Preface

The patterns of biogeography are the result of the interaction between the two great engines of our planet: evolution and plate tectonics. To interpret them, we need to understand many different areas of science—for example, evolution, taxonomy, ecology, geology, palaeontology and climatology. Although each area makes its own individual contribution, a textbook such as this therefore has to cover a similar scope, and must be suitable for students with a variety of different backgrounds. This is particularly necessary today, when the final coming-together of molecular methods of demonstrating relationships, and the cladistic technique of imposing pattern upon the resulting data, promise to revolutionize our understanding of biogeography.

Many changes have taken place in the study of biogeography over the 32 years and seven editions that have passed in the life of this textbook. Back in 1973, the depth of the problem that our species poses for our planet's biota and climate was hardly appreciated, and the 'greenhouse effect' was still mainly a concern for horticulturalists rather than a worry for the whole planet.

It was not until the 1980s that evidence that the Earth's climate is changing, and that this is increasingly the result of human activities, became steadily greater. This eventually led to greater public debate and scientific involvement. In interpreting the interaction between the physical world and the living world, and of the human impact on each of these, biogeography clearly has a major role to play in assessing the likely results of climatic change and in suggesting how best to counter them. As climatic change renders old crop areas less fertile, will it be possible to find new areas to replace them—and, if so, where? Or shall we have to find new varieties of plant, adapted to these new conditions—and, if so, where are we likely to find them? This was probably the reason for the great increase in the amount of research on biogeography that took place during the 1990s.

But it is not only our foodstuffs that are threatened by climate change, it is the diversity of life inhabiting environments that are shrinking and disappearing. This is not just a concern for the curators of museums and herbaria, for we are also becoming aware of the extent to which we rely on this diversity for new drugs as well as for new food plants. So we became aware of the need to census this diversity, in order to appreciate where it

is greatest, and where it is under particular threat. Which habitats are threatened, where and how should we attempt to preserve them? One of the responses of biogeographers to these new imperatives was to examine whether it was possible to use the integrative Theory of Island Biogeography, put forward in 1963, as a guide to the design of nature reserves. Though some of the claims for the predictive power of this theory now seem to have been overplayed, it remains an important concept in this area of human concern.

Biogeography textbooks have traditionally not considered marine biogeography in similar depth and detail as continental biogeography and island biogeography. That was, perhaps, partly because marine biogeography was comparatively poorly understood and, maybe, less important. However, we are now realizing that the seemingly limitless harvest of the seas is faltering under the impact of our soaring demands for food. Fortunately, the efforts of marine biologists to understand the dynamics of the life of the seas have recently been greatly aided by new techniques of evaluation, made possible by the use of satellite-based photographic monitoring. This made it possible, in the last edition of this textbook, to introduce a new chapter on marine biogeography. Students can therefore now compare and evaluate the data, patterns and problems arising from continental, marine and island biogeography within this single book.

This new edition is the first to contain a chapter on the history of biogeography, which has a particular role in the teaching of the subject. It is very tempting for students to believe that what they are taught is the simple, unalloyed truth. History not only shows us how the subject has developed—new theories being tested and, eventually, modified or rejected—it also, by implication, tells us that the science that we are taught today is not some semicrystalline structure of truth and beauty. Instead, it is merely the latest description of a beach that will soon be changed, perhaps only a little by a high tide or wind, but perhaps more fundamentally by a storm or land movement. This new chapter also begins with a section that attempts to make students aware that science is not a unique area of human endeavour, carried out by passionless automata. Instead, the scientists whose work and ideas are presented here are, like the rest of humanity, subject to error, prejudice and rivalry, and limited by the current assumptions and restrictions of science and society. In this book, we also try to evaluate conflicting theories and to give a reasoned judgment as to which is preferable. Whether a student ends up as a working scientist, or within another area of our society, these are important lessons to learn, and to apply when reading either the literature of science or its reporting in the newspapers and other media.