

- (1) The U.S. need for Canadian water. Is it real?
- (2) The growing pressures to make water transfers.
- (3) The support or non-support for water transfers.
- (4) The social and environmental costs of dams.
- (5) The North American Water and Power Alliance.
- (6) The economics of water development.
- (7) The phenomena of dam building and dam promotion.
- (8) Water management alternatives in Canada and the U.S.A.
- (9) The policy or lack of policy behind water programs in Canada.
- (10) Water development and the Canadian identity.

The depth of ideas and information in each chapter makes it difficult to more than touch on the issues in review. Nevertheless several major messages emerge in the book as a whole.

The need for Canadian water in the U.S. has been greatly overdrawn by some politicians and promoters. Water is misused in many large transfer schemes now in the U.S. The judgment and the motivation behind many water proposals is questioned in the book.

Massive damming operations in several places in the world are revealed as environmental disasters as long-

term effects begin to unfold. Many of the social costs in the wake of such operations as the W.A.C. Bennett Dam, and the High Aswan Dam are great but were never considered before construction.

Bocking makes the case that Canada is moving, without any predetermined plan, toward a situation where it will be forced into huge water transfers. The great waterways running east and west have given Canada much of its identity. With water deals we face not only the loss of real control over a major resource but also the loss of a heritage and an identity.

Water export plans give silent approval to the untenable precept that growth must go on. The engineering approach to over-population is to reach out further for more resources; the problems are worsened. It is depressing to reflect upon the loss of a heritage, an identity, and a quality of life as a part of an exercise in sustaining a growth process that must inevitably end.

Mr. Bocking's book is well researched and well presented. Although it is disturbing it is valuable reading to every Canadian. It should be equally valuable to every American.

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## OTHER BOOKS

### Ecology

By Robert E. Ricklefs. 1973. Chiron Press, Newton, Massachusetts. 861 pp. Introductory price \$9.00.

This book is the definitive broad treatment of the theory of ecology. It warrants widespread and long-continued use. I make this assessment realizing that this puts it in the class with Elton's classic *Animal Ecology* which was definitive for its era. In comparing these two works, however, differences reflect the fact that Elton's book filled an open field and contained original concepts, whereas Ricklefs' volume summarizes the vastly greater quantity and insights that have been generated in recent years. Ricklefs follows the sound rule of publishing new research and concepts separately from a textbook, as evidenced by the long list of his references at the end of the book. This avoids the impression that there may be first record of new concepts buried within this text.

The 46 chapters are grouped in parts devoted to the following sequence of subject areas: natural selection

and adaptation, the physical and biological environments in the ecology of organisms, ecological genetics and evolution, genetics of populations, ecology of populations, and finally ecology of communities. Within each part the relevant topics are discussed in some depth. For instance, under Physical Environment, the following are dealt with: requirements of life, aquatic and terrestrial environments, space, temporal variation, adaptation and distribution, regulation and homeostasis, perception, and sense of time. Under Biological Environment these are discussed: predator and prey relationships, competition, social environment, sexual environment, life history strategies, the social insects, and the integration of populations.

The extensiveness and richness of the material in the book can be judged in part from the quantities of figures (329), tables (97), glossary entries (301), and cited references (approximately 705). In addition there is a list of some 46 books in a reading list, 42 journals,

7 reprint collections, and 13 books on environmental issues.

The writing is informative, easy to read, and aided by frequent clear headings. The ideas are developed thoughtfully from basic evidence. The prose is clear and well written; it communicates effectively. The meaning is not obscured by any forest of highly technical terms, and the terms that are used are defined in the glossary. The available theories relating to diversity in a community, number of species in a community, and energy flow are all explored.

I would criticize the book in a way which may verge on quibbling. Ecology is one of the widest fields of human thought, and hence it needs structured summarizing. This book does have Parts, Chapters, and Headings. But similar-strength headings may be major principles or more often lesser sub-units or even questions. For instance, one heading is "When does succession stop?" The word 'climax' occurs in the subsequent text but there is no formal statement of, or definition of, climax association. The several types of climax are not defined, nor does climax appear as a major heading or principle; it should result from that question.

A notable omission from Ricklefs' book is the discussion and description of practical field methods for both plants and animals. Understandably in view of the size of the book, these are left for others or the instructor to supply and to discuss the advantages and disadvantages relevant to each field method.

The treatment is ideal for a student who intends to make his career in ecological biology. It also suits and challenges the good student in another stream who would appreciate a real insight into ecology. Equally then, this book would be enjoyed by a thoughtful person who wanted to relate environmental concerns to his scientific background.

In the epilogue Ricklefs makes a plea for more quantitative scientific investigation of natural communities, and subsequent fitting of models. He closes with the hope that the future development of ecology will be broad enough to accommodate man as a phenomenon of the natural world.

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### Geographical Ecology. Patterns in the Distribution of Species

By Robert H. MacArthur. 1972. Harper and Row, New York. 270 pp. \$12.95 (U.S.).

This is an interesting and thought-provoking book for anyone who has some knowledge of ecology or biogeography. The late Robert MacArthur has had a pronounced influence in biology, and is perhaps best known for his application of mathematics in the development of biological theory. In the present book, however, MacArthur has made a fairly successful attempt to express his ideas verbally, limiting much of the more complex mathematical formulae to various appendices.

The nine chapters in the book cover a wide range of topics, with a considerable variation in the quality and depth of coverage. Chapter one, entitled "Climates on a rotating earth," is a superficial but well-done description of global climatic patterns and the coriolis effect. While climate undoubtedly has a great influence on distribution patterns of organisms, chapter one is seldom referred to subsequently.

Chapter two deals with competition and predation in very general terms. It is a subject where multiple explanations for observed phenomena are possible and concrete examples therefore are scarce. MacArthur states that proof (mathematical in this case) is given in the appendix, which is larger than the chapter. If the non-mathematician is not discouraged by chapter two, he or she will find the next four chapters a delightful mix of interesting ideas and interpretive theory. Most of the

examples and ideas involve a comparison between the way organisms (mostly birds) survive on the mainland vs. off-shore islands. Differences in species composition and numbers, survival and extinction rates, and feeding habits are all discussed and a number of theories that may explain the differences are proposed.

MacArthur does not attempt to cite a large number of examples nor to propose all possible explanations. Rather he cites a few well-documented cases and presents his ideas concerning them in a clear and lucid style. The reader does not have to be skilled in mathematics to understand and enjoy these chapters. They can best be described as stimulating. The last two chapters, dealing with continental patterns of species diversity, differences in temperate vs. tropical species, and the time element are rather mundane, possibly since fewer examples are given and there are fewer original ideas. I do not mean to imply that the concluding chapters are not of interest. The entire book is essentially MacArthur's effort to stimulate thought and encourage research in a fascinating area of biology. He has been highly successful in this endeavor and any person interested in geographical ecology will find the time taken to read this book a worthwhile investment.

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