than review the articles and attempt to justify including them in a single section. I find these efforts strained and unconvincing, and I finished reading the book wondering how such a diverse set of papers could have been bound into a single volume.

Some of the essays in this volume are excellent case studies, and a few of them are theoretically stimulating. I think most of them could have been published independently in the anthropological journals. As a collection, however, they manifest the problems which beset current cultural anthropology.

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Archeology of Metallurgy

The Carbon-14 Dating of Iron. NIKOLAAS J. VAN DER MERWE. University of Chicago Press, Chicago, 1969. xii + 140 pp., illus. $7.50.

Since the initial burgeoning of ^{14}C dating through the mid-1950's, publications in this field have been limited to refinements of technique and to new applications. Should the known-age pundits agree upon the variations of the radiocarbon calendar, ^{14}C folk will be somewhat more confident of the data they publish. Until that distant day, however, publications are limited to surficial refinements. Van der Merwe's *Carbon-14 Dating of Iron* is one of the more interesting exercises to have achieved publication. The author has made a commendable attack upon application of ^{14}C dating to Iron Age chronologies.

The first three chapters deal with the techniques and development of iron metallurgy, and these alone are worth the price of the book. The discussion of bloomery and blast furnace reduction, of wrought and cast iron, and of what makes steel steel is quite rewarding. To the nonferrous archeologist, this neat summary of the intricacies of ironworking and its history are a godsend; I almost believe I understand what these people are talking about.

The remainder of the book is devoted to the techniques of sample pretreatment, combustion, purification, and dating. Herein are contained the nitty-gritty of sample size and suitability, and a list of dates obtained on iron samples of various sorts. This last is likely of more value to the archeologist than other material in the latter portion of the book.

One could have wished for a different mode of organization. Each chapter begins with a repetition of material already covered in previous chapters; this reader came to expect each section to start, "Meanwhile, back at the ranch . . . ." Chapters 4 and 5 are devoted, in large part, to a discussion of ^{14}C dating in general (not all of it strictly true) and of Yale laboratory practice in particular. This book is not the place for such a discussion: it contributes little to the value of the work; ^{14}C-oriented readers already know it, and archeologists are not about to run downstairs to set up a laboratory in the basement and therefore do not need it.

Similarly, both appendices could have been excised: the first is of passing interest only to laboratory personnel, and the second is once again repetition. One suspects that careless editors lifted a respectable Ph.D. dissertation *in toto* without considering the reading audience.

Aside from this nit-picking of what are essentially editorial faults, van der Merwe is to be thanked for his summary of iron metallurgy, the pre-laboratory assessment of samples, for the list of dates obtainable elsewhere only in piecemeal, and for his patience in attempting to date iron at all.

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A Mathematical Account

Population Genetics. W. J. EWENS. Methuen, London, 1969 (U.S. distributor, Barnes and Noble, New York). xii + 148 pp. $5. Methuen's Monographs on Applied Probability and Statistics.

Ewens's book is a compact presentation of many mathematical subjects related to population genetics. The book is written for highly mathematically competent population geneticists and mathematicians, as is made evident in the very first sentence of his preface: "Population genetics is the mathematical investigation of changes brought about . . . ." It is true that many population geneticists use mathematics and statistics as tools to investigate the behavior of genetic populations and analyze the data collected. It is also true that early population geneticists such as Sewall Wright and others used mathematics to work out systems of matings and the consequences of various pressures on genetic populations. However, population genetics is not a branch of mathematics but an area of genetic biology. Some population geneticists collect their data from wild populations, and some others work with real (not abstract) organisms under carefully designed experimental conditions.

The contents are well chosen, and not too difficult to follow if one is willing to skip mathematical proofs. There are a number of easily understandable points and some that are difficult. Section 1.6, on "the effect of selection," contains a few very important reminders for experimental population geneticists. Section 4.6, on "general offspring distributions," seems to be taken directly from Karlin's *A First Course in Stochastic Processes*, which is elegantly written. Theorem 4.1 is not easy to follow for an amateur population geneticist such as this reviewer. In spite of these criticisms, the book is worthwhile as reading for pre- and postdoctoral students in population genetics.

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An Anniversary History

The Cambridge Philosophical Society. A History, 1819–1969. A. RUPERT HALL. Cambridge Philosophical Society, Cambridge, England, 1969. vi + 114 pp., illus. Paper, 10 s.

The author presents us here with a concise history of the Cambridge Philosophical Society at the occasion of its 150th birthday. The Society was founded at the initiative of the geologists Adam Sedgwick and John Stevens Henslow at a time when science in Cambridge was at a low ebb, and its history reflects the initially slow growth of this science to its brilliance in the present century. The author illustrates this growth by thumbnail sketches of the principal figures, and, since there already exists a history of the Society up to 1890 (J. W. Clark, *Proc. Cambr. Phil. Soc.* **7**), he devotes much of his attention to the later years. He does not forget, however, some of the more interesting Victorians such as Airy, George Green, Cayley, J. C. Adams, and Whewell. We can only agree with Hall that a good

modern life of Whewell, "this Victorian giant," would be worth having.

As to the later years, primary attention goes, of course, to the impressive story of the Cavendish: of Rutherford, J. J. Thompson, Wilson, and their friends and collaborators. Egon Larson's splendid monograph of 1962 can supply further information. We are also informed about the astronomers and mathematicians in and around the Society, Milne, Forsythe, Hardy, Hobson, Baker. Stress is laid on the papers by these men that appeared in the late *Transactions* and the still very much alive *Proceedings* of the Society.

Personally I wish that the book had twice its size; it would have given the author more room for information on the many outstanding personalities who figured in the life of the Society and whose combined work encompasses a significant part of modern natural science itself. We would also have tasted, I am sure, more pretty anecdotes, such as that saying of Sydney Smith on Whewell, "science was his strength, omniscience his foible," or the reported story of J. B. S. Haldane demonstrating at a Society's dinner how to split walnuts by means of the table as anvil and his forehead as hammer.

Not the least of the book's merits are the many pictures of men who were members of the Society.

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Kinematic Diffraction

Theory of X-Ray and Thermal-Neutron Scattering by Real Crystals. MIKHAIL A. KRIVOGLAZ. Translated from the Russian edition (Moscow, 1967). Simon C. Moss, Transl. Ed. Plenum, New York, 1969. xx + 412 pp., illus. $25.

The words "thermal neutron" in the title of this book kindle the hope that we have here a definitive text updating Bacon's 15-year-old classic primer on neutron diffraction. A glance through the book itself dashes this hope.

Are we left then with just another book on x-ray diffraction devoted to recapitulating the fundamentals of this half-century-old field and offering a few interesting chapters on the author's own specialties within it that might best have been included in a review paper? The answer is a most emphatic no. The book is a thoroughly original and current treatment of kinematic diffraction in imperfect crystals as well as an introduction to fluctuation theory and critical phenomena. Krivoglaz has unified in one volume his prolific research efforts over the last 13 years. What is remarkable to me is the rapidity with which this translation from the original 1967 Russian text has been published.

The first three chapters (about one-third of the main text) barely mention scattering. This portion stands by itself as a good introduction to macro- and microscopic fluctuation theory as applied to periodic structures. Fluctuation theory is developed on a very broad base with Fourier representation (Bloch waves in essence) used to describe the microscopic (atomistic) nature of one or more specific effects that cause a crystal to depart from a perfect three-dimensional arrangement. These effects include compositional ordering (long- and short-range atomic ordering), concentration fluctuations (such as precipitation, or spinodal decomposition), static distortions (from random point strains or atomic size variations), and in general all the usual cooperative phenomena associated with magnetism and ferroelectrics. The macroscopic treatment relates the fluctuation waves to thermodynamic quantities and discusses this in the vicinity of the critical point of second-order phase transformations. The study of cooperative phenomena near these critical points is a highly active field. Krivoglaz's exposition, although it discusses experimental and theoretical work up to 1968, of necessity does not include the recent important advances in this area. Nevertheless, we have a fundamental treatment, establishing a basis for the diffraction theory comprising the last two-thirds of the book.

The treatment of standard kinematic diffraction, a highly individual one, is set up in a mathematical framework similar to that used in the treatment of fluctuation theory. I found it a very interesting and refreshing approach. The bulk of the diffraction theory is concerned with the diffuse scattering arising from structural defects. The approach, which is original with the author, is to associate the diffuse scattering not with single scattering centers but with the static displacements resulting from fluctuations (considered as waves) of concentration and other internal parameters. In this way one can relate the diffuse scattering directly to thermodynamic parameters of the crystal structure. As an example, the short-range order diffuse scattering as a function of position in reciprocal space is expressed directly in terms of the ordering energy for the successive coordination shells.

Elastic neutron diffraction is summarily disposed of by neglecting those properties of neutron scattering (polarization and magnetic scattering) which are different from x-ray interactions and merely advising the reader to replace all x-ray atomic scattering factors by neutron scattering lengths. A brief chapter is devoted to inelastic phonon scattering with neutrons. It is followed by a chapter on anharmonic effects on phonon lifetimes and the energy widths of single phonon neutron widths.

This important book is not written for the beginner in diffraction. It is directed to theorists and experimentalists actively engaged in kinematic diffraction studies of imperfect crystals. The focal point is the theoretical description of the diffuse scattering resulting from the simultaneous appearance of different structural defects. The fallout from the theory should keep experimentalists busy for a number of years.

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Gene Regulation

Nuclear Physiology and Differentiation. Proceedings of a symposium, Belo Horizonte, Brazil, Dec. 1968. ROBERT P. WAGNER and ESTHER A. EAKIN, Eds. Genetics Society of America, Austin, Texas, 1969. xvi + 472 pp., illus. Paper, $5. Supplement to *Genetics*, Vol. 61, No. 1.

This compilation of papers was given at one of a series of symposia in basic biology cosponsored and organized by Latin American biologists and the Oak Ridge National Laboratory. The volume is dedicated affectionately to Alexander Hollaender, who has contributed so much to biology at Oak Ridge and throughout Latin America. Hollaender should be especially proud of this symposium, in which many of his colleagues figure prominently and have contributed some of the most interesting papers.

The articles deal with the complexities of the genome in higher organisms. Problems of DNA redundancy, polyploidy, polyteny, heterochromatin, and amplification within the genome are discussed, and some attempts are made to relate them. These ideas are coming to the fore as additional variables to be considered in our understanding of