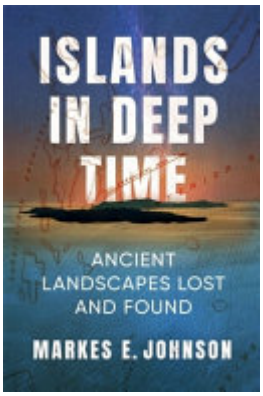
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Markes E. Johnson. *Islands in Deep Time: Ancient Landscapes Lost and Found.* New York: Columbia University Press, 2023. 312 pp. $135.00, cloth, ISBN 978-0-231-21218-2.



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Commissioned by Daniella McCahey (Texas Tech University)

Rachel Carson is a guiding light for Markes E. Johnson's *Islands in Deep Time: Ancient Landscapes Lost and Found.* But not so much for her most famous and influential book, *Silent Spring* (1962), which is commonly credited for its role in sparking the development of the modern environmental movement, but rather for her earlier published works as a marine biologist. As Johnson describes in dedicating his book to Carson's memory, her "descriptions of shorelines and ocean processes are unsurpassed in elegance. Her outlook was on our present world. But in her writings, she pointed out at nearly every turn of the page that the world's shores and oceans have a geologic past stretching far back in time" (front matter). Each of the twelve chapters of *Islands in Deep Time* begins with a quotation, and all but one of these are taken from Rachel Carson's works. Her observations are frequently referenced and discussed in these chapters too, along with other literary and scientific writers, ranging from philosophers and poets such as Ralph Waldo Emerson and Henry David Thoreau to scientific explorers such as Charles Darwin, James Dwight Dana, and Amadeus William Grabau.

Johnson's book is a scientific monograph, but it is also a travelogue that charts a journey through both time and space. Johnson sees geology as a form of time travel, and posits that islands should be seen as worlds in microcosm. As such, his aim is to encourage the reader to view the landscape "with one eye on the present and the other trained to recognize and enter a former world preserved in intricate detail beneath the skin of the same landscape" (p. x). Islands are the perfect means by which to ask questions about and reflect upon the vast temporal flows that have shaped our planet. We inhabit a world that is predominantly characterized by ecological time, but it is also a world which was molded by geological time; the processes of each have interacted like the flood and ebb tides that cycle back and forth

across the liminal intertidal zones and reefs which surround (or once surrounded) such islands. Johnson's "guiding lodestone for the journeys" he describes in the book "is Mount Monadnock in southern New Hampshire, which lends its geographic name (***monadnock***) to structures worldwide, both past and present, that commonly alternate between watery islands and sky islands left high and dry by tectonic forces or the sea's periodic retreat" (p. x). Paleoislands, such as Mount Monadnock, he likens to ships in dry dock, where the process of dry docking enables geologists to examine them below the waterline—for example, investigating fossilized corals or the sedimentary deposits of huge storm surges in order to understand changes in climate, patterns of coastal erosion, and the processes that caused sea levels to rise and fall. Johnson's inspiration for writing this book was in part serendipitous, he states, recalling the moment when on a fieldtrip with his students in Manitoba, on the shores of Canada's Hudson Bay, he let out a whoop of excitement, having noticed at low tide that the "modern coastline could be seen as congruent with the ancient rocky shore" (p. xi). His students challenged him to prove that such places might be more common than he'd previously thought. The outcome of this challenge is sequenced through a kind of stratigraphy laid down by the subsequent chapters of the book that takes the reader on a globe-hopping tour through half a billion years of geological time, mapping an extensive catalogue of fieldtrips undertaken during Johnson's long career as a geologist at Williams College in Massachusetts, which he joined in 1977, and where he is now the Charles L. Macmillan Professor of Natural Sciences, Emeritus.

Each chapter is framed as an answer to a "How?" question: how an island cluster acquires its shape; how islands recall windward surf and leeward calm; how bigger islands are broken into smaller pieces; how softer islands dissolve; how islands react to big storms; how island life aligns with global currents; how volcanic islands rise, fall, and renew. Each chapter is also a neatly packaged case study in itself, but when read in sequence simultaneously transports the reader through five hundred million years to the present, while also circumnavigating the globe from New Hampshire in the United States, through Canada, the United Kingdom, the mid-Atlantic archipelagos of Madeira and the Azores, to Mongolia, South Korea, Japan, Australia, Hawaii, and the coast of Baja California. Each case study is laid out in the same format, blending personal reportage with meticulous scientific description so that at certain points the reader almost feels like a student on a series of intrepid fieldtrips with Johnson as guide and teacher.

Topographical maps of the islands discussed are key features of each chapter, and these are accompanied by global maps that show the island's location in the context of its geological era, thereby tracing the evolutionary plate tectonics that transformed the face of the earth from the supercontinent of Pangea to the present configuration of the continents as we know them today, showing how the currents of the seas and oceans as well as the prevailing winds would have flowed and impacted these islands in their previous geolocations. A generous number of diagrams and annotated photographs also help to illustrate the complexity of many of the descriptions of geological formations and processes that characterize Johnson's island case studies. These photos, which are reproduced in black and white, are interspersed at relevant points within the text, with many helpfully being reproduced in color in the center of the book as well. Frequent cross-referencing between chapters helps to tie many of the observations Johnson makes together, illustrating contrasts and parallels in geological processes across the sites and epochs examined. A "historical vignette" is an interesting and entertaining recurring feature of each chapter, too—one that helps both to leaven the weighty forensic detail of "deep time" geological perspectives with the comparatively buoyant and more relatable modern

history of human interactions with such places as locales of scientific, economic, and/or spiritual interest. Some sample subjects include the work of biostratigrapher Christina Lochman-Balk, whose extensive knowledge of trilobites enabled her to chart the rise and fall of sea levels in North America during the Cambrian era; the disastrous expedition of Danish explorer, Jens Munk, who went in search of a trade route to Asia via Canada's Hudson Bay in 1619-20 but underestimated the extent to which climate conditions could vary across similar latitudes; and older historical and cultural connections to the landscape, such as those found in a mountaintop shrine to Genghis Khan in Mongolia, or in the ancient Aboriginal ancestral song lines of Australia.

The book's final chapter is something of a departure from those that have preceded. This chapter serves in part as a summation of the book's case studies in deep time, but it also gives a present-day overview of how humans have utilized islands and why Johnson thinks that islands are key localities for study with regard to the future of life on Earth in the "Anthropocene." Here he hints at a personal sense of religious faith that underlies and perhaps drives his scientific interests, noting that he is not alone in holding this kind of motivation.[1] Johnson also comes back full-circle to the points he made in the book's opening preface in which he described islands as worlds in miniature, particularly with regard to the increasing concerns surrounding present-day climate change. In this context, it is only natural that he should round off his conclusions by referencing Carson's *Silent Spring,* stating that "islands are among the most fragile ecosystems in our world due to vulnerabilities inherent in their small size compared to continents. Loss of biodiversity appears sooner and more drastically in island settings than on the nearest mainland" (p. 240). The wider implication of such an observation is poignantly clear: "Planet Earth is a mere speck of an island in relation to our solar system, the Milky Way, and the rest of the universe" (p. 240).

Islands in Deep Time is a well-balanced and readable book that examines the longevity of the world and the transformations which have shaped it through millennia, viewing both micro- and macro-lense perspectives of geological time through the personal experiences and ecological expertise derived from Johnson's lifetime of engagement with his subject, setting out his observations and reflections in a highly accessible dialogue with those who have thought and written about such topics before him. Johnson certainly does not shy away from highly technical descriptions of geological processes, providing a very useful glossary of terms at the end of the book; but he has also structured his text in the form of an affably inquisitive narrative journey, one that enables the reader to see and explore alongside the author while he elucidates the heaviest of subject matter with the lightest of touches. Johnson's book may not rival Carson's writings in terms of its poetic descriptions, but it is very much an enjoyable, informative, and relatable text that will serve well both the serious student of geology and the engaged lay reader alike, particularly anyone who is interested in understanding more about the environmental processes that have shaped our planet in the past and the ways in which it might be reshaped in the future.

Note

[1]. See R. S. White and J. K. Greenberg, "Religious Faith as a Motivation in Using Geosciences to Develop a Sustainable Future," in ***Geoscience for the Public Good and Global Development: Toward a Sustainable Future,*** ed. G. R. Wessel and J. K. Greenberg (Boulder, CO: Geological Society of America, 2016).

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