mate. Along the way such diverse and entertaining topics as the fate of the Donner Party, ice worms, frozen Norsemen at Herjolfsnes, the absence of snakes in Ireland, and the Abominable Snowman are discussed.

Dyson's style is personal, immediate, and lightly whimsical at times; even such familiar topics as the processes of mountain glaciation take on a new freshness when he writes about them. The author never confuses popularization with oversimplification, and a note of scientific caution pervades the book. Dogmatic assertions and personal axes are absent.

An excellent selection of photographs adds to the value of the book, which is also carefully indexed. An extensive and comprehensive bibliography cites standard works as well as the relevant current literature on ice.

For the layman who knows nothing about ice, this book opens up exciting vistas. For students in geology and geography, it will provide a valuable and fascinating introduction to the world of ice.

Dyson obviously enjoyed writing the book. By combining the best of a textbook with the appeal of a popular book, he has assured equal enjoyment for all who read it.

J. R. LOTZ
Northern Co-ordination and Research Centre, Department of Northern Affairs and Natural Resources, Ottawa, Canada

Brief Overview

Inorganic Reactions and Structure. Edwin S. Gould. Holt, Rinehart, and Winston, New York, ed. 2, 1962. xiv + 513 pp. Illus. $6.50.

During the past 7 years the first edition of this book has been widely popular as an inorganic chemistry text, deservedly so, since at the time of its publication texts which provided a modern treatment of inorganic chemistry were rare indeed. The revised edition has therefore been awaited with interest, for in recent years several other texts, with different approaches to the subject, have been published.

The new edition of Gould's book, like the first, attempts to provide a survey covering all major aspects of modern inorganic chemistry. It is clearly impossible to accomplish this with any reasonable degree of thoroughness in a book of this size, for the large body of descriptive material that has recently become available and the background material that is needed to satisfactorily explain the many examples of the use of molecular spectroscopy and kinetics to determine the structure and reactions of inorganic compounds both require adequate space for presentation. Consequently, Gould's book provides the reader with only a superficial treatment of most aspects of the subject matter and of its allied disciplines, such as molecular spectroscopy, which he also discusses. In those educational establishments where only a half-year course is offered, more or less as lip service to the teaching of inorganic or physical-inorganic chemistry, the new edition could well be useful as a text. As such, it will demonstrate to students whose interests lie primarily in other areas of chemistry what, in general, the practice of inorganic chemistry consists of today, and it will familiarize them, on a conversational level, with the significant discoveries made in recent years. It is to be hoped, however, that the training of future professional chemists will include a more detailed survey of inorganic chemistry than this book provides. I believe teachers of inorganic chemistry should strive to introduce more inorganic and physical-inorganic chemistry into the curriculum. If the attempt is successful, or if fewer topics are to be covered in depth within the given period, other less cursory texts, including some recently published, are more suitable for use.

The revision, like its predecessor, provides extremely useful exercises at the end of each chapter. The bibliographies, also at the end of each chapter, have been expanded, reflecting the increased amount of reference material now available. The separate chapter on inorganic reaction mechanism is a valuable addition. There are a number of errors in some of the figures; among the more serious is the erroneous presentation of the structure of manganese carbonyl with bridging carbonyl groups (page 158). The correct structure, containing a metal-metal bond joining two octahedrally disposed $Mn(CO)_5$ groups in staggered conformation (D_{4d}) was determined by x-ray diffraction and reported in 1957 (Dahl, Ishishi, and Rundle). The structure containing bridging cyanide groups with three-center Ni·C·Ni bonds for $Ni_2(CN)_6^{4-}$ (page 402) is based on what are now believed to be unreliable x-ray data. Two groups of workers, El-Sayed and Sheline (1956) and Griffith and Wilkinson (1958), have presented other results in favor of the earlier proposed Mellor-Craig structure (nickel-nickel bond joining two square planar $Ni(CN)_3^{2-}$ groups).

Two other figures require comment, because they contain errors carried over from the first edition. Some qualifying remarks should have been included to explain the unusual representation of the copper (II) chelate of acetylacetone on page 344. The chelated form of this ligand is usually written without the hydroxylic proton, especially when a straight line rather than an arrow is used to connect that oxygen to the metal, and the complex should then also bear one less positive charge. Finally, the negative charges on the quadridentate molecule (IV) on page 341 are missing.

In spite of the foregoing criticism, the second edition of *Inorganic Reactions and Structure* provides its reader with a glimpse of modern inorganic chemistry not duplicated in any other book of its size.

HERBERT D. KAESZ
Department of Chemistry, University of California, Los Angeles

Nontechnical Exposition

Use and Abuse of Statistics. W. J. Reichmann. Oxford University Press, New York, 1962. 336 pp. Illus. $5.

This is not a book for statisticians; it is for the general reader, say, a man who has forgotten algebra but who likes arithmetical puzzles, or one who once tried to use a book on statistics and found that it contained too many formulas but who enjoys the business section of his newspaper. The book is about as nontechnical as is possible for one that claims to treat statistics. At no point should any reader find that his mathematics are inadequate for reading the material. This, of course, means that hardly any understanding of the mathematics of statistics is proffered.

The tone of the book is informal but sober. It is chatty, and occasionally it manages to draw two or three illustrative metaphors of widely different character into a single paragraph. The prose

is rather inelegant, but, since statistics is often thought of as a dull subject, this may not be a material defect.

A very large share of the subject matter is cast in terms of the business world. Intrafirm economics, consumer economics, the interpretation of industrial statistics, and the like, all occur much more commonly than examples and principles related to scientific applications of statistics in the laboratory or elsewhere.

Very little emphasis is placed on statistical inference as it is usually developed in standard elementary texts, such as the one by Dixon and Massey. On the other hand, much thought is given to the interpretive aspects of what is often called "descriptive statistics."

Following the main part of the text (304 pages), there are 23 pages, comprising nine appendices. Their titles pretty well show what is *not* in the book but appears almost "by title" only in the appendices. Their titles are "Coefficient of correlation"; "The standard deviation"; "Least squares method"; "Geometric indices and the time reversal test"; "Factorial designs"; Latin squares"; "Standard error of the difference"; "Analysis of variance"; "Chi-square test".

Although the book is remarkably nontechnical, it is not unstatistical; indeed, it seems that the author knows a great deal more about statistics than he has written here, for misconceptions and implicit errors are rare.

LINCOLN E. MOSES
Department of Statistics,
Stanford University

Encyclopedic Treatment

Histoire Générale des Sciences. vol. 3, *La science contemporaine*. part 1, *Le XIX^e Siècle*. René Taton, Ed. Presses Universitaries de France, Paris, 1961. vii + 775 pp. Illus. Plates.

This skillfully and devotedly edited series is the first attempt on anything like an encyclopedic scale to bring the entire history of science into the compass of a reasonably comprehensive venture. Here, in the next-to-last volume of the series, the editor wisely allows his contributors to interpret the limits of its period, the 19th century, with a latitude suited to their subjects. The subtitle, *La science contemporaine*, suggests that the reader can scarcely hope to find, either in chronology or in some other principle of organization, elements of unity like those that gave form to the science of antiquity or of the early modern period which stretches for a century or so on either side of Newton.

René Taton suggests that this office might be filled, not by themes within the sciences, but by the circumstances and consequences of scientific work—the patronage of governments, the new connection with educational institutions, the social and political role of science. So it may, though scholarship is not yet able to bring it off. We are given essays—excellent ones in the case of the editor himself and his colleague at the *Ecole des Hautes Etudes*, Charles Morazé—on the historical environment that the 19th century provided for science, not only in western Europe but also in the cultures of Russia and of certain Asian and African countries. Apart from these occasional chapters, however, it cannot be said that the accounts of the sciences themselves, which necessarily form the substance of the volume, profit from the principle that the editor has laid down. These chapters have been written, for the most part, by professional scientists whose avocation is the recent past of their respective subjects.

One is grateful for the interest and devotion of the authors, but on the whole they do tend to write summaries rather than histories of their subjects. The mode of history is narrative, a story of how one event led to another, not just a précis of what the event was followed by an identification of the next one. That mild objection stated—and the historians do not exist who could better carry out the task—one must hasten to welcome this volume for all its many merits. If any topics are to be singled out for special appreciation, they will be Madame Tonnelat's account of theories of light, Maurice Daumas and Jean Jacques's description of chemical developments from the time of Dalton to the foundations of structural chemistry, and Pierre Costabel's discussion of the crisis of classical mechanics. If undue weakness is felt anywhere, it will be in the chapters on biology. The illustrations maintain the high standard that the preceding volumes have led us to expect, and the bibliography will permit a student to search further on any conceivable topic of the immense panorama of 19th-century science, which Taton and his colleagues have labored mightily, and with greater success than anyone heretofore, to spread generously before us.

CHARLES C. GILLISPIE
Department of History,
Princeton University

Natural Reservoir

Soil Animals. D. Keith McE. Kevan. Philosophical Library, New York, 1962. xv + 237 pp. Illus. Plates. $10.

Kevan has filled a gap in the biological literature with this comprehensive survey of soil fauna. No book in English is comparable in scope, and no book with which I am familiar provides so readable and well-balanced an introduction to the field.

After a brief survey of the development of soil biology, the characteristics of soil, and some special terminology, two chapters are devoted to the groups of animals that inhabit soils. Representative types are illustrated, and the biology of the various groups and of some familiar species is described. In the next chapter, the discussion of adaptations to life in the soil leads to a classification of soil fauna on ecological grounds. An important section reviews the techniques that have been used for collecting soil animals and points up the need for adapting methods to the particular group or habitat under study. The remainder of the book deals with the effects of physical and biological factors and human activities on the soil fauna, and the influence of the latter on soil structure and fertility.

The book is well printed and illustrated. At appropriate points and with minimum disturbance to chapter continuity, the author has managed to incorporate much specific information from the papers listed in the 14-page bibliography. I noted only a few errors during my first reading, but the figure of a *Tomocerus* (on page 59), which is labeled "*Entomobrya*," suggests that there may be other errors in groups with which I am less familiar. The inclusion of references to several recent monographs on particular groups (for example, Paclt's *Biologie der primär flugellosen Insekten*) might have aided readers whose interests are primarily zoological.

The book is directed mainly to the