to sample preparation (and) to expend more effort on guarding against the covert intrusion of bias'.

The over-all conclusion to be drawn from this excellent volume is that a wide range of statistically based monitoring systems are being evolved by mineral industry to improve the reliability of sampling. M. J. GALLAGHER

DOHR (G.). *Applied Geophysics: Introduction to Geophysical Prospecting.* Stuttgart (Ferdinald Enke Publ.), 1974. 272 pp., 125 figs. DM 16.80.

A concise textbook on applied geophysics with adequate descriptions of modern techniques in reflection seismic work is badly needed by students of applied geology and geophysics. This book aims to supply this need and devotes more than half its length to seismic methods, including most modern techniques. Many of the field examples are German, which is welcome. Unfortunately there are several serious defects. The translation is so awkward that not only is the book difficult to read but on occasion it is almost impossible to understand. The conventional vocabulary of applied geophysics is not always used, and anyone who learnt to use the terms given in this book would be unable to talk to his professional colleagues. Proof-reading has been poorly done. References are inadequate. Although the mature geophysicist may enjoy flipping through this book it cannot be recommended for use by students. It is described as Volume I in a series on The Geology of Petroleum. One hopes that the succeeding volumes will be translated more carefully. H. C. P.

LEVINSON (A. A.). *Introduction to Exploration Geochemistry.* Calgary (Appl. Publishing Ltd.), 1974. 612 pp., 198 figs. Price $25; Students $16 (purchasable post paid from Appl. Publ. Ltd., P.O. Box 39, Maywood, Illinois 60153, U.S.A.).

DR. LEVINSON can be congratulated in going a considerable way towards achieving the ambitious objectives outlined in his preface, of presenting an up-to-date review of value to students, geologists, those in allied fields such as geophysicists, and serious and experienced prospectors. All of these will find the book useful in different degree, either as a broad survey of the subject or as a reference on particular aspects of exploration geochemistry, for which it has the merits of referring in the text (albeit briefly) to the work of many recent authors in specialist fields and of including an extensive modern bibliography.

Probably the book is of most value to the exploration manager who has not specialized in geochemistry, and the predominance of Canadian examples of exploration practice and case histories is therefore fitting in view of the scale and variety of mineral exploration carried on in that country by the mining industry. This parochial bias does not detract from the value of the book to readers outside Canada, especially those working in high latitudes who can benefit from the sections on geochemical exploration in areas of permafrost, muskeg, bogs, and glacial deposits (the last two presenting problems currently demanding investigation in the U.K.).

The undergraduate reading for a geology or chemistry degree can be recommended to read selected chapters of the book to obtain perspective and to become acquainted with principles and practice. The introductory chapter is a most readable, succinct review, and the chapters on field methods, analytical methods, regional and detailed surveys, and statistical treatment of data (5, 6, 9, and 12 respectively) provide a good practical basis to the subject. In chapter 9 the author renders good service to the exploration man who has not specialized in chemistry by pointing up the limitations of analytical methods, although some of the suggested detection limits are optimistic. The review of statistical methods by Professor Richard B. McCannon (chapter 12) also sounds the necessary warnings to the type of geochemist (usually lacking in practical experience) who might be inclined to regard statistical analysis as a substitute for sound geological/geochemical deduction.

A somewhat disappointing feature of the book, and one inherent in an attempt to cater for different levels of expertise, is the paucity of conceptual or philosophical discussion by the author. Admittedly Dr. Levinson asserts that he is not writing for the specialist, but he later points to the fact that exploration geochemistry is almost exclusively a postgraduate subject, especially in North America. A greater basic knowledge by student readers could therefore have been assumed and the space thereby saved devoted to more advanced information or discussion. For example, 34 pages are largely given over to the description and classification of soils (a subject full of contention even among soil scientists) yet crystal field theory, series of elements, is not discussed in the chapter on the primary dispersion of metals. The chapter on the application of geochemistry to the search for crude oil and natural gas, prepared by Dr. Brian Hitchon, benefits from the acceptance that a brief review must assume basic knowledge by the reader. On the more practical side, fuller discussion of the pros and cons of utilizing mobile laboratories would have been welcomed by the exploration manager.

There is inadequate emphasis given to the necessity for monitoring sampling, subsampling, and analytical errors in the high-productivity systems that are a concomitant of exploration geochemistry. Much of the information is there (e.g. standardization takes a specific section, although the role of secondary standards is hardly discussed) but it is dispersed through the book. Yet control over the quality of both field and laboratory data is so important as to merit both repeated emphasis and the collation of relevant information and discussion. With the development of national geochemical data banks, which is happening in several countries including the U.K., this quality control takes on added importance.

Several useful tabulations are included, among them the pH of hydrolysis of some elements from dilute solutions, the relative mobilities of elements, the range of element abundance in soils, a comparison of analytical methods, and a table of available standards important in exploration geochemistry. Appendices include selected colorimetric methods and worked examples of the simpler statistical treatments.

In brief, this book can be confidently recommended to students and to professional but non-specialist readers and, as a useful reference source over a wide field, to the specialist geochemist.

D. OSTLE