

guide and discharge, and operation and maintenance procedures. The interrelation between theory and practice is again shown in the section on the metallurgy of continuous casting. A detailed account of the solidification process, the properties of steel at the solidification temperature, and solidification structure and segregation leads to discussion of the process aspects of castability and an extensive section on surface and internal defects and non-metallic inclusions. The section concludes with discussion of quality control and product properties. The final part of the book covers the automation of casting plants including subsections on data acquisition, procedures for process optimisation and coordination and diagnosis systems.

Scholarly comprehensive books such as these are expensive to produce and their high price means that they will be bought mainly by libraries of research institutes and large manufacturing companies. Steel-making remains a major industrial activity on a world-wide scale and these volumes show the enormous intellectual and practical activity which continues to go into its development.

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Chemistry of Iron

J. Silver (ed.) Chapman and Hall, London, 1993, xi + 306 pages £69.
ISBN 07514 00629

This book is one of a series dealing with the chemistry of individual elements or groups of elements. It aims to provide both an introduction to all aspects of iron chemistry for graduates in chemistry, biochemistry, physics, geology, materials science, metallurgy and biology, and at the same time a general reference for initial pointers into the scientific literature, outlining what has been achieved and identifying future targets. These aims are ambitious. To achieve them the contributors must understand the interdisciplinary areas at the periphery of chemistry and have first hand knowledge of the core subject they are seeking to introduce. Though it is difficult to make even judgments across the broad range of science covered in a book such as this, my impression is that some chapters are considerably more successful than others.

The first chapter, clearly and concisely written by J. Silver, introduces the principal themes of the book. It provides the information one finds in standard chemical texts and draws attention to the extraordinary wide

range of formal oxidation states, from $-2(d^{10})$ to $6(d^2)$ shown by iron compounds. The second chapter by F.J. Berry covers the industrial chemistry of iron. It is not easy to see who this is intended for: a metallurgy graduate would find it superficial and out of date, and a chemistry graduate wishing to learn about modern ferrous process metallurgy would not want to start here. The picture of a blast furnace is taken from a 1961 text (information about modern facilities is readily available in the scientific literature) and there should surely be a picture of a top-blown basic oxygen converter rather than one illustrating the Bessemer process which was phased out in the 1960s. Apart from a useful reference to corrosion there is little literature on the industrial chemistry of iron to follow up. The next chapter on the inorganic chemistry of iron by E. Sinn is also unsatisfactory. There is a reasonable summary of solid state chemistry, with a coda on spin equilibria, but otherwise little about the aqueous or coordination chemistry of iron. At one point the text lurches without explanation from unsophisticated crystal field theory (fine as an introduction for non-chemistry graduates) to a Hamiltonian involving angular momentum operators.

From then onwards the book improves. There is a long and well written chapter by P.L. Pauson on organo-iron compounds. This would indeed provide a good introduction to the field for graduates from a discipline other than chemistry or for third year chemistry undergraduates. The references are copious and recent. A short chapter on Mössbauer spectroscopy by B.W. Fitzsimmons also seems to be concise and well-conceived.

The remainder of the book is on the bioinorganic chemistry of iron and here the contributors have managed to provide accounts of interdisciplinary areas where biologists can learn from chemists and chemists from biologists. There are chapters on biological iron by G.J. Leigh (wrongly shown throughout the book as J.G. Leigh), G.R. Moore and M.T. Wilson, on models for iron biomolecules by A.K. Powell, and iron chelators of chemical significance by R.C. Hider and S. Singh. The reader is left in no doubt about the importance of iron in living organisms and about the excitement associated with the study of it. Among the topics discussed are the biochemical mechanisms and genetic controls for the uptake, transport and storage of iron, its role in oxygen transport and electron transfer and the use of chelating agents in the treatment of diseases associated with malfunctioning biochemical control mechanisms which allow iron-catalysed free radical generating reactions to occur.

The editor's aims are thus achieved with respect to organometallic chemistry and the chemistry and biochemistry of iron. In these areas the writing is authoritative and well researched. The reviews of areas where

chemistry borders on physics, geology, materials science and metallurgy do not match the high standard set by the rest of the book.

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Tellurium in Organic Synthesis

N. Petragnani, Academic Press, London 1994 £45.00
ISBN 0-12-552810-8

I awaited the review copy of "Tellurium in Organic Synthesis" with a keen sense of anticipation since it seemed to me that the book was timely, and that it might possibly encourage further research with this fascinating but unfashionable element. The book is one in the Academic Press series "Best Synthetic Methods", and is written by Nicola Petragnani who has contributed to the literature of organotellurium chemistry during four decades. Having now received and read the book I must confess to a slight feeling of disappointment.

Perhaps the major point of concern is that a superficially attractively produced book costing £45.00 should contain more proof reading errors than I have encountered in any other publication, be it book, article, or thesis. The actual text is relatively free of such errors but they abound in the equations and references. Thus in many equations products and reactants are identical; in some bonds are missing and in others numbers in formulae are not sub-scripted. Within the references the names of numerous authors are misspelt and initials are used as an alphabetic equivalent of random numbers. For example, D.L.J. Clive, an important contributor to the area, is listed as: D.L.Y., D.L.J., D.L., L.J., C.J., — a case of "will the real Professor Clive please stand up"! Spot checks on the numerical accuracy of the references were more reassuring, but one does not expect this level of carelessness in a book of this type.

The book is designed as a half-way house between the monograph and the laboratory manual. Thus, in

addition to surveys of the available organotellurium-based methodologies, each section contains practical details of individual syntheses. A one page introductory chapter is followed by a short chapter giving details of the preparation of inorganic tellurium reagents, the value of which is questionable. My own students will be surprised to be told that, in the solid state, TeCl_4 has the ionic structure $\text{TeCl}_3^+ \text{Cl}^-$, a "fact" supported by a Raman study of 1954! More useful is the next chapter detailing the syntheses of the major classes of organotellurium compounds. It could, with no loss of value, have been shorter, but perhaps those less familiar with the field than this reviewer might find it helpful to have such a review in situ. The treatment is uncritical, various routes to particular classes of compound being catalogued. This may, however, be wise, since, it is my own experience that different workers often develop particular preferences for one route over another, and that these preferences differ between the workers.

The meat of the book is encountered on page 88 with the long final chapter "Tellurium in Organic Synthesis". The chapter is sensibly sectioned and well indexed, and is generally user-friendly. Each section opens with a summary of the particular methodology, followed by a series of typical laboratory procedures that could be adapted to a particular worker's needs; the section ends with a listing of references. I was unaware of major omissions in coverage.

Although I have been critical of some aspects of the presentation of this book, it would be quite untrue to suggest that the volume is lacking in merit. I found it generated ideas as I was reading, which is always a good sign; also, unlike some new books, it does fill a genuine gap. Thus, if synthetic chemists can exercise patience when they encounter the numerous typographical errors, they may agree with me that it will prove to be one of the more useful recent additions to personal and institutional libraries.

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