and it is also a substantial addition to the growing body of studies on the subject of social conflict.

Marwick is concerned with a segment, living in the Fort Jameson district, of the populous Cewa people. Although altered in various ways by contact with Europeans, the culture of the Cewa retains many traditional features. Most of the people continue to live in small communities and gain their livelihood chiefly by simple hoe cultivation of crops. Descent is matrilineal; this is, the Cewa trace descent through female lines and take important social affiliations therefrom. As a matrilineal society, the Cewa have problems of social relationship which are peculiar to matrilineal groups and different from those of societies that trace descent and form social groups on other principles.

Among the Cewa sorcery is a common explanation of misfortune. Marwick analyzes, in considerable detail, 101 actual cases of alleged sorcery, presenting information on the sex, age, and relationships to others of the persons directly involved. He also presents relevant information on internal and external relations of matrilineages, the nature of chieftainship, and recent social changes. Throughout, discussion of these matters centers on sources of tension and conflict.

The principal ideas presented by Marwick about the nature and sociological significance of sorcery are not new, as he acknowledges. He sees beliefs and practices of sorcery as socially integrative rather than solely disruptive forces. In his own words, sorcery provides a means by which tense relationships may be "formulated" and "redressed." As various scholars before him have done, he also sees sorcery as a force upholding the moral order which operates through fear that failure to conform with social rules will lead either to accusations of performing sorcery and attendant punishment or cause the nonconformist to become the victim of sorcery. Marwick does not come to grips with the question of functional alternatives to sorcery, a subject that he discusses only briefly.

What is unusual and most commendable about this book is its presentation of abundant material on actual cases of alleged sorcery and sources of tension in Cewa society. It is at one time both a quantified study of sorcery and a fairly complete ethnography. This wealth of detail and the manner of its presentation make the book best suited for professional anthropologists and sociologists. The general reader will probably find the book difficult going.

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Animal Behavior, Adaptation, and Interrelations

Biology. Karl von Frisch. Translated from the German edition by Jane M. Oppenheimer. Harper and Row, New York, 1965. xviii + 516 pp. Illus. $9.50 (text ed.).

This book is a simply and clearly written description of certain aspects of biology. The English translation by Jane Oppenheimer is excellent, and the text reads as though it had been written originally in English. The illustrations are of good quality; almost all of them were drawn expressly for this book, and many of them are in color. In some illustrations the color is simply decorative, but in others it has been used to help clarify a point. The book is attractively designed and well printed, although there are quite a few typographical errors.

The text is organized in nine sections, beginning with cells, and proceeding to tissues, organs, adaptations, and interrelations amongst organisms and ending with discussions of reproduction, development, heredity, and evolution. The best sections of the book are those dealing with animal behavior, adaptation, and interrelationships. There is very little discussion of plants and their importance in the biological world, nor is there a description of the major kinds of animals. The text introduces many terms without defining them. The major deficits of the book, however, are in the discussions of the functional aspects of biology such as genetics, developmental biology, cellular physiology, plant physiology, and vertebrate physiology. All of these, indeed the discussion of the chemical basis of biology as a whole, are three decades or more out of date. There is little hint in this book of the current excitement in the field of biology.

The reader who opens this book expecting to find a fairly complete introduction to the problems and promise of modern biology will be disappointed. This text might serve for some very elementary course in high school biology, but it is unlikely that it will satisfy any instructor in college biology who is looking for a text to supplement his lectures in modern biology.

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Classical Mechanical Systems

Classical Dynamics of Particles and Systems. Jerry B. Marion. Academic Press, New York, 1965. xvi + 576 pp. Illus. $11.50.

Classical Dynamics of Particles and Systems was written as a text for an advanced, two-semester, undergraduate course in mechanics. More precisely, it was designed as a text for an advanced undergraduate physics course which would prepare the student for studies in quantum physics. This means that emphasis was placed on those areas of mechanics which play an important role in quantum mechanics or provide a demonstration of mathematical techniques useful in quantum theory.

I feel that, on the whole, this is a useful and well-written book. The author has a pleasing literary style, and his exposition of the subject matter is clear and unpedantic. The techniques of mechanics are illustrated by many worked examples, and these techniques are motivated and their limitations are carefully pointed out. A list of references is given at the end of each chapter, and the level of difficulty of each reference is indicated. A sufficient number of problems for the student are also provided at the end of each chapter. The format of the book is pleasing, and the diagrams are numerous and illuminating.

Several chapters are devoted to mathematics. The first two chapters treat vectors and matrices, and I was pleased to see vectors defined in terms of their transformation properties. Another chapter is concerned with the calculus of variations, in preparation for the study of the Lagrangian and Hamiltonian formulation of mechanics. There are also a number of mathematical appendices.

I was particularly pleased with the treatment of the foundations of New-

ton's laws. There are several good chapters on oscillatory motion, and Lagrange's equations receive an adequate treatment. The motion of a particle in a central force field is examined in considerable and interesting detail, and this is followed by a treatment of two-particle collisions. The dynamics of rigid bodies is also given an extensive discussion, as are the subjects of small oscillations and waves in one-dimensional systems. There is no treatment of elasticity or hydrodynamics.

The level of difficulty is intermediate between that of the standard elementary texts, and that of Goldstein's *Classical Mechanics*. Somewhat to my surprise, examination of the library at the Bell Telephone Laboratory showed that there are not many texts on mechanics at this level and oriented toward the needs of students of modern physics. Therefore, the publication of this book seems well justified.

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Ecology

Grundriss der Ökologie. Wilhelm Kühnelt. Fischer, Jena, Germany, 1965. 402 pp. Illus.

A modern textbook of ecology, in the German language, was badly needed, and this one is meritorious. Wilhelm Kühnelt, an Austrian ecologist, has selected from the world literature a vast array of references, illustrations (141), tables, and graphs. Although the facts and theoretical background presented are applicable to North American problems, many of them are not included in English-language textbooks. Kühnelt's book is therefore recommended as supplementary reading for environmental scientists, engineers, and landscape planners.

In this era of concern over the rapid and unchecked deterioration of the human environment, a section of this book is appropriately devoted to man-induced changes in the environment. The section is especially valuable because the measurements presented were made in old Europe where changes have been recorded over long periods of time.

The author examines records of the physical and chemical features of urban communities which show, among other differences, higher temperatures, lower light values (in winter), increased amounts of silicon dioxide and carbon dioxide in the air, and increased noise levels. Their effect on the vegetation and the animal life is projected and evaluated in part. In addition, examples are given of animal communities which now occupy micro-habitats that are peculiar to cities—for example, sewer canals and pipes, rain gutters, industrial yards, wine cellars, markets, and attics.

The impact of radioactive fallout, insecticides, and other man-made products on the environment is constructively analyzed. Historical events—climatic changes and vegetational shifts that have taken place and are reflected in pollen and animal fossils from the sediments of lakes—are interpreted in an ever-changing ecosystem.

Kühnelt suggests replacing the commonly used designation, terrestrial or landscape ecology, with the term *Epeirology*. This term would serve with limnology and oceanography as a companion subdivision of ecology.

More than 1200 references are cited, and many of them are reviewed critically. English-language sources are not neglected, but of great value are important references to work published in eastern and western Europe and not available here except in our largest libraries. Unfortunately, the reference to the American "Bible" of ecology written by Chicago's great "APPES" (Allee, Park, Park, Emerson, and Schmidt) fails to list Schmidt among the authors. Otherwise I noted relatively few errors.

Despite the emphasis placed on animal ecology, the role of plant associations is not ignored, especially in the chapter on communities. Here the animals' habitats (marine, freshwater, and soil), as well as the terrestrial vegetation, receive thoughtful treatment.

The principle of Liebig's law of the limiting factor comes in for well-justified criticism, and it is replaced by the more modern one, that cause and effect in ecological change are the result of simultaneous action of multiple factors, the evaluation of which requires more sophisticatedly designed experiments, with refined statistical procedures and using new computer programs in many cases. Kühnelt's book is nonmathematical, but he acknowledges the modern trend in ecology and discusses the newer concepts of energy flow in ecosystems. Much of the jargon commonly encountered in ecological literature is avoided.

In a handsomely illustrated chapter, the adaptational structures of animals as well as their ability to construct life sustaining features receive more emphasis than is provided in comparable English-language volumes. This "natural history" approach to ecology, in an age of molecular biology, is indeed refreshing.

Kühnelt's extensive treatment of social animals, mutualism, and parasitism reflects a traditional European bias in animal ecology.

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Aerospace Science

Atomic and Space Physics. Alex E. S. Green and Philip J. Wyatt. Addison-Wesley, Reading, Mass., 1965. xvi + 619 pp. Illus. $18.75.

Atomic and Space Physics is an interesting but rather unconventional text, as one may guess from its title. Assuming as background only elementary courses in physics and calculus, the authors have covered an amazingly wide array of topics with admirable versatility.

About half the book deals with basic physics. Newtonian dynamics, with emphasis on planetary motion and rocket flight, is developed in the first chapter. Four chapters treat theoretical spectroscopy: Chapter 2 gives an introductory review of basic concepts, including the Bohr-Sommerfeld atom; chapter 5 treats a few of the basic problems with the Schrödinger equation and presents a detailed discussion of elastic scattering; chapter 6 covers the vector model of the atom and discusses atomic radiation with the classical (oscillating-dipole) picture; and chapter 7 gives the elements of molecular structure.

The first portion of chapter 4 outlines some basic concepts in plasma physics, such as plasma oscillations, Debye shielding, and motions of a charged particle in a magnetic field. The remainder is concerned with space physics: the geomagnetic field, the solar corona and solar wind, solar activity and cosmic rays, and the radiation belts (natural and artificial). Chapter 8, on radiative transfer, is also a mixture of the basic subject and