

tence on understanding the underlying conditions of human evolution. It also creates difficulties for his argument: most notably, it leads him to treat sexual generalization (i.e. continuous female receptivity) as a given feature of the human species, to which other features must adapt, rather than as a phenomenon to be explained in itself.

The second problematic issue is related to the first. Wilson is fairer-minded than many in the capacities that he is willing to attribute to the non-human primates: but, perhaps because his argument emphasizes their relative specialization, he does not go far enough. To take again the example of sex and bonding, he not only doubts the existence of primate sex drives, he also implies that primates do not have multiple social relationships to sustain, as early

human beings, he postulates, did. There is surely no shortage of evidence to refute this suggestion: and if one concedes this point, then Wilson's explanation of why human capacities emerged when and where they did must lose much of its force.

With flaws such as this, Wilson's argument is far from being fully persuasive, even at the frankly speculative level which he intends. But he has taken more trouble than many to present a balanced view of early human societies and, despite its less than total success, his book deserves to be read by anyone with an interest in its theme.

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Electrochemistry, principles to practice

A.J. Nozik and R.J. Gale

Electrochemical Methods: Fundamentals and Applications. By A.J. Bard and L.R. Faulkner. Pp.718. ISBN hbk 0-471-05542-5; ISBN pbk 0-471-08753-X. (Wiley, 1981.) Hbk £21, \$39.85; pbk £11.75, \$21.70.

THE field of electrochemistry is currently undergoing a major renaissance, now having a central role in such exciting research areas as photoelectrochemistry, chemically modified electrodes, novel energy conversion systems and medical electronics. These fast-moving disciplines all involve a high degree of interaction between solid state physics, physical chemistry, photochemistry, surface science, engineering and electrochemistry. The appearance of *Electrochemical Methods*, which provides a clear and thorough account of all aspects of its subject, is thus timely.

The book is encyclopaedic in scope, covering both basic principles of electrochemistry and all the modern and relevant electrochemical and electroanalytical techniques; it is truly an exceptional resource for both practising electrochemists and those eager to learn about this frequently intimidating subject. In addition to the expected material on electrochemical principles and techniques, the book also has a nice, concise introductory chapter on spectroelectrochemistry and photoelectrochemistry; this includes material on optical, electron and ion spectrometry and related phenomena.

The audience for the book will be large since it will also serve as a textbook for senior undergraduate and beginning graduate students. It is the first comprehensive text to cover electroanalytical theory and techniques since Lingane's (*Electroanalytical Chemistry*; Interscience, 1958) and Delahay's (*New Instrumental Methods in Electrochemistry*; Interscience, 1954)

books of the 1950s. Since then, the subject has grown enormously and the range of modern techniques has necessitated a re-evaluation of the emphasis in applications. This has been successfully achieved in this text, and it should prove to be of considerable value in advanced courses in electroanalytical chemistry.

The omission of laboratory procedures is not especially troublesome since this area is complemented by Adams' *Electrochemistry at Solid Electrodes* (Dekker, 1969) and Sawyer and Roberts' *Experimental Electrochemistry for Chemistry* (Wiley, 1974). The absence of the more "classical" electrochemical topics could be a problem as most electroanalytical courses require at least a review of this material. It might also have been more appropriate to introduce concepts of the double-layer at an earlier stage than Chapter 12; Chapter 9 should be singled out as an excellent introduction to impedance concepts. The emphasis and presentation of the subject material are superlative throughout and the text could not be improved without considerable expansion in size and cost. An additional bonus is the problems, which provide useful exercises in the more important concepts and topics.

Very few errors have been noted; however, Problem 9.4 (p.368) does not tabulate the frequency as indicated, and the axes in Figure 14.8.2 (p.655) are labelled in an ambiguous (unconventional) manner.

This text has filled a definite need in present-day electroanalytical literature. We recommend it highly to students, teachers and research scientists.

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Ionic solutions

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Ionic Liquids. Edited by D. Inman and D.G. Lovering. Pp.450. ISBN 0-306-40412-5. (Plenum: 1981.) \$49.50, £31.19.

MOST conference volumes are conceived before the meeting itself takes place, and these days contributors are expected to arrive with camera-ready copy or place their expenses in jeopardy. The decision to publish the papers from this conference organized jointly by the Electrochemistry and Molten Salts Discussion Groups of the Chemical Society (now the Royal Society of Chemistry) apparently arose during the conference at St John's College, Oxford, in July 1978. The intention of the meeting organizers was to provide a greater exchange of ideas between aqueous solution chemists and molten salt chemists, thereby focusing attention on the somewhat neglected area of the properties of concentrated electrolyte solutions.

As with most conference volumes, the quality, approach and style of the 20 presentations are variable. Particularly valuable, however, are Enderby's account of the important neutron scattering first order difference method of determining radial distribution functions, and hence cation and anion hydration in concentrated solutions such as $\text{NiCl}_2/\text{D}_2\text{O}$, $\text{CaCl}_2/\text{D}_2\text{O}$, Duffy and Ingram's account of acid-base properties of concentrated aqueous solutions, and Adams and Hills's perceptive survey of computer simulation methods. The latter authors are somewhat scathing in their criticism of the preoccupation of solution chemists with continuum theories. In this connection, one of the contributors (Richter) quotes a 1957 paper of Fuoss and Onsager who thought that the problem of concentrated salt solutions should be approached from the fused salt side. Little progress has been made in those 24 years although recent approaches by Blander (Argonne), who was not a contributor, look promising.

Several papers highlight problems of technological interest — Dead Sea brines (Marcus), aluminium halide containing melts (Osteryoung) and sulphur and sulphide species in melts (Plichon) — and restore the balance towards practical aspects. Four papers deal with various aspects of water in melts: industrial and electrochemical (Lovering), concentration dependence of transport properties (Claes), solution chemistry (Coombes), and effect on purification (White).

The book is excellently produced with good, clear diagrams. It is to be recommended with the hope that it will, by placing the problems in perspective, encourage that progress which was the aim of the organizers.

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