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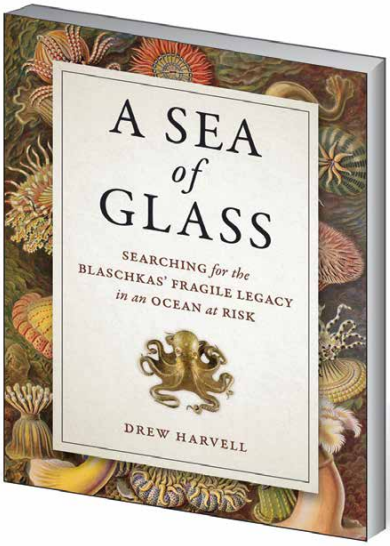

A SEA OF GLASS: SEARCHING FOR THE BLASCHKAS' FRAGILE LEGACY IN AN OCEAN AT RISK

By Drew Harvell, 2016, University of California Press, 232 pages,
ISBN 978-0-520-28568-2, Hardcover: $29.95 US

Reviewed by Bruce H. Robison

Drew Harvell's *A Sea of Glass* is at once a history, a memoir, and a status report on climate change—three interwoven narrative themes that tell the story of a quest. The inspiration for this adventure is a collection of exquisite glass sculptures of marine invertebrates, fashioned by father and son artisans Leopold and Rudolf Blaschka late in the nineteenth century. As curator of the collection, Harvell's mission in this book is to seek out living representatives of the species in her crystal menagerie to see how they are faring in today's changing ocean.

A Professor of Ecology and Evolutionary Biology at Cornell University, Harvell focuses her research and teaching on sustainable marine biodiversity and the ecology of host-pathogen interactions in a changing ocean. She brings a wealth of field and lab experience with living organisms to her collateral role as conservator of Cornell's collection of 569 glass invertebrates. The compelling stories she tells here of her adventures, her deep knowledge of these animals, and her concerns for the future, are well worth reading.

It begins with a discovery: in an old warehouse, long-stored boxes yielded an astonishing assortment of perfectly rendered glass models—a teaching collection from 150 years ago, a time when pickled specimens, watercolors, and line drawings were the standard fare for representing marine species away from their natural habitat.

Glass models were the next best thing to live specimens. The book details how Leopold Blaschka combined his love of natural history with his family's long tradition of glassworking, and how he and his son Rudolf transformed lumps of molten glass into masterpieces of technically precise, scientific art. The book is beautifully illustrated, and a reader can only marvel at the contrast between the complexity, delicacy, and beauty of the Blaschka's creations and the simplicity of their tools: flame, pigments, pliers, and forceps. Historical reflections on the Blaschkas, their inspirations, and contemporaries such as Ernst Haeckel, deepen the context of the author's observations and her disquiet about the future.

Harvell divides her chapters among the taxonomic groups that the Blaschkas modeled: Anemones & Corals, Jellyfish, Worms, Sea Slugs, Octopus & Squid, and Sea Stars. Each chapter contains color illustrations of living specimens and their glass doppelgangers, as well as some of the watercolor images that the glass artists used to prepare their sculptures.

In addition, Harvell vividly describes her first-hand encounters with living examples of the glass invertebrates in their natural habitats. She is very clearly a good observer in the field, and her compelling reports of her interactions with Blaschka species from deep reefs to the intertidal zone are welcome highlights throughout the book. Harvell reflects on these encounters from the standpoint of our changing ocean. What factors led to the decline and disappearance of a once common species from its habitat? And what does a continuation of such trends bode for the future?

A case in point is the chapter on sea slugs, where the author takes us along with her from Washington State to Indonesia, examining the ecological roles of different nudibranchs in different kinds of habitat communities. She details threats posed by local and regional impacts as well as by climate change, and she contrasts diversity differences between communities in protected and unprotected areas. She fills every chapter with intriguing natural history observations, ecological patterns, behavioral notes, phylogenetic relationships, and personal perceptions of diving with the living animals that served as models for the collection of glass avatars. Students and colleagues populate the descriptions of fieldwork, adding considerably to the narratives.

The final chapter recaps the theme of climate change and its effects on life in the ocean. Harvell summarizes the results of her quest to assess the fate of species modeled by the Blaschkas. She includes an imagined explanation to Leopold of all that has happened during the 150 years between his era and ours, as Earth's population has expanded from one to seven billion people. She considers the consequences of this colossal change, not just for the Blaschka species but for all of marine biodiversity. A concise but effective section addresses the issues of CO_2, acidification, and increasing susceptibility to pathogens. The appendix provides a phyletic road map of evolutionary origins and increasing complexity that puts the living marine invertebrates

into grand perspective.

The book will appeal to a wide range of readers, from weekend "tidepuddlers" to hard-core scientists, as well as to divers and laypersons concerned with human impact on the ocean. Dedicated nit-pickers will find few mistakes or misrepresentations, and overall the book is carefully written and is up-to-date. Weaving together several lines of narrative is an effective way to tell a story that takes place over a range of scales and times. Harvell does it well here and we readers are the beneficiaries. I learned a great deal and greatly enjoyed the experience.

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