

geologists do and how they go about their business. But there are also concise and authoritative discussions of the origins and distribution of mineral deposits, of the engineering and economic aspects of mining plus descriptions of the way exploration programmes are organised and prospects evaluated. The volume is a mine of information and a pleasure to read.

How appropriate it would be to measure equal enthusiasm for the latest edition of another chestnut of the 1940s — Bateman's *Economic Mineral Deposits* — the book so many of us studied before we read McKinstry. When Bateman died in 1971, he had already started revising the volume. Perhaps he had delayed so long because the task of a total revision was beyond him; possibly he realised that the format of the volume, which dated back to the teaching pattern of his mentor, J.D. Irving, had become too cumbersome. Whatever the reason, when he did realise the task was beyond him, he asked his friend and protégé M.L. Jensen, formerly at Yale, now at the University of Utah, to complete the task. It was, in reality, a request to fit an old but successful format to a very different and rapidly growing field.

The experiment has not been entirely successful. The earlier editions were successful because they were a mass of reliable and carefully checked observations. When complex ideas were included (rarely) they were carefully explained. The present edition has the same broad coverage, the same mass of data and observations (some unchanged from earlier editions), but it is no longer reliable. Mistakes appear on many pages, especially where new material has been added. Many of these errors are minor to be sure, but they are, nevertheless, misleading and greatly reduce the value of the book for the beginning student. For example, the caption for Fig. 15-2 (a *P-T* diagram for the polymorphs of Al_2SiO_5) mentions "phase boundaries indicated by short dashes" as being not experimentally determined, and "longer dashes" being an extrapolation of the kyanite-sillimanite curve. But all boundaries shown are solid lines and in addition the reference used (Morey, 1964) is hardly the most recent or most authoritative. Even if mistakes are corrected in later printings though, the book introduces so many ideas, concepts and ways of plotting data without adequate explanation, that it is no longer the easily accessible volume that earlier editions were. The volume can probably be used as a class text (and presumably will be, because it has a broader coverage of topics than any other English language introductory text), but it will require very careful checking by the instructor and a lot of back-up information. □

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Instrumental analysis

J.F. Coetzee

Instrumental Analysis. By Henry H. Bauer, Gary D. Christian and James E. O'Reilly. Pp.832. (Allyn and Bacon: Boston, Massachusetts, 1978.) \$23.95.

THE explosive growth of chemistry is making it increasingly difficult to decide which material should be included in the curriculum. It is also making it increasingly difficult for one or two authors to produce a uniformly authoritative textbook, particularly at the higher levels. This is certainly true of textbooks on instrumental analysis, because instrumentation is developing at an ever-increasing rate and this is occurring in a variety of essentially unrelated areas. The answer is to employ as many authors as are necessary to ensure authoritative treatment of all topics included. Any unnecessary proliferation of authors should be avoided, however, because it would create unnecessary editorial problems in achieving the reasonable consistency in approach, emphasis, style and other matters required for a pedagogically effective textbook. The compromise reached in the present text many not be ideal in that the 24 chapters have been contributed by 26 authors. Six chapters have two authors each, and only three chapters have been written by authors who have also contributed another chapter. Considering this plethora of authors, the undoubtedly odious editorial task has been performed well in most cases, however. Two introductory chapters, one to electrochemical methods and another to

spectroscopic methods, contribute significantly to the effectiveness of the text; a third, on separation theory, would have been a useful addition.

The balance of topics included in a textbook such as this must reflect to some extent the personal bias of the editors, but this reviewer finds it entirely reasonable. The three main subdivisions of instrumental analysis — spectroscopic, electrochemical and separation methods — are treated in approximately 350, 140 and 110 pages, respectively. Other topics make up the remaining 200 pages; among these are particularly useful chapters on computers and automation. An additional chapter, dealing with a critical comparison of trace analysis techniques, would have been welcome. The emphasis throughout is on instrumental methods of quantitative analysis, rather than on electronics and instrument design. No laboratory exercises are included. The rationale for these editorial decision to make the theoretical background of each method "as brief and qualitative as possible consistent with clarity and accuracy," but instructors who wish to strengthen these parts of the text can easily do so. An adequate number of questions and problems are included with the majority of chapters, but future editions of the text would benefit from the inclusion of a few more truly challenging problems and, of course, correction of some errors in the answers provided.

In summary, this text has major strengths and only comparatively minor weaknesses. It represents a new and basically sound departure in producing a textbook on instrumental methods of analysis, and it should be on the short list of anyone considering such a text. □

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General chemistry

Jerry A. Bell

Chemistry: An Introduction. Second edition. By Sydney B. Newell. Pp.563. (Little, Brown and Co.: Boston, 1980.) \$15.95. *Problem Exercises for General Chemistry.* By G.G. Long and F.C. Hentz Jr. Pp.364. (Wiley: New York, 1978.) \$9.80.

THIS is an outstanding, short text that fulfills the author's purpose, "to provide beginning students and their instructors with a comprehensive, understandable, and motivating introduction to chemistry."

The book begins with a simple, descriptive picture of the atom, to make the four succeeding chapters on stoichiometry,

naming and equations, comprehensible. It goes on to atomic structure, periodicity and chemical bonding in more detail as the background for material on states of matter and chemical change (solutions, equilibria, electrochemistry and rates) as well as brief introductions to nuclear, organic and biochemistry.

Although mathematics is used throughout, the text is suitable for students that have difficulty with quantitative reasoning; most concepts are introduced by homely and timely examples that involve relatively little mathematics and jargon, there are exceptionally clear appendices on working with numbers and units, and all examples are worked out in