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.

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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.

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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

general reader who has some background in biology, and it admirably fulfills its purpose as an introduction to the biology of soil animals; but specialists concerned with any aspect of pedology will also find a great deal of interest here. Much of it should be of lasting value, although it will undoubtedly contribute to its own obsolescence by stimulating and directing research in soil zoology.

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Historical Mineralogy

On the External Characters of Minerals. A. G. Werner. Translated from German by Albert V. Carozzi. University of Illinois Press, Urbana, 1962. xxxi + 118 pp. $4.50.

This delightful little book should find a receptive audience among mineralogists and historians of science, since it stands as a monument to the early attempts to make orderly arrangements of data from scattered observations. Its appearance in 1774 clarified an ill-defined discipline and excited wide scientific concern. Of especial interest are the semantic writhings and circumlocutions required to describe, for example, such physical properties as color or cleavage, which, although recognized, were not understood.

The name of Werner is popularly associated with the ideas of Neptunism and continental drift, but his principal early interests and contributions lay in the field of descriptive mineralogy, where the impact of his ideas is still echoing. The subject matter of his text, which today would be termed the "physical characteristics of minerals," is limited in scope but thorough in treatment. He attempted, rather successfully, to define and to arrange the physical properties of minerals into an orderly scheme along the line of modern determinative tables in which only qualitative observations are required. Werner demonstrated a consistent antipathy to the use of quantitative measurements, by disregarding mineral chemistry although this art was relatively advanced at Leipzig, by his unconcern with crystallography which he considered to be a kind of applied mathematics, and by his attitude towards the determination of specific gravity which required "much time in the preparation of such experiments, not to mention other difficulties."

This translation is taken from Werner's personal "desk" copy, which includes numerous changes made by Werner's own hand, apparently in anticipation of another edition. Carozzi has done a masterful job of incorporating this material, together with appropriate explanatory notes, into a very readable whole. He has also included an extensive and well-documented introduction in which he discusses the history of the book in its various early translations and brings Werner's mineralogical contributions into proper relation with the ideas of the time.

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New Books

General

American Credos. Stuart Chase. Harper, New York, 1962. 217 pp. $3.95.

Diseases of Turfgrasses. Houston B. Couch. Reinhold, New York, 1962. 302 pp. Illus. Plates. $10.

English-Polish Technological Dictionary. S. Czerni and M. Skrzńska, Eds. Wydawnictwa Naukowo-Techniczne, Warsaw, Poland; Pergamon, New York, 1962. 450 pp. $10.

Essays on African Population. K. M. Barbour and R. M. Prothero, Eds. Praeger, New York, 1962. 346 pp. Illus. Maps. $7.50.

A Field Guide to Western Birds. Roger Tory Peterson. Houghton Mifflin, Boston, ed. 2, 1961. 392 pp. Plates. $4.95.

The First Nine Months of Life. Geraldine Lux Flanagan. Simon and Schuster, New York, 1962. 95 pp. Illus. $3.95.

Flora of the British Isles. A. R. Clapham, T. G. Tutin, and E. F. Warburg. Cambridge Univ. Press, New York, ed. 2, 1962. 1317 pp. Illus. $13.50.

High School Social Studies Perspectives. Erling M. Hunt *et al.* Houghton Mifflin, Boston, 1962. 353 pp. Maps. Paper, $3.75. Thirteen contributed papers that deal with the social studies and their objectives and curriculums and with the critical areas of the world today. The book is intended for use in institutes and workshops for teachers as well as for use in courses offered in teacher-training institutions.

History of Science. An annual review of literature, research, and teaching. vol. 1, *1962*. A. C. Crombie and M. A. Hoskin, Eds. Heffer, Cambridge, England, 1962. 140 pp. 30s.

How to Review Advanced Algebra. Howard Eisner. Youth Education Systems, Larchmont, N.Y., 1961. 141 pp. Paper, $1.50.

Intermediate Algebra Review. Stanley I. Cohen. Youth Education Systems, Larchmont, N.Y., 1960. 144 pp. Illus. Paper, $1.50.

Life Beyond Our Planet. A scientific look at other worlds in space. Dan Q. Posin. McGraw-Hill, New York, 1962. 129 pp. Illus. $3.25.

Medical Abbreviations. A cross reference dictionary. Special Studies Committee of the Michigan Occupational Therapy Association. The Association, Ann Arbor, 1961. 247 pp. Paper, $2.

The National Aeronautics and Space Act. A study of the development of public policy. Alison Griffith. Public Affairs Press, Washington, D.C., 1962. 126 pp. $3.25.

Of Time, Work, and Leisure. Sebastian de Grazia. Twentieth Century Fund, New York, 1962. 570 pp. $6.

Problems in High Speed Printing. The influence of printing speed and pressure on print quality. Proceedings of the Sixth International Conference of Printing Research, held at Elsinore, Denmark, 1961. W. H. Banks, Ed. Pergamon, New York, 1962. 300 pp. (23 contributed papers). Illus. $15.

Project Plowshare. The development of the peaceful uses of nuclear explosions. Ralph Sanders. Public Affairs Press, Washington, D.C., 1962. 216 pp. $4.50.

Science and the Humanities. Moody E. Prior. Northwestern Univ. Press, Evanston, Ill., 1962. 136 pp. $3.50.

Scientific Explanation, Space, and Time. vol. 3, *Minnesota Studies in the Philosophy of Science*. Herbert Feigl and Grover Maxwell, Eds. Univ. of Minnesota Press, Minneapolis, 1962. 643 pp. $8.50.

The State Universities and Democracy. Allan Nevins. Univ. of Illinois Press, Urbana, 1962. 180 pp. $2.95.

Subantarctic Campbell Island. *Proceedings*, No. 10, Denver Museum of Natural History. Alfred M. Bailey and J. H. Sorensen. The Museum, Denver, Colo., 1962. 305 pp. Illus. $7.

Unpublished Scientific Papers of Isaac Newton. A selection from the Portsmouth Collection in the University Library, Cambridge. Edited and translated from the Latin by A. Rupert Hall and Marie Boas Hall. Harper, New York, 1962. 437 pp. Illus. Plates. $11.

Tenth Year Mathematics. Joseph A. Vellozzi. Youth Education Systems, Larchmont, N.Y., ed. 2, 1960. 252 pp. Illus. Paper, $1.50.

Thinking about the Unthinkable. Herman Kahn. Horizon Press, New York, 1962. 254 pp. $4.50.

The Weapons Acquisition Process. An economic analysis. Merton J. Peck and Frederic M. Scherer. Graduate School of Business Administration, Harvard Univ., Boston, 1962. 768 pp. Illus. $10.

Young People's Science Encyclopedia. vols. 1–19 (1896 pp. Illus.); vol. 20, *Parents' and Teachers' Guide: Index and Bibliography* (171 pp.). Edited by the Staff of National College of Education. W. Ray Rucker, Ed., Children's Press, Chicago, Ill., 1962. $59.95; schools and libraries, $44.95.

Yugoslavia and the New Communism. George W. Hoffman and Fred Warner Neal. Twentieth Century Fund, New York, 1962. 562 pp. Illus. $8.