

The only reservation one might have concerns the breadth of coverage: some might feel that the title implies a broader treatment than the subject actually receives in the book. For example, one will search in vain between its covers for any discussion of physical properties such as conductivity or ferroelectricity, or for any mention of organic crystallography, and this is perhaps a little disappointing in view of the emphasis in the preface on the interdisciplinary nature of crystallography.

The coverage is indeed implied both by the fact that the book forms part of an Intermediate Geology Series, and by the author's own background. Should anyone remark that it ought not to be necessary to know the author to guess the coverage of his book, one can only reply that this is in fact the way that most of us select our reading matter in the wider sense (e.g. novels). Knowing the author, neither the topics covered nor the masterly treatment of them should be in the least surprising. For a thorough grounding in classical mineralogical crystallography, this book is to be heartily recommended.

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**Preparation and analysis of protein crystals.** By A. MCPHERSON. Pp. xi + 371. Chichester: John Wiley, 1982. Price £39.00.

Crystallographers and biochemists have traditionally viewed each other with a mixture of respect and suspicion, not surprising, perhaps, considering the vastly different techniques involved in the production of pure crystallizable material and in the determination of a three-dimensional crystal structure. The author sets out to enlighten both parties by describing the principles and methodology of both protein purification and protein crystallography in the conviction that either partner ought to be able to initiate a structure analysis. Thus the book is essentially divided into two sections, pivoting about a long chapter on the crucial step of crystallization, a speciality shrouded in mystery but one in which the author has achieved considerable success.

The first three chapters summarize the major methods encountered in protein purification and analysis together with some useful appendices/recipes, followed by a discussion of sources of heterogeneity. By necessity the methods are only briefly discussed but are generally well referenced. The text is liberally, and at times indiscriminately, sprinkled with diagrams, tables and photographs, many of which have been

reproduced from manufacturers' publications which themselves are freely obtainable.

In the chapter on crystallization (77 pages) McPherson concedes that empirical rules and experience have to substitute for theory, and that crystal growing is akin to gold prospecting. As an experienced prospector himself he offers a great deal of useful practical information culminating in an extensive appendix of successful crystallization procedures for proteins, transfer RNA's and viruses. This chapter does, however, give the impression of being assembled a little carelessly. Some of the subheadings under *Conditions at supersaturation* belong elsewhere and others repeat information given under *Means for attaining supersaturation*. No overall scheme emerges and little comfort is offered to the person with only a few milligrams of precious material at his disposal.

The latter half of the book begins with a helpful comparison of macromolecular and small-molecular-weight crystals together with a succinct discussion of crystal symmetry. Contrary to the outline given in the Preface, which states that Chapter 6 covers principles of diffraction, the next chapter actually deals with isomorphous heavy-atom derivatives. This seems a curious sequence as structure factors and phases are mentioned without any prior treatment of diffraction theory. The anticipated sections on photographic analysis, data collection, methods for structure determination and interpretation of results ensue, concluding with a short chapter on electron microscopy of micro-crystals. Again the emphasis is on principles and not details (though further discussion of the electron density equation would be of considerable help to the non-crystallographer) and the reader is advised to consult other publications, particularly *Protein Crystallography* by Blundell & Johnson for more rigorous treatment. Some minor irritations include a discussion of non-crystallographic symmetry under the inappropriate heading of *Estimations of quality*, and an invitation to identify the symmetry in nine diffraction patterns which for clarity ought to have been twice the size.

This book is primarily intended as a concise guide to techniques encountered during a protein crystal structure investigation. To this end it is quite successful despite the organizational flaws. With a few exceptions the book is comprehensively referenced, mostly free of typographical errors but the quality of photographic figures is frequently disappointing. Overall the strength of this book is the sound, practical advice and instruction offered by an obvious enthusiast who writes in a relaxed and lucid style.

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