

## **Ice, Fire and Nutcrackers: A Rocky Mountain Ecology**

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Source: Arctic, Antarctic, and Alpine Research, 47(3) : 591

Published By: Institute of Arctic and Alpine Research (INSTAAR),  
University of Colorado

URL: <https://doi.org/10.1657/AAAR0047-3-book1>

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## Book Reviews

ICE, FIRE AND NUTCRACKERS: A ROCKY MOUNTAIN ECOLOGY. By George Constantz. Salt Lake City: University of Utah Press, 2014. vii + 399 pp. \$24.95 (softcover). ISBN 978-2607813620. (ebook). ISBN 978-1607813637.

This book will be enjoyed by natural history enthusiasts, hikers, and tourists in the Rocky Mountains from Canada to Mexico who visit this vast region in person or from the arm chair. The book title reflects how environmental controlling forces in the Rocky Mountain ecosystem—for example, fire and ice—interact with plants and animals to produce appropriately adapted organisms such as the Clark’s nutcracker. It will be of value to college teachers and students throughout the region who may wish to add some spice, anecdotes, and authority to their lectures or assignments. For myself, I would have found the book to be an excellent resource when I first came to the Colorado Front Range, in 1969, as an assistant professor and was assigned to teach undergraduate field botany and general ecology and needed to add a mountain dimension to my knowledge. The author is a veteran mountain hiker, naturalist, and conservationist who infers, in evolutionary terms, the bases for the adaptations and habits of plants and animals that are commonly encountered by visitors to the area.

These inferences are set against the author’s joy of the mountains and their plants and wildlife, his concern conserving these, and his own curiosity to explore the underpinnings of a variety of biological adaptations. Often these explorations will have been set in motion by the “why” questions that are raised by visitors who see patterns among the organisms along the trail. For example, “Why do quaking aspen grow in prominent clumps?” or “Why do bull elk grow such humongous antlers?” “Why” questions imply a quest for purpose, which the author nicely dodges, in my opinion, by dissecting the subject area into “how” questions. This is smart and in keeping with the best way to pose questions when using the scientific method.

There are 23 chapters plus a long introduction that includes a treatise on evolutionary mechanisms. All but the final chapter focus on a selected plant and animal species or groups of related species. The final chapter reprises the author’s concerns about the effects of climate warming and habitat fragmentation and the need for expanded stewardship and conservation. The chapters are short, around 10 pages in length, and can be read separately and in any sequence—say, at bedtime, while travelling, or while waiting in the doctor’s office. Among the chosen plants are lupines, paintbrushes, and lodgepole pines, and among the animals are pikas, marmots, and bumblebees. The author creates a good naturalist’s tale for each organism he addresses. These tales are based on his own keen field observations, anecdotes, facts, and a good grasp of the mechanisms of biological evolution. He is thoroughly familiar with the region and with a wide range of relevant biological literature. The narratives are scholarly and entertaining.

Throughout the book text boxes are used to convey additional information about the subjects and processes discussed. These allow for browsing and serve to add information that is relevant, although sometimes tangential, to the narrative. At the close of the book there is a detailed list of plants and animals by their common and scientific names, a comprehensive glossary, a huge list of references cited, and an index; all of which will be useful. Regrettably, the book lacks illustrations. Perhaps a second edition, as with the author’s earlier book

on the ecology of the Appalachian Mountains (Constantz, 2004), will have maps and sketches of locations and subject organisms.

I have no doubt that the book will serve to stimulate ongoing research and allow for further stepwise investigations to improve the understanding of this ecosystem and the evolution and behaviors of its denizens. I can imagine an application of the book, beyond the Rocky Mountains, where it can serve as a reference for the pursuit of comparative ecology, evolution, and behavior across the Holarctic realm, which contains many related species and genera. These show a mixture of parallel, convergent, and divergent adaptations resulting from historical, geographical, environmental, and ecological constraints since the Tertiary and Quaternary. A good starting point for those seeking such a challenge is the rarely known paper by Hoffmann and Taber (1967) on the origin and history of tundra and montane ecosystems of the Holarctic. Such an application might allow a comparison and testing of Constantz’s ideas with analogous situations in Europe and Asia.

In my library, the book will find a welcome place by the side of such standout essays as *A Sand County Almanac* (Leopold 1949), *Silent Spring* (Carson, 1962), and *Land Above the Trees* (Zwinger and Willard, 1996).

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DOI: <http://dx.doi.org/10.1657/AAAR0047-3-book1>