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Book Reviews

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Book reviews

Specialist Periodical Reports—Nuclear Magnetic Resonance, Vol. 12. Edited by G. A. WEBB. (London: The Royal Society of Chemistry, Burlington House, 1983.) [Pp. 338.] £68.00; \$122.00. ISBN 0 85186 352 3.

This latest volume in a well-established series covers the literature from June 1981 to May 1982. Its twelve chapters review ten subjects which appear annually and two which appear biennially. The latter are the N.M.R. of paramagnetic systems (K. G. Orrell) and the N.M.R. of liquid crystals and micellar solutions (O. Söderman, B. Lindman and P. Stilbs). The former are theoretical and physical aspects of nuclear shielding (C. J. Jameson), applications of nuclear shielding (G. E. Hawkes), theoretical aspects of nuclear spin-spin coupling (J. Kowalewski), applications of spin-spin coupling (D. F. Ewing), nuclear spin relaxation in fluids (A. Kratochwill), solid state N.M.R. (G. R. Hays), multiple resonance (W. McFarlane and D. S. Rycroft), natural macromolecules (D. B. Davies), synthetic macromolecules (J. R. Ebdon) and conformational analysis (F. G. Riddell). The increase in price is pleasingly small—just £1.00. This contrasts with the £11.00 increase which the purchasers of Vol. 11 had to accept.

A very helpful feature of the series is the list of N.M.R. books and reviews published during the review period. In Vol. 11 the list occupies 27 pages but in the present volume only 17 are used. The largest reduction comes in the section entitled 'Edited Books and Symposia'. This could reflect the fact that N.M.R. spectroscopists spend more of their time nowadays preparing research proposals and have less time to devote to other writing. It could also reflect a lessening of zeal on the part of the editor. Some regular users of the series may regret the continued absence of the alphabetical list of quoted authors which appeared in each of the first ten volumes.

The recent division of each of the shielding and spin-spin coupling reports into separate chapters covering theoretical and physical aspects and applications has the advantage of matching the differing interests and expertise of individual reporters. However, it does lead to a certain diffuseness in the applications chapters which include topics such as isotope, van der Waals and electric-field effects (clearly 'physical') and the straight reporting of shielding and spin-spin coupling measurements (clearly not 'applications'). Furthermore they, like the other chapters, are meant for the N.M.R. expert and the general reader should look elsewhere for an exhaustive survey. For example, the two applications chapters quote 792 references. This is to be compared with 2500 quoted by B. E. Mann in his report for SPR—Spectroscopic Properties of Inorganic and Organometallic compounds, Vol. 15, which covers roughly the same review period but still only a limited portion of the literature.

None of this is meant to suggest, of course, that this series is anything but invaluable to the specialist in N.M.R. theory and practice. Apart from the individual references, the major advantage of this series for such a specialist is to bring to his attention significant new developments in areas close to his own. For this reviewer Vol. 12 discusses a range of interesting new developments including the IGLO method of chemical shift calculation introduced by Schindler and Kutzelnigg, the importance of relativistic contributions to chemical shifts and coupling constants, and the calculations of Lazzeretti and Zanasi which demonstrate the absence of ring currents in aromatic compounds, a result which supports Blustin's empirical approach.

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Molecular Dynamics. By M. W. EVANS, G. J. EVANS, W. J. COFFEY and P. GRIGOLINI. (New York: Wiley, 1982.) [Pp. xxvi + 866.] £95.00. ISBN 0471 05977 3.

This book is both long and expensive. It aims to cover both theories and experimental observations of molecular motion in liquids, glasses and liquid crystals. The emphasis is on those aspects of molecular motion that affect various forms of spectroscopy, so that reorientation is

treated at greater length than is translation. The theoretical chapters include a detailed discussion of diffusion equations and their solution and a good introduction to Mori theory. Experimentally, low-frequency methods are prominent, but the full range of relevant spectroscopies is included. There are useful comparisons of data with both theoretical models and computer simulations.

Who is this book for? The authors suggest that it will be a library manual and hope that teachers and undergraduates will find that it provides an introduction to the active research in this area. To be a useful work of reference the index must lead one to the right part of the book, which must be reasonably succinct and self-contained. One learns most easily from a book that is readable and comprehensible. While these aims are not necessarily incompatible, they are difficult to reconcile. Reading some sections in order to learn more I found that they tended to be somewhat repetitive and not always very clear. To test the book as a work of reference I tried various topics, such as dielectric friction, J diffusion and neutron diffraction, with mixed results. J diffusion tackled via the index was particularly unhelpful. The page number given was incorrect, but the previous page mentions J diffusion and refers us to Chapter 2. I could not find anything about J diffusion in Chapter 2 at all. During further reading I found several references to J diffusion in the chapters on experimental spectra. There is a useful discussion on page 462 which is not indexed and two incorrect descriptions on pages 263 and 478. This may be an unfortunate example, but it illustrates the lack of care and coordination in this book.

Another problem in writing a book is to combine immediacy and longevity. Basic theory will not date rapidly, but the detailed experimental results in, for example, the chapter on far-infrared spectra will soon be superseded. Some of this material would have been better in a review, keeping only illustrative examples for the book. The final chapter on 'Intercomparison of Experimental Techniques' not only attempts to introduce an unnecessary addition to the English language, but also is particularly unsuitable for a book designed to last. Research proposals are, by their nature, ephemeral.

The strengths of this book lie in the areas that the authors are most familiar with. The weakness is that it is too long. The discipline of halving the length of the text could have resulted in a better clarified and coordinated book and reduced its price to at least within library budgets, possibly even to a level that research workers could afford.

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Specialist Periodical Reports—Electrochemistry, Vol. 8. Edited by D. PLETCHER. (London: Royal Society of Chemistry, 1983). £40.00. ISBN 0-85186-0672.

Derek Pletcher, the new SPR Senior Reporter for Electrochemistry, has wisely continued the policy of his predecessor in providing reports on selected topics rather than blanket coverage of the year's literature. Volume 8 contains five densely factual, extensively referenced reviews of the type characteristic of this series, which should be read by all electrochemists. The current volume lacks an index, a regrettable innovation which diminishes its archival value.

The review of flooded, porous static electrodes by Hampson and McNeil covers the long period 1966–1980. Developments in single pore and continuum models are outlined. Individual progress reports on seventeen porous electrode systems follow. Lead and lead dioxide still occupy a special position, but the new porous aluminium and lithium electrodes developed for non-aqueous batteries are also covered. Robinson's report on the 1980–1981 literature on electrode processes in molten salts covers both the traditional alkali-metal halide melts and the newer low-temperature aluminium halide melts. Novel applications include the electrowinning of silicon from fluoride melts and the processing of nuclear fuels.

Schiffrin's account of progress in oxygen electrochemistry from the end of 1979 until October 1981 is agreeably critical in tone. Despite the importance of oxygen reduction in metal corrosion, mechanisms on most materials (except platinum) are still not clearly established. There are interesting accounts of N_4 macrocycles as oxygen reduction electrocatalysts and of the reactions of the superoxide ion in non-aqueous media.

Pickett's report on the electrochemistry of transition-metal complexes (1980–1981) and Grimshaw and Pletcher's account of electrochemical organic syntheses (1976–1980) make good reading for inorganic and organic chemists as well as for electrochemists. Inorganic electrochemistry is fairly predictable though ligand-based reactions provide some surprises. Synthetic organic electrochemistry provides elegant pathways to some compounds not accessible by homogeneous oxidation or reduction. Even asymmetric induction is possible, by the use of a chiral electrolyte. Those of us who thought the Kolbe reaction was all there was to it will have our eyes opened.

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