

BOOK REVIEWS

Storm-Petrels of the Eastern Pacific Ocean: Species Assembly and Diversity along Marine Habitat Gradients, by Larry B. Spear and David G. Ainley. 2007. American Ornithologists' Union (Ornithological Monographs no. 62.). 77 pages, 37 figures, 10 tables, 2 appendices. Paperback, \$10.00, ISBN 0-943610-71-0.

The majority of information on storm-petrels comes from studies conducted on land, where these small nocturnal birds come to breed and are accessible to biologists. Few people have the fortitude and insight to spend sufficient time on the open ocean studying marine birds to begin to understand the bigger picture of their distribution, abundance, and ecological significance. Larry Spear and David Ainley are among the few who have accomplished this feat. Their monograph on eastern Pacific storm-petrels reports findings from 23 cruises over 26 years covering over 110,000 km² of the eastern Pacific Ocean, stretching from the California Current south through the Humboldt Current and out to 170° W. It summarizes observations of 36,005 storm-petrels from over 9000 hours of observation and provides a comprehensive overview of 23 forms or subspecies of 13 species of this smallest, most pelagic, and widespread group of marine birds. As Spear and Ainley note, "Storm-petrels in the eastern Pacific have a diversity greater than that of any other seabird group in a comparable area of ocean."

The monograph is based around the hypothesis that storm-petrel diversity reflects marine habitat complexity. It begins with a review of the existing information on the distribution and population size of each of the species, which for some species is remarkably meager. Spear and Ainley then use their copious data set and sophisticated data analyses, involving general additive models and principal-component analysis, to determine the birds' abundance, distribution, and habitat preferences at sea. The bulk of the monograph, and its greatest value, consists of population estimates and distribution maps for each of the taxa, which are treated individually in the text but are compared in the many figures and tables that add considerably to the volume. Abundance estimates imply that populations of most of the storm-petrels are robust, some containing a significant number of adult birds that are capable of breeding but do not because of a limitation in nesting habitat. Five taxa, however, have populations of fewer than 10,000 birds, and one subspecies of the White-bellied Storm-Petrel (*Fregatta grallaria*) is in imminent danger of extinction.

A summary of results compares patterns across species, focusing on habitat use in relationship to environmental gradients. Distributional patterns are correlated with ocean depth except in the three species endemic to the Humboldt Current off South America. Six taxa are strictly pelagic and are found only westward of the continental slope. Three taxa are most abundant over the slope, and six others are found most commonly over the continental shelf. The remaining taxa have broader habitat preferences. Within these depth preferences all taxa except two are distinct in their association with a suite of oceanographic variables, including gradients in sea-surface temperature and salinity, wind speed, and thermocline depth and strength. Sea-surface temperature, however, is the most important factor. These physical gradients affect ocean productivity, which plays a major role in influencing storm-petrel distribution.

The monograph includes new information on movement patterns, behavior at sea, and annual cycles of abundant taxa. The majority of storm-petrels are dispersers in that they occur at all distances within a given radius of the breeding site. The only long-distance migrants to the eastern Pacific are the Leach's (*Oceanodroma leucorhoa*) and Wilson's (*Oceanites oceanicus*) storm-petrels. The collection of birds at sea during some of the cruises allowed Spear and Ainley to establish breeding status and molt patterns for a number of taxa. The discussion ends with a synthesis that focuses on

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why storm-petrel diversity in the eastern Pacific is so high. Spear and Ainley speculate that the age, stability, and physical diversity of the habitat have played a major role in facilitating the birds' diversity and that the clumping of nesting habitats and the clumps' wide separation by ocean has encouraged speciation.

This review omits many of the finer details of the individual species and their associations, the details of which at times can be rather daunting for those of us who have little experience with all of the species. For readers interested in these poorly known birds, however, a deeper look at this monograph is profitable. Should you wish to learn more, Spear and Ainley, with W. A. Walker, published another monograph in 2007, "Foraging Dynamics of Seabirds in the Eastern Tropical Pacific Ocean" (*Studies in Avian Biology* no. 35). Spear and Ainley, through meticulous recording of observations at sea and subsequent thorough data analysis, have provided an unparalleled contribution to our understanding of these remarkable birds that will stand as a key reference for many years.

Jan Hodder

John Kirk Townsend: Collector of Audubon's Western Birds and Mammals, by Barbara and Richard Mearns. August 2007. B. & R. Mearns, Dumfries, Scotland. Hardback, 290 × 230 mm, 400 pages, approx. 350 illustrations (300 in color), 10 maps, 4 flow charts, 18 appendices, and bibliography. ISBN 978-0-9556739-0-0. Available from www.mearnsbooks.com.

When the young Quaker naturalist John Kirk Townsend returned to Philadelphia from the west coast of North America, where he had lived for two years, he began writing an account of his adventures for his family and friends. Published in 1839, his *Narrative of a Journey across the Rocky Mountains, to the Columbia River, and a Visit to the Sandwich Islands, Chili, &c., with a Scientific Appendix* was charming, full of encounters with native peoples and historic figures, mountain men, grizzlies, and bison, all viewed through the eyes of a greenhorn in his mid-twenties. Townsend captured the wonder of western travel, its danger, and his own barely restrained excitement at the new lands and new creatures he was discovering almost every step of the way. In 2001, the magazine *National Geographic Adventure* named it one of the 100 greatest adventure books of all time.

In 1905 the historian Reuben Gold Thwaites reprinted the *Narrative* in his series *Early Western Travels* but excised sections on Townsend's travels in the Hawaiian Islands and his sail home from the Northwest. Subsequent reprints were reprints of Thwaites's abridged edition. In 1999, Oregon State University Press produced the first unabridged reprinting of the *Narrative*, for which I provided an introduction and annotations.

Now Barbara and Richard Mearns have again reprinted the *Narrative*, marrying it with a great deal of new material of interest to historians and to natural scientists. The result is an indispensable treasure trove of Townsendsia. The *Narrative* appears in context as part of a comprehensive biography of Townsend, from his earliest years in Philadelphia, his travels west, to Washington, D.C., where he worked as a taxidermist at the National Institute, then back to Philadelphia and his early death at just 41 years of age.

Of particular interest is the Mearnses' discussion of Townsend's complicated relationship with John James Audubon, who obtained some of Townsend's western specimens to paint for *Birds of America*. Audubon was a monumental talent, and a monumental ego, in American ornithology, and did not adequately credit his great debt to Townsend; I am pleased to see the Mearnses address this lapse and take Audubon to task.