Book reviews

Iron and steel in art: corrosion, colorants, conservation by D A Scott and G Eggert. *Archetype Publications, London, 2009, A4, xi+196pp, 86 figs, 67 colour plates, 20 tables, glossary, index, ISBN 978-1-904982-05-0, h/b, £55.00/$90.00.*

Anyone with an interest in iron and its history will be intrigued and impressed by this reference book, although it is aimed primarily towards conservation scientists, conservators and curators. The chapters divide into four subject areas: a background on iron and steel, the compounds of iron, deterioration and corrosion in different environments, and conservation.

Iron and its alloys and constituents are introduced in a comprehensive chapter on their compositions, occurrences, properties, and metallurgy, presenting clear explanations of the characteristics relevant to the main thrust of the book, such as the effects of thermal conservation treatments on properties and metallurgical microstructures. Although detailed descriptions of mining, extraction and alloy preparation are beyond its scope, wrought, cast and meteoric irons are all described in their historic contexts, as are technological developments such as damascening and pattern-welding, and surface finishes such as electroplating, browning and blueing.

The largest section of the book deals with the minerals and corrosion products of iron under the following seven chapters: iron oxides and hydroxides, iron carbonates, iron chlorides, iron sulphides and sulphates, iron phosphates, iron silicates, and iron carboxylates and cyanides. Compounds are discussed in terms of characteristics that are significant to the early uses, and structural and physical properties relevant to corrosion processes and conservation practice. The inclusion of Pourbaix diagrams for a wide range of corrosion products is particularly useful, as are diagrams showing phase transformations. Much of the data presented is otherwise spread across modern chemistry books and periodicals; only the oxides of iron have previously deserved a whole scholarly book to themselves, and then only in the context of modern industrial practice (Cornell and Schwertmann 2003). The authors have scoured primary sources and archaeological data for methods of synthesis of iron compounds and their early uses in different cultures, including pigments and dyes, jewellery, pottery slips, abrasives, photographic processes, medicinal preparations and many other uses.

The next three chapters discuss corrosion processes in the soil, the atmosphere, and in freshwater and marine environments. This leads to the final section of the book containing five chapters on conservation of artefacts from different environments. Key treatments that have been applied from the 19th century onwards are summarised and critically assessed, in particular the reasoning behind methods of stabilisation by interventive treatments and through storage regimes.

This comprehensive reference book is an essential tool for those involved in the corrosion chemistry of iron and its conservation, and for art historians and others working with pigments and dyes in particular. Presented with clarity and balance, it is a highly readable account that offers fascinating insights into the history of iron and its compounds.

Vanessa Fell

Reference

Cornell R M and Schwertmann U 2003, *The iron oxides: structure, properties, reactions, occurrence and uses*, 2nd edn (Weinheim).

The Wealden iron industry by J Hodgkinson. *The History Press, Stroud, 2008, 230x155mm, 160pp, 73 figs, index, ISBN 978 0 7524 4573 1, £15.99, p/b.*

Jeremy Hodgkinson's book is an excellent introduction to the Wealden iron industry, so important in Roman and in early-modern times, but which had gone from the landscape by 1830. Despite this long history on so many sites, little remains of the industry in standing buildings; there are no furnace stacks as in Shropshire or Cumbria. Documentary evidence, field walking to detect slag, and the furnace or hammer ponds (or their dry dams) and water works are the common remains, further revealed by archaeological excavation. Mr Hodgkinson provides a clear discussion of the basic processes of the industry. His text is especially illuminating on the varied quality of local ores, on the complexity of water operations at

the finery forges, and on the complications of running a furnace campaign when the molten pig-iron was to be cast into moulds for heavy guns.

He provides a good context for the operation of the Roman industry, making clear the benefits of the more convenient harbours and water courses which the Romans enjoyed over later iron workers. The scarcity, almost absence of Saxon iron working is a puzzle, and the medieval period is hard to reconstruct because of limited evidence, though there are thirty-six dated medieval sites and some good runs of documents. Incidentally, it is clear that a high proportion of Wealden bloomery sites have been dated compared to other areas of the country, though I found the figures of the dating of 'early' sites confusing.

It was with the introduction of indirect smelting and the blast furnace and finery forges (gazetteer provided) in the late 15th century that the Weald became a leading area in the development of the iron industry, and from 1543 gun casting was central to this importance. The founders tried to avoid over-dependence on crown gun contracts by developing lighter weapons which merchant ships would mount. Two views of the economic impact of the industry are offered. One is the suggestion that there may have been 6,000 people, with varying degrees of commitment, involved in the industry in 1574 when the population of the Weald can be estimated at 70,000. The other is a study of surviving houses of ironmasters.

Hodgkinson places the decline of the industry in the late 18th century at the door of technological change: coke-fuelled furnaces elsewhere in the country produced cheaper guns. Economic historians have wondered how far the capitalists in the industry were weakened earlier in the century by their virtual monopoly of crown gun-casting contracts.

This is a well produced, pleasantly illustrated, well informed and up-to-date account of the Wealden iron industry. It is easy to read and provides information on where to see the remains of the industry as well as a good reading list. It should certainly fulfil its aims of attracting less academic readers, while specialists will also value it.

C B Phillips

The story of Scotland's metals by R A A Devéria. *Capercailzie Publications, Aberfeldy, 2009, A5, 49pp, 26 colour plates, ISBN 978-0-9548612-7-8, p/b, £8.76 incl postage in UK. Available from the author, 36 Market Street, Aberfeldy PH15 2AN.*

Iron working in Merioneth from prehistory to the 18th century: from the Celts to the Quakers by Peter Crew. *Snowdonia National Park Authority/Plas Tan y Bwlch, Maentwrog (Merfyn Williams Memorial Lecture No 2), 2009, A5, 40pp, 15 figures, 8 pages of colour plates. ISBN 978-1-84527-260-9, p/b, £4.00.*

These two booklets are based on lectures delivered by the authors in an official capacity. They may be a poor substitute for hearing them 'in the flesh' but do make the lectures available to a wider audience, allowing us all to benefit from the accumulated knowledge and insights they contained.

Peter Crew's booklet describes his 30-year campaign of excavations at a series of ironworking sites between Ffestiniog and Dolgellau, in North Wales, summarising the results in a convenient and easily accessible format. Although the area was never a major producer of iron, the excellent preservation of the sites and the thorough way in which they were investigated, has given them considerable importance. The true nature of most of the sites was unsuspected until they were excavated. The outcome was that Bryn y Castell and Crawcwellt were identified as late prehistoric bloomeries; Llwyn Du as a medieval bloomery; Dol y Clochydd as a 16th-century bloomery converted at the end of the century into a short-lived blast furnace, and Dolgun an early 18th-century charcoal blast furnace. By good fortune, all but the two prehistoric sites had surviving documentary sources so the details of those working the sites, their dating and use, could be compared with the archaeological evidence. The illustrations include examples of Peter's ironworking experiments, but there is no substantial text to accompany them—perhaps we can look forward to a second booklet from him?

In contrast, Richard Devéria's booklet has a far wider range. He explains it grew out of his speech when installed as President of the Mining Institute of Scotland for the year 2007–08. It presents an overview of documentary and physical evidence for the discovery and production of Scottish non-ferrous metals: gold, silver, lead, copper, nickel and other minor metals, from the Middle Ages to the present; coal and iron are also mentioned. The long timespan and breadth of subject matter have necessarily restricted the detail given, but it is a handy introductory source.

Both booklets make good use of their numerous colour illustrations, and contain references to source material so readers can easily learn more. They are cheap and cheerful—in these cases a positive accolade.

Justine Bayley