, and lead a group discussion at appropriate geographic localities. In fact, Grayson hints at this application in the last sentence of the book. For a detailed geological field guide for such a trip I would start with D. E. Easterbrook (ed.), 2003, Quaternary Geology of the United States, Desert Research Institure, Reno, NV.

As I finished this review I learned that the author has been elected to the National Academy of Sciences. Based on the broad scholarship exhibited by this book, I thought this prestigious honor was well deserved.

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The Roof at the Bottom of the World: Discovering the Transantarctic Mountains. By Edmund Stump. New Haven: Yale University Press, 2011. 254 pp. $29.95 (hardcover with numerous colored photos, illustrations, and maps). ISBN: 978-0300171976

A century after Amundsen and Scott's field parties first reached the South Pole, Edmund Stump has published a book about how various regions of the Transantarctic Mountains were first explored. The title, The Roof at the Bottom of the World: Discovering the Transantarctic Mountains, is appropriate because it describes the exploration of a 1200-mile-long chain of mountains that reach to within 176 miles of the South Pole. This is the third recent book on Antarctic exploration published by Yale University Press, preceded by Susan Solomon's Coldest March in 2001 and Edward J. Larson's An Empire of Ice, also in 2011.

The author wants the reader to ''visualize the trails blazed by these explorers who bore first witness to the wonders beyond the icy sea.'' Included with a superb narration of exploration of each part of the Transantarctic Mountains are shaded U.S. Geological Survey (USGS) topographic maps with routes followed by explorers marked in color, maps constructed by explorers, satellite images, and Stump's photos. These photos show landscapes that have not changed since seen by the first explorers. In his 13 expeditions Stump has seen more of the Transantarctic Mountains on the ground than any other scientist. His experiences of being the first person to stand in many places and to be in places last visited by the early explorers, traveling on glaciers, making first ascents on mountains, and surviving storms in a tent, add realism to his descriptions. Within the book is another ''book'' with passages of Stump's own experiences inserted within the text.

The first chapter presents a succinct and informative history of early Antarctic exploration from the sea, beginning with the prediscovery voyages of Magellan, Drake, and Cook. Beginning with the discovery of Antarctica by Bellingshausen in 1821, expeditions led by Bransfield, Weddell, Biscoe, Kemp, d'Urville, and Wilkes charted most of the outline of Antarctica in sailing ships. A helpful map shows the progression of knowledge of the coastline through this time. This is followed in detail by the two voyages of Ross (1840–1843) in which the Ross Sea coast of Victoria Land was charted from Cape Adare to the edge of the Ross Ice Shelf. The mountain ranges, prominent peaks seen at great distance from Ross's ships, and the major glaciers entering the sea along this coast were named at this time. Ross's map of Victoria Land is one of the many useful illustrations in this chapter. Substantive exploration of the geography and geology on land was not made until Scott's *Discovery* expedition (1902–1904) explored the region around their base along McMurdo Sound.

In chronologic and geographic order from north to south, each of the following chapters details the exploration of a new part of the Transantarctic Mountains. Chapter 2 relates the attempts of *Discovery* field parties to find their way up glaciers through the mountains to reach the Polar Plateau. A shaded relief map shows the routes taken by each of the field parties. Encountering flat-lying sandstone beds in Beacon Valley in the upper reaches of the Taylor Glacier, Ferrar's party unsuccessfully searched for fossils to date what he named Beacon Sandstone, a term still used for the Devonian to Triassic stratigraphic sequence throughout the Transantarctic Mountains. Field parties also encountered the massive, dark-brown dolerite sills, named after Ferrar, which have since been dated as Jurassic and form resistant outcrops throughout the Transantarctic Mountains.

Chapter 3 describes the exploration by field parties from Shackleton's *Nimrod* expedition from 1907 to 1909. Because one of the objectives was finding a way to the South Pole, Shackleton first attempted to find a landing place at the Bay of Whales near the far eastern edge of the Ross Ice Shelf, where Amundsen later began his successful trip. From the standpoint of science and geography, it was fortunate that Shackleton established his camp at Cape Royds in the McMurdo Sound area. In March 1908 a party of

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