NATURE / BIRDS

"*Long Hops* is an engaging and entertaining treatment of the many complex facets of bird migration. It will contribute significantly to the layperson's knowledge of the subject and to an understanding of the importance of habitat for breeding, wintering, and migratory stopovers, all of which are essential to the survival of migratory birds. Any bird enthusiast with even a passing interest in bird migration and flight will find the book full of clearly explained and well-illustrated details."

–**SHEILA CONANT,** professor emerita, Department of Biology, University of Hawai'i at Mānoa

"Congratulations to Mark Denny, who not only explains how birds fly and navigate long journeys, but also manages to communicate the joy of science while doing so. After reading *Long Hops,* I heartily agree with the author: Birds are enchanting and physics is fun!"

–**SUSAN SCOTT,** *Honolulu Star-Advertiser* "Ocean Watch" columnist and author of *Call Me Captain: A Memoir of a Woman at Sea*

In *Long Hops,* physicist Mark Denny explains, in a clear, conversational style, the science of bird migration–from the intricacies of bird aeronautics to the newly unraveled mysteries of their magnetic compasses. While providing wherever possible examples of indigenous Hawaiian species, the book surveys the migration phenomenon as a whole, showing that birds are breathtaking works of engineering with spectacular capabilities for long-distance flights. Consider what it takes for a bird to navigate from Alaska to Hawai'i, as thousands of these hardy migrants do each year. They fly 2,500 miles nonstop and land on a small island in the middle of a vast ocean. How do they endure such marathon journeys, and how on earth do they know which direction to travel over featureless ocean? In fact, many migratory journeys, in all parts of the world and performed by birds as small as warblers and as large as swans, cover much longer distances.

After answering the "who, why, where, when" questions, Denny describes the different types of migration journeys found within the bird world, along with examples. He then concentrates on the much harder questions of how: how researchers study bird migration; how they gather data from old-fashioned bird banding, high-tech satellite tracking, and other techniques; and–above all–how the birds do it. Throughout the book, Denny explains concepts, such as the physics of bird flight and the role of physical geography on navigation, in a relatively math-free way. He concludes by exploring the past adaptations migrating birds have made to changing environments and examines the challenges they face in the future, as the world beneath them faces rapid climate change exacerbated by human activity.

MARK DENNY is a theoretical physicist, now retired, who has worked in academia (Edinburgh University and Oxford University) and industry, spending twenty years as a radar systems engineer with several multinational aerospace companies.

COVER PHOTO: Honey buzzard in flight, Republic of Malta. Photo courtesy of Aron Tanti.

ISBN 978-0-8248-6630-3

9 780824 866303 90000

www.uhpress.hawaii.edu

UNIVERSITY OF HAWAI'I PRESS
HONOLULU, HAWAI'I