Species Diversity In Space And Time

Biogeography represents one of the most complex and challenging aspects of macroevolutionary research, requiring input from both the earth and life sciences. Palaeogeographic reconstruction is frequently carried out by researchers with backgrounds in geology and palaeontology, who are less likely to be familiar with the latest biogeographic techniques: conversely, biogeographic methods are often devised by neontologists who may be less familiar with the fossil record, stratigraphy, and palaeogeography. Palaeogeography and Palaeobiogeography: Biodiversity in Space and Time bridges the gap between these two communities of researchers, who work on the same issues but typically use different types of data. The book covers a range of topics, and reflects some of the major overall questions in the field such as: Which approaches are best suited to reconstructing biogeographic histories under a range of circumstances? How do we maximize the use of organismal and earth sciences data to improve our understanding of events in earth history? How well do analytical techniques devised for researching the biogeography of extant organisms perform in the fossil record? Can alternative biodiversity metrics, particularly those based on morphological measurements, enhance our understanding of biogeographic patterns and processes? This book approaches palaeobiogeography with coverage of technological applications and detailed case studies. It spans a wide selection of overlapping and integrative disciplines, including evolutionary theory, vicariance biogeography, extinctions, and the philosophical aspects of palaeogeography. It also highlights new technological innovations and applications for research. Presenting a unique discussion of both palaeogeography and palaeobiogeography in one volume, this book focuses both historically and philosophically on the interface between geology, climate, and organismal distribution.

This book discusses the factors and processes affecting biodiversity and its preservation.

Biodiversity in Drylands, the first internationally based synthesis volume in the Long-Term Ecological Research (LTER) Network Series, unifies the concepts of species and landscape diversity with respect to deserts. Within this framework, the book treats several emerging themes, among them: ï¿½ how animal biodiversity can be supported in deserts ï¿½ diversity's relation to habitat structure, environmental variability, and species interactions ï¿½ the relation between spatial scale and diversity ï¿½ how to use a landscape simulation model to understand diversity ï¿½ microbial contributions to biodiversity in deserts ï¿½ species diversity and ecosystem processes ï¿½ resource partitioning and biodiversity in fractal environments ï¿½ effects of grazing on biodiversity ï¿½ reconciliation ecology and the future of conservation management In the face of global change, integration is crucial for dealing with the problem of sustaining biodiversity. This book promises to be a vital resource for students, researchers, and managers interested in integrative species, resource, and landscape diversities.

Understanding and predicting species diversity in ecological communities is one of the great challenges in community ecology. Popular recent theory contends that the traits of species are "neutral" or unimportant to coexistence, yet abundant experimental evidence suggests that multiple species are able to coexist on the same limiting resource precisely because they differ in key

traits, such as body size, diet, and resource demand. This book presents a new theory of coexistence that incorporates two important aspects of biodiversity in nature--scale and spatial variation in the supply of limiting resources. Introducing an innovative model that uses fractal geometry to describe the complex physical structure of nature, Mark Ritchie shows how species traits, particularly body size, lead to spatial patterns of resource use that allow species to coexist. He explains how this criterion for coexistence can be converted into a "rule" for how many species can be "packed" into an environment given the supply of resources and their spatial variability. He then demonstrates how this rule can be used to predict a range of patterns in ecological communities, such as body-size distributions, species-abundance distributions, and species-area relations. Ritchie illustrates how the predictions closely match data from many real communities, including those of mammalian herbivores, grasshoppers, dung beetles, and birds. This book offers a compelling alternative to "neutral" theory in community ecology, one that helps us better understand patterns of biodiversity across the Earth.

Species Diversity in Space and TimeCambridge University Press

This accessible and timely book provides a comprehensive overviewof how to measure biodiversity. The book highlights newdevelopments, including innovative approaches to measuringtaxonomic distinctness and estimating species richness, andevaluates these alongside traditional methods such as speciesabundance distributions, and diversity and evenness statistics. Helps the reader quantify and interpret patterns of ecologicaldiversity, focusing on the measurement and estimation of speciesrichness and abundance. Explores the concept of ecological diversity, bringing newperspectives to a field beset by contradictory views andadvice. Discussion spans issues such as the meaning of community in thecontext of ecological diversity, scales of diversity anddistribution of diversity among taxa Highlights advances in measurement paying particular attentionto new techniques such as species richness estimation, applicationof measures of diversity to conservation and environmentalmanagement and addressing sampling issues Includes worked examples of key methods in helping people tounderstand the techniques and use available computer packages moreeffectively

The loss of the earth's biological diversity is widely recognized as a critical environmental problem. That loss is most severe in developing countries, where the conditions of human existence are most difficult. Conserving Biodiversity presents an agenda for research that can provide information to formulate policy and design conservation programs in the Third World. The book includes discussions of research needs in the biological sciences as well as economics and anthropology, areas of critical importance to conservation and sustainable development. Although specifically directed toward development agencies, non-governmental organizations, and decisionmakers in developing nations, this volume should be of interest to all who are involved in the conservation of biological diversity.

This classic by the distinguished Harvard entomologist tells how life on earth evolved and became diverse, and now, how diversity and life are endangered by us, truly. While Wilson contributed a great deal to environmental ethics by calling for the preservation of whole ecosystems rather than individual species, his environmentalism appears too anthropocentric:

"We should judge every scrap of biodiversity as priceless while we learn to use it and come to understand what it means to humanity." And: "Signals abound that the loss of life's diversity endangers not just the body but the spirit." This reprint of the 1992 Belknap Press publication contains a new foreword. Annotation copyrighted by Book News, Inc., Portland, OR

"This volume provides a series of essays on open questions in ecology with the overarching goal being to outline to the most important, most interesting or most fundamental problems in ecology that need to be addressed. The contributions span ecological subfields, from behavioral ecology and population ecology to disease ecology and conservation and range in tone from the technical to more personal meditations on the state of the field. Many of the chapters start or end in moments of genuine curiosity, like one which takes up the question of why the world is green or another which asks what might come of a thought experiment in which we "turn-off" evolution entirely"--

A plethora of different theories, models, and concepts make up the field of community ecology. Amid this vast body of work, is it possible to build one general theory of ecological communities? What other scientific areas might serve as a guiding framework? As it turns out, the core focus of community ecology—understanding patterns of diversity and composition of biological variants across space and time—is shared by evolutionary biology and its very coherent conceptual framework, population genetics theory. The Theory of Ecological Communities takes this as a starting point to pull together community ecology's various perspectives into a more unified whole. Mark Vellend builds a theory of ecological communities based on four overarching processes: selection among species, drift, dispersal, and speciation. These are analogues of the four central processes in population genetics theory—selection within species, drift, gene flow, and mutation—and together they subsume almost all of the many dozens of more specific models built to describe the dynamics of communities of interacting species. The result is a theory that allows the effects of many low-level processes, such as competition, facilitation, predation, disturbance, stress, succession, colonization, and local extinction to be understood as the underpinnings of high-level processes with widely applicable consequences for ecological communities. Reframing the numerous existing ideas in community ecology, The Theory of Ecological Communities provides a new way for thinking about biological composition and diversity.

This book provides an up to date review of the methods of measuring and assessing biological diversity, together with their application.

Some structural features of languages predict others, some remain unchanged in daughter languages, others have an areal consistency; in establishing typologically, historically and geographically stable features in the worlds languages, examples are included from Kayardild, Djingili, Dyirbal, Mangarayi, Maung, Ngiyambaa.

From the oceans to continental heartlands, human activities have altered the physical characteristics of Earth's surface. With Earth's population projected to peak at 8 to 12 billion people by 2050 and the additional stress of climate change, it is more important than ever to understand how and where these changes are happening. Innovation in the geographical sciences has the potential to advance knowledge of place-based environmental change, sustainability, and the impacts of a rapidly changing economy and society. Understanding the Changing Planet outlines eleven strategic directions to focus research and leverage new technologies to harness the potential that the geographical sciences offer.
Organised into four sections, this text discusses the organisation of the living world. Links Ecology, Biodiversity and Biogeography Bridges modern and conventional Ecology Builds sequentially from the concept and importance of species, through patterns of diversity to help consider global patterns of biogeography Uses real data sets to help train in essential skills
How will patterns of human interaction with the earth's eco-system impact on biodiversity loss over the long term--not in the next ten or even fifty years, but on the vast temporal scale be dealt with by earth scientists? This volume brings together data from population biology, community ecology, comparative biology, and paleontology to answer this question.
This volume explores the relationship between law and geography, especially with respect to taken-for-granted distinctions between the social and the material, the human and non-human, and what constitutes persons and things. As a genuinely reflective `Law and Geography' project, this collection offers interdisciplinary inquiry, particularly in response to globalisation - of law, commerce, environmental change and society - which renders relations between the local and the global moresignificant. Because of the sheer expansiveness and complexity of both law and geography we use conceptual frames to structure this volume - boundaries, land, property, nature, identity (persons, peoples and places), culture and time, and knowledge. These frames cut across the various subdivisions of law and geography described above and provide a route into the various practical and theoretical deliberations on the interrelationship and interstices of law and geography which follow. The chapters are diverse in style, research methodology, and subject matter (organ transplants, lawn mowing, settler states, archaeological remains, shopping, gay nightclubbing, seeds, common space).
The species-area relationship (SAR) describes a range of related phenomena that are fundamental to the study of biogeography, macroecology and community ecology. While the subject of ongoing debate for a century, surprisingly, no previous book has focused specifically on the SAR. This volume addresses this shortfall by providing a synthesis of the development of SAR typologies and theory, as well as empirical research and application to biodiversity conservation problems. It also includes a compilation of recent advances in SAR research, comprising novel SAR-related theories and findings from the leading authors in the field. The chapters feature specific knowledge relating to terrestrial, marine and freshwater realms, ensuring a comprehensive volume relevant to a wide range of fields, with a mix of review and novel material and with clear recommendations for further research and application.
Resource-management decisions, especially in the area of protecting and maintaining biodiversity, are usually incremental, limited in time by the ability to forecast conditions and human needs, and the result of tradeoffs between conservation and other management goals. The individual decisions may not have a major effect but can have a cumulative major effect. Perspectives on Biodiversity reviews current

understanding of the value of biodiversity and the methods that are useful in assessing that value in particular circumstances. It recommends and details a list of components-including diversity of species, genetic variability within and among species, distribution of species across the ecosystem, the aesthetic satisfaction derived from diversity, and the duty to preserve and protect biodiversity. The book also recommends that more information about the role of biodiversity in sustaining natural resources be gathered and summarized in ways useful to managers. Acknowledging that decisions about biodiversity are necessarily qualitative and change over time because of the nonmarket nature of so many of the values, the committee recommends periodic reviews of management decisions.

This is a readable, informative and up-to-date account of the patterns and controls on biodiversity. The author describes major trends in species richness, along with uncertainties in current knowledge. The various possible explanations for past and present species patterns are discussed and explained in an even-handed and accessible way. The implications of global climate change and habitat loss are considered, along with current strategies for preserving what we have. This book examines the state of current understanding of species richness patterns and their explanations. As well as the present day world, it deals with diversification and extinction, in the conservation of species richness, and the difficulties of assessing how many species remain to be discovered. The scientifically compelling subject of vegetation-climate interaction is considered in depth. Written in an accessible style, the author offers an up-to-date, rigorous and yet eminently comprehensible overview of the ecology and biogeography of species richness. He departs from the often heavy approach of earlier texts, without sacrificing rigor and depth of information and analysis. Prefacing with the aims of the book, Chapter 1 opens with an explanation of latitudinal gradients, including a description of major features of the striking gradients in species richness, exceptions to the rule, explanations, major theories and field and experimental tests. The following chapter plumbs the depth of time, including the nature of the fossil record, broad timescale diversity patterns, ecosystem changes during mass extinctions and glaciations and their influence on species richness. Chapters 3 and 4 consider hotspots and local scale patterns in species richness while Chapter 5 looks at the limitations and uncertainties on current estimates of richness, the last frontiers of species diversity and the process of identifying new life forms. The last three chapters cover humans and extinctions in history and prehistory, current habitat and global change, including the greenhouse effect, and the race to preserve what we still have, including parks, gene banks and laws.

The diversity of species of plants and animals is the net result of the origin of new species by the splitting of existing lineages (speciation) and the loss of species through extinction. Why there are more species in some groups of organisms, in some places or at some times depends on the balance of these processes. This book explores the interaction between mechanisms and rates of speciation and these patterns of biological diversity, and is unusual in that it brings together the viewpoints of ecologists interested in the processes that generate patterns of diversity and evolutionary biologists who focus on mechanisms of speciation. It is intended to stimulate dialogue between these groups and so promote a more complete understanding of biological diversity.

This book is a printed edition of the Special Issue Causes and Consequences of Species Diversity in Forest Ecosystems that was published in Forests

The present book offers an overall up-to-date overview of the biological diversity, comprising many interesting chapters focussing on the different aspects of biodiversity. Most of the chapters include findings of investigations and observations on biodiversity, whilst a few are based on statistically and theoretically derived information. The book produced sufficient information on the occurrence and distribution of many plant and animal species or groups of organisms with environmental estimates from a wide variety of interesting terrestrial and aquatic

habitats. With 18 interesting and elaborately prepared chapters, the present book would definitely be an ideal source of scientific information to the advanced students, junior researchers, scientists and a portion of the public involved in ecology and other research areas involving biodiversity studies. It will also help to the development of the growing awareness of the close linkage between the conversation of biodiversity and economic development.

Describes the effects of disturbance, species competition and coexistence, and the processes of plant succession.

This book is a unique introduction to the fields of macroevolution and macroecology, taking an enquiry-led approach to exploring the evolution and distribution of biodiversity across time, space and lineages.The only introduction to macroevolution and macroecology to adopt an innovative enquiry-led, case study-based framework to encourage active learning and critical thinking, this book:Extends the study of evolutionary biology and ecology beyond the topics covered in typical undergraduate textsExplores the nature of scientific investigation by emphasising hypothesis testing and highlighting the range of analytical tools available to contemporary researchersEncourages active student-driven learning by using open questions and current debates to promote critical thinking, identify interesting and important problems, and demonstrate how to frame testable research hypothesesCombines these three skills--an understanding of macroevolutionary and macroecological principles and patterns, a grasp of hypothesis testing, and the ability to identify important questions--to allow students to look at the world with new eyes, and develop an understanding of why the biological world is as it is.

The Great Barrier Reef Marine Park is 344 400 square kilometres in size and is home to one of the most diverse ecosystems in the world. This comprehensive guide describes the organisms and ecosystems of the Great Barrier Reef, as well as the biological, chemical and physical processes that influence them. Contemporary pressing issues such as climate change, coral bleaching, coral disease and the challenges of coral reef fisheries are also discussed. In addition,the book includes a field guide that will help people to identify the common animals and plants on the reef, then to delve into the book to learn more about the roles the biota play. Beautifully illustrated and with contributions from 33 international experts, The Great Barrier Reef is a must-read for the interested reef tourist, student, researcher and environmental manager. While it has an Australian focus, it can equally be used as a baseline text for most Indo-Pacific coral reefs. Winner of a Whitley Certificate of Commendation for 2009.

The book reports key findings of a research program in which economists and ecologists considered the consequences of biodiversity loss. Despite acknowledgment that loss of living diversity is an international biological crisis, the ecological causes and consequences of extinction have not yet been widely addressed. In honor of Edward O. Wilson, winner of the 1993 International Prize for Biology, an international group of distinguished biologists bring ecological, evolutionary, and management perspectives to the issue of biodiversity. The roles of ecosystem processes, community structure and population dynamics are considered in this book. The goal, as Wilson writes in his introduction, is "to assemble concepts that unite the disciplines of systematics and ecology, and in so doing to create a sound scientific basis for the future management of biodiversity."

Measuring the abundance of individuals and the diversity of species are core components of most ecological research projects and conservation monitoring. This book brings together in one place, for the first time, the methods used to estimate the abundance of individuals in nature. The statistical basis of each method is detailed along with practical considerations for survey design and data collection. Methods are illustrated using data ranging from Alaskan shrubs to Yellowstone grizzly bears, not forgetting Costa Rican ants and Prince Edward Island lobsters. Where necessary, example code for use with the open source software R is supplied. When appropriate, reference is made to other

widely used programs. After opening with a brief synopsis of relevant statistical methods, the first section deals with the abundance of stationary items such as trees, shrubs, coral, etc. Following a discussion of the use of quadrats and transects in the contexts of forestry sampling and the assessment of plant cover, there are chapters addressing line-intercept sampling, the use of nearest-neighbour distances, and variable sized plots. The second section deals with individuals that move, such as birds, mammals, reptiles, fish, etc. Approaches discussed include double-observer sampling, removal sampling, capture-recapture methods and distance sampling. The final section deals with the measurement of species richness; species diversity; species-abundance distributions; and other aspects of diversity such as evenness, similarity, turnover and rarity. This is an essential reference for anyone involved in advanced undergraduate or postgraduate ecological research and teaching, or those planning and carrying out data analysis as part of conservation survey and monitoring programmes.

This book introduces recent progress in the study of species diversity and community structures in terrestrial organisms conducted by three groups at Kyoto University. First, it explains species diversity and the functioning of fungi in Asian regions as outlined by metagenomic approaches using next-generation sequencing technology. The advances in high-throughput sequencing technologies accelerate the speed of species inventorying, especially for microorganisms. Second, the study of complex interactions between herbivorous insects and plants in the community and ecosystem contexts is presented. Recent studies in community and ecosystem genetics shed light on these complex interactions with novel approaches incorporating genetic perspectives including genetic variation and phenotypic plasticity in plant defenses against herbivores. Finally, recent studies on speciation processes in insects are described, processes that are related to the evolution of particular life history strategies. Included is an examination of two hypotheses that may be important in understanding diversification of insect species in heterogeneous environments in space and time. This book is a valuable resource especially for ecologists who are interested in species diversity and community structure.

Rex and Etter present the first synthesis of patterns and causes of biodiversity in organisms that dwell in the vast sediment ecosystem of ocean floor. They offer a new understanding of marine biodiversity that will be of general interest to ecologists and is crucial to responsible exploitation of natural resources at the deep-sea floor.

Biodiversity.

We conceived the idea for this book after teaching a graduate seminar on 'Habitat Complexity' at The University of South Florida. Discussions during the seminar led us to conclude that similar goals were to be found in studies of the topic that spanned the breadth of ecological research. Yet, the exact meaning of 'habitat structure', and the way in which it was measured, seemed to differ widely among subdisciplines. Our own research, which involves several sorts of ecology, convinced us that the differences among subdisciplines were indeed real ones, and that they did inhibit communica tion. We decided that interchange of ideas among researchers working in marine ecology, plant-animal interactions, physiological ecology, and other more-or-less independent fields would be worthwhile, in that it might lead to useful generalizations about 'habitat structure'. To foster this interchange of ideas. we organized a symposium to attract researchers working with a wide variety of organisms living in many habitats, but united in their interest in the topic of 'habitat structure'. The symposium was held at The University of South Florida's Chinsegut Hill Conference Center, in May. 1988. We asked participants to think about 'habitat structure' in new ways; to synthesize important, but fragmented, information; and. perhaps. to consider ways of translating ideas across systems. The chapters contained in this book reflect the participants' attempts to do so. The book is divided into four parts, by major themes that we have found

useful categorizations.

From global-scale variation in the distribution of light reaching the Earth's surface to the smallest chemical gradients, environmental heterogeneity, or variation in environmental conditions over space and time, is critical to explain process and pattern in nature. Environmental heterogeneity has long been hypothesized to promote species coexistence by allowing niche partitioning. Organisms respond to heterogeneity in abiotic environmental conditions at several scales, interactions between organisms can be mediated by heterogeneity, and organisms themselves can generate additional heterogeneity that may be important for the structure of communities. Importantly, how environmental heterogeneity interacts with biodiversity remains an important challenge to predicting the ecosystem functioning. Moreover, given that environmental conditions and ecological process change across scales of space and time, investigating how heterogeneity influences ecological communities – both directly by modifying habitat quality and indirectly by modifying interactions – across a range of scales is necessary if we want to make predictions in community ecology. Ecologists often observe and measure communities at a single scale, which often not the scale at which processes take place, so defining appropriate scales for inquiry can be challenging. If a single scale is chosen, ecologists must consider the natural history of their systems that relate to the patterns and processes being investigated. However, the ability of ecologists to view systems at several scales at once is improving with technological advances. My goal with this dissertation was to take what we already know about biodiversity maintenance and ecosystem functioning and extend it to multiple trophic levels, habitats, and scales of observation, all of which are important to our general understanding of community ecology. The real world is messy, which makes the job of a community ecologist simultaneous fascinating and frustrating. However, by considering some of the complexities inherent in natural systems (including how they might change across scale) I aim to help in pushing biodiversity science into the 21st Century. All of the following chapters explore some aspect of environmental heterogeneity and how it either influences biodiversity or interacts with it to determine some important ecological process. Chapter 1 explores temporal variation in a major environmental gradient in marine habitats, water flow, and how it interacts with species diversity of suspension feeding invertebrates to predict community-wide water filtration. I manipulated species diversity of suspension feeders and the presence of water flow directly in the lab and allowed communities to consume a diverse mélange of phytoplankton. By tracking chlorophyll a concentrations over time, I was able to get a proxy for water filtration taking place at the community-level. Species diversity enhanced community filtration, and this response did not depend on whether water was flowing or not. However, individual species and pairs did respond to flow, so these results suggest that interactions between organisms and their modification of water flow may be important for predicting food delivery and ultimately water filtration over time. The balance of competition and niche complementarity appeared to change across flow regimes, which brings species interactions, and their sensitivity to environmental conditions, to the forefront. Chapter 2 investigates a common form of spatial heterogeneity on a rocky shore, namely topography generated by space-holding barnacles and how it interacts with grazer species diversity to drive algal community succession. This chapter was part of a project started by Kristin Aquilino in which we simultaneously manipulated barnacle cover and snail grazer diversity at small scales relevant to seaweed-grazer interactions. Then we tracked communities over time as they recovered from algal clearing. The presence and heterogeneity of barnacles along with the diversity and identity of grazing invertebrates interacted to predict algal succession. Grazer diversity itself was important for suppressing early successional microalgae, while later successional macroalgae were promoted by the presence of a key limpet grazer. In the absence of this limpet heterogeneity in barnacle cover led to increased algal accumulation. Again, species interactions and the potential for niche complementarity depended on habitat heterogeneity, thus the influence of environment on interactions remains strong

thread in the dissertation. Chapter 3 also considers topographic heterogeneity on rocky shores, but this time focusing on how topography at different spatial scales modifies community structure during early succession. We have known for a long time that large elevation gradients on rocky shores are critical for the distributions of organisms, but perhaps small scale environmental variation also matters for these communities as suggested by many previous studies. I decided to manipulate small-scale (mm) topography by making settlement plates that mimicked real rock surfaces. Then I placed these plates across areas of mid-intertidal a rocky shore, which represented larger scale (cm to m) variation in topography, including differences in elevation and distance to shore. Importantly, both scales of environmental heterogeneity influenced community composition, but in different ways. Early successional algae responded more strongly to the large-scale heterogeneity present along and across the coastline, while mobile invertebrates responded strongly to small-scale characteristics like rugosity and convexity. It is likely then that small-scale heterogeneity can have a driving influence on algal distributions indirectly through the grazing behaviors of invertebrate animals, but once again this will depend on the traits of the grazers (e.g., body size) and how they interact with heterogeneity. One conceptual result that helps tie all of these chapters together is that in order for environmental heterogeneity to be important to ecological communities, the scale at which heterogeneity occurs must match response and effect traits of the organisms living within the community. Body size and the way organisms of a particular size respond to, and potentially modify, their abiotic surroundings play a role in every chapter, from the fouling invertebrates that emerge from the substrate into flowing water (Chapter 1) to the tidepool invertebrates that crawl on bumpy substrates in search of food and refuge (Chapters 2, 3). All of this work, I hope, will help advance ecological knowledge and our collective ability to make predictions in a changing world. Yet, it is likely that the work presented here will generate more questions than answers. For instance, how do we take the ideas laid out in this dissertation and marry them with life histories, which often cause organisms to experience very different scales of environmental heterogeneity over their lifetimes? If we want to make large-scale predictions about the abundance and distribution of life on Earth and how it responds to environmental change, how much information do we actually need to know at the small scales? Give that body size is important for metabolic rates and impacts on ecosystems, might there be ways to combine scaling and metabolic theories in ecology, which strive for simplicity, with the messier information about environmental heterogeneity and species traits to make predictions across different types of ecosystems? These are the types of questions that continue to motivate me and that, hopefully, motivates the field of ecology in the future.

This volume is an investigation of interspecific competition for space, particularly among sessile organisms, both plant and animal, and its consequences for community structure. While my own contribu tion ----and the bulk of this volume --- lies in mathematical analysis of the phenomenon, I have also tried to summarize the most important natural historical aspects of these communities, and have devoted much effort to relating the mathematical results to observations of the natural world. Thus, the volume has both a synthetic and an analytic aspect. On the one hand, I have been struck by certain similarities among many communities, from forests to mussel beds, in which spatial com petition is important. On the other hand, I have analyzed this pheno menon by means of reaction-dispersal models. Finally, the mathematical analysis has suggested a conceptual framework for these communities which, I believe, further unifies and illuminates the field data. A focal perception of this work is that, just as niche relations provide an appropriate expression of the influence of resource compe tition on community structure, so do dominance relations provide an appropriate expression of the influence of spatial competition.