

Electrochemistry The Interfacing Science

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Electrochemists, in common with lesser mortals, are not averse to exploring their roots and connections. In the kaleidoscopic panorama of science, the quasi-permanence of the electrochemical pattern — albeit in constantly transfigured form — attests to the central role of electrochemistry in the evolving story of human knowledge. Aside from mathematics and medicine, electrochemistry is, perhaps, one of the few branches of science that have continued to evolve and grow, at least for the past 2200 years, it is interesting to juxtapose here the ancient copper-iron battery of Mesopotamia, found in the ruins of a Parthian village, with the fuel cells of space craft and even with photoelectrochemical devices. The book under review presents a recent snapshot of some growing points in electrochemistry and constitutes the Proceedings of the Sixth Australian Electrochemistry Conference.

An aim of the Conference was to honour Allen J. Bard with the 1984 Bruno Breyer Medal, his splendid lecture on photoelectrochemistry constitutes the centrepiece of the book. It is fitting therefore to examine here, briefly, the status of modern electrochemistry and the role Allen J. Bard has played in it.

Modern electrochemistry is a vast field with origins in thermodynamics, kinetics, theoretical electrostatics, solid state physics and instrumentation. It spans problems in engineering, materials science, biology, metallurgy and, of course, chemistry and physics. At the most fundamental level, the conceptual framework of electrochemistry evolved along two lines: (i) electro-analytical — with focus on force-flux relationships, techniques, and instrumentation, and their mathematical treatments, and (ii) physical electrochemistry — with bias towards the chemical physics of the charge-transfer processes and a heavy interaction with the molecular level events in the interphase. The hiatus between these fields was first bridged to some extent by Delahay, who made a significant imprint on the field but later abandoned electrochemistry in favour of other seductions. The early promise of a few other electrochemists never really materialized to the extent one had hoped for. And then an exceptionally gifted young man — Allen J. Bard (Ph.D. 1958) — appeared on the scene. With lightning rapidity and stunning originality, he bridged the chasm in such a splendid manner that the united field became a most important area of research in physical science. Without any fear of contradiction, one may say that Allen J. Bard is one of the most prolific bards of Modern Electrochemistry.

Bard's lecture is followed in the book by the Conference Theme Lecture on "Electrochemistry. the Interfacing Science" by I M Ritchie. The author clearly succeeds in showing the range of interactions between electrochemistry and a number of other fields, although the flavour of this article is strongly that of corrosion, electrodeposition, batteries, and electroanalysis.

rather than that of solid-state physics, quantum mechanics, and molecular biology. This sets the stage for the rest of the papers on themes such as Electrode Surface Studies (Hubbard *et al* , Cooney and Mernagh), Semiconductor and Photoelectrochemistry (Miller, Lyons *et al* , McCann and Skyllas-Kazacos), Mineral Processing and Electrometallurgy (5 papers), Trace Electroanalysis (3 papers), Organic and Bioelectrochemistry (5 papers), Physical Electrochemistry (1 paper by Weaver *et al* on outer-sphere electrochemical reactions), Solid Electrolytes (Macdonald and Cook, Worrell and Liu, Badwal *et al*), and Electrochemical Power Sources (6 papers). Considering the particular interests of the readers of this Journal, it may be added that papers on power sources dealt with aspects of fuel cells, lead-acid, zinc-air and β -alumina batteries, properties of manganese dioxide, and mixed polyether-lithium-ion conductors. Among the bonus features of the book are the introductory remarks by T. Biegler on The Bruno Breyer Award, 1984.

The variety of the contents and the calibre of the authors are sure to present some pleasing features to most readers. However, it seems fair to warn the reader that this book is a reprint of *J Electroanal Chem Interfacial Electrochem* , Vol 168 (1984). Thus, those having access to this Journal may not feel the need to acquire this otherwise excellent book in the series from the Electrochemistry Division of the Royal Australian Chemical Institute.

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