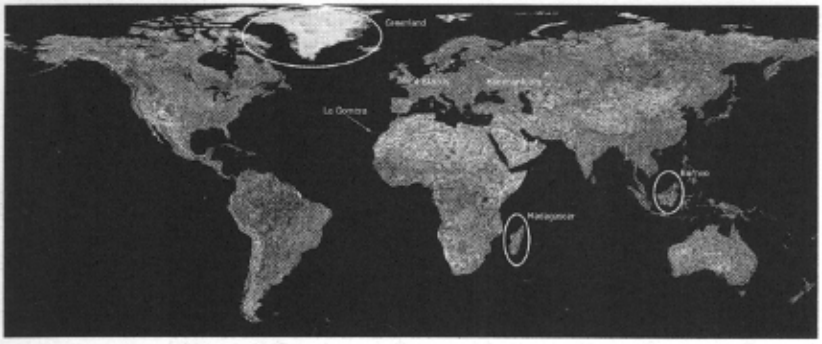
Preface

Biodiversity, and life in general, is the defining feature of our planet. Small children are fascinated by biodiversity, but sadly that interest often wanes because we grown-ups and our educational systems fail to nurture it, and fail to build bridges between children's instinctive attraction to animals and plants and sound understanding of the ecological and evolutionary processes that keep the world running. Not all children lose their early curiosity about biodiversity, however; their interest may mature and lead to a profession in ecology and evolutionary biology. That is what happened to me. I remember one early incident that played an especially big role. I spent all my school holidays in the country, at my grandmother's place, which I value in hindsight as a huge privilege. At the age of eight, I took up collecting butterflies and moths, following the example of a few older boys. For the others this interest lasted a year or two, but mine never stopped. One reason that I stayed interested was a butterfly that I collected in 1964. The butterfly, a dusky meadow brown (*Hyponephele lycaon*), had gone extinct in Finland around 1936. My specimen must have been a vagrant from somewhere southeast of Finland. I was surprised and delighted to have captured such an unusual species; my father thought that I should let others know about it, and so I attended my first meeting of the local entomological club. The news about my butterfly was conveyed to Esko Suomalainen at the University of Helsinki, a population geneticist who is still remembered for his work on

chromosome evolution in Lepidoptera (butterflies and moths). Suomalainen published a paper in 1958 on the extinction of the dusky meadow brown from Finland, in which he discussed the role of inbreeding in the disappearance of the last small populations. His thinking was ahead of his time; research on the effect of inbreeding on extinction became a hot topic only in the 1970s. He sent me a reprint of his publication, which I could not read as it was written in German, but you can imagine the effect on an eleven-year-old boy of receiving his letter and a copy of his scientific paper. Collecting that butterfly and receiving that reprint made it practically certain that I would become a biologist.

Research on biodiversity, and reading and finding out more about it, has a dark side that most other fields of research do not. Biodiversity is declining rapidly both locally and globally, because the human impact on the planet has reached such a level that many researchers describe our time as a new geological epoch, the Anthropocene. The world is changing so rapidly that an individual observer can record very substantial changes in his or her lifetime. I have been struck by dramatic changes in the composition of a bird community on a small island in the Gulf of Finland during forty-six years, changes in the elevational distribution of dung beetles on a mountain slope in Borneo during thirty-five years, and a sudden shift in the lemming dynamics in Greenland at the turn of the century, apparently due to climate warming. Changes can be represented by numbers in tables and graphs, but the human mind is such that only what we have seen with our own eyes, heard with our own ears, and touched with our own fingers seems real. A cool summer makes people doubt climate change. At the same time, the human perception of time is so inadequate that unless you make an effort, you can miss the change. You become used to the altered environment so quickly that you do not realize that the world is changing at all. Researchers who are concerned about the loss of biodiversity and speak out about it are occasionally accused of partisanship. (Oddly enough, medical doctors who are concerned about public health are unlikely to be accused of partisanship.)

Many discoveries about biodiversity and the ecological and evolutionary processes shaping it have been made on islands. Isolation and distinctness of islands have influenced the populations and communities inhabiting them, and these features have also affected researchers. Island populations are well-delimited targets for research; the island environment is often different enough to impose new selection pressures; the size of island populations is related to island area; and the exchange of genes and individuals with



The six islands featured in this book.

other populations is affected by island isolation—all features that facilitate research. It is probable that the short visit that Charles Darwin made to the Galápagos Islands in September 1835, toward the end of his five-year voyage around the world, and the birds that he collected there helped him take the mental leap to the idea of natural selection. The equilibrium theory of island biogeography composed by Robert MacArthur and Edward O. Wilson was not based on any particular island, but on islands in general, and the result was a paradigm change in biogeography and ecology. Closer to home, my predecessor in the chair of ecology in the University of Helsinki, Olli Järvinen, biogeographer and conservation biologist, thought that Finnish population biologists are especially fortunate because of the huge number of islands in the Baltic Sea and in the many large lakes in Finland. Each of the six chapters in this book is launched with a short narrative of my personal experiences and, in most cases, research done on six islands, from a tiny islet in the Gulf of Finland to Borneo, Madagascar, and Greenland.

The purpose of this book is not to describe the global distribution of biodiversity. There is no shortage of wonderful field guides, especially on birds, but also on many other groups of animals and plants. Leafing through the maps of species' geographical ranges helps one understand the big picture of biodiversity around the planet. Naturally, the best way to become familiar with biodiversity locally is to take your field guides to the field. Neither does this book catalogue changes in the state of biodiversity, which is well done in many books, reports, and websites. My purpose is to present an overview of what biodiversity is, how it has evolved in the course of evolution, and how it changes at present; how we humans shape biodiversity by unintentionally helping other species expand their distributions and by converting their

habitats; and why biodiversity is important, why we must protect it. These are big topics on which there is a vast literature. My goal is not to summarize all that knowledge, but rather to present it from the perspective of one working scientist. I hope that short stories of how research has been done will convey a glimpse of the excitement of doing research on biodiversity.

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