The Committee on Common Problems was formed in 1942 for the purpose of bringing together paleontologists, systematists, and geneticists in the study of problems of evolution. Another outgrowth of the work of this committee was the founding of the Society for the Study of Evolution, in 1946, and the establishment of the journal *Evolution*, which is published by the society.

The Princeton symposium was a conference of about sixty workers in diverse fields of evolutionary study, chiefly paleontologists, systematists, and geneticists. Several European scholars attended, as guests of Princeton University, and contributed to the program and to the present volume. The scope of the conference is indicated by the following list of topics for discussion, the principal speaker being indicated in each case:

Time in Earth History (Adolf Knopf), Gene and Character (Curt Stern), Gene and Mutation (A. H. Sturtevant), Time Series, Trends, in Animals (A. S. Romer), Time Series, Trends, in Plants (R. W. Chaney), Rates of Evolution in Animals (G. G. Simpson), Rates of Evolution in Plants (G. L. Stebbins, Jr.), Speciation and Systematics (Ernst Mayr), and Adaptation and Selection (Sewall Wright). There was, in addition, a public address on Man's Evolution: Past and Future, by J. B. S. Haldane (*The Atlantic*, 1947, 179: 45.). A summation of the conference, by H. J. Muller, concluded the program. A brochure summarizing the discussion was published by the university in 1948 (Princeton University Bicentennial Conference, Series 2, Conf. 3, pp. 1–36, 1948).

The present volume includes the full text of 23 papers presented by members of the conference. All of the papers mentioned above are included, except that of Sturtevant, and there are in addition papers by E. H. Colbert, D. D. Davis, E. B. Ford, William Hovanitz, Theodor Just, David Lack, H. L. Mason, J. A. Moore, Bryan Patterson, W. P. Spencer, D. M. S. Watson, T. S. Westoll, and H. E. Wood II.

This book does not represent the "synthesis of biology and geology through their common denominator, evolution," which, in Prof. Jepsen's phrase, was the original objective of the committee. It is true that "paleontology studies the results of evolution, while genetics studies its mechanism," but it does not follow that the intermingling of paleontologists and geneticists will result automatically in the elucidation of genetic mechanisms over the broad field of known evolution. Genetics, which in its earlier years was called "experimental evolution," has so far developed valid methods for the study of only a small sector of biological variation. It tells us virtually nothing of the manner of origin of new gene loci. Its results on the nature of genic elements outside the choromosomes are still equivocal. In the allelic mutation of chromosomal genes, on which almost all experimental study of gene mutation has been focused, it cannot yet speak clearly as to the extent and characteristics of subliminal mutation. It has made a major contribution to evolutionary theory in the concept of gene frequencies in equilibrium with evolutionary pressures, a subject covered in this volume in an elegant paper by Sewall Wright. But as to the sources and mechanisms of the variations found in evolution on the grand scale, the development of experimental genetics to date has placed little restriction upon free speculation. The investigation of time series, trends, and rates of evolution, which makes up the bulk of this volume, necessarily remains today, as in Darwin's time, a wholly descriptive science.

This book includes a valuable collection of papers, representing, in many cases with excellent examples, the wide diversity of current work on evolutionary problems.

L. J. STADLER

Yale University

The Vertebrate Body. Alfred Sherwood Romer. Philadelphia-London: W. B. Saunders, 1949. 643 pp. $5.50.

This most recent book of Prof. Romer's bids fair to become one of the leading textbooks in college courses in comparative anatomy. The author, trained in the Columbia school of Gregory and McGregor, and now Agassiz Professor of Zoology in Harvard University, has written an admirable account of vertebrate history and structure.

The book is truly comparative. It avoids overemphasis on human structures, one of the most common faults of textbooks on comparative vertebrate anatomy. The early chapters are devoted to the vertebrate pedigree, to a roll call of the vertebrates, and to an adequate treatment of the animal cell and its physiology. Chapter 5 gives a fairly comprehensive account of early vertebrate development, and a series of chordate forms ranging from *Amphioxus* to Mammalia is treated in a comparative manner.

Eleven chapters are devoted to a consideration, seriatim, of the various organs and organ systems of the vertebrate body. Among the several systems, the skeleton is treated in the most detailed fashion; a section of 112 pages being devoted to this topic. This undoubtedly stems from the author's interest and experience in this particular field, as well as from the fact that this system, drawing from the field of paleontology, offers a splendid opportunity for a really adequate evolutionary story. The muscular system, treated rather briefly by most textbooks, is covered in a rather comprehensive manner. The other organ systems are also well covered, the material being presented in a clear and interesting fashion.

One of the unique features of the book is that, in addition to presenting the comparative anatomy of the various organ systems, it gives considerable attention to the development, histological structure, and physiology of the various structures. A knowledge of the embryonic origin of an organ is fundamental to an understanding of its adult structure, and including histological material makes for a clearer and more interesting study. The relationship of form to function, ignored by many writers in this field, is adequately treated by Prof. Romer. To illustrate this point, the chapter on the muscular system is introduced by an account of the histological structure of the various types of muscle, followed by a consideration of muscle fiber function.

The appendix includes, besides a rather full bibliography and synoptic classification of the vertebrates, a section on scientific terminology. A list of some 600

anatomical terms is given with the definition and derivation of each. This section on etymology should prove particularly valuable to the student.

As is usual with Prof. Romer, this book is most interestingly written. It is not merely a collection of anatomical facts, but rather tells the story of vertebrate history and structure in a clear and lively manner. The illustrations are good and profuse (363 figures), and many of them are original.

Many teachers are reported to have adopted this book sight unseen. It is the opinion of this reviewer that they will be well pleased with their choice.

WILLIAM O. PUCKETT

Davidson College

Principles of Animal Ecology. W. C. Allee, Alfred E. Emerson, Thomas Park, Orlando Park, and Karl P. Schmidt. Philadelphia: W. B. Saunders, 1949. 837 pp. $14.00.

Since Haeckel's suggestion of the term *ecology* in 1870 no group of authors has done more than this illustrious quintet to establish the science on a firm basis.

Among the book's outstanding values are its documentation of many principles on which the evidence was previously widely scattered, its precise statement of the present status of these principles, so that lines of past and present accomplishment and profitable future advance are indicated, and its comprehensive organization of the widespread materials of ecology.

The five principal sections of the book are "The History of Ecology," "Analysis of the Environment," "Populations," "The Community," and "Ecology and Evolution." These are supplemented by an excellent subject index, meticulously prepared, a bibliography, and an author index of nearly 2,500 titles. Great care has been taken to correlate various parts of the book through cross references. A glossary would have been helpful.

The authors rightly make the point (p. 693) that ecology tends to be holistic in its approach. Where most adequate, the book considers its subject matter from the bio-ecological, i.e., the plant-animal, viewpoint. The authors reject the terms "animal formation" and "plant formation" in favor of biotic concepts (p. 582). Unfortunately, the authors felt that, for convenience and workability, they could not extend their work to include the whole scope of ecology (p. vii), the bio-ecology of some writers. But in fact most of their treatment is sympathetically bio-ecological.

The concept of the community as a complex organism, which many authors have discussed without coming to any very widely accepted conclusion, receives full recognition here. Table 30, p. 440, presents a highly convincing comparison of the doctrines of the cell, the multicellular organism, and the community. The reviewer would point out that the community as a functioning organism in many, probably most, instances, is the plant-animal community. This important point is not always made clear by our authors, although it is unmistakably implied or exemplified on many pages.

Note some of the practical implications of this concept of the plant-animal community as a complex organism. Ecology should never be divided, at least in philosophic thought, into plant ecology and animal ecology. The splitting up of the subject into abstracted aspects of restricted scope (one of my students reported taking five courses in ecology in a single institution—plant, animal, forest, insect, and wildlife ecology) is strictly for convenience and may lead to confusion.

The pervasive quality of the order of nature is suggested on page 464, where it is pointed out that there is a parallel between the zonation of a restricted community on granite rock and the major features of the suppositional dispersal pattern of the world biota (Matthew). In both, the primitive types are peripheral and the more highly evolved ones at or near the center.

Tables of stratal equivalents, such as those given on pages 470 and 473, may be of the highest theoretical and practical value, especially in such fields as horticulture, game management, fisheries administration, and agriculture generally.

Under "Natural Selection" (pp. 640 and following) there is a closely reasoned development of the thesis that the concept of competition has often been misapplied in recent years. "The importance of its implications and of its conscious misapplications in human affairs, both in economics and in interclass and international warfare, can hardly be overemphasized." On page 641 appears the significant statement: "Fitness involves cooperation, and adaptations leading to coordination of parts of organisms and of individuals in populations are the result of evolution through natural selection." The action of selection on a unitary population emphasizes the desirability of highly developed cooperation within communities. Indeed, the concept of community selection is probably one of the most important in the entire philosophy of evolution. It dispossesses the tooth and claw theory of survival, the philosophy of the Nietzsches and the Hitlers, and enforces instead the survival value of cooperation, as a controlling selection factor in some cases.

Instances of sacrificial individual or group action are often overlooked. Somatic cells sacrifice the capacity to reproduce new organisms and often die functioning for the benefit of the whole organism (pp. 691–692). Maternal instincts subject the mother to a higher mortality rate than would otherwise be the case. ". . . Survival may well be in relation to humanity as a whole, rather than for the benefit of the few at the expense of the many" (p. 694). "The evolution of greater interdependence between organisms is correlated with progressive evolution" (p. 696).

Ecological indicators or indices, as the authors call them, are given rather sketchy treatment. No mention is made of the important work of Shantz and others in this field, although its theoretical and practical importance has been widely demonstrated. Also there might well have been somewhat more generous explicit reference to the concept of emergence, although it must be conceded that the whole cell-organismal-community concept is a philosophical elaboration in terms of emergence, implicit if not definitely expressed.