problems is, in a practical sense, the least interesting, for outside of special experimental situations, there are no populations that experience such regular breeding systems. Even the reported cases of cross-cousin marriage systems in the anthropological literature cannot be taken too seriously, and they are much more likely to fall into the category of irregular pedigrees. From the purely formal side, however, regular systems of inbreeding are basic to the development of inbreeding theory, and it is to these that Fisher's book is devoted.

It is characteristic of Fisher's work that it often appears to be developed in a kind of splendid isolation. Thus, the basic method of "generation matrices" used by Fisher to solve the problem of inbreeding is simply a special case of the stochastic matrix, and the use of the eigen vectors to find higher transition probabilities is standard in the algebraic theory of Markov chains. Fisher, and earlier Haldane, came to this procedure simply as the solution of simultaneous recurrence equations, quite independently of the development of Markov theory. Fisher's failure in the book to relate the two gives the work a kind of old-fashioned feel that is not characteristic of most recent treatments of inbreeding. Moreover, framing the process of inbreeding in terms of Markov chains allows us to go on immediately to the problem of random drift in finite populations, a matter not treated at all by Fisher. Although we know that he did not regard random drift as an important phenomenon, even Fisher would have conceded that it is at least as common an occurrence in nature as selfing in a hexasomic organism, an occurrence to which he devotes three pages.

This book is a kind of monument, a monument to human intelligence and human frailty. The very great intelligence and insight involved in dealing with the problems of inbreeding will be obvious to any reader. The frailty is hidden from the uninitiated. That Fisher could have completed a manuscript on the theory of inbreeding in 1961 without a single mention of Sewall Wright, without a single allusion to finite population effects, without any hint of the vast literature in existence, bears witness to the power of pride and prejudice.

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Biological Sciences

Mammalian Cytogenetics and Related Problems in Radiobiology. Proceedings of a symposium (Sao Paulo and Rio de Janeiro, Brazil), October 1962. C. Pavan, C. Chagas, O. Frota-Pessoa, and L. R. Caldas, Eds. Pergamon, New York, 1964. xviii + 427 pp. Illus. $15.

One of the problems encountered in publishing a collection of scientific papers delivered at a symposium or a conference is that it takes too long to get the volume on the market. When the monograph is finally available many of the articles are more or less out of date. I have had my personal and bitter experiences in writing chapters for such collections, one of which required more than three years for publication. By that time my contribution had become old hat instead of brand new data and ideas. Investigators, therefore, like to attend conferences or symposia, especially those held in exotic settings, but they shy away from publishing their best papers as a part of the records of such meetings. They would rather submit their good articles to reputable journals.

Mammalian Cytogenetics and Related Problems in Radiobiology, edited by C. Pavan, C. Chagas, O. Frota-Pessoa, and L. R. Caldas, is such a collection of papers. The meeting was held in Brazil in 1962, but the report, this monograph, was published in 1964. Indeed, the volume contains papers by many well-known mammalian cytogeneticists and radiobiologists, but I would not think that the authors consider the papers they wrote for this book among their better contributions. Many are perfunctory writings that merely fulfill the obligation of having a good time in Rio de Janeiro.

I always thought that a monograph should contain papers of a relatively broad nature, with synthesis of past knowledge in an area of research, plus new information and discussion of, or even speculations about, deeper strata of the problems. Not many papers presented in this monograph belong in that category. The book is roughly divided into two portions, "Mammalian Tissue Culture and Cytology" and "Selected Topics in Radiobiology." One can find little coherence among the topics. For example, several papers are simple case reports and descriptions of single karyotypes. Such articles should be published in specialized journals rather than monographs.

Admittedly, as stated in the foreword and in the preface, the meeting was held in Brazil to promote biological research in Latin America. The symposium may have achieved this goal, but, because of the heterogeneous quality of the papers, the book, as a whole, is a disappointment.

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Blood

Comparative Hematology. Warren Andrew. Grune and Stratton, New York, 1965. viii + 188 pp. Illus. $22.75.

Only rarely does there appear a book that is destined to be a classic in its field. But Warren Andrew's *Comparative Hematology* is such a book. Andrew has brought together most, if not all, of the relevant information concerning the morphology and physiology of the wandering cells and blood cells of animals ranging from sponges to mammals. The core of the book is a series of chapters that contain a detailed review of the literature, of both the older works and the latest material. Considerable emphasis is placed on phase-contrast and electron microscopy and histochemistry. These are chapters packed with interesting bits of information that make you want to set up a microscope and look for yourself. The author points out innumerable areas which should be fruitful for further investigation. Although there are details aplenty for the specialist, other chapters will hold more interest for the more general reader. The summarizing chapters include sections devoted to such topics as respiratory pigments of invertebrate blood hemopoiesis in vertebrates, some comparisons between invertebrates and vertebrates, and comparative hematology in relation to clinical hematology. These chapters will especially appeal to the clinical hematologist who is interested in biology.

The book is well written. The use of common names for some species would have been helpful to the general reader. ER should be clearly defined as endoplasmic reticulum. The fact that certain cells of sea urchins have the appearance of rat-tailed mag-

gots doesn't leave me with a very clear picture. But these are minor problems. The illustrations are good with the exception of a few of the color plates which are quite unrealistic in appearance. Most biology textbooks devote very little space to blood. This book will fill a very real need and should be a great stimulus to future work in the field of comparative hematology.

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Modern Biology Series

Interacting Systems in Development. James D. Ebert. Holt, Rinehart, and Winston, New York, 1965. x + 227 pp. Illus. Paper, $3.

Interacting Systems in Development, a volume in the Modern Biology Series, is designed to introduce beginning college students to developmental biology. As indicated, interactions represent the major theme; this includes such diverse phenomena as egg-sperm, nucleo-cytoplasmic and tissue interactions, cleavage and gastrulation, molecular expression of genes expressed during development, products of gene expression and their regulation, humoral regulation of growth, endocrine and nervous coordination, and developmental aspects of immunity.

In the 12 chapters and 216 pages of this paperback book, Ebert presents a well-balanced view of developmental phenomena and problems. Model systems (adequately covered in other books) have been studiously ignored; instead, the actual problems encountered in embryos and other multicellular systems have been presented. Areas of ignorance are clearly and unhesitatingly indicated, along with an invitation to students to prepare themselves for the excitement of becoming involved in attempts to seek answers and solutions.

I like the book, possibly because it takes essentially the approach that I have used in my course. There are, as one would expect, differences in emphasis and organization. For instance, I would tend to devote more than seven pages to gastrulation and to relate this topic more closely to cell sorting and migration. Both of the latter subjects are covered in other parts of the book without relation to the earlier morphogenetic movements. Most of the highlights of the major aspects of development are covered quite adequately for this type of introduction.

Use of many terms without definition could be criticized, but I do not consider such usage a serious drawback. Instead, I believe that it may serve to whet the curiosity of the more interested students. This book should serve admirably to cover the developmental-biology portion of introductory courses in biology. It should also serve as a supplement to many courses in embryology and developmental biology (in fact, I have recommended it as a supplement to my own students in such a course). The blend of the molecular with the structural, the liberal inclusion of genetic analyses, along with the broad coverage and viewpoint, tend to make this a valuable little book.

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A Literature Survey

Balsam Fir. A monographic review. E. V. Bakuzis and H. L. Hansen. University of Minnesota Press, Minneapolis, 1965. xxii + 445 pp. Illus. $9.50.

This monograph is an outgrowth of a recommendation, made in 1953 by the Quetico-Superior Wilderness Research Center Advisory Committee to the University of Minnesota School of Forestry, that the literature of *Abies balsamea* (L.) Mill. be surveyed in an attempt to understand the successional role of the species. The authors, assisted by seven contributors, examined 2334 sources of which 1393 are cited. They have done an outstanding job in bringing balance and unity to a work assembled from such a wide background. The book is divided into nine chapters, each with a preface and conclusions. The first five chapters deal with basic fields: Botanical foundations, geography and synecology, ecological factors, microbiology, and entomology. The last four chapters deal with more practical applications: Reproduction, stand development, growth and yield, and utilization. Two indexes list the myxomycetes and fungi and the insects associated with balsam fir. Forty-seven pages are devoted to listing the literature cited, with the sources for each chapter listed separately. The index is helpfully arranged in four subdivisions: General, species, communities, and localities. Tables, figures, and plates are well done—usually completely reworked for clarity and uniformity.

Careful editing and revision is indicated by the unity that exists between chapters of this well-written book. The title could be misleading in that some may, on the basis of the title, think that the book covers a specialized topic. Although it covers the topic of balsam fir exhaustively, it will be useful to a wide range of readers. The ecological approach is so effectively used throughout the book that ecologists and plant geographers, as well as foresters, will find it especially helpful. The commercial value of the species as well as the rich natural history of the spruce-fir region will add to the list of potential readers.

The authors deserve praise for the manner in which they were able to condense the source materials without losing the meaning of the original authors. The conclusions at the end of each chapter effectively summarize the types of studies that have been made, and are especially valuable in that they point out specific areas where further research is needed. An outstanding feature of the book is the stress on and effective use of multidimensional ecosystem models to illustrate the interaction of environmental factor complexes.

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Organic Chemistry

Introduction to Mass Spectroscopy and Its Applications. Robert W. Kiser. Prentice-Hall, Englewood Cliffs, N.J., 1965. xii + 356 pp. Illus. $14.

This book has been written especially for the scientist with little or no experience in the field of mass spectroscopy, and it attempts to present systematically basic principles, applications, and recent advances as well as to discuss advances that are likely to be made during the next several years. A historical chapter that gives an interesting introduction to the subject precedes a discussion of the various parts of a mass spectrometer, the various types of complete instru-