Ilkka Hanski, Messages from Islands: A global biodiversity tour, 2016, The University of Chicago Press, ISBN: 978-0-226-40644-2, 272 pp., $32.50 (paperback)

Ilkka Hanski was one of the most important contributors to metapopulation theory and it may be no accident this book is dedicated to the role that islands exerted in his research, and hence in the development of metapopulation studies. There is an intimate relationship between island biogeography and metapopulation ecology: both deal with isolated populations. However, island biogeography is primarily concerned with multispecies communities, while a metapopulation is a group of interacting populations of the same species. Thus, population dynamics is different. Island populations are regulated by colonization and extinction processes that depend on individuals' ability to cross barriers that separate islands (e.g., the sea between true islands, land between lakes, plains between mountains, and landscapes fragmented by development). By contrast, births and deaths of individuals in each local population of a metapopulation (and hence their persistence through time) are influenced by the ability of individuals to move through the matrix (the hostile environment that separate habitat patches occupied by local populations).

A cursory examination of the number of citations to the key words "island biogeography" and "metapopulation" in the "Web of Science Core Collection" from 1985 to 2016 (performed on 2nd July 2017) indicates a clear trend: the ratio of the number of "metapopulation" to the number of "island biogeography" citations increased quite regularly from 1985 (when there were only one paper with the metapopulation key word and six with island biogeography, *i.e.* 1:6) to 2003 (when there were 312 papers recorded with the metapopulation keyword and 152 with island biogeography, *i.e.* about 2:1); after 2003, this trend is reversed, with the ratio "metapopulation: island biogeography" approaching 1:1 in

2016 (with 397 papers recovered with the metapopulation keyword and 390 with island biogeography). This suggests that initially metapopulation studies grew at the expense of island biogeography, reaching their golden age in the years between 1997 and 2007 (when, on average, the number of papers in metapopulation studies was 1.5 higher than those in island biogeography). This period can be considered that in which metapopulation ecology entered its maturity and attracted most attention. In this period, Hanski's works in metapopulation ecology had a prominent role in popularizing this research field. In particular, in 1977, Hanski edited (with Michael E. Gilpin) “Metapopulation Biology: Ecology, Genetics, and Evolution” (Academic Press, San Diego), and, in 1999, published “Metapopulation Ecology” (Oxford University Press). These two books were preceded by “Metapopulation Dynamics: Empirical and Theoretical Investigations edited by Gilpin and Hanski in 1991 (Academic Press, London). The importance of these books in making metapopulation ecology an established field of study is clearly demonstrated by the number of citations received: 4103 for “Metapopulation Ecology”, 2270 for “Metapopulation Biology” and 956 for “Metapopulation Dynamics” (according to Google Scholar, 30 September 2017).

Less obvious is Hanski's contribution to biogeography. Although it would not be correct to say that metapopulation theory has its roots in the island biogeography theory, it is clear that island biogeography studies represented an essential framework for the development of metapopulation research. Hanski's interest in biogeography, and the intimate relationships between these research fields, are testified by the present book.

From a very personal perspective “Messages from Islands” explores the role of islands as natural laboratories for ecological research. The author uses his experience of six islands to discuss broad topical themes in population ecology, community ecology and conservation biology. The chapters are short but authoritative.

The volume includes a preface, six chapters, an epilogue, a reference section and an index. The Preface explains how the book is conceived and organized, its history and aim. The first chapter (“Biodiversity: Species and where they live”) introduces the topics covered in the rest of the volume. Here the author uses his experience in Borneo in 1978 (as a PhD student) to discuss how many species live on our planet, the origin of biodiversity, the evolution of ecosystems, the variety of habitats, and the distribution of biological diversity on the Earth. This chapter has a special focus on the hotspots, the

possible causes of concentration of diversity in the tropics, the species-area relationship and its use to forecast species loss.

The second chapter (“How is biodiversity generated”) uses the author's research on the diversity and ecology of dung beetles of Madagascar to explain the mechanisms of natural selection, speciation, evolutionary radiation and coevolution.

Chapter three (“Changing biodiversity”) starts with author's memoirs about his visits to Haminanluoto (a two hectare island in the Gulf of Finland) as a child to examine changing species composition over time. The observations on Haminanluoto birds are used to introduce a wider discussion about how globalization creates biotic homogenization, the special challenges megafauna face, and how climate change forces range shifts and contributes to extinctions.

The fourth chapter (“Species on the move”) starts with author's memoirs of a visit to La Gomera (Canary Islands) in 1976 to familiarize himself with dung beetles, but his attention turned to blowflies. The blowflies of the Canary Islands are used to introduce the ecological characteristics of species that best colonize islands, the dynamics of invasive species, and the threats that species introduction may pose to biodiversity conservation. This chapter also explores how assisted migration may help imperiled species.

The fifth chapter (“Habitat loss and fragmentation”) is dedicated to metapopulation theory and may be considered the keystone chapter of this book. The Glanville fritillary in the Åland Islands (Baltic Sea) introduces the ecological, genetic, and evolutionary consequences of habitat fragmentation. The principles and implications of metapopulation theory are discussed with an emphasis on forest fragmentation, design of protected areas, and determination of the habitat that must be protected to maintain most species above their extinction thresholds.

The sixth chapter (“Why is biodiversity important”) starts with the description of population dynamics of lemmings and their four predators in East Greenland and how it has been altered by climate warming. The effects of environmental perturbations on this simple community are used to illustrate how diversity begets ecosystem stability and productivity. This chapter also deals with other important issues, such as the importance of ecosystem services, the management of agricultural systems and plantations, and the increase of

allergic and autoimmune diseases as a possible consequence of reduced contact of people with environmental biodiversity.

The Epilogue is a conclusive reflection on the future of life on our planet. “In reality, there is little cause for optimism,” Hanski writes, “as long as the present economic and political orders prevail. We lack political leadership that would address the root problem, destructive competition among individuals, groups of individuals, companies, and organizations, and among nations […] It is difficult for societies and humankind to change their course, but it is also difficult to believe that attempts will not be made when it becomes sufficiently clear to most of us [how dramatically the world around us is changing]. The question is how much damage will be done by that time, and how permanent it will be”.

Although recognizing “little cause for optimism” the book is not pessimistic. The author's infectious enthusiasm for nature permeates the book and makes the reader confident that we can really do much to save what can be still saved.

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